Aquifer Exemptions at Uranium ISR Sites

Uranium Recovery Workshop
June 19, 2014
Denver, CO

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Presentation Outline

Key Principles of the Safe Drinking Water Act (SDWA) and the Underground Injection Control (UIC) Program

- Underground Sources of Drinking Water (USDW)
- UIC Program Primacy
- Well Classification

Aquifer Exemptions

- Basis for exemption
- Public Participation Process
- Delineation of Aquifer Exemption Boundary
- Aquifer Exemption Inventory

SDWA and USDWs

- ***SDWA is designed to prevent endangerment of underground drinking water sources (SDWA 1421(b))***

- ***Underground Source of Drinking Water*** (USDW)

  an aquifer or its portion:

  (a)(1) Which supplies any public water system; or

  (2) Which contains a sufficient quantity of ground water to supply a public water system; and

  (i) Currently supplies drinking water for human consumption; or

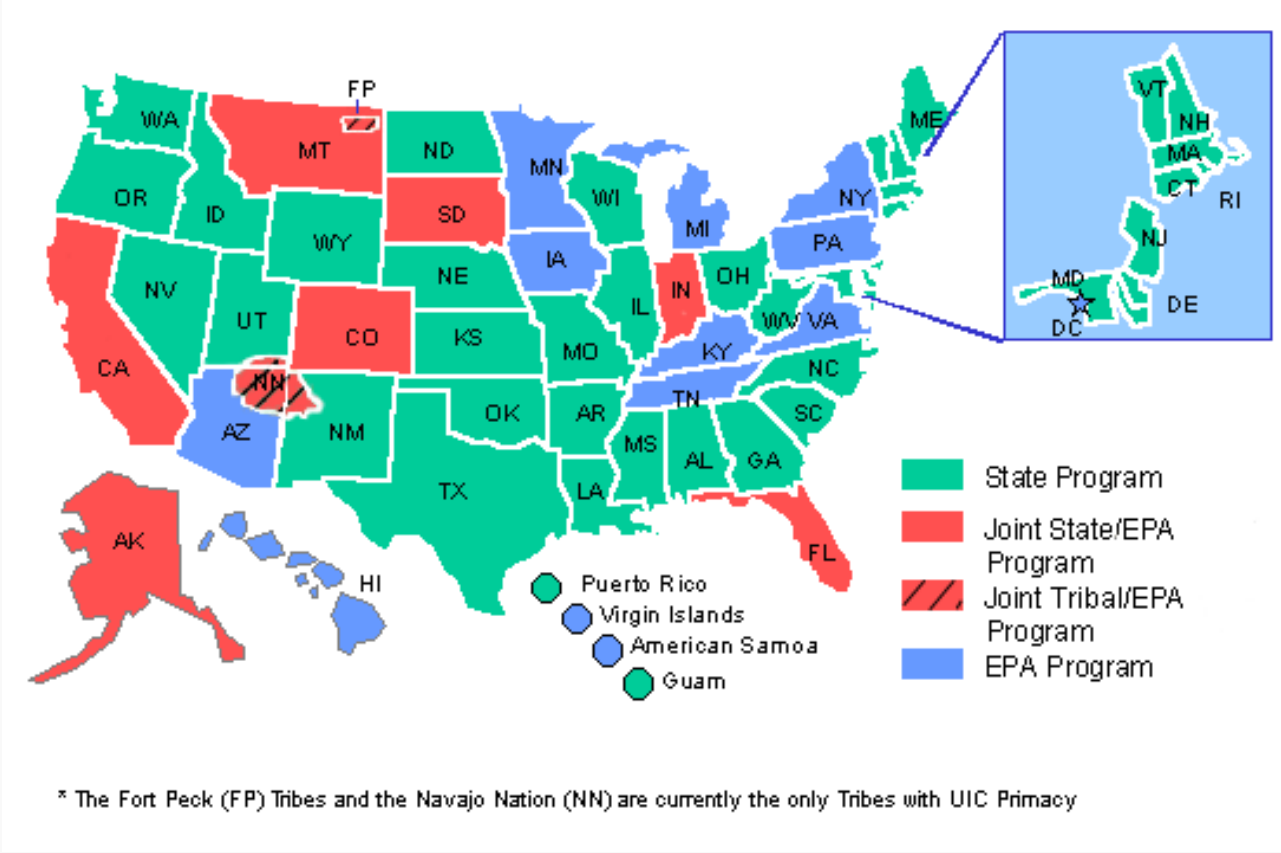
  (ii) Contains fewer than 10,000 mg/l total dissolved solids; and

