**STATE OF NEW MEXICO**
**BEFORE THE WATER QUALITY CONTROL COMMISSION**

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| **IN THE MATTER OF PETITION TO AMEND )** | **WQCC 14-15 (R)** |
| **20.6.2.3000 NMAC AND 20.6.2.5000 NMAC )** | |
| **)** | |
| **Navajo Refining Company, L.L.C., )** | |
| **)** | |
| **Petitioner. )** | |

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DIRECT TESTIMONY OF

ROBERT F. VAN VOORHEES

ON BEHALF OF

NAVAJO REFINING COMPANY, L.L.C.

June 15, 2015

## Contents

**Exhibits**

A. *Curriculum Vitae* for Robert F. Van Voorhees

B. J. E. Clark, D. K. Bonura & R. F. Van Voorhees, "An Overview of Injection Well History in the United States of America" Underground Injection Science and Technology (C. F. Tsang & J. A. Apps, eds.) (2005) ("Overview History")

C. Van Voorhees, R., "Removed from the Environment," 18 Env. L. Forum 23 (2005)

D. EPA Poster "Safe Drinking Water Act Underground Injection Control (UIC) Program Protecting Public Health and Drinking Water Resources," (EPA 816-H-10-001) (November 2010) ("Protecting Public Health"

E. EPA, "UIC Inventory by State – 2011"

F. EPA, "Class I Underground Injection Control Program: Study of the Risks Associated with Class I Underground Injection Wells," xiii (EPA 816-R-01-007) (2001) ("Class I Study of the Risks")

G. EPA, "US EPA's Program to Regulate the Placement of Waste Water and other Fluids Underground," at 1, EPA 816-F-04-040 (June 2004) ("EPA Program to Regulate Waste Water")

H. Navajo Refining Company, Summary of Proposed Water Conservation Rule

I. Rish, W. A., Ijaz, T. and Long T. F. (1998). "A Probabilistic Risk Assessment of Class I Hazardous Waste Injection Wells" in Underground Injection Science and Technology (C.F. Tsang & J. A. Apps, eds.) (2005)

**1. Please state your name and business address.**

My name is Robert Van Voorhees. My business address is 1155 F Street, NW, Washington D.C. 20004.

**2. Please state your qualifications to provide this testimony.**

I hold a Bachelor of Arts Degree in Political Science from the George Washington University and a Juris Doctor Degree from the University of Virginia School of Law. I have practiced law in the area of environmental regulation for more than forty years. Since 1985, I have focused a substantial amount of time working in the area of underground injection control (UIC) regulation at both the state and federal levels in the United States. That experience has included the following:

- Representation of the Underground Injection Control Group of the American Chemistry Council (ACC) (formerly the Chemical Manufacturers Association (CMA)), a group of more than twenty companies operating Class I hazardous and nonhazardous injection wells in states located within the U.S. Environmental Protection Agency (EPA) Regions 4, 5, 6 and 7 from 1985 through 2005.

- Representation of the Underground Injection Technology Council (UITC) (the successor to the ACC Underground Injection Control Group) from 2006 through 2010 and service as Manager and then Executive Director of that group from 2011 to the present.

- Participation in the official regulatory negotiation conducted by EPA from 1986 through 1987 to develop proposed regulations for implementation of the Hazardous and Solid Waste Amendments (HSWA) of 1984, amending the Resource Conservation and Recovery Act (RCRA) to include among other things the land disposal restriction program requiring EPA to develop and promulgate regulations prohibiting the deep well injection of hazardous waste except by methods found to be protective of human health and the environment.

- Commenting on EPA's notice of proposed rulemaking for Hazardous Waste Disposal Injection Restrictions, 52 Fed. Reg. 32446 (August 27, 1987) on behalf of the CMA Underground Injection Control Group.

- Representing CMA and individual companies before the United States Court of Appeals for the District of Columbia Circuit by filing and intervening in the petitions for review of the final EPA rule promulgating the Hazardous Waste Disposal Injection Restrictions (HWDIR), 53 Fed. Reg. 28118 (July 26, 1988). The D.C. Circuit upheld EPA's issuance of the HWDIR in *Natural Resources Defense Council v. EPA*, 907 F.2d 1146 (D.C.Cir.1990).

- Representing CMA/ACC, UITC and individual companies in advocacy to ensure prompt and effective implementation and management of the no migration exemption demonstration approval process by the EPA Office of Ground Water and Drinking Water (OGWDW) and EPA Regions 4, 5, 6 and 7 during the period from 1988 to the present.

Over the years this work has included providing input to EPA for the development of guidance documents, including "Guidance for Case-by-Case Extension Petitions for Class I Hazardous Waste Injection Wells With Submitted No Migration Petitions: UIC Program Guidance #69," "Determination of 'Hazardous Levels' for 'No Migration' Demonstrations Pursuant to 40 CFR Section 148.20; Underground Injection Control Guidance No. 71," "Incorporation of UIC 'No Migration' Petition Conditions into Class I Hazardous Waste Injection Well Permits: Underground Injection Control Program Guidance No. 73," "Modification of Class I Hazardous Waste Injection Well 'No Migration' Exemptions -- Underground Injection Control Program Guidance No. 74," and "Underground Injection Control (UIC) Class I SNC Redefinition - UICP Guidance No. 81."

- Representing CMA and assisting others in obtaining enactment of the Land Disposal Program Flexibility Act of 1996, P. L. 104–119 (Mar. 26, 1996), 110 Stat. 830.
- Representing individual companies in obtaining new or revised Class I hazardous and nonhazardous injection well permits from a number of states, including Arkansas, Louisiana, Oklahoma, and Texas in EPA Region 6.
- Representing individual companies in obtaining new, modified or reissued approvals of Class I hazardous waste injection well no migration exemption demonstrations in EPA Regions 4, 5 and 6.
- Representing individual companies in conjunction with administrative, civil and criminal enforcement actions over the operation of Class I hazardous and nonhazardous injection wells in a number of different state and federal jurisdictions.
- Representing individual companies in the defense of civil actions in various courts seeking damages from the operation of Class I injection wells.

In 1996, I received the Ground Water Protection Council (GWPC) Award of Excellence in Ground Water Protection for outstanding contribution in the development of sound national regulations for underground injection control. GWPC is the organization of state ground water regulatory agencies which come together to mutually work toward the protection of the nation's ground water supplies. The purpose of the GWPC is to promote and ensure the use of best management practices and fair but effective laws regarding comprehensive ground water protection.

