Section 4.1 Environmental Health

4.1.1 Noise

EFSEC rules mandate that the energy facilities it permits must comply with the Washington noise standards and also must assess the potential for impacts from low frequency noise. Washington noise standards identify overall A-weighted sound level limits but do not directly address low frequency noise or potential increases over existing ambient sound levels. Therefore, other noise impact guidelines used in the noise impact analysis include published guidelines regarding low frequency noise.

The noise impact analysis determined that sound levels emitted from the Facility will comply with Washington A-weighted noise limits. In the assessment of impacts from low frequency noise, predicted C-weighted sound levels are ~~at or lower than~~ within the published ranged of guidelines suggested to protect against low frequency vibrations and rattles.

4.1.1.1 Affected Environment

Introduction to Noise ~~Technology~~Terminology

The human ear responds to a very wide range of sound intensities. The decibel scale (dB) used to describe sound is a logarithmic rating system which accounts for the large differences in audible sound intensities. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dB. Therefore, a 70-dB sound level will sound about twice as loud as a 60-dB sound level. People generally cannot detect differences of 1 dB. In ideal laboratory situations, differences of 2 or 3 dB can be detected by people, but such a change probably would not be noticed in a typical outdoor environment. A 5-dB change would probably be clearly perceived by most people under normal listening conditions.

As mentioned above, the decibel scale used to describe noise is logarithmic. On this scale, a doubling of sound-generating activity (i.e., a doubling of the sound energy) causes a 3-dB increase in average sound produced by that source, not a doubling of the loudness of the sound (which requires a 10-dB increase). For example, if traffic along a road is causing a 60-dB sound level at a nearby location, a doubling of the number of vehicles on this same road would cause the sound level at this same location to increase to 63 dB. Such an increase might not be discernible in a complex acoustical environment.

When addressing the effects of noise on people, it is necessary to consider the frequency response of the human ear, or those frequencies that people hear best. Sound measuring instruments are therefore often designed to “weight” sounds based on the way people hear. The frequency weighting most often used to evaluate environmental noise is A weighting because it best reflects how humans perceive sound. Measurements from instruments using this system are reported in “A-weighted decibels,” or dBA. Unless specified otherwise, noise levels are reported in A-weighted decibels.

Low frequency noise is characterized by noise levels at frequencies less than about 100 hertz (Hz). Noise at those frequencies can be annoying to some people even at relatively low levels. Some jurisdictions assess low frequency noise by limiting unweighted sound levels in the octave bands below 100 Hz, typically in the 31.5 and 63 Hz bands. Other jurisdictions assess low frequency noise by an alternative frequency weighting system, C-weighting, which does not

reduce the level of low frequency noise as much as the A-weighting system and is better at describing loud, low frequency sounds. Although low frequency sound is less audible to humans, C-weighting is often used to assess potential annoyance from structural rattling due to low frequency noise. Measurements from instruments using this system are reported in "C weighted decibels" or dBC.

Distance from the source, the frequency of the sound, the absorbency of the intervening ground, obstructions, and duration of the noise-producing event all affect the transmission and perception of noise. The degree of the effect on perception also depends on who is listening (individual physiological and psychological factors) and on existing sound levels (background noise). Typical noise levels of familiar noise sources and activities are presented in Table 4.1-1.

Table 4.1-1. Common Sound Levels/Sources and Subjective Human Responses

Thresholds/Noise Sources	Noise Level (dBA)	Subjective Evaluations	Possible Effects on Humans
Human Threshold of Pain Carrier jet takeoff (50 ft)	140	Deafening	Continuous exposure to levels above 70 can cause hearing loss in majority of population
Siren (100 ft) Loud rock band	130		
Jet takeoff (200 ft) Auto horn (3 ft)	120		
Chain saw Noisy snowmobile	110	Very Loud	
Lawn mower (3 ft) Noisy motorcycle (50 feet)	100		
Heavy truck (50 feet)	90		
Pneumatic drill (50 feet) Busy urban street, daytime	80	Loud	
Normal automobile at 50 mph Vacuum cleaner (3 ft)	70		Speech Interference
Large air conditioning unit (20 feet) Conversation (3 feet)	60	Moderate	
Quiet residential area Light auto traffic (100 ft)	50		Sleep Interference
Library Quiet home	40	Faint	
Soft whisper	30		
Slight rustling of leaves	20		
Broadcasting Studio	10	Very Faint	
Threshold of Human Hearing	0		

Source: EPA 1974

Note that both the subjective evaluations and the physiological responses are continuous without true threshold boundaries. Consequently, there are overlaps among categories of response that depend on the sensitivity of the noise receivers.

Environmental noise is usually described in terms of certain "metrics" that allow comparison of sound levels at different locations or in different time periods. Federal regulatory agencies often use the equivalent sound level (L_{eq}) or the day-night sound level (L_{dn}) to characterize sound

levels and to evaluate noise impacts. The L_{eq} is the level that if held constant over the same period of time would have the same sound energy as the actual, fluctuating sound. As such, the L_{eq} can be considered an energy-average sound level. Because the L_{eq} considers sound levels over time, this metric accounts for the number and levels of noise events during an interval (e.g., 1 hour), as well as the cumulative duration of these events. The L_{dn} is like a 24-hour L_{eq}, except that the calculation of the L_{dn} adds 10 dBA to the sound levels between 10 p.m. and 7 a.m. to account for possible sleep disturbance. The L_{dn} is used to describe the noise environment in areas where there are both nighttime and daytime uses, such as residences.

Noise Standards

This evaluation includes noise criteria established by EFSEC, the State of Washington, and the City of Vancouver (City).

EFSEC – Energy facilities seeking permits from EFSEC are subject to section 463-60-352 of the WAC (WAC 463-60-352). The code states that applications should:

- Describe and quantify the background noise environment that would be affected by the energy facility
- Identify and quantify the impact of noise emissions resulting from construction and operation of the energy facility, using appropriate state-of-the-art modeling techniques, and including impacts resulting from low frequency noise
- Identify local, state, and federal environmental noise impact guidelines
- Describe the mitigation measures to be implemented to satisfy WAC 463-62-030
- Describe the means the Applicant proposes to employ to assure continued compliance with WAC 463-62-030

WAC 463-62-030 states that energy facilities shall meet the noise standards established in Chapter 70.107 RCW, the Noise Control Act of 1974 as implemented in the requirements in 173-60 WAC. These requirements are described below.

Washington State Standards – EFSEC rules mandate that the Applicant comply with the noise standards established in WAC 173-60, which establishes the maximum noise levels permissible in identified environments pursuant to Chapter 70.107 of the RCW. The state noise limits are based on the environmental designation for noise abatement (EDNA) of the noise source and the receiving properties. EDNAs are designated by class; Class A generally corresponds to residential areas or areas where people sleep, Class B EDNAs to retail and commercial areas, and Class C EDNAs to industrial and agricultural areas. The class of a property is typically determined by its predominant land use. The noise limits for each land use classification are presented in Table 4.1-2.

Table 4.1-2. Washington Maximum Permissible Sound Levels (dBA)

EDNA of Noise Source	EDNA of Receiving Property		
	Class A[1] (Residential)	Class B (Commercial)	Class C (Industrial)
Class A	55/45	57	60
Class B	57/47	60	65
Class C	60/50	65	70

[1]Sound limits shall be reduced by 10 dBA between the hours of 10 p.m. and 7 a.m. at Class A EDNAs
Source: WAC Chapter 173-60

The noise limits presented in Table 4.1-2 can be exceeded for certain periods of time: 5 dBA for no more than 15 minutes in any hour, 10 dBA for no more than 5 minutes of any hour, or 15 dBA for no more than 1.5 minutes of any hour. Sometimes these exceptions are described in terms of the percentage of time a certain level is exceeded. For example, L25 represents a statistical sound level that is exceeded 25 percent of the time, or 15 minutes in an hour. Similarly, L8.33 and L2.5 are the sound levels that are exceeded 8.33 and 2.5 percent of the time, or 5 and 1.5 minutes in an hour, respectively. At no time can the allowable sound level be exceeded by more than 15 dBA, represented by the Lmax.

The Facility would be considered a Class C noise source. In practice, a Class C noise source may not generate a sound level (L_{25}) exceeding 70 dBA at nearby Class C EDNAs (i.e., industrial properties) during daytime and nighttime hours. At the nearest Class A EDNAs, noise generated by the Facility ~~would~~ will be limited to 60 dBA during daytime hours (7 AM to 10 PM) and 50 dBA during nighttime hours. Because the proposed Facility could operate 24 hours per day, it must be designed to meet the 50 dBA nighttime limit at any Class A EDNAs.

WAC 173-60-050 identifies several sources of noise that are exempt from the noise limits displayed in Table 4.1-2. These include the following:

- Traffic on public roads
- Sounds from surface carriers engaged in interstate commerce by railroad
- Sounds from temporary construction activities between 7 AM and 10 PM

Because "sounds from surface carriers engaged in interstate commerce by railroad" are identified as exempt from the WAC noise limits, the noise analysis assumes that noise from the train is exempt from the noise limits until delivery of the train to the unloading area.

City of Vancouver Noise Standards – Chapter 20.935 of the Vancouver Municipal Code (VMC 20.935) identifies performance standards for proposed land uses and development activities, including standards for noise. Section 20.935.030(A) applies the noise limits and exemptions established by WAC 173-60, as identified in the previous section. In addition to the WAC noise limits and exemptions, the City restricts construction activities, including construction staging, to between 7 AM and 8 PM, 7 days a week.

Federal Noise Standards – There are no federal regulations that establish noise limits on the sound emanating from the proposed Facility as it affects surrounding properties.