  (b) ***Which is not an exempted aquifer.*** *(40CFR 144.3)*

- *UIC program protects all USDWs from injection activities*

UIC Program Primacy

33 States and Tribes have primary enforcement authority (primacy) for the UIC program; EPA and States share program implementation in 7 States; EPA directly implements the entire UIC Program in 10 states



* The Fort Peck (FP) Tribes and the Navajo Nation (NN) are currently the only Tribes with UIC Primacy

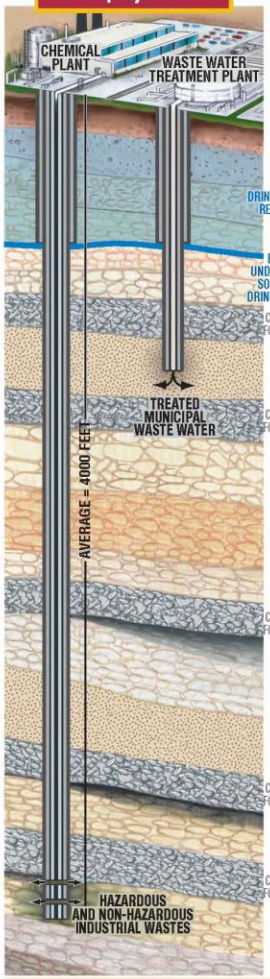
Safe Drinking Water Act

Underground Injection Control (UIC) Program

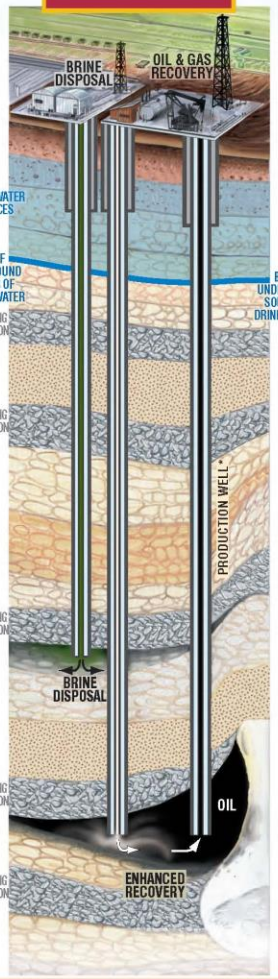
Protecting Public Health and Drinking Water Resources

EPA
United States Environmental Protection Agency | Office of Water (4606) Washington, DC 20460 | EPA 816-H-10-001 November 2010 http://water.epa.gov/drink

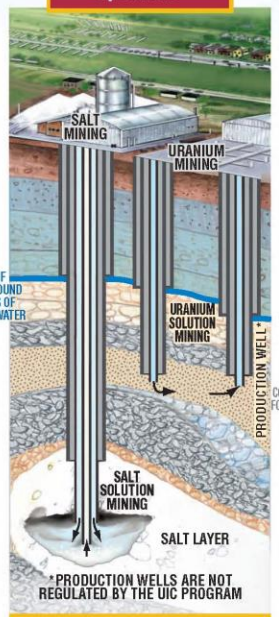
Class I wells- Isolate hazardous, industrial and municipal wastes through deep injection