I have also written and presented extensively on issues related to Class I hazardous and nonhazardous injection wells. A list of my recent publications and presentations is included in my *curriculum vitae*, which is attached as **Exhibit A.**

**3. What is the history of the UIC well program?**

Injection of liquids into underground formations through wells was started by the petroleum industry. In the 1930s it was common practice to dispose of produced brine through injection wells. Since the early 1950s, injection wells have been used for fluids associated with industrial facilities. In the mid-1960s and 1970s, injection began to increase, growing at a rate of more than

20 new wells per year. In 1974, responding to concerns about underground injection practices, EPA issued a policy in which it stated that underground injection should only be conducted with strict control and clear demonstration that the wastes will not adversely affect useable groundwater supplies.[1/]

Enactment of the Safe Drinking Water Act (SDWA) in 1974 ratified EPA's underground injection policy position and required the Agency to promulgate minimum injection well requirements for state programs to prevent endangerment of underground sources of drinking water (USDWs).[2/] EPA and state agencies conducted detailed reviews of injection practices during the late 1970s which were incorporated into a final set of UIC regulations promulgated by EPA in 1980.[3/] With the 1980 regulations, a national standard was established protecting current and potential drinking water sources with less than 10,000 mg/l total dissolved solids (TDS) that could serve as a source of drinking water for a public water system. Minimum technical requirements for siting, construction, operation, testing, monitoring, and plugging and abandonment of injection wells were established in the UIC regulations.

## 4. What are the different classes of UIC wells?

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1/ J.E. Clark, D.K. Bonura & R.F. Van Voorhees, "An Overview of Injection Well History in the United States of America" Underground Injection Science and Technology (C.F. Tsang & J.A. Apps, eds.) (2005) ("Overview History") **[Exhibit B]**.

2/ The term "underground source of drinking water" and the acronym "USDW" are used throughout the EPA UIC regulations to identify the water resources required to be protected. The definition of "underground source of drinking water" is: "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 [TDS]; and

(b) Which is not an exempted aquifer."

40 C.F.R. §§144.3 and 146.3. As noted, there are provisions that allow ground water meeting the specifications of subpart (a) to be designated as "an exempted aquifer" that is not a USDW. *See* 40 C.F.R. §144.1(g) (explaining the definition of USDW and the provision for designation of exempted aquifers), §144.7 (the procedure for designating exempted aquifers) and § 146.4 (setting forth the criteria for exempted aquifers.

Under the New Mexico UIC regulations, the term for the water resources to be protected by the UIC program is "ground water that has a TDS concentration of 10,000 mg/l or less." NMAC §20.6.2.3109(c)(1). New Mexico also has a procedure for the designation of additional Class I well injection zones under NMAC §20.6.2.5103, but that designation provision is more stringent than the federal program because it is limited to ground water with "a concentration between 5,000 and 10,000 mg/l TDS." NMAC §20.6.2.5103.

To avoid confusion between the EPA and New Mexico provisions, I will use the term "protected ground water" to refer to both unless it is important to focus on the specific provision in a particular context.

3/ Van Voorhees, R., "Removed from the Environment," 18 Env. L. Forum 23 (2005) **[Exhibit C]**; Brasier, F.M., and Kobelski, B.J., "Injection of Industrial Wastes in the United States," in Deep Injection Disposal of Hazardous and Industrial Waste at 2-3 (ed. by J.A. Apps. and Chin-Fu Tsang) (1996).

EPA's original UIC Program created five classes of injection wells. EPA has since added a sixth class.[4/] The principal factor used to define most classes was the type of activity and general nature of the fluids associated with that activity, including: a) injection of hazardous, industrial, and municipal waste; b) injection related to the production of oil and gas; c) injection related to the recovery of minerals; and d) other injection related to activities where data are insufficient to evaluate the threat to ground water (where fluids are not hazardous, but may still pose a threat). A secondary factor used in classification was the location (depth) of the injection relative to protected ground waters.[5/]

Class I wells, for example, inject hazardous, nonhazardous industrial or municipal waste, or radioactive waste, below the lowermost formation containing a protected ground water within one quarter mile of the wellbore. 40 C.F.R. § 144.6(a). The definition of a hazardous waste is set forth in the RCRA regulations under 40 C.F.R. Part 261. A fluid may be hazardous if it exhibits one of four characteristics (corrosive, reactive, ignitable or toxic) or if it is a listed waste as defined in 40 C.F.R. Part 261, Subpart D. As of 2011, the Class I category consisted of about 678 active wells in the United States. This total included 561 nonhazardous Class I wells and 117 wells that inject hazardous wastes. EPA, "UIC Inventory by State – 2011" **[Exhibit E]**.

Class II injection wells are associated with disposal of fluids from oil and gas production and injection to enhance oil and gas production (secondary and tertiary recovery injection wells). The injected fluids are typically waste fluids produced from downhole in connection with primary production of oil and gas, fluids generated in the field in connection with oil and gas production (such as gas sweetening), or fluids used for enhanced recovery of oil or gas. 40 C.F.R. § 144.6(b). As of 2011, there were approximately 168,089 Class II wells in 33 states, including wells on Tribal Lands. **[Exhibit E]**.

Wells injecting fluids for mineral extraction are defined as Class III wells. This includes: solution mining of salts; in situ extraction of metals, such as uranium; and mining of sulfur by the Frasch process. 40 C.F.R. § 144.6(c). At present, most active Class III facilities are associated with the solution mining of uranium and salt.

If a well is injecting hazardous fluids into a protected ground water, it would be defined as Class IV and is prohibited by the regulations and subject to immediate closure. Class IV wells used in remedial cleanups at EPA or State approved Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and RCRA sites, however, are allowed as long as the final cleanup standards are protective of human health and the environment 40 C.F.R. § 144.6(d).

According to the regulatory definition (see 40 C.F.R. §§ 144.80(e) and 144.81), Class V wells are any injection wells that: 1) emplace fluids into the subsurface; and 2) do not meet the

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4/ All of the current classes are described and depicted on EPA's poster "Safe Drinking Water Act Underground Injection Control (UIC) Program Protecting Public Health and Drinking Water Resources," (EPA 816-H-10-001) (November 2010) ("Protecting Public Health ") **[Exhibit D]**.

5/ EPA, Technical Program Overview: Underground Injection Control Regulations 7, EPA 816-R-02-025 (2001).

definitions of Classes I through IV or Class VI. 40 C.F.R. § 144.6(e).This category is predominantly shallow injection wells but does include several types of deep injection wells. Specific types of Class V injection wells are described in 40 C.F.R. § 144.81.

In 2010 EPA created an additional Class VI for wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide. 40 C.F.R. § 144.6(f). *See* 75 Fed. Reg. 77287 (Dec. 10, 2010).