~~**Low Frequency Noise Guidelines** – Energy facilities seeking permits from EFSEC are required to identify potential low frequency noise impacts in their permit applications (WAC 463-60-352). But Washington does not apply specific regulatory limits on low frequency noise nor provide any basis for assessing impacts from such noise. Therefore, to provide a means for considering potential noise impacts from low frequency noise, an appropriate noise guideline was determined based on the review of several sources that consider this issue. ANSI Standard B133.8 Gas Turbine Installation Sound Emissions indicates that a 75 to 80 C-weighted decibels or dBC (C-weighting as defined in this section) sound level should be used as an upper limit to prevent structural vibrations and rattling. Several other documents and studies have indicated that 70 dBC is a more appropriate minimum threshold to prevent rattles and vibrations from low~~

~~frequency noise.[17, 18, 19] The analysis reported here therefore applied the more conservative noise level of 70 dBC as a guideline to protect against impacts from low frequency noise.~~

Existing Sound Levels

The existing noise environment in the project vicinity was previously characterized by sound level measurements (SLMs) taken on nearby parcels for another project. These sound levels were taken with Type I sound level meters over a week-long period from March 25-31, 2011. The measured sound levels are summarized in Table 4.1-3 and the locations are briefly described below and displayed in Figure 4.1-1.

- *SLM1* – Sound level measurements were taken in the Fruit Valley residential area northeast of the proposed Facility. Contributing noise sources included local and distant traffic, trains, and occasional aircraft. The measured levels are typical for many urban residential areas.
- *SLM2* - Sound level measurements were taken on the western boundary of the JWC. The lowest measured sound levels are not unexpected since the adjacent industrial sites were unoccupied during the measurement period, but the levels are lower than would be expected for a busy industrial area.
- *SLM3* – Sound level measurements were captured on the property boundary of the Tidewater office building site, on the west side of Terminal 5 site. The measured levels are representative of fairly remote locations, far from continuous noise sources, with occasional events due to train passbys or activities. The low measured sound levels are not unexpected since the adjacent industrial site is currently unoccupied, but the levels are lower than would be expected for a busy industrial area, except during those hours with nearby train activity.

Table 4.1-3. Range of Measured Sound Levels in Project Vicinity (dBA)

SLM Location	Daytime Leqs	Nighttime Leqs	Ldn
SLM1 – Fruit Valley Residential Area	52-64	46-63	61
SLM2 – Jail Work Center	51-63	47-59	62
SLM3 – West Side of T5	50-73	42-57	60

Source: Wilson Ihrig & Associates, 2011.

~~The existing noise environment has been previously characterized by sound level measurements (SLMs) taken on nearby parcels for various other projects. These sound levels were taken with Type I sound level meters over periods ranging from several days to a week. The measured~~

~~[17] Environmental Sound Survey and Noise Impact Assessment – Dairy Hills Wind Farm Project, Perry, NY. Hessler Associates, Inc. May 3, 2006.~~

~~[18] Aesthetic and Noise Control Regulations. Rule 802d of the Colorado Oil and Gas Conservation Commission, (COGCC).~~

~~[19] *PARTNER – Low Frequency Noise Study*, April 6, 2007. Prepared by Kathleen K. Hodgdon, Anthony A. Atchley, and Robert J. Bernhard.~~

~~sound levels are summarized in Table 4.1-3 and the locations are briefly described below and displayed in Figure 4.1-1.~~

- ~~*SLM1* – Sound level measurements were taken over a 48-hour period in October 2005 in the Fruit Valley residential area northeast of the proposed Facility.~~
- ~~*SLM2* - Noise monitoring was conducted at the Jail Work Center over several periods for different projects. A 72-hour measurement was taken between March 31 and April 3, 2009. Additional measurements for a different project were taken at the Jail Work Center during four 5-day periods between July and October 2012. Some of the measured levels in 2012 included noise from construction of the NW Gateway Avenue Overcrossing.~~
- ~~*SLM3* – Sound level measurements were captured over four 5-day periods between July and October 2012 at the western property boundary of the Terminal 5 site. This measurement location represents the Tidewater office building. This location is identified as SLM3 in Figure 4.1-1.~~

~~Table 4.1-3. Range of Measured Sound Levels in Project Vicinity (dBA)~~

~~SLM Location~~	~~Date~~	~~Source~~	~~Daytime Leqs~~	~~Nighttime Leqs~~	~~Ldn~~
~~SLM1 – Fruit Valley Residential Area~~	~~October 2005~~	~~1~~	~~49-65~~	~~42-65~~	~~58~~
~~SLM2 – Jail Work Center~~	~~March-April 2009~~	~~1~~	~~55-68~~	~~50-61~~	~~64~~
	~~July - October 2012~~	~~2~~	~~53-74~~	~~39-64~~	~~61-68~~
~~SLM3 – West Side of T5~~	~~July - October 2012~~	~~2~~	~~46-76~~	~~40-72~~	~~56-71~~

~~Sources:~~

~~(1) West Vancouver Freight Access Project, Schedules 2 through 4, Port of Vancouver; Noise and Vibration Discipline Report; July 2009; ICF Jones & Stokes.~~

~~(2) BHP Billiton POV Terminal 5 Environmental Monitoring; July through October 2012; ENVIRON International Corporation.~~

4.1.1.2 Environmental Noise Impacts

Construction

During the construction phase of the project, noise from construction activities could add to the noise environment in the immediate vicinity of the site. For the purposes of this analysis, construction activities are separated into "typical" construction activities and impact pile-driving activities.

"Typical" Construction Activities

The ~~nearest~~ noise sensitive use that ~~would~~will be nearest to most construction activities associated with~~of~~ the proposed Facility is the eastern housing unit of the ~~Jail Work Center (~~JWC~~)~~. This facility, which includes dormitories, ~~which~~ is just over 400 feet from the proposed pipeline from the storage tank area to the ship loading dock. The nearest residences are approximately 3,000 feet from the proposed tank holding area. The Tidewater office building is just over 100 feet from the nearest proposed rail line associated with the Facility. Typical sound levels associated with construction activities at these distances are displayed in Table 4.1-4.

BergerABAM

Figure 4.1-1. Background Noise Measurement Location and Receptors (Revised)

Table 4.1-4. Typical Construction Equipment Noise

Activity	Range of Hourly L_{eqs} (dBA)		
	At 100 Feet	At 400 Feet	At 3,000 Feet
Clearing	77	65	47
Grading	70-82	58-70	40-52
Paving	67-82	55-70	37-52
Erecting	67-78	55-66	37-48
Types of Equipment	**Range of Noise Levels (dBA)**		
	At 100 Feet	**At 400 Feet**	**At 3,000 Feet**
Bulldozer	71-90	59-78	41-60
Dump Truck	76-88	64-76	46-58
Scraper	7487	62-75	44-57
Paver	80-82	68-70	50-52
Generator	65-76	53-64	35-46
Compressor	68-75	56-63	38-45

Source: EPA, 1971

~~As shown in Table 4.1-4, the estimated hourly L_{eqs} at the nearest residences (more than 3,000 feet) are below the noise level limit of 60 dBA that would apply to long-term operational noise. In addition, the calculated construction sound levels at the housing units of the Jail Work Center (the nearest sensitive receivers to the site at approximately 400 feet from the nearest construction area) would fall within the existing range of measured hourly L_{eqs}.~~ As shown in Table 4.1-4, the estimated construction-related hourly L_{eqs} at the nearest residences (more than 3,000 feet away) are below the noise level limit of 60 dBA that would apply to long-term operational noise. The calculated construction sound levels at the housing units of the JWC (the nearest sensitive receivers to the site at approximately 400 feet from the nearest construction area) would be higher than the existing range of measured hourly L_{eqs} shown in Table 4.1-3, but the elevated levels would be temporary and would occur only during daytime hours.

Per WAC 463-62-030, EFSEC requires that energy facilities meet the noise standards established in 173-60 WAC. WAC 173-60-050 exempts construction noise from any limits on noise levels between 7 AM and 10 PM but places no additional constraints on construction activities. Section 20.935.030(4) of the Vancouver Municipal Code restricts outdoor construction activity to between 7 AM and 8 PM, seven days a week. Although the VMC standard is superseded by the State standard for an EFSEC-permitted facility, the Applicant will, to the greatest extent feasible, schedule noisy construction activities to the hours identified in VMC 20.935.030(4). If outdoor construction is required beyond the hours of 7 AM to 8 PM, the Applicant will consult with the City of Vancouver, will notify EFSEC in advance, and will not conduct the work until EFSEC has reviewed and approved the planned activities.

Restriction of construction to daytime hours, the temporary nature of construction noise, the distances between the residential uses and most of the construction areas, and the presence of existing noise at nearby sensitive receivers would serve to minimize potential noise impacts from construction activities.

Impact Pile-Driving Activities

The proposed project is expected to require at least some impact pile driving during construction of upland dock structures, foundations of the rail unloading structure, and potentially at various locations along the pipeline. The nearest portions of these elements of the project are approximately 450 feet from the nearest occupied structures of the JWC and over 3,000 feet from the nearest residences east and west of the site.

Previous sound level measurement data of impact pile driving activities indicate that the hourly average sound level (L_{eq}) of pile driving is approximately 86 dBA at a distance of 100 feet. Using this sound level information and the CadnaA noise model described later in this section, impact pile driving sound levels were estimated at the JWC and the nearest residences to the site.

Assuming impact pile driving were to occur at the portion of the pipeline that will be nearest the occupied structures of the JWC, the model-calculated hourly L_{eq} is 70 dBA. Although a level of 70 dBA may be considered intrusive to occupants or employees of the JWC, this level is not atypical of sound levels in industrial areas similar to where the JWC is located. Furthermore, the pile driving activities at this location would be short-lived and restricted to daytime hours, which would reduce the potential for impacts.