Class II wells- Inject oil and gas production fluids

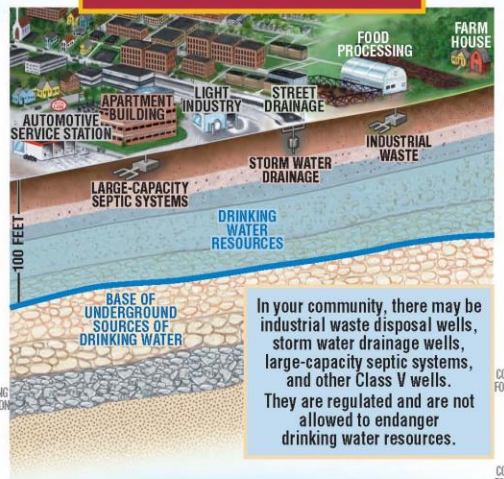


Class III wells- Minimize environmental impacts from solution mining operations



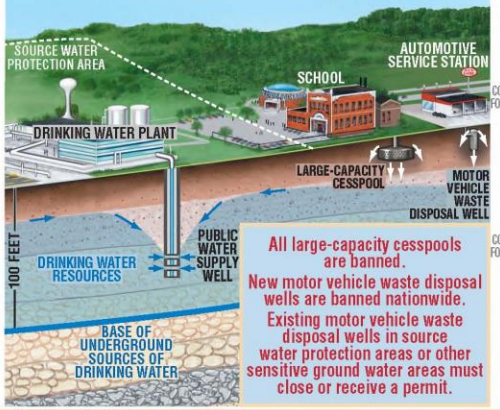
Class IV wells- Banned under all scenarios except as part of authorized hazardous waste cleanup authorities

Class V wells- Manage the shallow injection of all other fluids to prevent contamination of drinking water resources



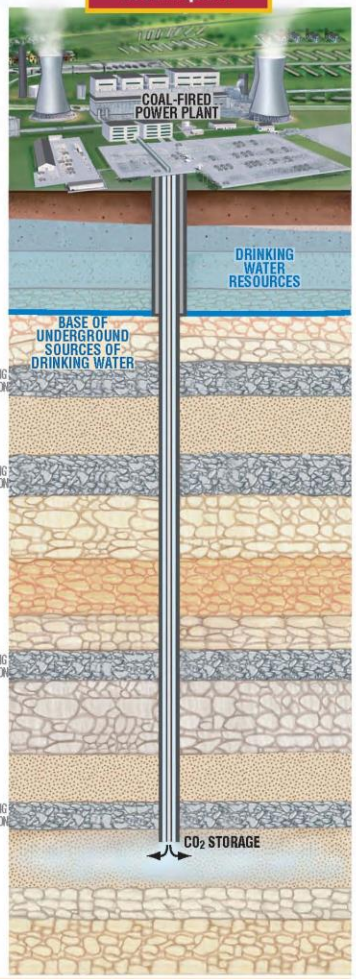
In your community, there may be industrial waste disposal wells, storm water drainage wells, large-capacity septic systems, and other Class V wells. They are regulated and are not allowed to endanger drinking water resources.

Class V wells continued



All large-capacity cesspools are banned.
New motor vehicle waste disposal wells are banned nationwide.
Existing motor vehicle waste disposal wells in source water protection areas or other sensitive ground water areas must close or receive a permit.

Class VI wells- Inject CO_2 for long-term storage to reduce emissions to atmosphere



Not drawn to scale

UIC Injection Wells at ISR Sites

- **Class III Uranium ISR Injection Wells**
- **Class I Radioactive Waste Disposal Wells**
  - Radioactive Waste means any waste which contains radioactive material in concentrations which exceed those listed in 10 CFR Part 20, Appendix B, Table II, Column 2
  - Injection is below the lowermost USDW
- **Class V Non-hazardous Waste Disposal Wells**
  - Is not Radioactive Waste
- **Other Class V Injection Wells**
  - Storm drainage, sanitary waste, etc.

Aquifer Exemptions

- ***Removes a USDW or a portion from protection under SDWA***
- ***Requires demonstrating the exempted aquifer isn't used as a drinking water source now, and not likely to be used as a future drinking water source***
- ***An aquifer exemption is a separate process from the permit process, but can be done concurrently, or after, the permit process***
- ***Final decision is by EPA***
  - Primacy UIC Program (State or Tribe) proposes an exemption, and EPA ***MAY*** approve the exemption

Basis for Approval (*40 CFR 146.4)*

a) Does not currently serve as a source of drinking water, and

b) It cannot now and will not in the future serve as a source of drinking water because:

(1) It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.

(2) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;

(3) it is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or

(4) it is located over a Class III well mining area subject to subsidence or catastrophic collapse;

OR...

Basis for Approval *(continued...)*

c) The total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system, or

(d) The areal extent of an aquifer exemption for a Class II enhanced oil recovery or enhanced gas recovery well may be expanded for the exclusive purpose of Class VI injection for geologic sequestration under § 144.7(d) of this chapter if it meets the following criteria:

(1) It does not currently serve as a source of drinking water; and

(2) The total dissolved solids content of the ground water is more than 3,000 mg/l and less than 10,000 mg/l; and

(3) It is not reasonably expected to supply a public water system.

