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

ROBERT O'BRIEN

ON BEHALF OF

NAVAJO REFINING COMPANY, L.L.C.

June 15, 2015

Contents

1. Please state your name and business address.

My name is Robert O'Brien. My business address is 501 E. Main Street, Artesia, New Mexico 88211.

2. Please state your qualifications to provide this testimony.

I am a chemical engineer with nearly 35 years of experience in the oil and gas industry and a focus on refinery operations. I have a B.S. (magna cum laude) in Chemical Engineering from the University of Cincinnati. I am currently the Vice President and Refinery Manager for Navajo Refinery. In that role, I am responsible for the operation of Navajo Refining's facilities in Artesia and Lovington, New Mexico (the "Navajo Refinery"). Prior to joining Navajo Refining, I worked in a variety of capacities for Shell Oil Products, many of which involved Shell's refinery operations. In my current position, I have been involved in all aspects of the refinery's operations and planning, including the submission of this rulemaking petition. My resume is attached to this testimony as Exhibit A.

3. Please provide an overview of Navajo Refinery's operations.

Navajo Refinery's operations involve the conversion of crude oil into transportation fuels and other desirable products. The refinery consists of two facilities in Artesia and Lovington, New Mexico. The Lovington facility processes crude oil into intermediate products. The Artesia facilities process crude oil as well as intermediate products from the Lovington facility into final products. The refinery processes crude oil from the Permian Basin and from western Canada, although the crude slate varies based on availability and on market conditions. Table 1 below provides a representative sample of the refinery's crude slate. The refinery has a nominal rating of 100,000 barrels/day (bpd). Production varies based on the types of crude oil that are processed at the refinery.

Table 1:

Crude Origin	Percent
New Mexico	77%
Texas	20%
Canada	3%
Total	100%

4. What products does the Navajo Refinery produce?

The Navajo Refinery produces transportation fuels and a number of other products. The primary products produced by the refinery are gasoline and diesel fuel, which comprise nearly 90% of total production. Other products produced at the refinery include propane, fuel oil, asphalt, and sulfur. The composition of the final products produced at the refinery can vary depending on the types of crude oil that are processed and on market conditions. Table 2 below is a representative example of the refinery's production.

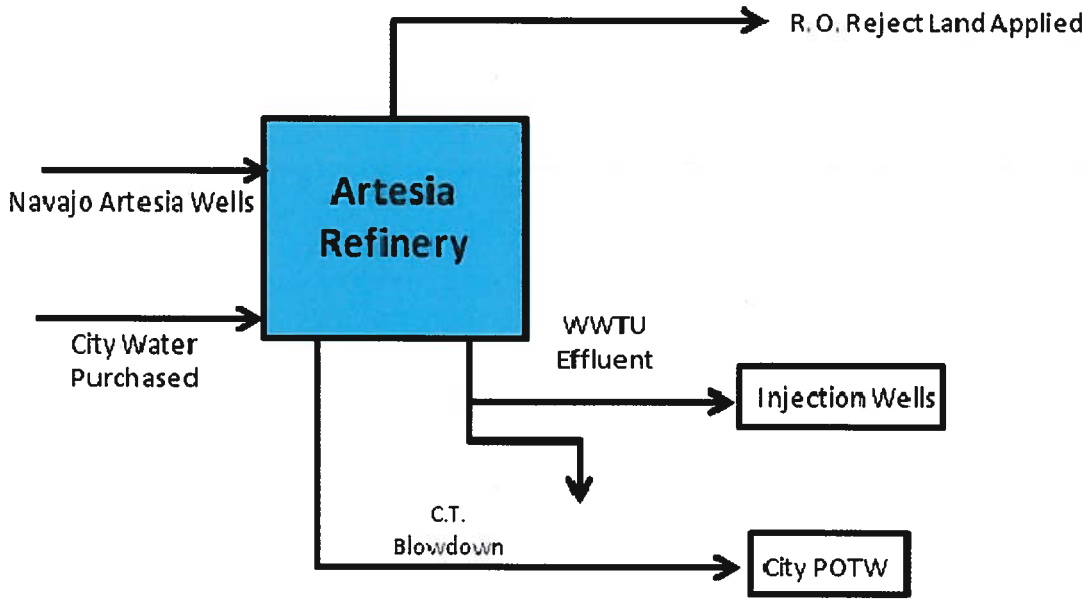
Table 2:

2013 Annualized Production (excluding fuel gas produced)	Barrels per Day	%
Propane	821	0.9%
Gasoline	44,702	49.2%
Ultra Low Sulfur Diesel	36,079	39.7%
Fuel Oil	5,392	5.9%
Asphalt	2,774	3.1%
Sulfur	290	0.3%

5. What byproducts are produced during the refining process?

Navajo Refinery has several waste streams that potentially could be disposed of in an injection well under appropriate conditions and circumstances. First, effluent from the refinery's wastewater treatment plant is currently disposed of in three UIC Class I nonhazardous waste injection wells operated by the refinery. In addition, a small stream of wastewater effluent is processed in Artesia's publicly owned treatment works (POTW). This effluent comes from a number of different processes within the refinery including washdown, sour water stream, wash water from process units and other operations. Second, blowdown from the refinery's cooling towers is sent to Artesia's POTW for treatment prior to discharge. Third, the refinery's reverse osmosis (RO) units produce RO reject fluid which is land applied pursuant to a discharge permit issued by New Mexico Oil Conservation Division (OCD). The RO process purifies fresh water by removing total dissolved solids (TDS), and the RO reject fluid contains those dissolved solids. The solids were contained in the fresh water obtained by the refinery, but they are concentrated by the RO process. A diagram of the refinery's wastewater streams is provided in Figure 1 below:

Figure 1:



In addition to these wastewater streams, Navajo Refinery produces other byproducts which, based on their physical and chemical composition, cannot be disposed of through underground injection. First, the refinery produces air emissions which are subject to separate permitting requirements under state and federal law. Second, the refinery produces solid wastes, sludges, sediments, liquid wastes, and spent catalysts that are transported off-site to landfills, fuel blenders, incinerators, or reclamation facilities for reclamation, treatment, or disposal.

6. Are any of the byproducts described above currently considered hazardous waste under state or federal law?

Yes. Some of the solid waste produced by the refinery (including sediments, sludges, and liquid waste) are considered hazardous waste, but these byproducts are not suitable for underground injection and are reclaimed, treated, or disposed of off-site in accordance with state and federal regulations. Effluent from the wastewater treatment unit does not qualify as a hazardous waste under normal operating conditions.

7. Could any of the wastewater byproducts be considered hazardous waste if they contained constituents in greater concentrations?

Potentially yes, depending on the concentrations of certain constituents. As I understand it, one of the factors for determining whether a substance like wastewater is a hazardous waste relates to the concentrations of specific constituents in that wastewater. Wastewater that is nonhazardous can become hazardous if the ratio of water to those specific constituents exceeds a threshold set by U.S. EPA. Thus, effluent from the refinery's wastewater treatment unit could qualify as characteristic hazardous waste in certain circumstances. Of the relevant constituents, selenium is currently present in the highest concentrations and would be the constituent most likely to trigger a hazardous waste determination, but only if it becomes concentrated. Other relevant chemicals present in effluent from the wastewater treatment unit include arsenic, barium, mercury, and benzene, but these chemicals are present in much lower concentrations than selenium. None of these constituents in the wastewater effluent currently exceed any hazardous waste threshold. The RO reject fluid that is currently land applied and the cooling tower blow-down/wastewater effluent disposed of through the Artesia POTW do not include any potentially hazardous chemical constituents beyond what is in the wastewater effluent, to my knowledge.

In addition, benzene is present in the wastewater that enters the treatment unit. While the wastewater treatment unit is designed to remove benzene from the effluent, it is possible that benzene could be present in effluent from the wastewater treatment unit if, for example, a malfunction were to occur.

8. Could Navajo Refinery reduce or eliminate those potentially hazardous byproducts through changes in refinery operations?

No. Constituents like selenium are naturally present in the crude oil that is processed at the refinery as well as in the fresh groundwater and water purchased from the City of Artesia. As a result, these constituents cannot be reduced or eliminated without reducing or eliminating refining capacity.