At the residences east and west of the site, model-calculated impact pile driving L_{eq}s range from 41 to 49 dBA from the pile driving activities nearest the residences. These levels are lower than the existing L_{eq}s at these residences. However, even with fairly low levels of pile driving noise, the unique nature of pile driving impact noise could result in the sounds being audible at and within the residences nearest this activity. This noise could be perceived by some people as intrusive and possibly annoying, but the low overall levels would minimize the potential for impacts.

Operation

Noise Sources – The Facility ~~would~~ will generate noise from a number of sources associated with petroleum product rail unloading, storage, ship loading, and transport. Some of these sources are relatively quiet, and these quieter sources would not be audible when the louder equipment is operating. Therefore, this evaluation focused on the loudest noise sources associated with the Facility, including pumps, compressors, blowers, and the MVCU. Equipment that ~~would~~ will be located inside buildings (i.e., the boilers and the rail unloading pumps) is not expected to substantially contribute to the overall Facility noise and was not included in the analysis (see Table 4.1-5).

Table 4.1-6 summarizes the A-weighted sound pressure levels associated with the dominant noise sources examined in this assessment. The Sound Power Level (SWL) and octave band data are provided in Table 4.1-7.

Table 4.1-5. Summary of Major Facility Noise Sources

Source	Data Source	No. of Units	Approximate Sound Pressure Level at 100 ft (dBA)
Rail Unloading (Area 200)			
Compressor	1	1	~~72~~40
Transformer	~~1~~2	3	54

Source	Data Source	No. of Units	Approximate Sound Pressure Level at 100 ft (dBA)
Storage (Area 300)			
Pumps	~~2~~3	1	64
Transformer	~~1~~2	1	54
Marine Terminal (Area 400)			
Marine Vapor Combustion Unit	~~3~~	~~8~~	~~67~~
MVCU Blower	1	8	49
MVCU Exhaust Stack	1	8	36
Vapor Blower ~~Skid~~Staging Unit Blowers	~~1~~2	~~3~~2	~~59~~60
~~Dock Safety Unit~~	~~1~~	~~1~~	~~59~~
Train Sources			
Locomotives (10 mph)	4	3	54 (Hourly Leq)
Rail Cars (10 mph)	4	7000 feet	52 (Hourly Leq)
Idling Locomotives	5	3	65
Switch Engine	2	1	66

Sources:

(1) Based on vendor-provided equipment sound levels

(~~1~~2)Based on equipment sound levels from previous ENVIRON noise analyses

(~~2~~3)Based on a measured sound level of similar petroleum product off-loading pumps

~~(3) Based on a sound level of 85 dBA identified by the manufacturer. ENVIRON applied the sound level at three feet from the base of the stack and at the upper rim of the stack.~~

(4) CadnaA v4.1. DataKustik GmbH. FRA/FTA module.

(5) Assessment of Railway Activity and Train Noise Exposure: A Teaneck, New Jersey, Case Study. Craig B. Anderson. October 2009

Note: Please note that engineering and equipment selection has not been finalized and that the above equipment sound levels are speculative. They are used in this analysis to represent a reasonable estimate of overall future sound levels from the proposed Facility.

CadnaA Noise Model – Noise anticipated to be generated by operation of the Facility was evaluated at nearby receivers using the CadnaA noise model. CadnaA is a computer program that calculates sound levels after considering the noise reductions or enhancements caused by distance, topography, ground surfaces (including water), atmospheric absorption, and meteorological conditions in compliance with ISO-9613-2:1996. The modeling includes the following steps: (1) characterizing the noise sources, (2) creating three-dimensional (3-D) maps of the site and vicinity to enable the model to evaluate effects of distance and topography on noise attenuation, and (3) assigning the equipment sound levels to appropriate locations on the site. CadnaA then constructs topographic cross sections to calculate sound levels in the vicinity of a project site.

In addition to using the ISO 9613 procedures in CadnaA for on-site equipment, ENVIRON used the Federal Railroad Administration (FRA)/Federal Transit Administration (FTA) module available in CadnaA for modeling noise due to moving trains. This module computes train noise using the source levels and methods outlined by the FRA. The trains were specified to consist of three locomotives and be approximately 7,000 feet in length. The train was specified to travel 10 mph while on the site, although it is expected that trains would generally travel slower than 10 mph, and the resulting rail-related noise would be lower than modeled.

For the modeling effort, ENVIRON used numerous modeling "receptor" locations representing the off-site uses nearest the project site. The modeling receptors considered in the noise modeling are depicted in Figure 4.1-1 and described in more detail below.

- R1 – The southwest corner of the Jail Work Center representing the western housing unit, which is nearest the rail line. The housing units of the Work Center are considered Class A EDNAs when applying the WAC noise limits.
- R2 – The southeast corner of the Jail Work Center representing the eastern housing unit, which is nearest the pipeline and marine terminal. The housing unit is considered a Class A EDNA.
- R3 – The Tidewater Office Building near the northwest corner of the site. The office building is considered a Class B receiving property (e.g., commercial).
- R4 – The CPU River Road generating facility north of the site. This is a Class C (Industrial) receiving property.
- R5 – The nearest residential structure northwest of the site, a Class A receiving property.
- R6 and R7 – Residences in the Fruit Valley residential community northeast of the site, both considered Class A receiving properties.

Predicted A-weighted Sound Levels at Nearby Receiving Properties –Modeled A-weighted sound levels with the equipment above are presented below.

~~Table 4.1-6. Modeled A-Weighted Sound Levels (Hourly L_{eq}, dBA)~~

~~Receptor~~	~~MVCU Option 1~~		~~WAC Noise Limit[1, 2, 3]~~
	~~Without Train Arrival~~	~~With Train Arrival~~	
~~R1 – SW Jail Work Center~~	~~47~~	~~50~~	~~60/50~~
~~R2 – SE Jail Work Center~~	~~50~~	~~51~~	~~60/50~~
~~R3 – Tidewater~~	~~39~~	~~58~~	~~65~~
~~R4 – CPU~~	~~45~~	~~59~~	~~70~~
~~R5 – NW Residence~~	~~33~~	~~39~~	~~60/50~~
~~R6 – Fruit Valley Residence~~	~~37~~	~~37~~	~~60/50~~
~~R7 – Fruit Valley Residence~~	~~36~~	~~36~~	~~60/50~~

~~[1] The noise limits do not apply to rail noise and are only applicable to the No Train scenarios. Noise from surface carriers engaged in interstate commerce by railroad is exempt from the WAC noise limits (WAC 173-60-050).~~

~~[2] The noise limits for Class A receivers (e.g., residences and housing facilities) are displayed as Day/Night where Day refers to the hours between 7 AM and 10 PM and Night refers to the hours between 10 PM and 7 AM. Because the Facility could operate 24 hours a day, the more restrictive nighttime noise limit would apply.~~

~~[3] The WAC noise limit shown in the table uses the hourly L25 noise descriptor. The primary noise sources from the site would emit fairly continuous noise, and the modeled hourly Leq would essentially be the same as the hourly L25. Because it is not a continuous noise source, the modeled hourly Leq of railroad-related noise may differ from the hourly L25. However, railroad noise is exempt from the WAC noise limits, so comparisons of the "With Train" scenario sound levels to the WAC noise limits are unnecessary.~~

Table 4.1-6. Modeled A-Weighted Sound Levels (Hourly L_{eq}, dBA)

Receptor	~~MVCU Option 1~~		EDNA	WAC Noise Limit[1, 2, 3]
	Without Train Arrival[1]	With Train Arrival		
R1 – SW Jail Work Center	45	50	Class A	60/50
R2 – SE Jail Work Center	38	46	Class A	60/50
R3 – Tidewater	52	54	Class B	65
R4 – CPU	61	62	Class C	70
R5 – NW Residence	27	33	Class A	60/50
R6 – Fruit Valley Residence	26	44	Class A	60/50
R7 – Fruit Valley Residence	25	47	Class A	60/50

[1] The noise limits do not apply to off-site rail noise or on-site train delivery noise because surface carriers engaged in interstate commerce by railroad are exempt from the WAC noise limits (WAC 173-60-050). However, the "Without Train Arrival" scenario does include idling locomotives during train unloading and a switch engine, which are not exempt from the noise limits.

[2] The noise limits for Class A receivers (e.g., residences and housing facilities) are displayed as Day/Night where Day refers to the hours between 7 AM and 10 PM and Night refers to the hours between 10 PM and 7 AM. Because the Facility could operate 24-hours a day, the more restrictive nighttime noise limit would apply.

[3] The WAC noise limit shown in the table uses the hourly L25 noise descriptor. The primary noise sources from the site would emit fairly continuous noise, and the modeled hourly Leq would essentially be the same as the hourly L25. Because it is not a continuous noise source, the modeled hourly Leq of railroad-related noise may differ from the hourly L25. However, railroad noise is exempt from the WAC noise limits, so comparisons of the "With Train" scenario sound levels to the WAC noise limits are unnecessary.

