BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of: Application No. 2013-01 TESORO SAVAGE, LLC TESORO SAVAGE DISTRIBUTION TERMINAL	CASE NO. 15-001 SWORN PRE-FILED TESTIMONY OF JEFFREY B. HALE

I, Jeffrey B. Hale, state as follows:

1. I swear under the penalty of perjury of the laws of Washington and the United States that the following testimony is true and correct.

2. I am over eighteen years of age and am otherwise competent to testify in this case. My testimony is based upon my education, training, experience, professional qualifications, and understanding of the matters herein.

3. Based on my professional experience and training, I have developed an expertise in the conceptual layout of industrial facilities and final design.

I. EDUCATION AND PROFESSIONAL BACKGROUND

4. I am a civil engineer with R&M Engineering Consultants.

5. R&M Engineering Consultants is a civil/structural engineering firm that is licensed in many states, including the State of Washington. The emphasis of the company is in the industrial market, including work on rail loading and unloading facility & support structures. I am a licensed engineer in the State of Utah, but for this project I am working under the direction of Norman L. Bennion P.E. (Washington).

6. I graduated from the University of Utah in 2003 with a Bachelor in Civil Engineering. The following year, from the same school, I received my Master of

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Engineering in Civil Engineering Project Management. Since June of 2003 I have worked at R&M Engineering. My time here has been focused mainly in the industrial sector. I have designed many steel structures and their accompanying concrete foundations. These structures have been located in many locations spread out across the country. I have experience designing structures in both highly seismic regions as well as in hurricane-prone areas. I have also worked on the design of many railroad facilities for loading and unloading product. My involvement in many jobs starts during the conceptual layout phase, and then continues through to include final design.

II. PURPOSE OF TESTIMONY

7. The purpose of my testimony is to address how the Vancouver Energy Project's Application for Site Certification (ASC) complies with the requirements of WAC 463-60-145 and Adjudication Issue 16 and 31, as identified in the Administrative Law Judge's Order Clarifying EFSEC's Process, Modifying Dispositive Motion Deadline, Summarizing Preliminary Issues, and Setting Hearing Dates (February 3, 2016). As explained below, based upon my review of the application and available information, the ASC meets the requirements of WAC 463-60-145, all applicable codes and engineering standards, and the project as described in the ASC is designed to protect the public interest with respect to risks from geological or soil hazards and human or mechanical error.

III. SCOPE OF WORK ON PROJECT

8. For the Vancouver Energy Project located in Vancouver, Washington, my involvement started in early 2013, drawing up a conceptual layout of the site. This was done based on the input from the design team. The layout has been changed numerous times since then, as is common with any design process, to get one that works to meet all

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the needs of the Project. By the time the Project is completed the full scope of R&M Engineering will include the following items:

- Area 0100 General Arrangment
  a. The Site Plans for the full facility.
- Area 0200 Rail Unloading and Office Area
  a. The foundation design of the rail unloading enclosure
  b. Cable tray support steel and foundation design outside of the rail unloading enclosure
  c. The foundation design of the office & change room buildings
  d. The foundation design of the secondary containment
  e. The foundation design for the MCC support slabs
  f. The foundation design for the fire foam and pump buildings
- Area 0300 Tank Storage Area
  a. The foundation design of the pre-engineered storage building
  b. The foundation designs for the product tanks inside the storage area
  c. The foundation design for the pipe supports from the storage area pump pit and the various tanks
  d. The steel and foundation design of the cable tray supports, inside and outside of the containment berm
  e. The foundation design of the storage area pump Basin
  f. The civil design of the storage area containment
  g. The foundation design for the MCC support slabs
  h. The foundation design for the fire foam and pump buildings
- Area 0400 Dock Loading Area
  a. The structural steel design of the hose and stair tower on the dock
  b. The foundation design for the MCC, fire foam, and pump building
  c. The structural steel design of the pipe supports out on the dock
  d. The foundation design for the MVCU
- Area 0500 Pipeline
  a. The foundation design of the pipelines that run between:
    i. The rail enclosure and the storage area pump Basin
    ii. The storage area pump pit and the dock area
  b. The storage area pump pit and the dock
  c. The design of the underground vaults for areas where the pipeline needs to go under the road or rail.