**5. What is the UIC Class I hazardous waste injection well program?**

By definition, Class I wells inject industrial or municipal wastewater beneath the lowermost formation containing "within one-quarter mile of the well bore" a protected groundwater. 40 C.F.R. § 144.6(a). Class I wells permitted to inject hazardous wastewater are referred to as hazardous wells; those that inject only nonhazardous wastewater are known as nonhazardous wells. Class I wells used for disposal of treated municipal sewage effluent are referred to as Class I municipal wells. 40 C.F.R. § 144.6(a)(3).

Many Class I wells inject wastewater associated with the chemical products, petroleum refining, and metal products industries. Injected wastewaters vary significantly based on the process from which they are derived. Some of the most common wastewaters are manufacturing process wastewater, mining wastes, municipal effluent, and cooling tower and air scrubber blowdown.

In 1984, Congress enacted the HSWA to RCRA, which banned the land disposal of hazardous waste, unless the hazardous waste is treated to meet specific standards or unless the EPA could determine that the disposal method would not adversely affect human health and the environment.[6/] In a 1985 Report to Congress on injection of hazardous waste, the EPA Office of Drinking Water stated that underground injection "was considered a method to isolate wastes (that could not be easily treated) from the accessible environment by placing them into deep formations where they would remain for geologic time."[7/] The report included an inventory of hazardous wells and also looked at hydrogeology, engineering, mechanical integrity tests, monitoring waste characteristics, and noncompliance incidents. Overview History 4 [**Exhibit B**].

From 1986 to 1988, State and Federal agencies, environmental groups, and industry representatives participated in a facilitated negotiated rulemaking process ("Reg-Neg") to develop consensus requirements to implement the land-ban provision of HSWA. Although the Reg-Neg group did not achieve complete consensus, EPA used what it learned through that process to strengthen the regulatory requirements for hazardous injection wells by establishing the no-migration demonstration requirements for Class I hazardous waste injection wells. The demonstration required to obtain approval for injection of hazardous waste into a Class I well is known as a no-migration exemption petition. Overview History 4 [**Exhibit B**].

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6/ Smith, R.E., "EPA Mission Research in Support of Hazardous Waste Injection 1986-1994," in *Deep Injection Disposal of Hazardous and Industrial Waste* 9 (ed. by J.A. Apps and Chin-Fu Tsang) (1996).

7/ EPA, "Report to Congress on Injection of Hazardous Waste" 3 (EPA 570/9-85-003) (1985).

As summarized by EPA, "[t]he 1988 UIC regulations ... offer additional protection by requiring operators of Class I hazardous wells to complete no-migration petitions to demonstrate that the hazardous constituents of their wastewater will not migrate from the injection zone for 10,000 years, or that characteristic hazardous wastewater will no longer be hazardous by the time it leaves the injection zone."[8/] EPA also stated: "After 10,000 years of containment constituents would either be immobilized or otherwise be at non-hazardous levels throughout the injection zone." 53 Fed. Reg. 28118, 28122 (July 26, 1988), An environmental group which had withdrawn from the Reg-Neg process in the final stages challenged the 1988 EPA UIC Hazardous Waste Disposal Injection Restrictions and Requirements. The U.S. Court of Appeals for the D.C. Circuit ruled in EPA's favor and upheld the 1988 regulations, leaving the No-Migration Exemption program for Class I hazardous waste injection wells in place. *Natural Resources Defense Council v. EPA*, 907 F.2d 1146 (D.C. Cir. 1990).

In addition to adding the no migration demonstration requirement to satisfy the HSWA requirements in 1988, EPA added a number of other requirements in a new subpart G to the 40 C.F.R. Part 146 regulations that must be met by Class I hazardous waste injection wells. These additional requirements increased the frequency of mechanical integrity tests from once every 5 years to once annually and required the use of radioactive tracer surveys in addition to the tests previously specified in 40 C.F.R. § 146.8, added specificity to the existing compatibility requirements, applied more specific siting requirements, expanded the minimum area of review from one-quarter mile to two miles, and listed additional methods for monitoring Class I hazardous waste injection activities. Subpart G also added operational controls, including: (i) automatic shutoff or alarm devices, (ii) controls on wells injecting fluid which could generate gas in the subsurface, (iii) limitations on the use of fluid seals, and (iv) a requirement that annulus pressures exceed injection pressures in most instances.

The design of Class I hazardous wells under the 1988 regulations is state-of-the-art. The wells are built with redundant containment systems and extensively monitored to prevent any loss of injected fluids. For environmental safety, Class I injection regulations require a well within a well — analogous to the double-hull arrangement on modern oil tankers. Regulations also require monitoring of injection pressure and the pressure of the protective fluid between the well casing and injection tube, which means that any leaks during injection would be immediately detected. Class I hazardous injection wells have alarm systems used to shut down injection operations should any loss of well integrity occur. This monitoring supplements the strict testing of construction integrity and mechanical operating integrity that wells must undergo before initial operation and periodically throughout the life of a well.

EPA concluded in the preamble of the 1988 Federal Register notice for the improved regulatory program mentioned earlier that, once the geologic receiving formation has stabilized following injection, there is little or no possibility that injected wastes will ever move vertically upward out of the injection zone. Class I industrial wells are also designed to inject industrial wastewater far below any potentially usable sources of drinking water.

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[8/] EPA, "Class I Underground Injection Control Program: Study of the Risks Associated with Class I Underground Injection Wells," xiii (EPA 816-R-01-007) (2001) ("Class I Study of the Risks") [**Exhibit F**].

## 6. What is the difference between a Class I hazardous and a Class I non-hazardous waste injection well?

Class I hazardous waste injection well operators must meet all of the regulatory requirements that apply to all Class I industrial wells and are then subject to a number of unique additional requirements, most of which were added in 1988. First, as described above, a Class I hazardous well operator must demonstrate that operation of the well qualifies for exemption from the RCRA land disposal restrictions that would otherwise ban the injection of hazardous waste into a Class I well – the so called "land ban." In addition to the no migration exemption demonstration, a number of other additional requirements must be met by Class I hazardous waste injection wells, as generally described below. *See* 40 C.F.R. Part 144, Subpart F and Part 146, subpart G.

### a. Siting Requirements

All Class I injection well applicants must inject into a formation that is below the lowermost formation containing, within one-quarter mile of the well, a protected ground water. To demonstrate this, operators are required to provide geologic studies of the injection and confining zones to show that:

- The receiving formations are sufficiently permeable, porous, homogeneous, and thick enough to receive the fluids at the proposed injection rate without requiring excessive pressure;
- Formations are large enough to prevent pressure buildup and ensure that injected fluid will not move out of the injection zone;
- There is an overlying low-permeability confining zone to prevent vertical migration of injection fluids;
- Injected fluids are compatible with well materials that will be contacted and with rock and fluid in the injection zone; and
- The area is geologically stable.