Table 4.1-7. Equipment Octave Band Sound Levels

Equipment	Sound Power Levels (Octave Bands (Hz))									Total Sound Power Level		
	31.5	63	125	250	500	1000	2000	4000	8000	Linear	A-Wght	C-Wght
Rail Unloading (Area 200)												
Compressor	72	72	71	69	69	71	75	74	70	81	80	81
Transformer	95	95	95	97	95	87	80	73	66	103	95	102
Locomotive	117	121	109	101	102	97	96	96	97	123	105	122
Switch Engine	125	116	110	104	108	99	91	81	71	125	106	123
Storage (Area 300)												
Pumps	51	65	81	89	95	100	100	96	83	104	105	104
Transformer	95	95	95	97	95	87	80	73	66	103	95	102
Marine Terminal (Area 400)												
MVCU	~~117~~96	~~117~~95	~~116~~94	~~117~~96	~~107~~85	~~102~~81	~~95~~74	~~91~~70	~~90~~68	~~123~~101	~~111~~90	~~122~~101
MVCU stack	91	93	82	72	72	71	74	71	66	95	79	94
Vapor Blower ~~Skid~~Staging Unit Blowers	106	106	105	106	96	91	84	80	79	112	100	111

As shown in , the modeled sound levels would comply with the most restrictive nighttime noise limits at ~~the nearest~~ all off-site receivers nearest~~to~~ the Facility. Furthermore, the modeled sound levels at the nearest residences to the site are well below even the nighttime noise limit. ~~During those hours that include a train arrival, the modeled sound levels at most locations would continue to be below the State noise limits (although the limits do not apply to noise emitted by the railroad). The exception is at R2, representing the eastern housing unit at the Jail Work Center, where the modeled level is 1 dBA higher than the nighttime noise limit. This falls within the range of error of the noise model.~~

Predicted C-weighted Sound Levels at Nearby Receiving Properties – Energy facilities seeking permits from EFSEC are required to identify potential low frequency noise impacts in their permit applications (WAC 463-60-352). ~~But~~ Washington does not apply specific regulatory limits on low frequency noise nor provide any basis for assessing impacts from such noise. Therefore, to provide a means for considering potential noise impacts from low frequency noise, several sources were reviewed to identify appropriate guidelines for characterizing the potential effects of low frequency noise. ANSI Standard B133.8 Gas Turbine Installation Sound Emissions indicates that a 75 to 80 C-weighted decibels or dBC (C-weighting as defined in this section) sound level should be used as an upper limit to prevent structural vibrations and rattling. Several other documents and studies have indicated that 70 dBC is a more appropriate minimum threshold to prevent rattles and vibrations from low frequency noise.[20, 21, 22]

The Facility is still in preliminary design, and final equipment has yet to be determined. Therefore, accurate estimates of low frequency noise associated with the major on-site equipment are not yet available. However, frequency data of similar sources were used to estimate potential low frequency sound levels and overall C-weighted sound levels in order to assess the potential impacts from low frequency noise. The primary source of low frequency noise is anticipated to be the ~~MVCU~~on-site switch engine and idling locomotives, when present.

The predicted C-weighted sound levels using our presumed frequency data are presented in Table 4.1-8.

[20] Environmental Sound Survey and Noise Impact Assessment – Dairy Hills Wind Farm Project, Perry, NY. Hessler Associates, Inc. May 3, 2006.

[21] Aesthetic and Noise Control Regulations. Rule 802d of the Colorado Oil and Gas Conservation Commission, (COGCC).

[22] *PARTNER - Low Frequency Noise Study*, April 6, 2007. Prepared by Kathleen K. Hodgdon, Anthony A. Atchley, and Robert J. Bernhard.

Table 4.1-8. Modeled C-Weighted Sound Levels[1]

Receptor	Modeled Level	Guideline/Limit
R1 – SW Jail Work Center	~~60~~63	70-80
R2 – SE Jail Work Center	~~62~~58	70-80
R3 – Tidewater	~~51~~54	70-80
R4 – CPU	~~57~~75	70-80
R5 – NW Residence	~~46~~45	70-80
R6 – Fruit Valley Residence	~~49~~44	70-80
R7 - Fruit Valley Residence	~~49~~44	70-80

[1] The modeled C-weighted sound levels do not include train noise. The FRA noise prediction method used by CadnaA does not include frequency data for the train sources.

As seen in Table 4.1-8~~8~~, the estimated C-weighted sound levels at most locations are ~~less~~ much lower than 70 dBC from the Facility, which would protect against undue impacts from low frequency noise. At the CPU River Road generating plant, the estimated C-weighted level of 75 dBC is above 70 dBC but falls below the limit of 80 dBC identified in the ANSI standard as protective against structural vibrations and rattling. Because this location represents an industrial use with no sensitive receivers, the likelihood of impact from low frequency noise is minimal.

4.1.1.3 Mitigation Measures

Construction

Construction ~~would~~ will occur only during daytime hours to reduce the potential for noise impacts from this activity. Construction noise is exempt from the Washington noise limits during daytime hours.

The Applicant will, to the greatest extent feasible, schedule noisy construction activities to the hours identified in VMC 20.935.030(4), i.e., between 7 AM and 8 PM. If outdoor construction is required outside of these hours, the Applicant will consult with the City, will notify EFSEC in advance, and will not conduct the work until EFSEC has reviewed and approved the planned activities.

Operation

~~Modeled sound levels of the Facility would comply with the applicable Washington State noise limits. Therefore, no operational noise mitigation is proposed.~~The model-calculated sound levels indicate that the Facility would comply with the WAC noise limits at all nearby receiving properties. Therefore, no noise mitigation is proposed.

4.1.2 Risk of Fire or Explosion

This section addresses for the risk of fire or explosion during the construction, operation, standby and/or nonuse, dismantling and/or restoration of the Facility and what measures will be implemented to mitigate risk of fire or explosion.

4.1.2.1 Construction

The risk of fire or explosion during the construction of the Facility is generally related to the storage and use of flammable materials, including petroleum products such as vehicle fuel, solvents, cleaners, and welding gases. The proposed Facility is located in a developed industrial zone; the majority of the areas proposed for the project are devoid of vegetation thereby limiting

the potential for fire propagation due to combustible vegetation. During the first phases of construction, patches of existing vegetation where project facilities are proposed will be graded and the vegetation removed, thereby reducing fire risk. With proper storage of these materials on site and proper material handling and work practices, the risk of fire during construction is very low. The Applicant will conduct construction activities and provide firefighting and response equipment in compliance with WAC 296-155 Part D, NFPA 241 (Standard for Safeguarding Construction, Alteration, and Demolition Operations) and NFPA 5000 (Building Construction and Safety Code).

As discussed in Section 4.1.4 below, Washington State chose to run its own workplace safety and health program, under the Washington Industrial Safety and Health Act (WISHA). WISHA safety standards are as stringent as or more stringent than applicable federal Occupational Health and Safety Administration (OSHA) codified in 29 CFR 1926; WISHA standards are implemented through WAC 296.

The Applicant will consult with the Port, City fire officials, and other emergency responders to ensure their response is coordinated with the Applicant's provisions for construction site fire control, existing firefighting facilities, and capabilities at the site (i.e., fire hydrants). Fire prevention and control will include, but not be limited to:

- Ensuring that appropriate firefighting equipment (i.e., extinguishers) is staged in the construction areas, either in fixed locations or on mobile construction vehicles as appropriate.
- Ensuring that highly flammable materials are identified, stored, and handled in accordance with applicable fire prevention and safety regulations.
- Managing combustible wastes to prevent fires.
- Implementing appropriate work procedures so that fires are prevented (e.g. hot work and welding).
- Limiting smoking to approved areas.
- Providing fire safety training to all construction personnel, including the identification of ignitions sources, the initiation of fire alarms, the use of established egress routes and locations, worker gathering locations, and procedures for notification of emergency responders.
- Providing first responders with maps that identify primary and secondary site access locations in the event of a fire.

The construction management lead will develop and implement a construction fire prevention and response plan addressing the procedures for fire prevention and response. The fire prevention plan will be a component of the Facility construction site safety plan and will address:

- A list of the major construction workplace fire hazards and their proper handling and storage procedures, potential ignition sources (such as welding, smoking, and others) and their control procedures, and the type of fire protection equipment or systems that can control a fire involving them;
- Names or regular job titles of those construction site personnel responsible for maintenance of equipment and systems installed to prevent or control construction related ignitions or fires; and
- Names or regular job titles of those personnel responsible for control of fuel source hazards at the construction site.

The construction fire prevention and response plan will be submitted to EFSEC for review and approval prior to the beginning of construction activities.

4.1.2.2 Operations

Flammability Characteristics of Crude Oil

As noted in the introduction in section 2.10.1.2, the Applicant proposes to handle light and heavy crude oils with an API gravity ranging from 10 to 45.

Across this spectrum crude oils contain a variable mixture of light and heavy hydrocarbons. Light crude oils contain a higher proportion of lower molecular weight ("light") hydrocarbons, resulting in an overall higher vapor pressure, i.e., they vaporize more easily at ambient temperature and pressure. Heavier crude oils contain a smaller proportion of light hydrocarbons, resulting in lower vapor pressures – i.e., they vaporize less easily at ambient temperature and pressure. As described below, the vapor pressure of crude oils is an important factor in their flammability.

NFPA standard 704 (NFPA 704), *Standard System for the Identification of the Hazards of Materials for Emergency Response*, establishes a standard system for evaluating the flammability rating of materials. NFPA 704 establishes five Degrees of Flammability Hazards, ranging from Degree of Hazard "0" – materials that will not burn under normal conditions, to Degree of Hazard "4" - materials that will burn readily under normal conditions. Table 4.1-~~9~~10 presents the specific definition of the NFPA 704 Degrees of Flammability Hazards.

Table 4.1-9. NFPA 704 Table 6.2 Degrees of Flammability Hazards

Degree of Hazard	Definition
0	Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.
1	Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. Materials in this degree also include finely divided suspended solids that do not require heating before ignition can occur.
2	Materials that must be moderately heated or exposed to relatively high ambient temperature before ignition can occur. Under normal conditions, these materials would not form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating they could release vapor in sufficient quantities to produce hazardous atmospheres with air. Materials in this degree also include finely divided suspended solids that do not require heating before ignition can occur.
3	Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions.
4	Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or are readily dispersed in air and burn readily.