Nor are there any feasible alternatives for disposal. In response to previously high selenium concentrations in the wastewater treatment unit, the refinery has already installed a Selenium Reduction Treatment (SeRT) unit which removes selenium from the effluent stream and ensures that selenium concentrations in the wastewater treatment unit effluent remain below characteristically hazardous thresholds. The refinery is currently in the process of upgrading the SeRT unit to improve efficiency, which could further reduce but not eliminate selenium concentrations in the effluent. In addition, the refinery has also installed and operates an Iron Coprecipitation Process (ICP) to remove selenium from the final effluent prior to routing the effluent to the wells. Additional treatment technology for selenium beyond those currently planned are not economically feasible.

Other alternative treatment options such as evaporation ponds or brine crystallization are prohibitively expensive and are not a feasible alternative to underground injection for the entire wastewater effluent stream. Land application, which is currently used for RO reject, is not available for the refinery's wastewater treatment effluent because it would exceed applicable groundwater standards. Further disposal through Artesia's POTW is not available because the facility cannot remove selenium and other components described above to meet the POTW's discharge requirements.

9. Has Navajo Refinery had any compliance issues related to the injection of wastewater treatment unit effluent in UIC Class I nonhazardous waste injection wells?

The refinery has not experienced any issues with the operational integrity of any of its Class I nonhazarous injections wells. In 2013, Navajo Refinery discovered that, on several occasions, selenium concentrations in the wastewater treatment unit effluent exceeded the characteristically hazardous threshold. In response, the refinery entered into a settlement agreement with the state and purchased the ICP and SeRT units to remove selenium from the effluent stream prior to injection. Since that time, I am not aware of any issues related to the UIC Class I nonhazardous waste injection wells.

10. Why is Navajo Refinery interested in regulations that would authorize UIC Class I hazardous waste injection wells in New Mexico?

Navajo Refinery's primary interest in regulations that would authorize UIC Class I hazardous waste injection wells in New Mexico is additional operational flexibility. Having the opportunity to obtain a permit for and, if necessary, inject hazardous wastewater into a UIC disposal well would provide the refinery with the flexibility to make additional operational changes that would provide the following substantial benefits to the refinery and the community without creating productivity risks.

First, obtaining a Class I hazardous waste injection well permit would provide the refinery with the operational flexibility to implement water conservation measures that will have the effect of conserving a significant amount of water resources. The refinery is considering a variety of water conservation and re-use opportunities in the refinery. Implementing such water conservation measures will benefit the refinery and the local community by reducing the refinery's reliance on Artesia's public water supply and/or its well water. But the water

conservation math is simple: conserving water cannot be accomplished without concentrating chemical constituents in the remaining wastewater effluent. The more those constituents are concentrated, the greater the water savings, but the more likely it will be that the remaining effluent will become characteristically hazardous. This process would not itself create any new pollution, however. Receiving a Class I hazardous waste injection well permit would ensure that the refinery can continue to operate at full capacity, even if concentrations of selenium exceed the characteristically hazardous threshold in the future.

Second, Navajo Refinery is interested in constructing a Class I hazardous waste injection well at this time due to other operational needs at the refinery. Separately from any water conservation measures, Navajo Refinery is currently planning to permit and construct a fourth UIC well for disposal of wastewater from the refinery. The refinery's three existing Class I non-hazardous wells have finite storage capacity and due to their age and proximity to other wells, allowable injection rates are declining over time. Installing a fourth UIC well will ensure that the facility has the capacity to dispose of effluent from the wastewater treatment unit and would also provide an alternative to land application for RO reject fluid. Constructing a well that would comply with the more stringent standards for Class I hazardous waste injection wells would provide Navajo Refinery with operational flexibility going forward.

Navajo Refinery does not anticipate injecting any new waste streams into the well if it obtains a Class I hazardous waste injection well permit, aside from the secondary RO reject fluid (which is not projected to be characteristically hazardous).

11. How many people are employed in Artesia by Navajo Refining?

Navajo Refining and its affiliate companies currently employ approximately 850 people in Artesia. In addition, the refinery indirectly manages a significant number of people who work as contractors at the refinery or in support of refinery operations.

12. How large is the Navajo Refinery compared to other employers in the Artesia area?

Navajo Refinery and its affiliate companies are currently the largest private employer in the Artesia community and the second largest employer overall. Table 3 below, which was obtained from the Artesia Chamber of Commerce, lists the largest employers in Artesia.