In addition to these requirements, Class I hazardous waste injection wells must provide additional structural studies to demonstrate that the injection and confining formations are free of vertically transmissive fissures or faults capable of allowing migration out of the injection zone and to demonstrate that there will be additional features, such as at least one sequence of permeable and less permeable strata that will provide an added layer of protection for protected groundwater. In addition to assessing geological stability, Class I hazardous waste injection well operators can be required to monitor for seismicity.

All Class I injection well operators are required to identify an area of review around the well that must have a minimum radius of one-quarter mile. For Class I hazardous wells, the area of review is a minimum of two miles and can be larger by calculation. Operators of all Class I wells must identify the location of all known wells within the injection well's area of review which penetrate the injection zone. The operator must develop and implement a corrective action plan to prevent movement of fluid into protected groundwater through any wells which are improperly sealed, completed, or abandoned.

### b. Construction Requirements

All Class I wells must have a multilayered design with approved engineering schematics and subsurface construction details to prevent fluids from entering protected ground waters. The wells must have at least two layers of concentric casing and cement with surface casing cemented from the surface to beneath the lowermost protected ground water. Class I hazardous wells must also have cement the length of the long string casing and through the confining zone to prevent the movement of fluids into or between protected ground waters or into any unauthorized zones. There are additional detailed cementing, casing, tubing, packer and completion requirements based on the specifics of each well, the injected fluids, and site-specific characteristics. The construction details must be approved before the well is constructed, and the well and injection zone must be logged and tested before injection of any waste stream is authorized.

### c. Operating Requirements

Class I wells must operate at injection pressures that will not initiate new fractures or propagate existing fractures with pressure maintained in the annular space. Class I hazardous wells must also maintain annular pressure to protect against leaks. Only the approved fluids may be injected, and continuous monitoring and recording devices must be operated on all Class I wells. For Class I hazardous waste injection wells, there is an additional requirement for automatic alarm systems and for steps to be followed for automatic shutdown or immediate response to any loss of mechanical integrity in the well that could indicate a leak.

### d. Monitoring and Closure

All Class I wells must undergo mechanical integrity testing (MIT) at least every five years, but Class I hazardous wells must undergo MIT annually along with monitoring of the pressure buildup in the injection zone. Every Class I well must be plugged and secured pursuant to an approved plan before it is abandoned. Class I hazardous waste wells must undergo MIT reservoir testing and additional steps such as flushing and post closure ground water monitoring until injection zone pressure cannot influence protected ground waters. Class I hazardous wells also have extensive financial assurance requirements that cover, in addition to the plugging and abandonment required for all Class I wells (40 C.F.R. § 144.52(a)(7)(i)), post-closure care. Class I hazardous wells also have prescribed financial instruments that must be used. 40 C.F.R. Part 144, Subpart F.

## 7. What are the benefits of having a UIC Class I hazardous waste injection well program?

The most important benefit of having a Class I hazardous waste injection well program follows from EPA's repeated determination that deep well injection is the safest and most effective disposal method for the disposal of hazardous industrial wastes. Based on studies, EPA has concluded that "Class I underground injection wells are safer than virtually all other waste disposal practices."[9/] Absent the availability of this option for the management of hazardous waste, less safe and less effective methodologies would need to be used, resulting in increased risk to human health and the environment. As EPA has noted, "[w]hile treatment technologies exist, it would be cost prohibitive to treat and release to surface waters the billions and trillions of gallons of wastes that industries produce each year."[10/] EPA has consistently found that "underground injection is an effective and environmentally safe alternative to surface disposal." EPA Program to Regulate Waste Water at 1 **[Exhibit G]**.

In summary, EPA has found that deep well injection under the UIC program: (1) reduces exposure to injected wastes by relying on proven federal and state regulatory programs; (2) eliminates billions of gallons of hazardous waste from the environment each year; (3) decreases public costs for water treatment; (4) avoids cost of ground water remediation, medical monitoring for health effects, and replacing a drinking water supply; and (5) enables communities to make informed wise local land use decisions. EPA Program to Regulate Waste Water at 2 **[Exhibit G]**.

Another benefit comes in the form of water conservation. With the availability of hazardous waste injection, it should be possible for managers of waste waters to recover water from waste streams for other beneficial uses without being concerned that the processing of those wastes would yield a residual waste stream that is too concentrated and therefore more likely to be characteristically hazardous. Given trends toward water scarcity in some areas, this would provide potentially critical flexibility for water conservation that is otherwise unavailable. Hand-in-hand with this ability to conserve water goes the ability to minimize waste through the recovery of useable water. By recovering water from injected waste streams, the volumes of waste finally injected could be significantly reduced.

The recovered and reused water would also provide economic benefits to neighboring communities which would have available more fresh water, the use of which is offset by the use of the water recovered from the injected waste streams.

Because disposal capacity for existing Class I nonhazardous waste injection wells is finite, reducing injected volumes to those wells preserves capacity. This will also serve to reduce the size of the injectate plume, reducing the area of review and the surrounding area potentially affected by the injection operation.

**8. How are Class I hazardous waste injection wells regulated to avoid posing a greater risk to the environment than other classes of UIC wells?**

The avoidance of greater risk is achieved by the additional technical requirements added in 40 C.F.R. Part 144 and the new requirements in part 146, subpart G in 1988 (along with additional

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9/ EPA, 1991 Toxics Release Inventory Public Data Release Report, EPA 745-R-93-003 ("1991 TRI PDR Report"), at 305 (May 1993).

10/ EPA, "US EPA's Program to Regulate the Placement of Waste Water and other Fluids Underground," at 1, EPA 816-F-04-040 (June 2004) ("EPA Program to Regulate Waste Water")**[Exhibit G]**.

requirements already in Part 144, Subpart F). I have already described the content of these technical requirements above.

In addition, 40 C.F.R. Part 148 specifies that an operator must submit a no-migration demonstration to show through sophisticated computer modeling either (1) that the injected hazardous waste will not migrate to a protected ground water within at least 10,000 years, or (2) that the injected hazardous waste will be rendered nonhazardous through attenuation, transformation, or immobilization. The first of these demonstrations is what is popularly referred to as a "containment" demonstration, while the second is known as a waste transformation and fate demonstration. I have already described the no migration exemption demonstration process.