The Degree of Hazard is based on a material's "boiling point" and "flashpoint." The boiling point is the temperature at which a liquid begins to vaporize. For the purposes of NFPA 704, the

boiling point is the temperature at which the vapor pressure of a liquid equals the surrounding atmospheric pressure. The flashpoint of a material is the minimum temperature at which a liquid or a solid emits vapor sufficient to form an ignitable mixture with air near the surface of the liquid or solid. The NFPA adopts standard test measures for determining boiling points and flashpoints. Generally speaking, materials with a high flashpoint will only emit ignitable vapors at higher temperatures. Materials with low flashpoints will emit ignitable vapors at lower temperatures.

Based on this standard Degree of Hazard, crude oils fall into NFPA 704 degrees 3 and 4. Heavier crude oils are more likely to fall into degrees 2 and 3 and will require the application of heat to produce ignitable vapors. Lighter crude oils are more likely to fall into degrees 3 and 4 and can be ignited at most ambient temperatures. Regardless of the degree, the presence of three conditions is necessary to cause a material to ignite: (1) the presence of combustible components (the fuel); (2) the presence of an oxidizing chemical in the correct proportions to the combustible components (e.g., air), and (3) the presence of an ignition source. Without all three of these components, a material will not burn. For example, in order for a hydrocarbon/air mixture to ignite, the hydrocarbon-to-air ratio has to be 1 to 6 percent (for example, 1 percent fuel and 99 percent air). This ratio varies depending on the specific hydrocarbons that are present. Avoiding the generation of vapors, minimizing exposure to oxygen, and avoiding sources of ignition allows safe handling of crude oil under typical industrial conditions. However, should these conditions not be avoided, ignition of the vapors emitted by crude oil can cause a fire, whereby the vapors are combusted; however, in the absence of the presence of these ignitable vapors, liquid crude oil will not ignite even in the presence of air, under ambient pressures and temperatures.

As noted above, the vapors emitted from crude oils can ignite when mixed with air in the appropriate proportions, and when an ignition source is present. “Flashbacks” and “boilovers” are two extreme, but very rare under typical handling conditions, types of events related to vapor ignition that can be erroneously construed as explosions. Flashbacks and boilovers can occur during the inappropriate handling of many types of materials that can produce ignitable or expandable vapors, not just crude oils. A flashback can occur when a large amount of an ignitable vapor/oxidizing mixture is suddenly ignited. Because of the large amount of fuel present in gaseous form, the combustion of the fuel occurs very quickly over a large area, causing a flashback. Boilovers are caused by an entirely different set of circumstances. Three key elements must be present for boilover to occur in its severest form: an open top tank fire (due to ignited hydrocarbon vapors on the surface of the crude oil); a water layer in the tank (present from water being sprayed into the surface of oil to abate the ignited vapors), and the development of a high temperature, relatively dense hot zone in the stored product – usually the surface layer of crude oil under the ignited vapors that has been heated to a very hot temperature. When the hot zone of product falls through the fuel and hits the water base at the bottom of, or elsewhere in the tank, the water boils, turns to steam and pushes up through the fuel above. The result is an eruption of tank contents that can boil over the tank walls, and spread beyond the tank. As described further below, the Facility will be carefully designed to avoid the potential for both flashbacks and boilovers.

Although crude oil does not generally have the characteristics of a reactive or explosive material, one of its components, hydrogen sulfide (H_2S), when emitted in large enough concentrations, can explode. Hydrogen sulfide is a highly flammable, explosive gas. The explosive range of

hydrogen sulfide in air is 4.5 to 45.5 percent. This range is much higher than the personal exposure limit (PEL) (see section 4.1.4).

Potential for Fire and Explosions at the Facility

Fire and explosion hazards at the Facility may result from the presence of combustible gases and liquids and ignition sources during rail unloading and vessel loading activities, releases of flammable liquids and gases, and maintenance activities involving combustible or ignitable materials or equipment that is handling or has handled such materials. Possible ignition sources include sparks associated with the buildup of static electricity, lightning, and open flames. Static electricity may be generated by crude oil moving in contact with other materials, including pipes, transfer pipelines, and storage tanks during crude oil conveyance. Water mist and steam generated during maintenance related tank and equipment cleaning can also become electrically charged, in particular with the presence of chemical cleaning agents. Finally improper hot-work practices, or smoking outside of approved areas could also cause fires.

Mechanical explosions result when a sealed or partially sealed container bursts under internal pressure. Under some conditions, crude oil being stored under anomalous conditions could produce vapors, that when constrained to a certain volume under high pressure could cause the failure of the storage system. Chemical explosions may occur if H_2S is released in sufficient quantities.

Fire Prevention and Suppression

Fire prevention actions during operations will be directed towards Facility design to avoid conditions that could lead to a fire, and implementing appropriate practices to safely handle and work in the vicinity of flammable materials.

Fire suppression actions during operations will be directed towards integrating fire suppression systems into the design of the Facility, and developing and implementing a fire response plan.

The Facility will be designed and operated according to federal, state, and local standards for the prevention of fire and explosion hazards, including provisions for distances between tanks in the Facility and between the crude oil-handling facilities and adjacent buildings. Examples of other risk-based management approaches that can be implemented include:

- Implementing safety procedures for unloading of crude oil from rail cars and loading to vessels, including using fail-safe control valves and emergency shutdown equipment.
- Protecting against potential ignition sources and lightning by (1) proper grounding to avoid static electricity buildup and formal procedures for the use and maintenance of grounding connections; (2) using intrinsically safe electrical installations and non-sparking tools; and (3) implementing permit systems and formal procedures for conducting any hot work during maintenance activities, including proper tank cleaning and venting.
- Reducing emissions of VOCs and evaporative losses by:
- Conducting all unloading, conveyance, storage and loading operations using a closed system, where product is not exposed to the atmosphere;
- Using a double seal internal floating roof in each of the crude oil storage tanks to eliminate vapor space;
- Installing pressure, flow and temperature sensors to ensure all storage and conveyance activities are conducted within appropriate parameters, and to quickly identify any abnormal situations that could potentially lead to a fire;

- Designing electrical equipment to WAC 296-24-95711 which addresses the requirements for electric equipment and wiring in locations that are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers that may be present therein and the likelihood that a flammable or combustible concentration or quantity is present.
- Installing a dock safety unit at the loading berth and a MVCU to minimize the risk of explosive conditions being created during the marine vessel loading operations;
- Requiring all personnel to wear Lower Explosive Limit (LEL) detectors to detect hydrocarbon concentrations that could lead to ignition conditions; requiring all personnel to wear H_2S detectors to detect H_2S concentrations that could be unsafe.
- Using environmentally friendly firefighting foam, such as Universal Gold Foam (National Foam, 1999)

Fire suppression equipment will be installed to allow control of fires should they occur. Fire suppression equipment and systems will be designed to NFPA and API requirements, the more stringent Factory Mutual Global insurance requirements, and state and local regulations, and will include automatic and engineered controls. Buildings will be fireproofed and emergency egress will be provided in accordance with applicable fire and building codes. All fire suppression systems will be designed to activate automatically and will be equipped with manual trip stations. The design of fire suppression systems for specific proposed project elements is discussed below.

Area 200 – Unloading and Office. The rail car unloading area will be served with single interlock pre-action 3 percent foam/water sprinkler systems designed to activate as necessary in five segments of the building. Design density will be 0.30 gallon per minute/4,000 square feet with a hose allowance of 500 gallons per minute. The system will include linear heat detectors, gas detectors, temperature monitors, pump monitors, automatic exterior alarm horns and strobes, manual alarm stations, automatic and manual foam release systems, and tamper-resistant systems. Fire hydrants will be located along the south side of the building at 300-foot intervals. All systems will interface with the rail car unloading building control room.

The office and support buildings will be equipped with extinguishers.

The fire foam water system installed in Area 200 (and in Areas 300 and 400 as described below) will utilize foam that is flourosurfactant free. This type of foam does not contain surfactants that persist and bioaccumulate in the environment (Scheffey and Hanauska 2002). The foam system and fire pump systems will be tested and inspected before operations and regularly during operations. The foam will be tested by discharging foam at a test port to a confined area approximately 10’x30’ in size for testing. The foam is discharged until a consistent foam supply is achieved and then stopped. After samples are taken the foam will be collected and disposed of at an off-site facility. The pumps will be operated weekly to ensure they work properly, but no water or foam will be discharged. The testing requirements will also require discharge of water from the system on a more infrequent basis. On a similar time frame, the foam concentrate will be tested by retrieving a small sample of the concentrate for testing, but no foam or foam solution will be discharged to the land or water during the event.

Area 300 – Storage. The storage tank area will be served by six foam water sprinkler zones, one per storage tank. Each foam water sprinkler zone will be designed to discharge into the inside of the storage tank it protects. The system will include linear heat detectors and warning horns and

strobes, as well as manual alarm and foam release stations. A fire water loop will be provided with hydrants and monitors spaced at a maximum of 300 feet and configured so that each tank can be reached by two hose streams. Each tank will be protected by a fixed 3-percent foam/water suppression system on the seal area surface. All systems will interface with the tank area control room. The east boiler building in Area 300 will be served by adjacent hydrants. Smoke detectors, automatic and manual alarms, and hand held fire extinguishers, will be located as appropriate inside and outside the boiler building as required by local fire code. Based on the construction type and occupancy classification sprinkler systems are not necessary for fire control in the east boiler building.

Area 400 – Marine Terminal. Two elevated fire monitors will be installed at the marine loading dock, with hydrants connected to the existing on-site water supply. This system is primarily for fires on the berth, but can be used to assist in the event of a vessel fire.