Table 3:

Artesia's Major Employers	
Company	Employees
Federal Law Enforcement Training Center	920
Navajo Refining & Affiliates	850
Mack Energy and related companies	600
Artesia Public Schools	432
Yates Petroleum and related companies	350
Artesia General Hospital	275
Wal-Mart	225
Halliburton	220
Baker Hughes	210
City of Artesia	202
Concho Oil and Gas	175
J&J Home Care	120
Penasco Valley Telecommunications	102
Devon Energy	100

13. What investments has Navajo Refinery made to support the continued operations of the refinery?

Navajo Refining is committed to the Artesia community and had made significant capital investments in recent years to ensure the long-term viability of the facility. In 2002, our parent company's predecessor, Holly Corporation, commenced a three-phase expansion of the refinery that increased the capacity from approximately 70,000 bpd to a nominal rating of 100,000 bpd. This was a substantial undertaking and required an investment of nearly $1 billion in capital.

Since then Navajo Refining has continued to make capital investments to maintain and improve operations at the facility. For example, as discussed above, in 2013 Navajo Refining invested just over $5 million to install the SeRT unit to remove selenium from the refinery's effluent. In addition, the costs of the ongoing upgrade to the SeRT unit are projected to be approximately $4 million.

These investments demonstrate the commitment that Navajo Refinery and our parent company HollyFrontier Corp. have made to Artesia.

14. What tax benefits does Navajo Refinery provide to New Mexico and to the Artesia community?

In addition to being the largest employer in Artesia, Navajo is one of the largest property owners in the area. In 2014, the Navajo Refinery paid a total of $4,408,062.72 in property taxes, the majority of which support local activities. Our property is located partially inside and partially outside of Artesia's city limits, and the property tax distribution for each portion of the refinery's property is provided in Table 4 below:

Table 4:

	Residential (inside city limits)	Non-residential (outside city limits)
State	6.73%	6.12%
County	33.03%	33.74%
Municipal	8.74%	10.01%
Schools	36.28%	33.55%
Hospital	17.94%	16.57%

15. In what other ways does Navajo Refinery benefit the local community?

Navajo Refinery is an active member of the Artesia community and supports it in a number of ways. It is a major contributor to the new library in Artesia and to the Artesia Chamber of Commerce and the Artesia Main Street Association. The refinery also provides financial support to local schools, community events, social programs, community development initiatives, youth programs, youth sports, the arts, public safety programs, neighborhood programs, and other non-profit organizations.

Navajo Refinery also provides a wide range of non-financial support including a large team of volunteers who work within the community serving civic and social organizations and other non-profit organizations. In addition, Navajo Refinery participates in joint drills with local emergency responders.

16. Is Navajo Refining recommending any changes to the proposed amendments to 20.6.2.3000 NMAC or 20.6.2.5000?

Yes. Navajo Refining is recommending a number of clerical changes to the proposed amendments, as well as one substantive—but uncontroversial—change that would result in EPA rather than OCD administering the no migration petition program after Class I hazardous waste injection well permits are issued. The recommended changes are provided below. A complete set of proposed regulations that includes these recommended changes is included as Exhibit B to my written testimony.

Changes to Section 20.6.2.5004 NMAC. Navajo Refining is recommending a change to Subsection A(3)(a) of Section 20.6.2.5004 to reflect the fact that this provision would prohibit only to Class I radioactive waste injection wells and not other Class I wells, including hazardous waste. In particular, this is intended to clarify that Class I hazardous waste injection wells, which are subject to the requirement in Subsection A(3) of Section 20.6.2.5004, would no longer absolutely prohibited. Instead, they would be subject to the permitting requirements of the proposed regulations. The proposed change is highlighted below:

20.6.2.5004 PROHIBITED UNDERGROUND INJECTION CONTROL ACTIVITIES AND WELLS:

A. No person shall perform the following underground injection activities nor operate the following underground injection control wells:

* * * * *

(3) The injection of any hazardous or radioactive waste into a well is prohibited, except as provided in Sections 20.6.2.5300 through 20.6.2.5399 NMAC or this Subsection.