The authority to make no migration determinations is delegated to each EPA Region's Water Division Director and can be delegated to any state having primacy for the UIC Class I hazardous waste program. No state has yet applied for primacy to administer the land disposal restriction program of part 148. As I understand it, the no migration program for New Mexico will not be included in the proposed regulations and would therefore be administered by EPA Region 6, which has the largest number of approved Class I hazardous waste injection facilities and the most experience with the program (often providing technical assistance to other EPA regions). Region 6 has approved 42 of the total 56 petitions approved to date and currently has oversight responsibility for 33 of the 45 active petitions.[11/] Each no migration demonstration petition is a complex technical analysis which describes the well construction, the injected wastewater, and the local and regional geology and hydrogeology. It relies on conservative mathematical models to demonstrate that the hazardous wastewater will not migrate from the injection zone into protected ground waters. Once a no-migration petition is approved, an operator may inject only those hazardous wastes that are listed in the petition.

Key factors that must be considered in the modeling demonstration include the pressure, permeability, and porosity of both the injection zone and confining layers, as well as mobility of hazardous constituents (e.g. their coefficients of dispersion and diffusion). For modeling the geochemical "fate-of-waste," an analysis of the chemical reaction(s) that will render the waste nonhazardous must be considered as well. Operators must conservatively estimate their projected injection volume, rate, and pressure, taking into consideration key factors, and produce an estimate of their plume dimensions forecast into the future, paying close attention to how much reduction in concentration is likely over both the operational period and any long-range non-operational period (e.g., 10,000 year "containment" demonstration).

To provide public notice, EPA must publish its decision of whether to approve or deny a no-migration demonstration in the Federal Register. Approvals are not synonymous with UIC permit approval, nor do they necessarily carry the same approval duration that an accompanying permit might have. Much of this is dependent upon what geologic, hydrological, and operational assumptions were made in the computer modeling exercise.

## 9. How do States obtain authority to implement the UIC well program?

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11/ *See* http://www.epa.gov/region6/water/swp/uic/landban.htm [accessed on June 12, 2015].

The UIC Program requirements were developed by EPA, but the program was designed by Congress to be adopted and implemented by states, territories, and tribes. States, territories, and tribes can submit an application to EPA to obtain primary permitting and enforcement responsibility, known as "primacy." State agencies that have been granted this authority for specific well classes oversee the injection activities in their states. The requirements for obtaining primacy are outlined in the UIC regulations at 40 CFR Part 145.

To gain authority over Classes I, III, IV, V, and VI, state programs must be at least as stringent as the federal program and show that their regulations contain effective minimum requirements (for example, inspection, monitoring, and recordkeeping requirements that well owners and operators must meet). While state regulations must be at least as stringent as the federal requirements, they may be more stringent. Achieving state primacy approval for Classes I, III, IV, V, and VI is governed by section 1422 of the SDWA. For Class II UIC program primacy, states have the alternative under section 1425 of the SDWA of demonstrating that the state's Class II program will achieve an equivalent level of protection for protected groundwater.

**10. Does New Mexico currently have authority for the UIC Class I hazardous waste injection well program?**

No, but it does have primacy generally. After EPA promulgated UIC technical regulations in 1980, States were required to adopt regulations that met or exceeded the minimum technical criteria. If State regulations were found to be adequate, the State was granted primacy, for various classes of wells. If a State did not adopt minimum federal regulations, EPA was required to implement the program for the State. Thirty-five States and territories have received primacy for Class I programs. EPA implements Class I programs in the remaining twenty-two States and territories.

In 1983 New Mexico was granted primacy over the UIC program for all Class I wells. Notice of this approval was published in the Federal Register on July 11, 1983 (48 Fed. Reg. 31640); the effective date of this program was August 10, 1983. The UIC program for Class I, III, IV and V injection wells in the State of New Mexico is administered by the New Mexico Water Quality Control Commission, the Environment Department (formerly Environmental Improvement Division), and the Energy, Minerals and Natural Resources Department, Oil Conservation Division (OCD).

EPA's 1988 revision of the regulations applicable to Class I hazardous waste injection wells described above occurred subsequent to New Mexico's obtaining primacy for the Class I program. That promulgation of new Class I regulations by EPA triggered an obligation for New Mexico and every other state to revise and update its Class I program to conform to the federal requirements. Rather than amend its regulations to incorporate the changes made in the federal regulations, however, New Mexico chose in 2001 to eliminate the authorization of Class I hazardous waste injection wells because there had been no existing Class I hazardous injection wells or applications for Class I hazardous waste injection wells in New Mexico since the inception of the UIC program.

Accordingly, New Mexico currently has complete primacy for administration of the Class I UIC program, including authority over Class I hazardous waste injection wells, but the permitting and operation of those wells is currently prohibited. If the WQCC approves the proposed regulations to allow the permitting of Class I hazardous waste injection wells, that step would not involve an application for primacy but rather the adoption of a program revision and the submission of that program revision to EPA for approval under 40 C.F.R. § 145.32.

### 11. What are the minimum requirements for a UIC Class I hazardous waste injection well program?

The paramount requirement for a state Class I hazardous injection well program is that it must "establish requirements at least as stringent as the corresponding [federal] provisions." 40 C.F.R. § 145.11(b)(1). The specific substantive provisions for which the state must match stringency are identified section 145.11. As noted, "[m]any of the requirements for State programs are made applicable to States by cross-referencing other EPA regulations." In addition to the generally applicable requirements for all Class I wells that are already part of New Mexico's UIC program, Class I hazardous wells must also meet "the requirements of § 144.14 (requirements for wells injecting hazardous waste), paragraphs (a)(7) and (a)(9) of this section, and subpart G of part 146." 40 C.F.R. 144.52(a). The financial assurance requirements of 40 C.F.R. Part 144, Subpart F must also be mirrored for Class I hazardous wells.

In contrast, the UIC regulations do not require a state to adopt regulations that are at least as stringent as the no migration exemption provisions in 40 C.F.R. Part 148 in order to have a program that includes the minimum requirements for UIC Class I hazardous waste injection wells. For the specific land disposal restrictions on injection of RCRA hazardous wastes being adopted pursuant to HSWA, EPA took a different approach because the statute required those restriction to become effective for all wastes by specific dates unless one or more of the various options for postponing the effective dates applied. EPA used the same approach for the no migration exemption provisions and included all of those provisions in the new Part 148 to the UIC regulations. The new regulations in Part 148 became immediately effective everywhere, including in primacy states, and have been directly enforced by EPA through its regional offices. 53 Fed. Reg. 28118, 28120 (July 26, 1988). For the no migration exemption approvals, EPA explained: "After the effective date of a prohibition in Part 148 Subpart B, untreated wastes can only be injected if an exemption has been granted by the Administrator pursuant to a petition under Part 148 Subpart C . . . ." *Id.* Even though EPA made Part 148 available for states to seek primacy, no state has yet done so; accordingly, the Part 148 restrictions and no migration exemption petition program are everywhere administered by the EPA regional offices.