Public Notice Requirements

- Public notice and opportunity for public comment and/or hearing is required. (40 CFR § 144.7)
- "Major" and "Minor" Aquifer Exemptions
  - "Major" require formal rulemaking and publication in the Federal Register (Substantial Program Revision)
    - Proposed exemptions of an aquifer containing water of less than 3,000 mg/l TDS which is: (a) related to any Class I well; or (b) not related to action on a permit, except in the case of enhanced recovery operations authorized by rule.
    - Where the effect of a proposed exemption that ordinarily would be considered minor appears particularly significant and far-reaching
  - All other exemptions are considered "Minor" (Non-substantial Program Revision) and States with primacy usually provide the public notice with the permit.

Public Notice Requirements Cont.

- EPA may seek public comment on its approval/disapproval decision even if the Agency treats it as a non-substantial program revision. Factors EPA might consider in determining whether to seek public comment: whether the public had an opportunity during the State's public participation process to comment on the data and analyses relevant to EPA's decision and/or the complexity of factual/technical issues.

Prohibition of fluid movement

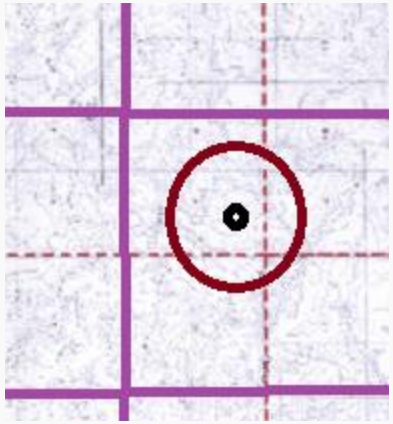
- **§ 144.12 Prohibition of movement of fluid into underground sources of drinking water.**

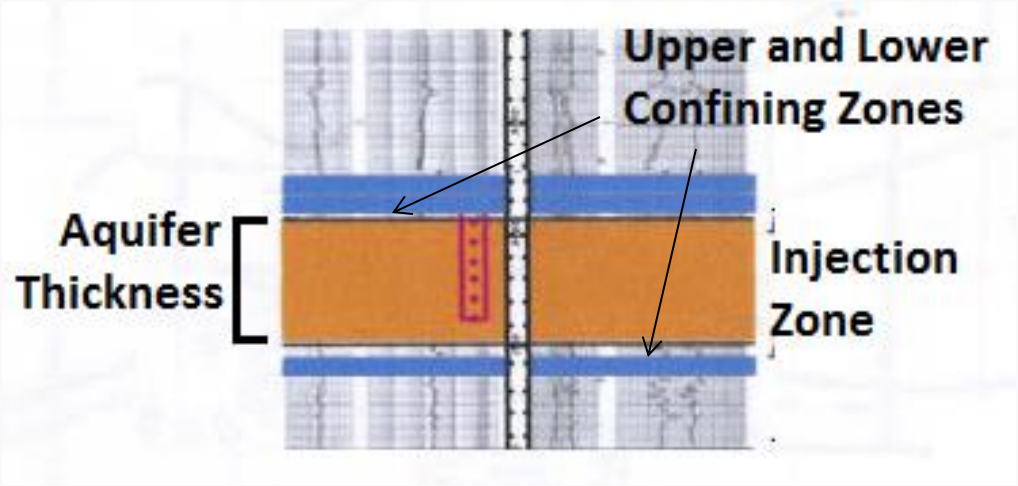
  (b) For Class I, II, III, and VI wells, if any water quality monitoring of an underground source of drinking water indicates the movement of any contaminant into the underground source of drinking water, except as authorized under part 146, the Director shall ***prescribe such additional requirements for construction, corrective action, operation, monitoring, or reporting (including closure of the injection well)*** as are necessary to prevent such movement. In the case of wells authorized by permit, these additional requirements shall be imposed by ***modifying the permit in accordance with § 144.39, or the permit may be terminated under § 144.40 if cause exists, or appropriate enforcement action may be taken if the permit has been violated.***

Aquifer Exemption Delineation

The aquifer exemption boundary is determined based on where the injected fluids are expected to flow.

