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 NICHOLAS NASH

I, Nicholas Nash, 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 experiences and training, I have developed an expertise in general industrial project engineering loading requirements.

I. EDUCATION, PROFESSIONAL BACKGROUND AND OTHER QUALIFICATIONS

4. I am a Project Manager and Project Engineer with Intermountain Consumer Professional Engineers, Inc. (ICPE). My business address is 1145 E South Union Ave, Midvale, UT 84047. My contact phone number is 801-255-1111 (office), and my email address is nic.nash@icpeinc.com.

5. I obtained my Bachelor of Science in Mechanical Engineering from Brigham Young University in 2009.

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6. I am a Project Manager and Project Engineer with experience in project management, project engineering and detailed engineering design. My experience ranges from managing multimillion dollar capital projects to completing detailed engineering and design. I have managed the engineering and design of the following similar transloading terminal projects:

- Delaware City Refinery Loop Track Unloading Facility. The facility is capable of unloading and transferring via a 24" overland pipeline approximately one unit train of crude per day.
- Savage Bakken Petroleum Services Hub. The facility is capable of unloading 12 tanker trucks at a time and transferring the crude to five crude storage tanks via pipelines. The facility is also capable of loading via pipelines 24 rail tanker cars at a time equating to approximately two unit trains per day. This facility has two vapor combustion units and is connected via pipeline to an underground crude oil pipeline for additional capacity.

7. ICPE is a Utah-based, full-service engineering firm providing a range of professional process, mechanical, piping, electrical, instrumentation and control, civil, and structural engineering and design services. The principals and key project engineers on staff have worked together in consulting and design since 1979. ICPE's engineering and design teams have a wide range of experience, including providing services for petroleum refineries, storage facilities, and transloading terminals.

8. ICPE was contracted by Savage Services to provide process, mechanical, piping, electrical, structural, and instrumentation and control engineering and design for the Vancouver Energy Project (Project). The various elements of ICPE's engineering and design scope of work are briefly described below in Section II.

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9. The Project consists of a team of consultants assembled by Vancouver Enery (VE) and managed by Savage Services. The team of consultants includes but is not limited to the following entities:

a. Savage Services

i. Project Management

b. Tesoro

ii. Project Management

c. Intermountain Consumer Professional Engineers, Inc.

iii. Electrical, Mechanical, Process, Structural, and Instrumentation and Control

d. R&M Engineering Consultants (R&M)

iv. Structural, Civil

e. GRI Engineering (GRI)

v. Geotechnical

f. Hayward Baker Incorporated

vi. Geotechnical

g. Berger ABAM

vii. Structural, Civil, Permitting

h. Poole Fire Protection

viii. Fire Protection

II. BRIEF DESCRIPTION OF ICPE'S ENGINEERING AND DESIGN SCOPE OF WORK.

10. As a general note, and as is the custom for this type of work, ICPE's work on the design continues as ICPE obtains additional information and works with the permitting agency to ensure compliance with all applicable standards and regulations.

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A. Process Design

11. ICPE is responsible for the Project block flow diagrams (BFD), process flow diagrams (PFD), and the piping and instrumentation diagrams (PID). These diagrams show, step-by-step, the functional flow of the Project.

B. Mechanical Design

12. ICPE is responsible for the Project general arrangement drawings and equipment specifications, including the specifications for the storage tanks and crude oil pumps. Please see section 2.3.6 of the ASC document for storage tank information. The storage tanks are engineered to meet the requirements of American Petroleum Association (API) 650 – Welded Tanks for Oil Storage. The Project's primary type of crude oil transfer pump is a positive displacement type that is engineered to meet the requirements of API 676 – Positive Displacement Pumps – Rotary.