### 12. Does the proposed rule here meet the minimum requirements for a UIC Class I hazardous waste injection well program?

I have reviewed the proposed regulations and have compared them to EPA's regulations for Class I hazardous waste injection wells in 40 C.F.R. Parts 144 and 146. In my opinion, the proposed rule would allow New Mexico to meet the minimum requirements for a UIC Class I hazardous waste injection well program because it adopts each of the necessary requirements either by using similar language or by direct reference to the EPA UIC regulations. Thus, the proposed rule is no less stringent than EPA's regulations. A summary of the proposed regulations that was prepared by Navajo Refining Company is attached as **Exhibit H**. The summary describes each provision of the proposed rule, its intended purpose and how, if at all, it differs from EPA's regulations. I have reviewed both the summary and the proposed rule in detail and endorse and adopt the summary.

**13. In what ways, if any, is the proposed rule more stringent than the minimum requirements?**

The proposed rule is more stringent than required in several ways. First, the proposed rule retains the New Mexico provisions for protecting groundwater that I reference at the outset of my testimony (see footnote 1). Specifically, New Mexico protects "ground water that has a TDS concentration of 10,000 mg/l or less" without adding a limitation to formations with "a sufficient quantity of ground water to supply a public water system," as the federal regulations do. *Compare* Section 20.6.2.3109(c)(1) NMAC *with* 40 C.F.R. §§ 144.3 and 146.3. In addition, although New Mexico and EPA regulations both allow the designation of additional aquifers as injection zones, New Mexico does not allow such designations for formations having a TDS concentration of less than 5,000 mg/l. Section 20.6.2.5103 NMAC. The EPA regulations do not include that restriction.

There are several other respects in which the proposed rule is more stringent than the minimum requirements. The proposed rule imposes additional reporting requirements for noncompliance events that may endanger public health or the environment that are not included in the federal requirements, and the proposed rule does not authorize the issuance of area permits, which are allowed under the federal rule. The proposed rule does not incorporate by reference the federal provisions that would provide for state assumption of responsibility for plugging and abandonment of Class I hazardous waste injection wells, meaning that the operator would always retain that obligation. Thus, the proposed rule would provide less flexibility to permittees with respect to plugging and abandonment requirements. Nor does the proposed rule adopt the federal provisions that permit a financial test by a permit applicant to meet the financial assurance requirements because that approach would be inconsistent with OCD's existing UIC regulations. Finally, the proposed rule is more stringent than EPA's regulations by imposing the requirement that the Director of OCD provide written approval for the transfer of a Class I hazardous waste injection well permit before the transfer can become effective.

**14. Are there any ways the proposed rule is less stringent than the minimum requirements?**

No.

**15. How does the proposed rule compare to other states' UIC Class I hazardous waste injection well programs generally?**

The proposed rule is unique as compared with other states that have primacy and administer UIC programs for Class I hazardous waste injection wells because those permits would only be "authorized for use by petroleum refineries for the waste generated by the refinery." In a sense, that limitation also makes the proposed rule more stringent than the federal rule. Other states that conduct permitting programs for Class I hazardous waste injection wells do not include this type of limitation. In all other respects, the proposed rule is similar to what is in place in other states for Class I hazardous waste injection wells because each state's program must be as stringent as EPA's regulations.

**16. What kind of hazardous waste can be placed in the well under the proposed rule?**

Under the proposed rule, only wastes generated by the petroleum refinery to which the Class I hazardous waste injection well permit has been issued could be injected into the well. That means that no off-site waste can be accepted. In addition, the regulations specifically require identification of the source and an analysis of the chemical, physical, radiological and biological characteristics of injection fluids. Because no migration exemption approvals are based on the specific characteristics of the injected waste stream, those characteristics must be identified and used in the no migration demonstration also. Petitioners for exemptions from the prohibitions on underground injection of hazardous waste must demonstrate that hazardous constituents in the injected waste stream will not migrate from the injection zone at "hazardous levels." See 40 C.F.R. § 148.20(a). The preamble to EPA's framework regulation described the general procedures for establishing "hazardous levels" for each waste constituent. See 53 Fed. Reg. 28,119, 28,122-23 (July 26, 1988). Significant changes in the injected waste stream would require revision of the OCD permit and the EPA Region 6 no migration exemption approval.

**17. Will UIC Class I hazardous waste injection wells constructed and operated in accordance with the proposed rule and EPA's regulations be protective of human health and the environment?**

Yes. The safety and effectiveness of Class I hazardous waste injection wells in protecting human health and the environment is extremely well established. On the twenty-fifth anniversary of the Safe Drinking Water Act, EPA noted that underground injection "reduces human exposure to organic and inorganic chemicals by removing them from the environment" and emphasized that deep well injection "eliminates more than nine billion gallons of hazardous waste and a trillion gallons of oil field waste from the environment each year."[12/] EPA has also reported that "[m]ore than 750 billion gallons of hazardous and non-hazardous fluids are disposed of safely through underground injection."[13/]

Beginning with a 1985 Report to Congress and continuing through numerous other studies, EPA and others have analyzed voluminous scientific information on deep well injection. EPA has also conducted meticulous site-by-site reviews of all currently existing Class I hazardous wells through its review of no migration demonstrations. In conjunction with its HSWA rulemaking in 1987 and 1988, EPA concluded that chemical and physical mechanisms will render wastes nonhazardous within 10,000 years. These comprehensive and site-specific studies caused the agency to conclude that "Class I underground injection wells are safer than virtually all other waste disposal practices."[14/]

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12/ EPA Program to Regulate Waste Water at 2 **[Exhibit G]**.

13/ Protecting Public Health **[Exhibit D]**.

14/ 1991 TRI PDR Report at 305.

Because they may inject hazardous waste, "Class I wells are the most strictly regulated" UIC wells. 2001 TRI PDR Report, at 1-13. Consistent monitoring and enforcement assure that the wells will continue to be protective of human health and the environment. Permits allow for the injection and containment of substances within deep geological formations located many thousands of feet below the Earth's surface. There the injected fluids will remain isolated and contained for millions of years and become transformed into less toxic materials[15/] — an effective way to protect human health and the environment, as well as underground and surface sources of drinking water.[16/] EPA has repeatedly noted that "[w]hen wells are properly sited, constructed, and operated, underground injection is an effective and environmentally safe method to dispose of wastes."[17/] Indeed, when EPA promulgated its standards for permitting Class I hazardous waste injection wells, the agency noted that, over time, "geochemical transformations . . . would render the waste nonhazardous or immobile." 53 Fed. Reg. 28,126 (July 26, 1988).