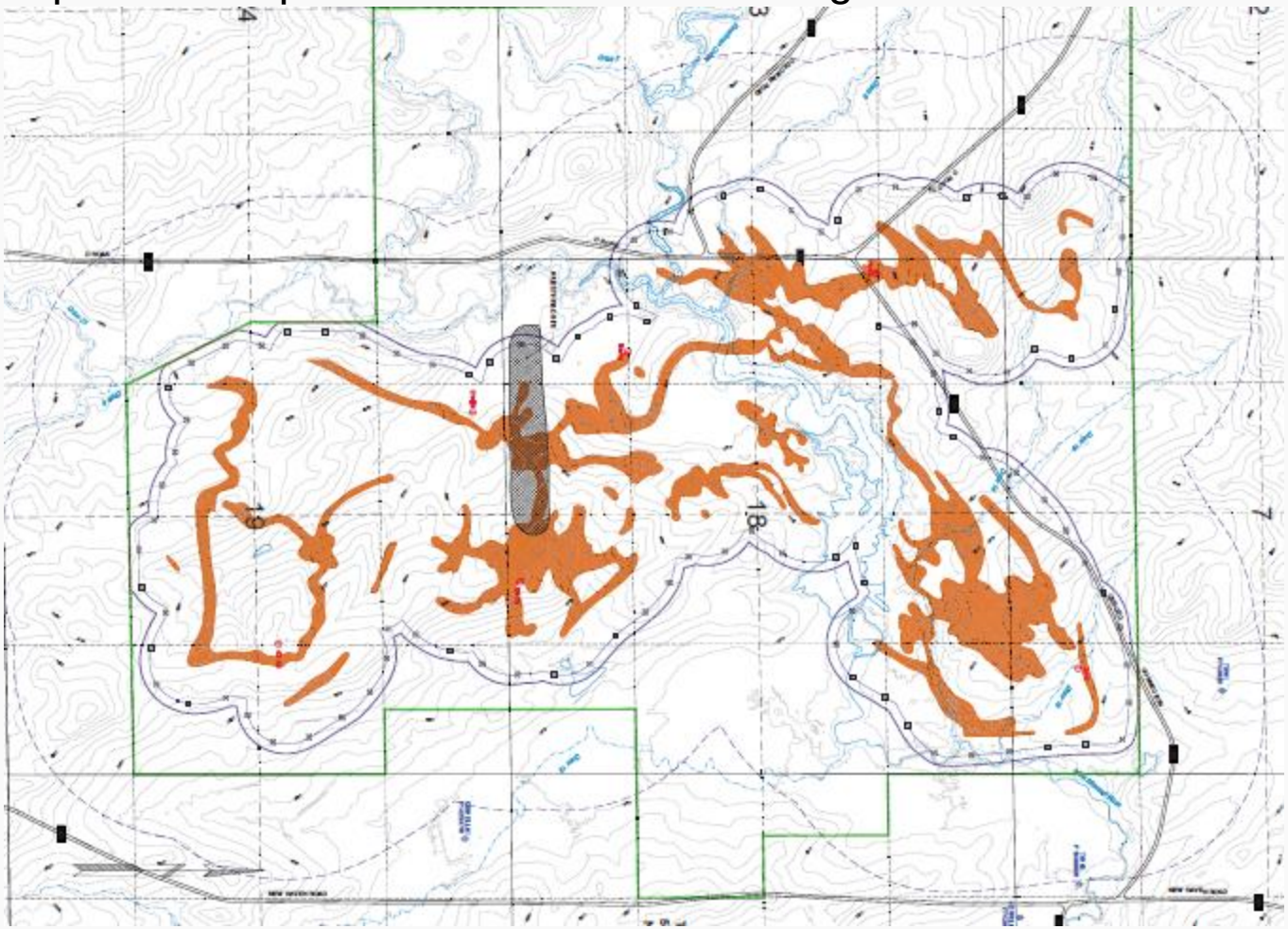
•Lateral Limits: In a single well, it is a minimum ¼ mile radial distance from the well bore. Distance is calculated based on the expected volume emplaced into the well.
•Vertical Limits: Vertical extent typically coincides with the injection zone