C. Piping Design

13. ICPE is responsible for the piping engineering and design throughout the Project. Specifically, ICPE is responsible for the railcar unloading system piping and the discharge piping from Area 0200 to Area 0500. In Area 0300, ICPE is responsible for the tank interconnection piping, as well as the piping coming into and out of the area, including the pump piping. In Area 0400, ICPE is responsible for the marine terminal piping up to the hose manifold and including the return piping system. In Area 0500, ICPE is responsible for the transfer piping from Area 0200 to Area 0300, as well as from Area 0300 to Area 0400. In Area 0600, ICPE is responsible for the boiler system piping.

14. In Areas 0200, 0300, 0400, and 0500, the pipeline has been designed to meet the requirements of American Society of Mechanical Engineering (ASME) B31.4, Pipeline Transportation Systems for Liquids and Slurries. In Area 0600, the pipeline has

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been designed to meet the requirements of ASME B31.1, Power Piping. The ASME piping codes requires that the pipe be designed to withstand the maximum design temperature and pressure of the system in conjunction with external forces such as in the case of a seismic event.

15. The piping system has been designed with three basic pipe support types: vertical, guide, and anchor. The use of these three support types, along with the expansion loops, allows for the controlled thermal expansion of the pipe utilizing the expansion loops to relieve stress in the pipe.

16. The guide and anchor supports also serve the purpose of controlling pipe movement during a seismic event. In order to ensure that the supports are capable of serving their purpose during a seismic event, maximum displacements of the supports have been defined that allow the pipe to comply with the ASME code during a seismic event. ICPE was provided the GRI Soils Report. This report was used to determine the site class for calculating seismic forces acting on the pipe in each of the Project areas. During a seismic event, the pipe supports can displace a maximum of 1" in any direction; this displacement is beyond the 1" that is allowable under normal operating conditions.

17. These calculated forces were provided to R&M for their use in engineering and design of supporting structures and foundations. Methods of how these acceptable limited movements are accomplished with site soil conditions are discussed in detail in ASC Section 2.18, Protection from Natural Hazards.

D. <u>Structural Design</u>

18. ICPE is responsible for the area 0200 railcar unloading system which included the unloading rack/walkway, rail cross-over walkways, pipe trench foundation, rail building concrete slab, and miscellaneous pipe and cable tray supports. ICPE is

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responsible for all internal building pipe supports on the unloading rack/walkway. R&M is responsible for the rail unloading structure and its foundation. The transition between ICPE and R&M with regards to the transfer pipelines support occurs at the rail building wall.

19. ICPE is responsible for the area 0300 pipeline cross over stairs and valve access platforms and pump basin cable tray supports.

20. ICPE is responsible for the area 0600 boiler building pipe rack and cable tray supports.

21. ICPE is responsible for miscellaneous pipe and cable tray supports throughout the Project.

22. All ICPE's structural engineering and design elements noted above are engineered to meet the requirements of American Society of Civil Engineers (ASCE) 7 – Minimum Design Loads for Buildings and Other Structures and the GRI geotechnical report.

E. <u>Electrical Design</u>

23. ICPE is responsible for the electrical system design for the Project, and the system is designed in accordance with the applicable codes and standards found in National Fire Protection Agency (NFPA), National Electrical Code (NEC), National Electrical Safety Code (NESC), Illuminating Engineering Society (IES), and API.

24. The electrical design includes the power distribution, site lighting, building lighting, grounding, lightning protection, control and monitoring, heat-tracing, E-house and equipment layouts, and electrical equipment specification.

25. The electrical service will be supplied by the local utility from a nearby substation. Power will be received at medium voltage (12.47kV) into electrical

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switchgear which will feed the respective main power transformers in each area. In general, the transformers will step down the medium voltage (12.47kV) to the intended main distribution voltage (480V), and will supply power to a motor control center (MCC) for that area.

26. The MCC will supply power to the various process equipment and ancillary systems respectively.

27. Site and outdoor lighting will be provided for the entire building entrance, parking, walkways, and maintenance and process areas. The indoor building lighting design incorporates emergency lighting for means of personnel egress. Indoor and outdoor lighting foot-candle level design follows the minimum requirements for the categorized areas as described in the IES and API guidelines.

28. The ground grid design will provide personnel safety and equipment protection by eliminating unsafe step and touch potentials inherent to electrical systems.

