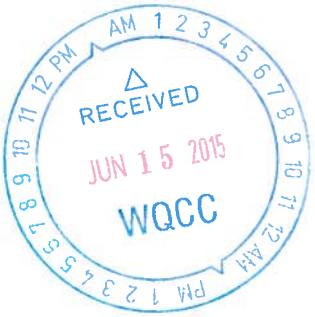
STATE OF NEW MEXICO
BEFORE THE WATER QUALITY CONTROL COMMISSION

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

FRANCISCO SALVARREY

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 Francisco Salvarrey. My business address is 200 E. 4th Street, Roswell, New Mexico 88201.

2. By whom are you employed and in what capacity?

I am employed by Occam|EC Consulting Engineers, Inc. (Occam|EC) as a Project Engineer and Certified Floodplain Manager.

3. Please describe the purpose of your testimony.

The purpose of this testimony is to address the importance of groundwater resources in New Mexico, the local and regional water supply/demand conditions in southeast New Mexico, the general relationship between the City of Artesia and Navajo Refining Company, L.L.C. (Navajo Refining), the efforts by the City and its citizens and partners to plan for the future, and the impact that water conservation by the Navajo refinery may have on those plans. Occam|EC is actively engaged in assisting the City of Artesia to develop and implement its water conservation plan. The City derives all of its potable water from groundwater resources, and therefore providing its water consumers with sufficient and steady supplies requires consideration of demand, supply and conservation to provide the best value to its customers. Artesia's single largest industrial customer is the Navajo refinery, which uses approximately 44% of the potable supply delivered by the City annually. Consequently, the refinery simultaneously constitutes a major component of the City's economy and its largest water consumer. As a result, any regulatory changes that would allow the refinery to change its water usage patterns will have a profound effect on Artesia and its water management strategy.

4. Please briefly summarize your testimony and the conclusions made in it.

I conclude that, to the extent the proposed rule before the Water Quality Control Commission will allow Navajo Refinery to apply for and obtain a Class I hazardous waste injection well permit, it is my understanding that the refinery will be able to undertake significant water efficiency or conservation improvement programs that will be supportive of the future water use and efficiency goals of the City of Artesia. These programs will benefit the community economically and environmentally by improving supply reliability, extending existing water supplies and reducing waste treatment.

5. Please describe your educational background, training and work history.

I received a Bachelor of Science degree in Engineering Technology Civil Engineering Discipline, New Mexico State University, 2001. After graduating from New Mexico State University, I was hired by a consulting engineering firm in Roswell, New Mexico in 2002. I served as a lab technician for 2 years. For the next 3 years I gained experience in the design of civil site plans, utility systems, public works projects, and subdivision plats. I also prepared numerous construction contract documents and was involved in the bidding process. In 2007, I was hired by Occam|EC as an engineer intern. Since working with Occam|EC I have developed a strong background in hydraulics and hydrology and general civil engineering for a wide variety of private and public clients throughout southern New Mexico, particularly in southeastern New

Mexico. My resume is attached to this testimony as Exhibit A. My experience includes the analysis and design of water distribution systems, sanitary and storm sewer collection systems and the design and project management of hundreds of miles of highways, rural and urban roadways. I have also been involved in land development, construction management, hydrologic and hydraulic analysis, and infrastructure construction. I have recently participated in researching for and drafting the Artesia "Water Waste" Ordinance approved by the City in April 2015 as an initial component of the City's water conservation strategy.

6. What have you reviewed in preparation for your testimony?

I have reviewed the following documents in preparation for my testimony:

- Office of the State Engineer Drought Plan;
- Artesia's water use history;
- Artesia's water rights portfolio and water well information;
- Artesia Water Waste Ordinance;
- Artesia 40 year Water Plan;
- Office of the State Engineer, Water Use and Conservation Bureau's, Water Conservation Planning Guide for Public Water Suppliers;
- Albuquerque Bernalillo County Water Utility Authority and other regional water utility water conservation plans and ordinances, implementation strategies and public education programs; and
- Michael McKee's written testimony regarding Navajo Refinery's water conservation efforts.

7. How are potable groundwater resources defined in New Mexico?

In general, water is considered potable if it is fit for human consumption. Specifically, potable water is defined by its limits on toxic constituents and total dissolved solids.