"These wells are designed to entomb liquid wastes for at least 10,000 years."[18/] Class I wells must be constructed with multiple layers of concentric tubing (made of steel or other materials designed to be compatible with the injected fluids) and cement. This construction amounts to a pipe within a pipe within a pipe (three tubes, two layers of cement, and a fluid barrier).[19/]. Thus, "Class I wells have redundant safety systems and several protective layers to reduce the likelihood of failure. In the unlikely event that a well should fail, the geology of the injection and confining zones serves as a final check on movement of wastewaters to [protected ground waters]." Class I Study of the Risks at xiii **[Exhibit F]**. When wells comply with these regulations, EPA has consistently found that "underground injection is an effective and environmentally safe alternative to surface disposal." Program to Regulate Waste Water, supra, at 1. Furthermore, EPA has noted for Class I industrial wells that "[t]here are no documented problems with the effectiveness of the UIC regulations." See 55 Fed. Reg. 22,529, 22,658 (June 1, 1990).

The EPA and others have performed a number of studies of the risks associated with waste disposal using Class I wells. Class I Study of the Risks at xi **[Exhibit F]**. To the extent these studies identified any problems that occurred in Class I wells, those problems all occurred before

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15/ EPA has concluded that wastes injected into Class I deep wells become less hazardous over time. 53 Fed. Reg. 28,126 (July 26, 1988).

16/ Program to Regulate Waste Water, supra; and USEPA, Safe Drinking Water Act, Underground Injection Control (UIC) Program: Protecting Public Health and Drinking Water Resources, EPA 816-H-01-003 (Aug. 2001) ("Protecting Public Health").

17/ USEPA, 2001 Toxics Release Inventory (TRI) Public Data Release Report, EPA 260-R03-001 (July 2003) ("2001 TRI PDR Report"), at 1-10 (available at http://www2.epa.gov/toxics-release-inventory-tri-program/tri-national-analysis-archive under "Additional Materials, "2001_Chapter_1_overview.pdf).

18/ USEPA, 1999 Toxics Release Inventory Public Data Release Report (2001) ("1999 TRI PDR Report"), at 1-12. "Non-hazardous deep injection wells have to meet all the technical requirements of hazardous waste wells. These wells inject industrial, low radiation and municipal wastes." Class I Deep Wells

19/ EPA, Class I Injection Wells and Your Drinking Water, EPA 813-F-94-002 (July 1994) promulgation of the current UIC regulations. *Id.* at xii. The study concluded that any failures "were a result of historic practices that are no longer acceptable under the UIC regulations." *Id.* In addition, Rish and others[20/] quantitatively estimated the risk of loss of waste containment and movement of injectate into a USDW from a Class I hazardous injection well to be less than one in one million. This risk category agrees with EPA studies that deepwell injection is a low-risk management practice. Deep well injection technology is a major tool for protecting human health and the environment by preventing the endangerment of current and potential drinking water sources.

**18. What is the history of incidents involving UIC Class I hazardous waste injection wells?**

"Since the inception of the UIC program in the early eighties and since regulations governing injection have been promulgated by the Agency, no instances of contamination of USDWs by Class I hazardous waste injection wells have occurred."[21/] To examine the record prior to the UIC program, EPA and others have performed a number of studies of the risks associated with waste disposal using Class I wells. Class I Study of the Risks at xi [**Exhibit F**]. To the extent these studies identified any problems that occurred in Class I wells, those problems all occurred before promulgation of the current UIC regulations. *Id.* at xii. The study concluded that any failures "were a result of historic practices that are no longer acceptable under the UIC regulations." *Id.* Even considering the entire period prior to the implementation of the UIC program, EPA and the states identified just two cases where injected wastes contaminated protected ground water, and one case where an injection well was "suspected" of causing the contamination of a protected ground water. All three cases occurred prior to the implementation of a State or Federal UIC program. EPA has also identified eight cases where leakage from Class I hazardous waste wells entered non-protected ground water formations and two cases of surface contamination due to blowouts, all of which occurred before the 1988 amendments.[22/] There is a detailed discussion of these cases in EPA's 1991 report entitled "Analysis of the Effects of EPA Restrictions on the Deep Injection of Hazardous Waste," EPA 570/9-91-031 (October 1991).

As EPA has explained, "Both cases of known [protected ground water] contamination from Class IH injection wells (Tenneco Refinery #1, Chalmette, IA, 1980 and Velsicol Chemical #1, near Beaumont, TX, 1975) occurred prior to the existence of the UIC program and had the same cause. Both wells were constructed without tubing and packer and without surface casing set to protect all [protected ground waters]. Corrosion of the long-string casing (the only layer of protection) allowed the unobserved leakage of wastes to [protected ground waters]. The contamination was limited to within 100 feet of the wellbore, and both aquifers were cleaned up using pump-and-treat methods." *Id.* at 8. EPA also emphasized that "UIC regulations would have

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20/ Rish, W.A., Ijaz, T. and Long T.F. (1998). "A Probabilistic Risk Assessment of Class I Hazardous Waste Injection Wells" in Underground Injection Science and Technology (C.F. Tsang & J.A. Apps, eds.) (2005) [**Exhibit I**].

21/ EPA Response to Comments on Petition Filed by Disposal Systems, Inc. at 19-20.

22/ "Hazardous Waste: Controls Over Injection Well Disposal Operations," U.S. General Accounting Office, August 1987.

never allowed this method of completion for Class IH wells, but rather require three redundant layers of protection: surface casing set and cemented through all [protected ground waters], cemented long-string casing, and tubing with a packer or an equivalent. These levels of protection and the requirement for continuous annulus pressure (i.e., mechanical integrity) monitoring would make these cases of contamination impossible today." *Id.*

Since then and with the UIC program requirements in place, EPA has concluded that "[t]he probability of Class I well failures, both nonhazardous and hazardous, has been demonstrated to be low." 2001 Risk Assessment at 41. EPA emphasized that "early Class I failures were a result of historic practices that are no longer permissible under the UIC regulations. Class I wells have redundant safety systems and several protective layers; an injection well would fail only when multiple systems fail in sequence without detection. In the unlikely event that a well would fail, the geology of the injection and confining zones serves as a final safety net against movement of wastewaters to [protected ground waters]." *Id.* Thus, EPA found that "failures of Class I wells are rare." *Id.* EPA concluded that "[t]his can be attributed to the rigorous requirements for monitoring and for ensuring that the well materials are compatible with the wastewater injected." *Id.*

In 1992, Congress asked EPA and the Government Accounting Office (GAO) to review the Class I UIC program. The results of GAO's study, delivered to Congress in 1993, found no contamination of drinking water resources resulting from the operation of any industrial Class I well since the advent of the UIC program under the SDWA. In fact, the only cases of suspected fluid movement into underground sources of drinking water since EPA's initial UIC rules became effective involved several Florida Class I municipal wells, which are not subject to the same requirements as Class I industrial wells.