29. A lightning protection design will provide personnel safety and equipment protection from potential lightning strikes and the resultant voltage surges.

30. All of the major electrical equipment is specified to have communication provisions to allow for data acquisition and monitoring via the plant distributed control system.

31. Electric heat tracing design is provided for select pipes throughout the plant in order to achieve process flow specifications. Each area will have a dedicated E-house that will contain the major electrical equipment including MCC, panelboards, low voltage transformers, Programmable Logic Controllers (PLC) cabinets, and communication hardware. The E-houses are designed to have locking doors in order to allow access for authorized personnel only. Some of the E-houses also include a separate control room for plant operators to monitor and control the process.

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F. Instrumentation and Control Design

32. ICPE is responsible for the Instrumentation and Control hardware System design for the Project, and the system design is in accordance with the applicable codes and standards found in American National Standards Institute (ANSI), International Society of Automation (ISA), and API. ICPE is responsible for designing a complete control system containing cabling and hardware for PLC, instrumentation and communication.

33. The control system as designed by ICPE contains PLCs that monitor input from multiple instruments. These instruments monitor flows, temperatures, pressures and levels. The PLC then reports this information to a Human Machine Interface (HMI) that displays and records information concerning the process and safety of the Project. The PLC also provides visual and audible alerts if an unsafe condition should occur. Redundancy has been designed into the PLC system communication. The HMI receives data from multiple sources providing a safe and reliable view of PLC control system.

34. ICPE has specified instrumentation and provided data sheets that contain all pertinent information for each instrument describing the design parameters the instrument was selected for. Instruments have been chosen to monitor flows, pressures, temperatures, and levels of the process commodities as they are transferred and stored. The specified analytical instruments provide information to the PLC concerning unsafe conditions such as vapor levels and seismic activity.

III. CONCLUSION

35. Acting as the ICPE Project Manager, my responsibility for the Project was to manage the engineering and design activities required to complete ICPE's scope of work listed above in Section II a-f. It is my professional opinion, based on my work on the

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Project and my reliance on the professional opinions of others within ICPE and the Project Design Team (detailed below), that the work performed by ICPE meets the requirements of the applicable standards, laws, and regulations governing the design of the Project.

36. In order for the Project to be successful, the team of consultants must rely on each other's work product. The typical flow of information and coordination of work between consultants is as follows:

- ICPE and R&M work with Savage and Tesoro to establish the basis of design for the Project; this includes preliminary PFDs, PIDs, Single Line diagram, and Site Layout.
- Based on the Preliminary PFDs, PIDs, Single Line diagram, and Site Layout, ICPE begins to size the required mechanical, electrical and piping components for the Project. This preliminary sizing and associated support design criteria of the mechanical and electrical components is provided to R&M and Berger ABAM for their use in their preliminary design of the foundations and supporting structures.
- GRI is tasked with providing a soils report of the Project area.
- R&M and Berger ABAM take the information provided by ICPE and GRI and work to establish their preliminary foundation and support structure design requirements and the design criteria for ground improvements.
- R&M works with Hayward Baker on the required ground improvements to meet the requirements provided by R&M's and Berger ABAM's design criteria.
- ICPE and R&M also both work with Berger ABAM on Site civil and permit requirements.
- Pool Fire works with the Project Team to establish the fire protection requirements for the Project.

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

Attachment A: CV for Nicholas Nash

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[Signature on Following Page]

DATED this 13th day of May, 2016.

Nicholas Nash, Declarant

STATE OF UTAH)
COUNTY OF SALT LAKE)

Nicholas Nash, 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 13th day of May, 2016

NOTARY PUBLIC in and for the State of: UTAH

Residing at: Salt Lake County

My Commission Expires: 4-1-2020

Printed Name of Notary: Kimberly Perris Coleman

KIMBERLY PERRIS COLEMAN
NOTARY PUBLIC-STATE OF UTAH
COMMISSION# 688407
COMM. EXP. 04-01-2020

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