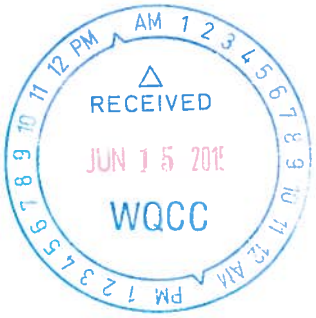
STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

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



DIRECT TESTIMONY OF

MICHAEL McKEE

ON BEHALF OF

NAVAJO REFINING COMPANY, L.L.C.

June 15, 2015

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1. Please state your name and business address.

My name is Michael McKee. My business address is 2828 N. Hardwood St., Dallas, Texas 75201.

2. Please state your qualifications to provide this testimony.

I am a chemical engineer with more than 36 years of experience in the petroleum refining industry. I have a B.S. in Chemical Engineering, History, and Macroeconomics from Cornell University, and have also completed an Executive Education program at the University of Pennsylvania's Wharton School. I am currently the Vice President of Refining Operations at HollyFrontier Corporation, a corporate affiliate of Petitioner Navajo Refining Company, L.L.C. (Navajo Refining). Previously, from June 2011 to December 2014 I served as the Refinery Manager for Navajo Refining in Artesia, New Mexico. Prior to joining Navajo Refining, I have worked in the petroleum refining industry for Sunoco, Murphy Oil, HIVENSA, and Amerada Hess. A copy of my resume is attached as Exhibit A to this testimony. In my current position and in my prior capacity as the Refinery Manager at Navajo Refining, I have been personally involved in projects to identify and implement water conservation efforts at Navajo Refining and in the decision-making process to pursue a new underground injection well for wastewater disposal.

3. Why is water conservation important to Navajo Refining?

Water conservation provides important benefits to both Navajo Refining and to the local community. In southeast New Mexico, we face significant constraints on both water availability and on wastewater disposal options. Implementing water conservation measures will allow the refinery to alleviate both of these concerns by reducing water intake and by reducing wastewater disposal. This provides important benefits to the local community by freeing up water resources for other current or future uses. It also provides important benefits to the refinery. Reducing water intake and wastewater disposal can result in significant cost savings for the refinery. At the same time, water conservation efforts provide the refinery with additional operational flexibility to expand operations and processing capacity without being constrained by existing limitations on water intake or wastewater disposal.

4. What water conservation measures are currently under consideration at Navajo Refining?

Navajo Refining has identified a series of water conservation measures that could be implemented at the facility if certain conditions are met. A summary of these water conservation measures is provided in Table 1 below. If all of the measures were adopted, we estimate that water use at the refinery could be reduced by 39%. A number of these water conservation measures are related to the long-term goal of becoming a zero-discharge facility. While this goal may not be attainable in the near term, it has forced us to consider opportunities to reduce water intake and water disposal through the reuse and recycling of wastewater streams throughout the facility. For example, we have approved initiatives to implement a secondary reverse osmosis (RO) unit to recover RO reject fluid from primary RO units as well as boiler condensate recovery and H2 plant condensate recovery. We are also evaluating an initiative to install a RO system at

our wastewater treatment unit. Other water conservation measures are focused on alternative water intake sources that will reduce our demand for groundwater and for water purchased from Artesia. These include initiatives to use Artesia's publicly owned treatment works (POTW) effluent for makeup water and to capture and use stormwater that is otherwise processed through the refinery's wastewater treatment unit and discharged. Taken together, these initiatives represent significant opportunities for the refinery and the local community.

However, as I discuss below in response to the next question, not all of these measures—or other future measures—may be possible due to the lack of a Class I hazardous waste injection well program in New Mexico.

Table 1:

Navajo Water Conservation Efforts

Summary

No.	Initiative	Status	Conservation (gpm)
1	3RD RO Skid	In Service	100
2	Secondary RO	Approved - Construction kickoff complete	210
3	Boiler Condensate Recovery	Approved - Engineering kickoff complete	100
4	H2 Plant Condensate Recovery	Approved - Engineering kickoff complete	50
5	Use City POTW Effluent for Makeup (annual average)	Evaluation complete - engineering proposal received	600
6	Additional POTW water via Increase in Navajo Discharge*	Se Removal, TDS segregation complete / TBLL near complete	150
7	Stormwater Re-use	Evaluation complete - engineering proposal received	varied
8	Steam Optimization	Evaluation complete - engineering proposal received	50
9	Navajo WWTP RO System**	Approval pending - Engineering complete	240
	Potential Total Reduction (gpm)		1210
	Potential Total Reduction (%)		39%

* Water for re-use via POTW decreases as refinery conserves water
** WWTP RO system would eliminate savings from 6 above

5. How would a UIC Class I hazardous waste injection well program benefit Navajo Refining?

Having a UIC Class I hazardous waste injection well program in New Mexico would provide Navajo Refining with operational flexibility as it evaluates potential opportunities for water conservation and for plant expansion.

As described above, many of the water conservation initiatives identified by Navajo Refining involve reuse or recycling of current wastewater streams. While these initiatives can reduce the total volume of wastewater from the refinery, they also have the effect of concentrating the chemical constituents of the wastewater effluent. As more and more of these initiatives are implemented, the concentrations of certain chemical constituents such as Selenium may approach or exceed thresholds for characteristically hazardous waste which cannot be discharged in Navajo Refining's existing Class I non-hazardous waste injection wells.