The vessels berthing at the Marine Terminal are required to have on-board systems as well as contracts with commercial marine firefighting companies to respond in the event of a shipboard fire (see Appendix B.1).

Area 500 - Transfer Pipelines. The pipeline area will be served by existing and new (as constructed to serve specific Facility areas) hydrants in the vicinity of the pipeline alignment.

Area 600 – West Boiler. The boiler building and area will be served by adjacent hydrants. Smoke detectors, automatic and manual alarms, and hand held fire extinguishers, will be located as appropriate inside and outside the boiler building as required by local fire code. Based on the construction type and occupancy classification sprinkler systems are not necessary for fire control in the Area 600 boiler building.

Rail Infrastructure. The location of rail infrastructure improvements will be served by existing and new (as constructed to serve specific Facility areas) hydrants in the vicinity of the rail loop alignment.

The Applicant will consult with the Port, City fire officials, and public fire and emergency responders to develop an Operations Fire Prevention and Control program coordinated with existing local response capabilities. The Applicant will consult with local responders to identify gaps in existing firefighting equipment, and will provide training opportunities at the nationally recognized ~~Tesoro firefighting school at~~ Texas A&M ~~University~~Engineering Extenion Service Emergency Training Services Institute. These measures will be documented in the Operations Site Safety Plan or other plans related to Facility operations as appropriate to the activity being addressed (e.g., the inadvertent release or contingency plans associated with Marine Terminal loading activities, as required to comply with applicable state and federal regulations). The fire prevention plan will be developed in compliance with WAC 296-24-567, and will address the following requirements:

- The fire prevention plan will be in writing.
- The fire prevention plan will include:
  - A list of the major workplace fire hazards and their proper handling and storage procedures, potential ignition sources (such as welding, smoking and others) and their control procedures, and the type of fire protection equipment or systems which can control a fire involving them;

  - Names or regular job titles of those personnel responsible for maintenance of equipment and systems installed to prevent or control ignitions or fires; and
  - Names or regular job titles of those personnel responsible for control of fuel source hazards.
  - Accumulations of flammable and combustible waste materials and residues will be controlled so that they do not contribute to a fire emergency. The housekeeping procedures will be included in the written fire prevention plan.
- Training will include:
  - Informing employees of the fire hazards of the materials and processes to which they are exposed.
  - Reviewing with each employee upon initial assignment those parts of the fire prevention plan which the employee must know to protect the employee in the event of an emergency.
- Keeping the written plan in the workplace and making it available for employee review.
- Regularly and properly maintaining, according to established procedures, equipment and systems installed on heat producing equipment to prevent accidental ignition of combustible materials. The maintenance procedures will be included in the written fire prevention plan.

Explosion Prevention

As noted above, two sources of explosions could potentially occur at the Facility – mechanical explosions due to overpressure conditions, and explosions due to the release of H2S. In addition to the fire prevention and suppression elements listed above, Facility design and operating procedures will include, but not be limited to, the following explosion prevention elements:

- The storage tanks will be operated at atmospheric pressure, and will be equipped with internal pressure relief devices to vent gases should an overpressure situation arise;
- Internal pressure relieving systems will be incorporated throughout the Facility, including the transfer pipelines, marine terminal loading equipment, and rail cars;
- Installing pressure, flow and temperature sensors to ensure all storage and conveyance activities are conducted within appropriate parameters, and to quickly identify any abnormal situations that could potentially lead to an explosion;
- Including expansion loops in the design of the transfer pipelines to ensure the pipelines can expand and contract to accommodate changes in ambient temperature;
- Equipping personnel with H_2S detectors which will trigger alarms at levels well below the explosive concentrations of H_2S gases emitted.

4.1.2.3 Stand-by and Non-use

The Applicant anticipates that the Facility will operate continuously. However should there be a period during which the Facility is not operating at full capacity and some portion of the Facility is not in use, the Applicant will ensure that the temporarily shut down equipment is maintained in a fashion to prevent conditions that could result in a fire, consistent with the measures described above. Regardless, all fire detection and suppression systems would continue to be operated and maintained as though the entire Facility was in operation.

4.1.2.4 Dismantling and Restoration

Decommissioning of the Facility is discussed in section 2.3.7. The Applicant anticipates that fire and explosion prevention measures similar to those implemented during construction ~~would~~ will

be implemented during decommissioning and site restoration. Prior to beginning decommissioning the Applicant will submit a detailed facility decommissioning plan, and such plan ~~would~~ will address fire and explosion prevention measures.

4.1.3 Releases or Potential Releases to the Environment Affecting Public Health

This section addresses the treatment or disposition of all solid or semisolid construction and operation wastes including spent fuel, ash, sludge, and bottoms, and show compliance with applicable state and local solid waste and how these wastes will be handled in compliance with applicable state and local regulations. The Facility is being proposed at a location where industrial and solid wastes from the construction and operation of a former aluminum smelter were stored in waste piles and consolidated in landfills on site over the years; an overview of the restrictive covenants in place at this location is therefore also provided.

4.1.3.1 Site History

Terminal 5 is the former location of the Alcoa/Evergreen Aluminum smelter, which operated until 2000. Industrial and solid wastes from the construction and operation of the aluminum smelter were stored in waste piles and consolidated in landfills onsite over the years. Hazardous contaminants in these wastes include petroleum hydrocarbons, polychlorinated biphenyls (PCBs), cyanide, fluoride, trichloroethylene (TCE), low-level organic chemicals, and metals. Prior to the Port's purchase of the properties in 2009, Alcoa and Evergreen completed site remediation and facility decommissioning under Consent Decree No. 09-2-00247-2 and Enforcement Order 4931 with Ecology. Efforts included removing structures and foundations to a depth of approximately 4 feet and the site soil and sediment with concentrations of chemicals of concern above the cleanup levels established by the consent decree.

Five locations within the boundary of the proposed Facility are subject to the Ecology consent decree and the environmental restrictive covenants discussed below. Figure 4.1-2 illustrates the location of the portions of Terminal 5 where restrictive covenants are in place. Portions of the Facility, including the rail unloading building and additional rail lines, may be located in these areas.

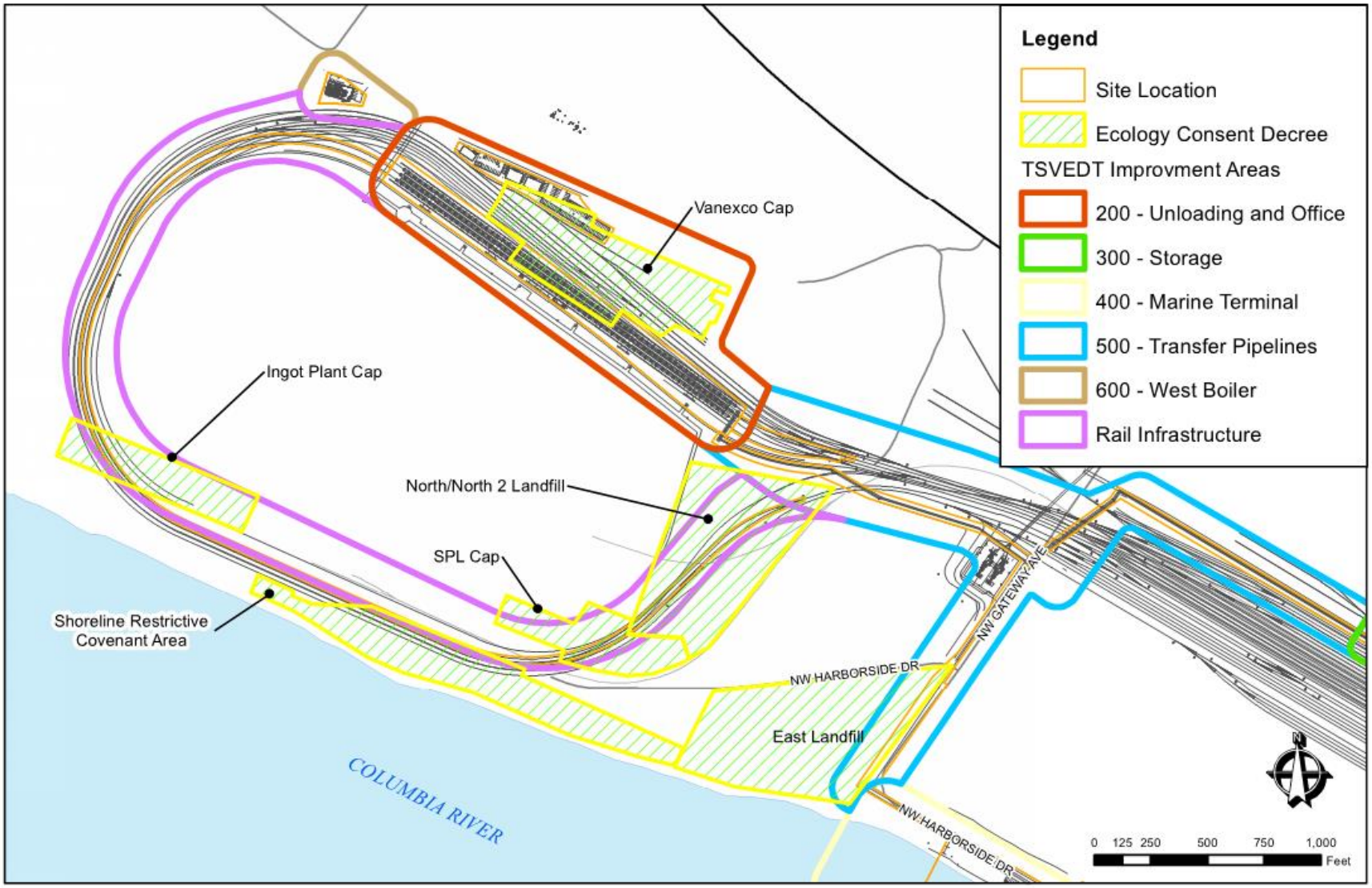
Consent Decree No. 09-2-00247-2

Consent Decree No. 09-2-00247-2 for the Alcoa Inc. site was entered into on January 30, 2009, and an amended Consent Decree on July 2011. It included the areas of the site that are listed below.