(a) Class I [~~hazardous or~~] radioactive waste injection wells are prohibited, except naturally-occurring radioactive material (NORM) regulated under Section 20.3.1.1407 NMAC is allowed as a Class I non-hazardous waste injection well pursuant to Subsection B (1) of Section 20.6.2.5002 NMAC;

Changes to Sections 20.6.2.5101, 20.6.2.5209, and 20.6.2.5210 NMAC. Navajo Refining is recommending changes to Sections 20.6.2.5101, 20.6.2.5209, and 20.6.2.5210, each of which deletes the phrase "non-hazardous waste injection" to indicate that under this proposal, Class I hazardous waste injection wells would also be authorized in New Mexico (subject to permitting). These recommended changes are highlighted below:

20.6.2.5101 DISCHARGE PERMIT AND OTHER REQUIREMENTS FOR CLASS I [~~NON-HAZARDOUS WASTE INJECTION~~] WELLS AND CLASS III WELLS:

* * * * *

I. Modification or Termination of a Discharge Permit for a Class I [~~non-hazardous waste injection~~] well or Class III well: If data submitted pursuant to any monitoring requirements specified in the discharge permit or other information available to the secretary indicate that this Part are being or may be violated, the secretary may require modification or, if it is determined by the secretary that the modification may not be adequate, may terminate a discharge permit for a Class I [~~non-hazardous waste injection~~] Well, or Class III well or well field, that was approved pursuant to the requirements of this under Sections 20.6.2.5000 through [~~20.6.2.5299~~] 20.6.2.5399 NMAC for the following causes:

20.6.2.5209 PLUGGING AND ABANDONMENT FOR CLASS I [~~NON-HAZARDOUS WASTE INJECTION~~] WELLS AND CLASS III WELLS:

A. The discharger shall submit as part of the discharge permit application, a plan for plugging and abandonment of a Class I [~~non-hazardous waste injection~~] well or a Class III well that meets the requirements of Subsection C of Section 20.6.2.3109 and Subsection C of Section 20.6.2.5101 NMAC and 20.6.2.5005 NMAC for protection of ground water. If requested, a revised or updated abandonment plan shall be submitted for approval prior to closure. The obligation to implement the plugging and abandonment plan as well as the requirements of the plan survives the termination or expiration of the permit.

B. Prior to abandonment of a well used in a Class I [~~non-hazardous waste injection~~] well or Class III well operation, the well shall be plugged in a manner which will not allow the movement of fluids through the well bore out of the injection zone or between other zones of ground water. Cement plugs shall be used unless a comparable method has been approved by the secretary for the plugging of Class III wells at that site.

20.6.2.5210 INFORMATION TO BE CONSIDERED BY THE SECRETARY FOR CLASS I [~~NON-HAZARDOUS WASTE INJECTION~~] WELLS AND CLASS III WELLS:

* * * * *

B. Prior to the issuance of a discharge permit or project discharge permit allowing construction of a new Class I [~~non-hazardous waste injection~~] well, operation of an existing Class I [~~non-hazardous waste injection~~] well, or operation of a new or existing Class III well or well field, or conversion of any well to injection use, the secretary shall consider the following:

* * * * *

(2) A map showing the Class I [~~non-hazardous waste injection~~] well, or Class III well or well fields, for which approval is sought and the applicable area of review. Within the area of review, the map must show, in so far as is known or is reasonably available from the public records, the number, name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells and other pertinent surface features, including residences and roads;

Changes to Section 20.6.2.5341 NMAC. Navajo Refinery is recommending a change to Subsection L of Section 20.6.2.5341 NMAC to reflect the fact that reports required by these provisions would be submitted to the Director of OCD rather than the Administrator of the U.S. Environmental Protection Agency (EPA). The proposed change is highlighted below:

20.6.2.5341 CONDITIONS APPLICABLE TO ALL PERMITS:

* * * * *

L. *Signatory requirement.* All applications, reports, or information submitted to the Director~~Administrator~~ shall be signed and certified. (See Subsection G of 20.6.2.5101 NMAC.)