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- Area 0600 Boiler Building Area
  a. The foundation design of the pre-engineered boiler building
  b. The foundation and steel bridge supports for the pipeline running from the rail enclosure to the boiler building

The above list can be summarized into three areas of design: Site Plan, Steel Structure Design, and Concrete Foundation design.

A. <u>Site Plan</u>

9. The site plan is the design of where things are located on the site.

10. For Area 0200, we worked with the Port of Vancouver ("Port") to fit the rail unloading structure within the lease area. Likewise, we worked with the Port to locate the office/change room buildings within the lease area. We worked with ICPE, the electrical consultant, to determine where the electrical buildings needed to be placed. We referred to the Burlington Northern and Santa Fe Railway (BNSF) standards for rail clearance to make sure that no part of our structured violated their clearances for the rail line.

11. For Area 0300, we followed the NFPA 30 code to place our storage tanks at the prescribed distances based upon their volume and diameter. We worked with ICPE to locate the other electrical and pumping structures for this area.

12. For Area 0400, we worked with BergerABAM and the surveyor (MacKay Sposito) to determine where the ordinary high water line of the river is to make sure that our site plan minimized the impact below this line. We worked with ICPE, Poole Fire Protection, and BergerABAM to locate the electrical/fire pump building. ICPE gave us the best location for the MVCU. Finally ICPE, BergerABAM and R&M Engineering worked together to locate the structures out on the dock.

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13. For Area 0500, I worked with the MacKay Sposito and the Port to determine where the pipeline could be placed to minimize the impact on any of the Port's tenants.

14. For Area 0600, I worked with ICPE to determine the location layout of the Boiler building and the pipe route. I worked with Wiser Rail and the Port to locate the supports for the pipe bridge that would allow the rail to continue to operate with the required clearances.

B. Steel Structures

15. The steel structure design is the design of structural steel supports and frames to hold up various items. The code that governs the design of steel design is AISC 360. This code has the equations to tell engineers like me how to design structural steel so that the steel safely supports the loads prescribed in ASCE 7. ASCE 7 is the code that gives the recommended loading for a structural design. (This loading includes loads like Wind & Seismic Loading.)

16. For Areas 0200 & 0300, our structural steel design was limited to the supports for cable trays. In Area 0200, our design was limited to the cable tray supports outside of the enclosure for the electrical wires. Cable trays are the pathways for all the electrical and communication wires between the different components of the area. As part of ICPE's design, they located where the trays needed to be, and then R&M Engineering designed the support steel.

17. For Area 0400, R&M Engineering designed the cable tray support steel, as well as the pipe bridge going over the road and the dock hose and stair towers. ICPE located where the pipe had to go, and R&M Engineering designed the pipe bridge to support it over the road. To load ships, a tower needed to be designed on the dock to lift

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and place the product hose in the right location to fill the vessel. Also, a stair tower needed to be added in order to access the different levels of the hose tower, as well as allow the crew of the ship to get safely onto the dock. R&M Engineering worked with ABAM and ICPE for this project. The coordination with BergerABAM was due to the fact that they designed the dock that will support these structures. ICPE and R&M Engineering had to coordinate on the requirements of the hose tower (i.e. where to place the hoses, how to raise them, etc.).

18. For Areas 0500 & 0600, we designed steel supports for supporting various pipes as they crossed over active rail lines. The heights of these pipes were determined based on the required clearances from the BNSF standards. The same code of ASCE 7 and AISC 360 were followed for these designs.