- **Vanexco/Rod Mill Site –** The 1995 consent decree (95-2-03268-4) for the Vanexco/Rod Mill building called for the building foundation (floor slabs) and building roof to serve as a cap to address PCB contamination beneath the building. Ecology approved an amendment in the 2009 consent decree (superseding the 1995 consent decree) to allow the removal of the building, providing that surface materials placed above the foundation are sloped to provide drainage away from the area. The site is located in Area 200 and is the location of the administrative and support buildings and the rail unloading building that are included in the proposed project.
- **Spent Pot Liner (SPL) Storage Area –** The 1992 consent decree (92-2-00783-9) for the SPL storage area called for covering it with either a polyvinyl chloride (PVC) or high density polyethylene (HDPE) membrane or a 2-foot-thick clay cover with a hydraulic conductivity of

no more than 1x10 6 cm/sec. The 1992 consent decree further required that the SPL cap be maintained. The 1992 consent decree was dismissed on January 30, 2009 and no longer has effect; however, the operation and maintenance activities, including institutional controls and cover maintenance, originally contained in the 1992 consent decree are now contained in the 2009 consent decree and continue to apply to the site.

- Consent decree 09-2-00247-2 (discussed in additional detail below) also notes Ecology's certification that all the terms of the construction portion of the 1992 consent decree had been completed on May 3, 1992. Prior to 2009, the SPL area was covered with an HDPE liner to meet this consent decree requirement.



BergerABAM

Figure 4.1-2. Ecology Consent Decree

- In April 2010, with Ecology approval, as part of its WVFA project, the Port placed an asphalt cap over the HDPE liner that had previously covered the area of contaminated soil. The cap consisted of a layer of asphalt overlain by an asphalt-impregnated geotextile (a combination of non-woven polypropylene fabric and asphalt cement tack coat) and geomembrane overlain by a second layer of asphalt. The fabric and tack coat combination form an asphalt membrane interlayer within the pavement section. This cap remains in complete form today.
- **North/North 2 Cap –** On March 26, 2009, former landowner Alcoa Inc. entered into an environmental restrictive covenant in favor of Ecology pursuant to its consent decree with Ecology effective January 30, 2009 restricting activity in the North and North 2 (NN2) landfills. This restrictive covenant was necessary because of the residual concentration of contaminants on the properties that exceeded cleanup levels for soil and/or groundwater established in the MTCA under WAC 173-340-720 and 740. These are presently covered by a 1-foot layer of clean sand. Per the restrictive covenant, these materials may be reused on site with Ecology's permission.
- **Shoreline Restrictive Covenant –** On March 26, 2009, Alcoa Inc., the former landowner, entered into an environmental restrictive covenant in favor of Ecology pursuant to its consent decree with Ecology effective January 30, 2009 restricting activity in the shoreline area. This restrictive covenant was necessary because of the residual concentration of contaminants on the properties that exceeded cleanup levels for soil established in the MTCA under WAC 173-340-720 and 740.
- **Ingot Plant Cap –** On December 31, 2008, former landowner Evergreen Aluminum LLC entered into a restrictive covenant with Ecology restricting activity in the ingot plant cap area. The covenant was necessary because the residual concentration of PCBs exceeds unrestricted use levels under WAC 173-340-740. A 1-foot layer of soil constitutes the cap.

Environmental Restrictive Covenant

The environmental restrictive covenant entered pursuant to Consent Decree No. 09-2-00247-2 established multiple conditions for the development of the site and addresses the East Landfill, SPL storage area, shoreline area, and the North/NN2 landfills. The sections are summarized below.

- **Section1** requires that the site be used solely for industrial purposes (per RCW 70.105D.020[23]) and allowed under City of Vancouver zoning regulations (VMC Title 20). The reference to the RCW is outdated and the current definition of Industrial Properties is located at RCW 70.105D.020(14); it reads as follows:

  'Industrial properties' means properties that are or have been characterized by, or are to be committed to, traditional industrial uses such as processing or manufacturing of materials, marine terminal and transportation areas and facilities, fabrication, assembly, treatment, or distribution of manufactured products, or storage of bulk materials, that are either:

  (a) Zoned for industrial use by a city or county conducting land use planning under chapter 36.70A RCW; or

  (b) For counties not planning under chapter 36.70A RCW and the cities within them, zoned for industrial use and adjacent to properties currently used or designated for industrial purposes.

The Facility consists of a marine terminal and is consistent with the definition from RCW 70.105D.020(14). As noted in section 2.23, the area of the project is zoned Heavy Industrial and the Facility is an allowed use in the zoning district.

- **Section 2** requires that any activity that may result in release or exposure to the environment of the contaminated soil within the restricted areas (noted above) or create new exposure pathway is prohibited without approval from Ecology. Examples of activity that require Ecology approval include drilling, digging, placement of objects, or the use of any equipment that deforms or stresses the surface beyond its load-bearing capacity as well as piercing the surface with a rod, spike, or similar item or bulldozing or earthwork. Activities similar to these will be performed in each of the restricted areas noted above and, pursuant to the covenant, will require approval from Ecology. It is anticipated that this approval will be considered as part of the site certification agreement through EFSEC.
- **Section 3** prohibits the use of groundwater for consumption or other beneficial purposes but allows construction dewatering. A waste determination is required for any water that is extracted during dewatering activities and water must be handled, stored, and managed according to applicable laws and regulations. Wells or groundwater extraction are specifically prohibited in the vicinity of the East Landfill. As noted in Section 2.6, water for domestic, industrial, and fire protection uses will come from existing municipal sources and no groundwater extraction is proposed for beneficial purposes. Excavations for utilities or building foundations may encounter groundwater and dewatering may be necessary.
- **Section 4** specifically prohibits activity on the property that may interfere with the integrity of the remedial action and the continued protection of the human health and the environment.
- **Section 5** requires Ecology approval for activities that may result in the release, exposure of, or creation of a new exposure pathway for hazardous substances that remain on the property
- **Section 6** requires written notification to Ecology for any proposed conveyance of title, easement, lease, or other interest in the property.
- **Section 7** requires the owner to restrict the use of the property and notify lessees of the restrictive covenant.
- **Section 8** requires Ecology approval for uses that may be inconsistent with the covenant.
- **Section 9** allows Ecology to enter the property and inspect records.
- **Section 10** defines a process to eliminate the covenant.

Environmental Restrictive Covenant (Enforcement Order No. 4931)

The environmental restrictive covenant entered into on December 31, 2008 for Evergreen established multiple conditions for the development of the former Evergreen site and addresses the ingot plant cap area. The sections are summarized below.

- **Section 1** requires that the site be used solely for industrial purposes (per RCW 70.105D.020[14]) as allowed under the Clark County Unified Development Code and that the existing cap may not be altered, modified, or removed without prior written approval from Ecology. It also states that any activity, that may result in release or exposure to the environment of the contaminated soil within the restricted areas or that creates a new exposure pathway, is prohibited without prior written approval from Ecology. Examples of activity that require Ecology approval include drilling, digging, placement of objects, or use of any equipment which deforms or stresses the surface beyond its load bearing capacity as well as piercing the surface with a rod, spike or similar item or bulldozing or earthwork.

- **Section 2** specifically prohibits activity on the property that may interfere with the integrity of the remedial action and continued protection of the human health and the environment.
- **Section 3** prohibits activity that may result in the release or exposure to the environment of a hazardous substance remaining on the Ingot Plant Capped Area as part of the Remedial Action or create a new exposure pathway is prohibited without prior written approval from Ecology.
- **Section 4** requires written notification to Ecology for any proposed conveyance of title, easement, lease or other interest in the property.
- **Section 5** requires the owner to restrict use of the property and notify lessees of the restrictive covenant.
- **Section 6** requires Ecology approval for uses that may be inconsistent with the covenant.
- **Section 7** allows Ecology to enter the property and inspect records.
- **Section 8** defines a process to eliminate the covenant.

4.1.3.2 Construction

Releases to the environment affecting public health are not anticipated during construction due to the limited types and relatively small quantities of hazardous materials that will be used during construction. Measures to prevent and contain any inadvertent release of hazardous materials will be provided as described in section 2.10 Spill Prevention and Control.

During construction of the Facility, solid construction debris, such as scrap metal, cable, wire, wood pallets, plastic packaging materials, and cardboard, will be removed by licensed disposal operators and disposed at local landfills licensed to accept such waste. Should any hazardous waste be generated, it will be collected, handled, stored and disposed of in accordance with applicable federal, state, and local regulations.

As noted in section 4.1.3.1, areas of the site and/or adjacent to the site are restricted for use because of the presence of subsurface soil and/or groundwater contamination from previous historic uses. Disturbance of those areas will be avoided to the extent practical. However, construction is necessary in each of the restricted areas. Construction will comply with the site-specific restrictive covenants, consent decrees, ~~and~~ MTCA, RCRA, and Dangerous Waste Regulations.

- **Vanexco/Rod Mill –** Contaminants in this area consist of PCB-impacted soils (Anchor 2008), Monitoring indicated that groundwater is not affected by the PCB-impacted soils (Consent Decree No. 09-2-00247-2). The building foundations and floor slabs were left in place to form a cap over the contaminated soils as required by the consent decree (95-2-03268-4) and surface materials above the foundation are sloped to provide drainage away from the area or that the foundation is replaced with an impervious layer and stormwater control facilities are located above the layer.