GAO essentially gave the Class I UIC program a clean bill of health, citing only minor enforcement concerns which were addressed and largely resolved even before the investigation was completed. Considering the probing questions that initiated the congressional investigation, GAO's failure to find any major problems requiring correction provided a strong reaffirmation of the Class I program.

In testimony before the House on the Land Disposal Program Flexibility Act of 1996, Solid Waste Director Michael Shapiro confirmed this assessment. Additional support was provided by then EPA Region 6 Water Division Director Myron Knudson, who called deep well injection "extremely safe." He testified: "It has been used for about 30 years now, and since the Safe Drinking Water Act was put in place and since the regulations, there have been no problems with the injection wells." The House Report on the legislation highlighted EPA's assessment, emphasizing that the "potential health risks from Class I injection wells are extremely low."[23/]

**19. Why is it preferable to dispose of hazardous waste through a UIC well as opposed to other approaches to treatment and disposal of hazardous waste?**

EPA Region 6 has emphasized that Class I hazardous waste injection is the preferable methodology, stating: "Class I injection is by far the safest form of hazardous waste disposal. All

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23/ Land Disposal Program Flexibility Act, H.R Rep. 104-454 at 5 (996).

of the other forms of disposal place the waste either in the air, into landfills which are located above the water table, or into rivers and streams that serve as recreation facilities, fish and wildlife habitats, sources of food, serve as drinking water sources, or that recharge drinking water aquifers. Only [Class I] injection wells serve to permanently remove the waste from the biosphere." [24/]

EPA summarizes the safety and effectiveness of deep well injection by stating, "Injecting wastes in Class I wells is safer than burying them in landfills, storing them in tanks, or burning the waste in incinerators." EPA, Class I Injection Wells and Your Drinking Water, EPA 813-F-94-002 (July 1994) ("Your Drinking Water").This was one of several favorable EPA statements that legislators quoted verbatim in supporting the 1996 land disposal restriction program relief legislation.

One basis for this conclusion is a study of many different waste management practices conducted for the Office of Solid Waste and Emergency Response (OSWER).[25/] The study conducted a comparative risk project using panels of experts to compare the risks associated with various activities involving potentially toxic chemicals. The panels ranked risks from different waste management practices based on six factors: acute exposure health risks; chronic health risks from acute events; other health risks; groundwater sources affected; welfare effects (e.g., wildlife, materials, quality of life); and ecological risks. Based on input from the individual panels, the plenary panel developed consensus rankings to identify overall risk levels of the various waste management practices. The experts gave hazardous waste injection the lowest risk ranking. OSWER Comparative Risk Study.

The study found that Class I hazardous waste injection wells are safer than virtually all other waste disposal practices. According to the study, high-risk disposal practices include municipal landfills, hazardous waste storage tanks, and land disposal of hazardous waste. Medium-risk activities include transportation of hazardous materials, municipal waste combustion, and Superfund sites. Only hazardous waste injection falls into the low-risk category.

Thus, even though there may be other methods available for waste management, such as landfills or storage tanks, these other methods would be inherently less safe and less protective than deep well injection, the preferred method for the management of hazardous and nonhazardous waste fluids. Your Drinking Water. As EPA has noted, "While treatment technologies exist, it would be cost prohibitive to treat and release to surface waters the billions and trillions of gallons of wastes that industries produce each year." Program to Regulate Waste Water at 1. Deep well injection technology and the federal and state level UIC programs, established by the SDWA (42 U.S.C. § 300h (1974)) to regulate this technology, are effective tools for protecting human health and the environment by preventing the endangerment of current and potential drinking water sources.

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24/ Letter from William B. Hathaway, Director of EPA Region 6's Water Quality Protection Division, to William H. Sanders, III, Director of EPA's Office of Pollution Prevention and Toxics (April 22, 1997).

25/ U.S. EPA, Office of Solid Waste and Emergency Response. OSWER Comparative Risk Project: Executive Summary and Overview. EPA/540/1-89/003. November 1989 (OSWER Comparative Risk Study).

**20. What other type of approval, such as U.S. EPA approval, is required before the proposed rule can become effective? What is the process for that approval?**

After the proposed rule has been adopted pursuant to the procedures required by the State of New Mexico, the revised regulations would need to be submitted to EPA Region 6 for approval as a program revision under 40 C.F.R. § 145.32 ("Procedures for revision of State programs"). Under section 145.32(a), each state is directed to "keep EPA fully informed of any proposed modifications to its basic statutory or regulatory authority, its forms, procedures, or priorities." Section 145.32(b) spells out the procedures to be followed, which include submitting a modified program description and other items. If EPA deems a proposed program revision is substantial, it issues a public notice, provide an opportunity for public comments for a period of at least 30 days, and provide for the opportunity to request a public hearing.

Although the program revisions may become effective as a matter of state law sooner, they will not be effective as substitutes for the EPA regulations and hazardous waste injection restrictions until approval by the EPA Administrator. Notice of approval will be published in the Federal Register.

**21. Is a new No Migration Petition required if a facility wants change or expand the types of hazardous waste that are injected?**

After a no migration petition is approved by EPA, an operator may need or wish to make changes relating to the petition which were not anticipated at the time the initial petition was filed. These changes may be administrative in nature (corporate name change, equipment change in the facility) which do not affect the wastes addressed in the petition, or they may be changes directly relating to the injection operation. This latter category of changes can range from the identification or new listing of a waste that was the subject of, or described in, an initial exemption demonstration, to substantive changes such as the injection of new wastes which differ hydraulically and chemically from the wastes which were the subject of the initial petition. EPA has promulgated regulations that outline, in broad terms, the procedures for altering exemptions where the changes an operator seeks to make are more than clerical in nature, and may affect the demonstration. See 40 C.F.R. § 148.20 (e) and (f).

**22. How are Resource Conservation and Recovery Act requirements applied to facilities that operate UIC Class I hazardous waste injection wells?**

The requirements of the Resource Conservation and Recovery Act are applied to Class I hazardous waste injection wells through the UIC regulations, including specifically the provisions in 40 C.F.R. § 144.14, 40 C.F.R. art 144, Subpart F, 40 C.F.R. Part 146, Subpart G, and 40 C.F.R. Part 148. The UIC permit issued to a Class I hazardous waste injection well operator constitutes a RCRA permit by rule.

Dated: June 15, 2015

Robert F. Van Voorhees