New Mexico's Groundwater and Surface Water Protection regulations, which would apply to Class I hazardous waste injection wells, seek to protect all groundwater that has a total dissolved solid (TDS) concentration of 10,000 mg/L or less on the basis that it has the potential to be used for domestic or agricultural water supplies. *See, e.g.*, Section 20.6.2.5001 NMAC.

Under the State Engineer's groundwater regulations, potable water is generally defined as groundwater that is less than 2,500 feet from the surface and that contains less than 1,000 mg/L TDS. Prior to 2009, NMSA 1978, § 72-12-25 through § 72-12-28 addressed deep water, stating that non-potable water in an aquifer whose upper boundary is deeper than 2,500 feet is not subject to the State Engineer's groundwater regulations. Nonpotable water was defined by those provisions as water containing more than 1,000 mg/L TDS. No permit was required to pump water from that depth. However, notice to the State Engineer and the neighboring public was required. The State Engineer could require reporting on such pumping activities and neighboring water users could file suit in district court if the pumping impaired their water supply.

In 2009, NMSA 1978, § 72-12-25 was amended to give the State Engineer jurisdiction over non-potable water in an aquifer whose upper boundary is deeper than 2,500 feet, if the State Engineer declares a groundwater basin. Certain uses of such water, including oil and gas exploration and

production, prospecting, mining, road construction, agriculture, generation of electricity, use in an industrial process or geothermal use remain unregulated by the State Engineer. All other uses within deep basins that have been declared by the State Engineer require a permit to appropriate under the same regulations as shallow fresh water. NMSA 1978, § 72-12-1 through NMSA § 72-12-24.

8. Why are only certain groundwater resources considered potable?

The primary driver is economic. As a theoretical matter, most groundwater or surface supplies in the state can, in theory, be treated to potable water quality - at a cost. However, even so, it is significantly more expensive to produce, treat, monitor, deliver and address the disposal of the waste stream and contaminated supplies, as opposed to development in existing potable aquifers. Thus, as a practical matter, the only groundwater resources that are utilized for human consumption are those that are naturally potable or can be economically treated to become potable.

9. Why is maintaining potable groundwater supplies important for the state?

Maintaining potable groundwater supplies is critical in an arid region like New Mexico that has limited alternative fresh water supplies. Water is the common denominator of New Mexico's future and is indispensable to the quality of life of the state's residents. Water is a basic necessity of life and the foundation of all economic activity, neither of which can occur without an adequate water supply. New Mexico must actively and efficiently manage its limited water supplies to ensure both. The value of water is often discussed by economists in terms of its attributes – quantity, quality, location and availability in time. Groundwater's accessibility in location and time can provide additional economic benefits as compared to surface water.

The New Mexico Interstate Stream Commission is charged with running the State's regional water planning program within the 16 planning regions, including this one. The basic change of the regional planning process is to:

a). Quantify and qualify available water supplies from all sources – surface water and groundwater.

b). Assess current demand for water and projected future demand.

c). Identify strategies to address supply/demand imbalance, if they exist, at the regional level.

In essence, there are four primary mechanisms to balance supply with demand:

1. Learn to live within existing supplies, or limit demand greater than supply.
2. Provide for transfers between uses – such as the transfer of water rights from agricultural use to municipal and industrial (M&I) use.
3. Address the demand side of the equation through improved water conservation and efficiency.
4. Development of new sources, if they exist.

10. What impacts do droughts have on demand for groundwater?

Extended drought can impact both the supply side and the demand side. For example, reduced aquifer recharge often results in declining groundwater levels, reduced productivity of wells, and increased costs of production. On the demand side, extended drought and reduced natural precipitation necessitate increased groundwater consumption to maintain current irrigation and water use.

New Mexico is a *Prior Appropriation Doctrine* state, as are most western states. This implies that in times of shortage, water right holders with junior priorities run a higher risk of being curtailed so that senior water rights can be satisfied. In 2013, the Carlsbad Irrigation District, the senior surface water right holder on the Pecos River, invoked a priority call asking the State Engineer to curtail juniors so their water needs could be met. But for a strong monsoonal precipitation event in September 2013, the economic impact on the region could have been devastating, with some municipalities and industrial users of water unable to obtain sufficient water to meet their needs.