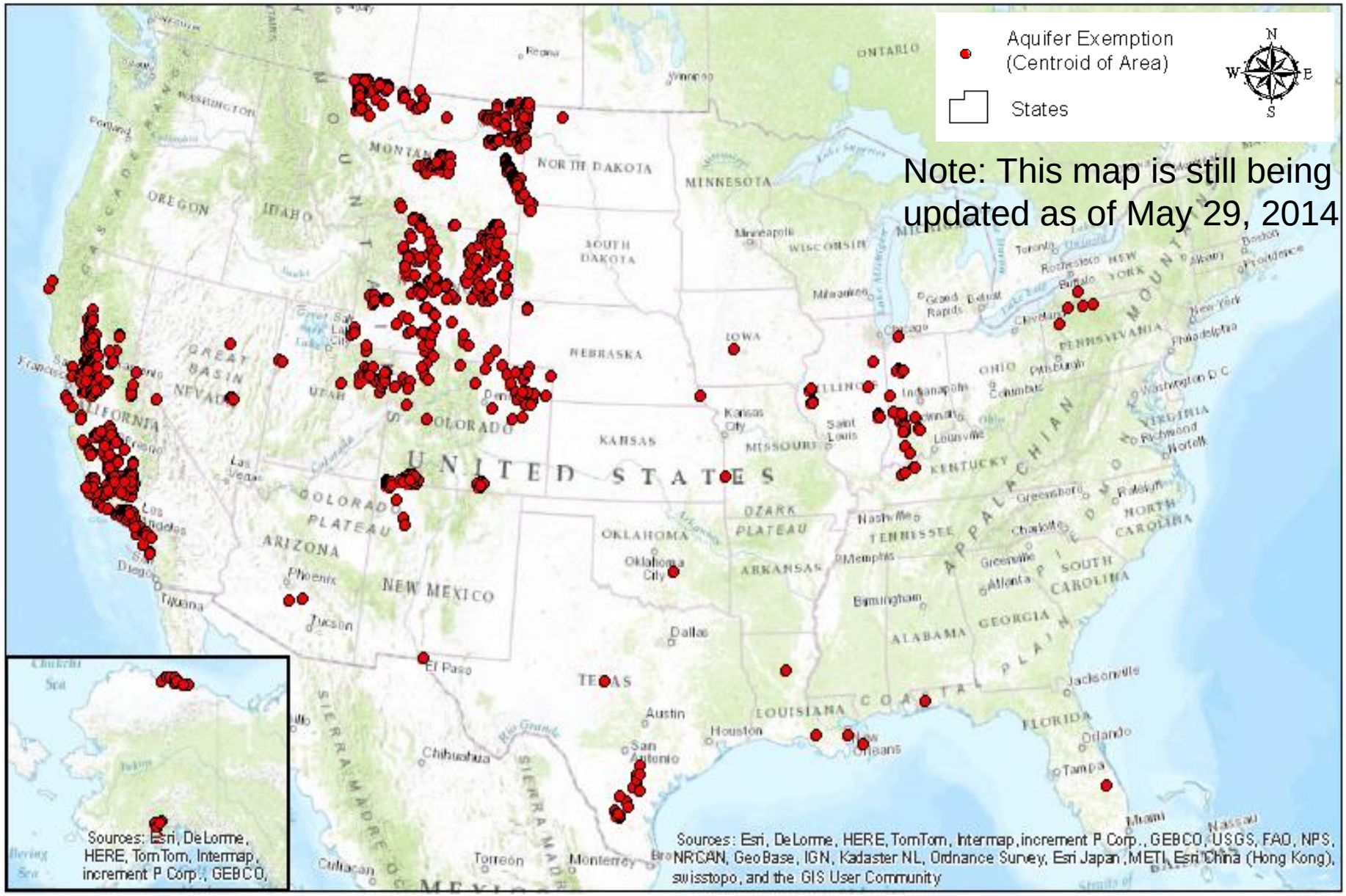
Aquifer Exemption Delineation

Aquifer Exemption for Class III ISR Mining Site



Aquifer Exemptions Inventory

Class	Aquifer Exemptions
Class I	140
Class II	4,614
	II D: 1,251
	II R: 3,037
	II Other: 326
Class III	120
Class V	2
Unknown	61
Total	4,937


Aquifer Exemption
(Centroid of Area)
States
N
W
E
S
Note: This map is still being updated as of May 29, 2014
UNITED STATES
Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community
Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO,

Thank you!

For more information:

http://water.epa.gov/type/groundwater/uic/index.cfm

http://www2.epa.gov/region8/underground-injection-control

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