Changes to Sections 20.6.2.5360, 20.6.2.5371, and 20.6.2.5372 NMAC. Navajo Refining is recommending several changes that would have the effect of retaining authority for reviewing No Migration Petitions and approving No Migration Exemptions with EPA Region 6, which is the current situation. Under these recommended changes, OCD would retain authority to issue Class I hazardous waste injection well permits. However, successful permit applicants would have to obtain a No Migration Exclusion from EPA Region 6 before they could commence injection of hazardous waste pursuant to a Class I hazardous waste injection well permit. As I understand it, this division of authority between OCD and EPA would be consistent with the manner in which Class I hazardous waste injection wells permit applications and No Migration Exclusions are processed in all other states that have authorized Class I hazardous waste injection wells. To effect this change, Navajo Refining is recommending the deletion of Sections 20.6.2.5371-72 NMAC, which incorporate by reference 40 C.F.R. Part 148. To clarify that permit applicants must obtain a No Migration Exclusion prior to commencing injection we are also recommending a new provision in Subsection B of Section 20.6.2.5360 NMAC that clarifies that a permittee must provide the Director of OCD with evidence that a No Migration Exemption has been granted before the Director can grant approval to operate a Class I hazardous waste injection well. The proposed changes are highlighted below:

20.6.2.5360 INFORMATION TO BE EVALUATED BY THE DIRECTOR:

* * * * *

B. Prior to the Director's granting approval for the operation of a Class I hazardous waste injection well, the owner or operator shall submit and the Director shall review the following information, which shall be included in the completion report:

* * * * *

(7) the calculated area of review based on data obtained during logging and testing of the well and the formation, and where necessary revisions to the information submitted under Subsections A(2) and (3) of Section 20.6.2.5360 NMAC; ~~and~~

(8) the status of corrective action on wells identified in Subsection A(15) of Section 20.6.2.5360 NMAC.~~; and~~

(9) evidence that the permittee has obtained an exemption under 40 C.F.R. Part 148, Subpart C for the hazardous wastes permitted for disposal through underground injection.

20.6.2.5364 – 20.6.2.539~~70~~: [RESERVED]

~~20.6.2.5371 ADOPTION OF 40 CFR PART 148 (HAZARDOUS WASTE INJECTION RESTRICTIONS). Except as otherwise provided, the regulations of the EPA set forth in 40 CFR Part 148 [insert current effective date] are hereby incorporated by reference.~~

~~20.6.2.5372 MODIFICATIONS, EXCEPTIONS, AND OMISSIONS. Except as otherwise provided, the following modifications, exceptions, and omissions are made to the incorporated federal regulations.~~

~~A. The following terms used in 40 CFR Part 148 have the meanings set forth herein when the terms are used in this part:~~

~~(1) "administrator" means the Director of the New Mexico energy, minerals and natural resources department, oil conservation division or his/her designee.~~

~~B. The following provisions of 40 CFR Part 148 are modified in Section 20.6.2.5381 NMAC:~~

~~(1) the cross reference to 40 C.F.R. § 146.6(a) in Section 148.1(d)(1) shall be replaced by a cross reference to Subsection B(1) of Section 20.6.2.5002 NMAC;~~

~~(2) the cross reference to § 146.63 in Section 148.20(a)(2) shall be replaced by a cross reference to Section 20.6.2.5353 NMAC;~~

~~(3) the cross reference to § 146.64 in Section 148.20(a)(2) shall be replaced by a cross reference to Section 20.6.2.5354 NMAC;~~

~~(4) the cross reference to § 124.10 in Section 148.22(b) shall be replaced by a cross reference to Section 20.6.2.3108 NMAC;~~

~~(5) the cross reference to § 146.67(i) in Section 148.24(b)(2)(ii) shall be replaced by a cross reference to Subsection I of Section 20.6.2.5357 NMAC;~~

~~(6) the cross reference to § 124.5 in Section 148.24(c) shall be replaced by a cross reference to Sections 20.6.2.3108 through 20.6.2.3112 NMAC;~~

~~(7) references to "Underground Source of Drinking Water" or "USDW" shall be replaced with references to "groundwater of the State of New Mexico" as defined in 20.6.2.5301 NMAC.~~

~~C. The following provisions of 40 CFR Part 148, Subpart B are omitted from Section 20.6.2.5371 NMAC:~~

~~(1) Section 148.15(c);~~

~~(2) Section 148.16(d).~~

Robert O'Brien