11. How frequently do droughts occur in New Mexico?

New Mexico, like most western states, is a naturally arid region and subject to highly variable precipitation every year. The period 2011 through 2013 represented one of the worst consecutive drought periods in the state's history since records have been kept – over 100 years. The susceptibility of the region to droughts illustrates the importance of one of the New Mexico Interstate Stream Commission's four main approaches to balancing supply and demand - **water conservation and efficiency.**

12. Is it typically feasible to treat groundwater for human use and/or consumption once it has been contaminated?

While it is theoretically and often technically possible to treat contaminated groundwater back to potable standards once it has been contaminated, feasibility is subject to many factors – availability of other sources, socio-economic conditions in the effected area, significant capital costs, increased operation and maintenance costs, etc. It is it certainly not desirable as a first choice, and in most cases it would not be economically feasible. Furthermore, most regulators will only permit contaminated groundwater to be treated sufficiently for discharge to surface water bodies, not for potable water supplies. It can be likened to the Pareto principle – the 80/20 rule: you can spend 20% of your resources working to maintain existing potable supplies through conservation, source water protection and other strategies, or 80% of your resources bringing contaminated supplies back to potable conditions. Thus, it is almost always more cost effective to design processes to avoid groundwater contamination rather than treating groundwater after contamination occurs. It is for this reason that municipalities and other water suppliers work so hard to maintain access to potable groundwater supplies that can be utilized with less expensive treatment techniques.

13. What options are available to local governments when demand for water approaches or exceeds available supply in places like Artesia?

Local governments have a number of options available when demand approaches or exceeds available supply. For example, in 2013, in the depth of a multi-year extended drought period, the city of Artesia bumped up against the limits of its water rights by producing 87% of its legal capacity from its wells. This fact caught the attention of the Council, Mayor, staff and area water users and served as the impetus for Artesia's current water conservation initiatives. Two primary options exist for the City in addressing this water demand for the future.

1. Increasing supplies through the addition of water rights – if available and affordable. Senior rights are the preferred investment garnering greater likelihood of associated "*wet water*" and supply reliability.
2. Reducing demand through water conservation and water use efficiency.

The first option is more challenging at this time. The City of Artesia currently owns 7,358 ac/ft of water rights and has a population of 11,948. For planning purposes, if the community was to increase to a population of 20,000 within the next 30 years it would need an estimated additional 2,641 ac/ft of water rights to meet demand based on current usage patterns. The estimated cost of acquiring these supplemental rights is $13.2 million in today's dollars based on research and information that the City of Artesia has provided.

Thus, the City is presently focusing on the second option, while continuing to monitor the market for supplemental water rights. Both conservation and water use efficiency are precisely what the City, in conjunction with its citizens and businesses, are pursuing. The "Waste Water" Ordinance described more fully below was passed in April 2015 and took effect immediately. Implementation activities, business outreach, and a structured public education program are in their initial stages.

14. What types of water conservation options are available for the residential and commercial sectors?

There are several water conservation options available to the residential and commercial sectors. Residents and businesses can conserve water both from indoor and outdoor uses. Indoor options include replacing older style toilets with low-flow toilets; finding, fixing and repairing any leaks, installing low water use fixtures and appliances, replacing evaporative coolers with refrigerated air conditioning systems and capturing water for other uses while waiting on hot water to appear.

Examples of outdoor conservation options include conversion to xeriscaping (landscaping and gardening that reduces or eliminates the need for irrigation), rainwater harvesting, containerizing plants, and installing low head or drip irrigation systems. Additionally, as is being addressed by the City's Water Waste ordinance, limiting outdoor irrigation to certain hours of the day, certain months of the year, and certain days per week can result in profound water savings over the course of a year.

15. What types of water conservation options are available for industrial sectors?

For industrial sectors some options would be leak detection and repair, high-efficiency fixture and appliance replacement, cooling towers, steam and boiler systems, processing equipment,

specialized non-residential surveys, audits, and process efficiency improvements. Industrial applications can often use water of lesser quality or non-potable as process water, wastewater effluent reuse as an example.

Other water conservation measures would be efficient use of gray water, effluent re-use and recycling programs including air cooling condensate, cooling tower blow down, and rainwater. Industrial facilities can also realize significant savings from the same measures available to residential and commercial users.