While Navajo Refining's current effluent steams are below characteristically hazardous waste thresholds, it is critical that changes to the refinery's operations—including adoption of water conservation measures—do not jeopardize the productivity of the refinery. Thus obtaining a Class I hazardous waste injection well permit would allow the refinery to continue discharging effluent even if it exceeds hazardous waste concentration thresholds for non-hazardous injection wells. This will allow the refinery to pursue additional opportunities related to water conservation measures, changes to the current crude oil slate, and facility expansion. It will also provide an additional safeguard in the event that there is a problem with the refinery's existing treatment units for wastewater effluent. Further installing a disposal well that complies with the Class I hazardous waste injection well regulations and can be operated subject to a Class I hazardous waste injection well permit will provide further assurance that discharge of effluent from the refinery will not increase the risk of harm to the environment.

Finally, Navajo Refining is uniquely situated to design and install a Class I hazardous waste injection well at this time. Navajo Refining currently disposes of wastewater treatment plant effluent through three Class I nonhazardous waste injection wells. However, due to their age and competition from other wells in their immediate vicinity, maximum injection rates have slowed. As a result, the refinery is considering options for constructing the fourth well as a hazardous waste injection well. If the fourth well is initially permitted as a Class I nonhazardous well, the proposed regulations would permit the refinery to convert the Class I nonhazardous waste injection well permit into a hazardous well permit once it complies with all of the Class I hazardous waste injection well requirements required by the proposed regulations and completes a no migration petition process required by U.S. EPA. By constructing the well to comply with the more stringent requirements for Class I hazardous waste injection wells, the refinery would have the ability to convert the well if hazardous waste injection well regulations are approved by the WQCC. Again, by adopting the regulations now while Navajo Refining is evaluating options to construct a new well, the refinery will increase its flexibility going forward.

6. How would approval of a Class I hazardous waste injection well permit change effluent that Navajo Refining disposes through underground injection?

As explained earlier, approval of a Class I hazardous waste injection well permit would provide Navajo additional operational flexibility.

At this time, we do not anticipate any changes that would increase the amount of pollutants disposed of by the refinery on a mass basis. The primary effect of the water conservation measures described above would be to concentrate the wastewater effluent streams, not to change the chemicals that are present. As a result, the concentration of chemicals would increase due to decreased water volume, but neither the identity of the chemical constituents nor their masses would change. However, the amount of chemicals disposed of through underground injection could increase as a result of changes to the RO process. If a secondary RO unit is added, the more concentrated RO reject fluid would be disposed of in an injection well rather than through land application. Because the water treated in the RO units has the same source as the makeup water that is eventually processed through the wastewater treatment unit, this would not introduce any new chemical constituents that are not already disposed of through underground injection at the existing Class I nonhazardous waste injection wells. Instead, it

would simply increase the mass of constituents that are already being injected into the Class I nonhazardous waste injection wells.

Additional changes in the chemical composition or mass of chemicals in the wastewater effluent could occur in the future as a result of the flexibility afforded by a fourth injection well that would be permitted for the disposal of hazardous waste. For example, new crude sources in the Permian Basin could have different chemical compositions than those currently processed at the refinery. Likewise, an increase in production capacity would result in a greater quantity of chemical constituents that must be disposed of through underground injection. However, these changes would likely be modest and, as explained below, any significant change in the chemical composition of the effluent would likely require Navajo Refining to engage in a new permitting process.

7. Does Navajo Refining currently have plans to seek approval for a UIC Class I hazardous waste injection well if the proposed regulations are adopted?

Yes. As discussed above, the refinery will soon need to install a fourth underground injection well to address reduced injection rates at the three existing wells. Navajo Refining intends to construct the fourth well so that it would be meet the requirements for a Class I hazardous wastes injection well and, under the proposed regulations, could be converted to a Class I hazardous waste injection well if such regulations are approved in New Mexico. At this time, the refinery is evaluating options for potential well locations and injection formations to ensure that the fourth well will have sufficient capacity to meet the refinery's projected disposal needs going forward. No final decision has been made with respect to the location of the fourth well.

8. What additional steps would Navajo Refining have to take before operating that well as a UIC Class I hazardous waste injection well?

If the fourth well is initially approved as a Class I non-hazardous waste injection well, Navajo Refining would have to go through a number of steps before operating the well as a Class I hazardous waste injection well.

First, the refinery would have to obtain a Class I hazardous waste injection well permit. This would involve submitting a new application to the New Mexico Oil Conservation Division and demonstrating that the well meets all of the criteria for a Class I hazardous waste injection well.

Second, after obtaining a state permit, the refinery would have to obtain a "no migration petition" from the U.S. Environmental Protection Agency (EPA). Under federal law, the land disposal of hazardous waste is prohibited unless a facility first obtains an exclusion from EPA. For underground injection control wells, such an exclusion can be obtained on a case-by-case basis by demonstrating that the hazardous wastes disposed of in the well will not migrate out of the injection zone and pose a risk to groundwater for 10,000 years. While the refinery does not currently discharge any hazardous waste in its wastewater effluent, we intend to seek a no migration exemption for all chemical constituents that are currently found in our wastewater effluent and that would meet the definition of characteristically hazardous waste if present sufficiently high concentrations, regardless of the anticipated concentrations of those chemicals in our waste stream. This will ensure that the permit is broad enough to cover any future water

conservation measures that will concentrate the wastewater effluent. We do not intend to seek a no migration exemption for any hazardous substances that are not currently present in our wastewater effluent. Thus, before an entirely new hazardous waste stream could be disposed of in the well, the refinery would have to modify its permit and obtain a new no migration exemption from EPA.

Michael McKee