C. <u>Concrete Foundation design</u>

19. This is the design of the concrete foundations to support buildings, pipelines, structural steel supports, tanks, etc. The code that governs all the concrete design is the ACI 318. This is supplemented by API 650 for the large tank design. Using the geotechnical information from GRI and with the ground improvement from HBI, these codes prescribe how to design a footing that will properly and safely support the structure above. The way this is done is by making sure that the foundation and structure do not tip over, slide, pick up, or sink down during a design event.

20. For the various pipe foundations and cable tray foundations, the loading was given to R&M Engineering by ICPE. The tank foundations in Area 0300 were designed for the tanks that T. Baily has designed.

21. During the DEIS process, I worked with the design team to review the section on seismic issues and address issues raised in the DEIS. We worked as a team to

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find ways to minimize the ground improvement in order to minimize the potential for impacts resulting from that work. This was done by rearranging the various components of the site plan in Area 0400 to be land side of the ordinary high water mark (OHM). Once this new site layout was done, it was sent to Hayward Baker to allow them to revisit their design for the new design requirements.

IV. DESIGN WORK ON THE PROJECT

22. During the course of this project, R&M Engineering relied upon information provided from various companies that comprise the design team. These companies included following:

- Intermountain Consumer Professional Engineers, Inc. (ICPE) provided mechanical engineering and electrical engineering for the project. This included the sizes of the buildings needed as well as loading and configuration of the pipelines. ICPE also provided the settlement criteria for ground improvement and allowable settlements for foundation design.
- GRI Engineering has provided a soils report for the facility that we have relied upon for design of the footings for buildings and pipe supports. They have also provided the seismic information for design of ground improvements.
- Hayward Baker is a specialty contractor who has provided information for the ground improvements that need to take place both Areas 0300 & 0400. The design criteria for their work such as settlement and horizontal movement that is allowed has been provided by different members of the design team, through R&M Engineering.
- BergerABAM has provided the elevations for the finished site work to provide for drainage work. This information has been coordinated with the site layout work that R&M Engineering has provided. BergerABAM has also provided the geometry and other information for the dock design where R&M has provided structural steel structures. They are taking the tower from R&M and working that into their dock seismic upgrade.
- Poole Fire Protection has provided the information on fire protection for the facility.

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23. The information received from the various design firms listed above has been given in a manner that is very typical of what we have seen on other projects across the country, and typical of the types of expert reports, designs, and opinions we rely on in forming our design strategy. Considering the information from the design team, R&M Engineering designed the elements I have detailed in the section Scope of Work above. The design was intended to respond to site conditions and design criteria established by GRI, and also to meet all applicable regulations and codes. The codes and standards that R&M Engineering used for our design have been listed in the testimony of Norman L. Bennion. I have read through this list and agree with his statement.

24. In my work on the Project, I considered the information from all members of the design team, but in particular GRI's geotechnical analysis and design criteria, which took a conservative approach and required that all design elements meet or exceed design criteria to withstand a significant seismic event. R&M then designed the facility layout and arrangement for the entire site. R&M created the exhibits and drawings that represent the design construction plans, as noted in the ASC, Section 2.3.

25. The final design of the Project will meet the standard of care of all applicable design codes and the requirements for each code.

26. The following documents are attached to my testimony for reference:

Attachment A: Curricula Vitae

[Signature found on following page]

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DATED this 13th day of May, 2016.

Jeffrey B. Hale, Declarant

STATE OF Utah)
)
COUNTY OF Salt Lake)

Jeffrey B. Hale, being duly sworn upon oath, deposes and says: The foregoing testimony is true, correct and complete to the best of my knowledge, information and belief and is given subject to the laws of perjury in the State of Washington.

GIVEN under my hand and official seal this 13 day of May, 2016

Melloney Szarek
NOTARY PUBLIC in and for the State of:
Utah
Residing at: Salt Lake City
My Commission Expires: March 24, 2019
Printed Name of Notary:
Melloney Szarek

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