16. Have you participated in the development of Artesia's water conservation strategies?

Yes, I participated in the development of Artesia's water conservation strategies and am actively engaged in this program at present. The aspects that I have been involved with include researching best practices for water conservation, consumer behavior, other community's conservation planning efforts, projecting population growth and potable water demands with and without a water conservation plan in effect, and current water use patterns.

I have also assessed evapotranspiration (ET) and consumptive use of vegetation and landscaping typical to the Artesia area, which helped determine effective irrigation by hours during the day, days per week, and weeks per month throughout the year.

17. Why is developing water conservation strategies important for Artesia?

The City of Artesia, based on 2012 water usage figures, is currently using up to approximately 85% of its water right availability. Based on current projected water demands, if the City of Artesia purchases no additional water rights, demand would meet current capacity in approximately five years. This is based on the 7,358.72 acre/feet of water rights that the city currently owns.

18. What mandatory water conservation strategies has Artesia enacted?

Thus far, the City's efforts have focused on actions that can be taken by resident and commercial customers, but all water users are subject to the provisions of the Water Waste ordinance. The newly enacted ordinance implements water restrictions that apply to all customers within the City Service Area. These restrictions include:

- Requiring self-canceling or automatic shut off nozzles for any hoses.
- Establishing allowable hours for spray irrigation during the day.
- Providing drinking water to customers in restaurants only upon request.
- Mandating any leaks in the system be repaired within five (5) working days after first discovery.
- Requiring that all spray irrigation during the period April 1st thru October 31st of each calendar year must occur only between 7:00 p.m. and 11:00 a.m. This restriction does not apply to drip irrigation and low head bubblers, hand watering, or watering of containerized plants and plant stock.

19. How would voluntary adoption of water conservation measures at industrial facilities affect water availability in Artesia?

It should be apparent that water conservation across all consumer sectors in the city is necessary to meet the City's goals of a 25% reduction in water use as stated in the Water Waste ordinance. Demand side reduction in water use through conservation and efficiency improvement will have a positive economic effect on water rates. Without reductions in water use and per capita water consumption, the City's requirements to add additional supply through water rights, capital investment in infrastructure, and increased operation and maintenance costs will be borne by the rate payers.

Artesia's biggest industrial customer, Navajo Refinery, is currently purchasing 44% of the total annual water delivery. If Navajo Refinery is able to conserve up to 39% of its water usage alone, as indicated by the water conservation initiatives referenced in Michael McKee's testimony, the City of Artesia would reduce approximately 17% of its total demand (39% of 44% ~ 17%). That would be a significant contribution towards the City's overall water use reduction goals and this effort alone would improve the City's position with respect to its current water right portfolio and its system reliability "cushion" in periods of extended drought and reduced production from its wells.

20. How meaningful would a 17% reduction in the city's water consumption be from the standpoint of water reserves and resiliency?

As I mentioned above, Artesia's "Water Waste Ordinance" sets an overall goal of reducing water consumption by 25%. Navajo Refinery's 17% reduction to the City's overall water usage as illustrated above goes a long way in accomplishing that water conservation goal. In fact, if Navajo Refinery were to reduce its water consumption by 39%, the remaining 56% of Artesia's water users would only have to meet a 14% reduction to achieve the city's overall goal of 25%. This would save the City of Artesia money by not purchasing additional water rights, but more importantly promote the longer-term reliability of providing water to all the City's residents and businesses while conserving existing supply.

21. In your opinion, does the proposed rule before the WQCC provide beneficial opportunities for needed water conservation in Artesia?

Yes. As I understand it, the proposed rule would allow the Navajo Refinery to apply for a Class I hazardous waste injection well permit. Currently, as I understand it, the facility only has Class I nonhazardous waste injection wells. An appropriately developed hazardous waste injection well would allow the refinery to concentrate its wastewater discharges, meaning it could recycle and reuse wastewater in its process, with a corresponding decrease in demand for fresh water. From the calculations during the development of the "Water Waste Ordinance" it is projected that if the City's overall water conservation plan were to meet a 20% reduction in water usage, current water system capacity, including water rights, would extend for an additional 18 years. Navajo's 39% water conservation strategies almost doubles Artesia's 20% conservation calculated numbers, and, if implemented, would add another 7 years to its projected additional 18 years of current water system capacity. I am not aware of any other proposed rule or regulation that would lead to such a significant result.

Francisco Salvarrey

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