  The Facility includes the construction of parking facilities and a portion of the rail unloading area within the Vanexco/Rod Mill restricted covenant area (see Figure 2.3-5). The parking facilities will not require deep excavations that penetrate the cap and will serve as an additional impervious layer to prevent precipitation from reaching the PCB-contaminated soils. Approximately 250 lineal feet of the northern edge of the rail unloading area is located above the cap. The building will require excavation for concrete foundations or driving piles within the cap area. The cap materials and excavated materials from beneath the cap will be

segregated, characterized, and properly disposed of based on the characterization. Any material exceeding Ecology soil cleanup levels for unrestricted use (that cannot be used on site) must be disposed of at a Subtitle D landfill in accordance with WAC 173-350. After construction of the foundation or pile driving, the cap will be restored with appropriate materials to form an impervious surface and restore the integrity of the cap.

- **Spent Pot Liner (SPL) Storage Area –** Contaminants in this area consist of residual affected soils containing cyanide and fluoride beneath a cap (Anchor 2008). The cap consists of a layer of asphalt overlain by an asphalt-impregnated geotextile (a combination of non-woven polypropylene fabric and asphalt cement tack coat) and geomembrane overlain by a second layer of asphalt. The fabric and tack coat combination form an asphalt membrane interlayer within the pavement section.
  The Facility will construct two additional rail loops within the SPL Storage Area. However, no excavation into the caps or the contaminated materials they cover will be necessary for the construction and no approval is required from Ecology.
- **North/NN2 Cap –** The North/NN2 cap covers former landfill areas that were remediated by disposing of materials off site and in the East Landfill and the resulting excavation was used to dispose of PCB-contaminated dredge materials from the cleanup of shoreline areas on the site. These materials are presently covered by a 1-foot layer of clean sand. Per the restrictive covenant, these materials may be reused on site with Ecology's permission.
  The Facility will construct two additional rail loops within the North/NN2 cap. However, no excavation into the caps or the contaminated materials they cover will be necessary for construction and no approval is required from Ecology.
- **Shoreline Restrictive Covenant Area** – The shoreline restrictive covenant area was remediated by removing soil and materials. Residual levels of contamination may remain and there is no cap or other surface material specifically placed in the area (Anchor 2009).
  The Facility will construct two additional rail loops within the area. Work will include manhole relocations that require excavation up to 20 feet below ground surface. These will be installed by cutting a trench, installing the manhole and pipe, and backfilling with soil and compacting. Utility relocations will be installed by cutting a trench, placing the conduits, and backfilling with soil and compacting. Excavation and grading on the north side of the shoreline berm will take place to allow the removal and relocation of the Terminal 5 access driveway and loop tracks. This construction will require approval from Ecology under the covenant.
- **Ingot Plant Cap –** The ingot plant cap covers residual affected soils containing PCBs. The cap consists of a 1-foot layer of clean soil.

  The Facility will construct two additional rail loops within the ingot plant cap. However, no excavation into the cap or the contaminated materials it covers will be necessary for the construction and no approval is required from Ecology.

The following construction methods are anticipated based on construction within the restrictive covenant areas:

- Measures to prevent releases will be included in a contaminated media management plan and construction specifications. For all work, the contractor will be required to follow a work plan, a health and safety plan, a stockpiling plan, and a decontamination plan.

- Areas that are disturbed or removed as part of final construction will be covered with at least 1 foot of clean soil fill to prevent a future direct contact hazard. Where asphalt (road) is laid, it will substitute for 1 foot of clean fill to prevent a future direction contact hazard.
- Soils that are excavated will either be:
  - Direct loaded or stockpiled, sampled and analyzed for polynuclear aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons and other parameters based on the anticipated contaminants, and disposed of off site, or
  - Reused on site in accordance with applicable regulations.
- Standard dust control measures such as spraying exposed soil surfaces with water will be employed during construction to prevent the release of airborne particulates.
- Equipment employed in the shoreline restrictive covenant area will be decontaminated at a location to be specified in the contractor's decontamination plan.

Excavation in other areas of the site is not expected to encounter soils with contaminant concentrations greater than industrial cleanup levels and can be reused on site. Excess excavated soils that will not be used onsite will be direct loaded or stockpiled, sampled and analyzed for PAHs and total petroleum hydrocarbons and other parameters based on the anticipated contaminants, and disposed of offsite in an appropriate location based on the results of the analysis.

At Terminal 5, groundwater has been shown to be contaminated throughout the site (Ecology 2008). Dewatering may be necessary during excavations for building foundations, utilities, and pipelines. Groundwater that is pumped out of the excavations will be stored, characterized, and treated in accordance with state and federal regulations prior to disposal. The water may be treated onsite and disposed of via the City's sanitary sewer system (if appropriate), or removed by a licensed commercial waste disposal facility for off-site treatment and disposal. If not exceeding state water quality levels, dewatering water will be managed in accordance with Construction Stormwater General Permit requirements.

4.1.3.3 Operations

Wastes Resulting from Normal Operations

The following solid waste streams are anticipated to be generated during normal operation of the facility:

- Oily and non-oily waste and rags resulting from cleaning of facility components;
- Oily sludge recovered from the bottom of the storage tanks when these are cleaned on a 10-year interval according to API standards;
- Domestic garbage and packing materials (cardboard, paper, plastic).

There are no wastes generated as a by-product from handling of crude oil at the Facility. The Applicant will identify the appropriate designation of the wastes produced, and if they designate as hazardous waste, they will be collected, handled, stored and disposed of in accordance with applicable federal, state, and local regulations. Solid wastes (i.e. non-hazardous) will be collected and recycled or disposed of at a licensed waste handling facility.

Wastes Resulting from Handling of Inadvertent Releases

Section 2.10 and Appendices B.2 and C describe the comprehensive spill prevention activities the Applicant will implement at the Facility during the operational phase. However, should an inadvertent release occur, the Applicant will be responsible for spill control and collection, and disposal of the resulting wastes.

Prior to beginning operations, as part of its SPCCP and Spill Contingency Plan, the Applicant will identify a process for dealing with wastes resulting from cleaning up inadvertent releases. This process will address the types of waste materials likely to be collected, the means for their characterization to determine if they are designated as solid waste or dangerous waste, and potential methods of disposal based on the waste type and its designation. Designation procedures and waste management requirements are contained in Dangerous Waste Regulations (Chapter 173-303 WAC). The Dangerous Waste Regulations also apply to other wastes and are more stringent than Federal Hazardous Waste Regulations (40 CFR, Parts 261 to 279).

Based on the types of waste identified, the Applicant will consult with spill contractors, chemical testing laboratories, and Ecology for advice on designating wastes as dangerous or solid. Testing of actual waste during a spill response activity may be required to determine whether such mixtures are designated as dangerous waste. If recovered, oily liquids and other materials contaminated by oil not designated as dangerous waste, will be classified as solid waste and subject to RCW 70.95. For example, recovered oily liquids and other materials contaminated by oil that are not designated as dangerous waste may be recycled, burned, or blended for fuel. Recovered oily liquids may be managed as “off specification fuels” under the exemption in the dangerous waste rules, as long as it is used as fuel. Recovered oily liquids and other materials contaminated by oil that cannot be recycled, burned, or blended for fuel are considered solid waste and subject to designation.

Oily waste may be designated as dangerous waste (dangerous waste or extremely hazardous waste) depending on characteristics, such as ignitability, corrosivity, reactivity, toxicity, and persistence.

Wastes may be designated as dangerous waste because they are:

- Listed (appear on lists for discarded chemical products or from specified industrial processes) or characterized as “dangerous waste” in the absence of knowledge of waste origination.
- Ignitable (flash point <140 degrees F);
- Corrosive (pH £ 2.0 or ³ 12.5) ;
- Reactive (explosive, self-igniting, reactive with water);
- Toxic (specific standards and test methods apply, i.e. Toxicity Characteristic Leaching Procedure (TCLP) and DW bioassay; and
- Persistent (specific standards and test methods apply).
- If a waste is classified as a dangerous waste, the Applicant will ensure safe management procedures to collect, handle, and dispose of the waste, including, but not limited to:

- the waste is placed in proper tanks or stored in closed compatible drums,
- has appropriate labels and markings,
- is transported by authorized haulers,
- is shipped using a Hazardous Waste Manifest,
- is delivered to an authorized recycler or permitted treatment, storage or disposal facility

4.1.4 Safety Standards Compliance

The implementation of a safety program for the facility will be based on compliance with state and federal regulations, as well as the implementation of industry standards. The following discussion identifies the primary safety regulations applicable to the activities conducted at the facility, and provides an overview of the numerous industry standards that the Applicant will implement in the design, construction and operation of the facility.

4.1.4.1 Washington State Safety and Health Standards

The U.S. Congress created the Occupational Safety and Health Administration (OSHA) in 1971 to develop and enforce workplace safety and health rules throughout the country. States may choose to enact and implement their own safety and health programs as long as they are at least as effective as OSHA. In 1973, the Washington State Legislature passed the Washington Industrial Safety and Health Act or WISHA (RCW 49.17), wherein the state chose to develop its own workplace safety and health program, which is implemented through WAC 296. In Washington, OSHA continues to cover workplaces with federal employees, nonfederal employees working on federal reservations and military bases, employees working on floating worksites (floating dry docks, fishing boats, construction barges), and employees working for tribal employers on tribal lands. The Facility will not have any such workplaces and is therefore entirely subject to WISHA.

The Facility will include multiple elements that will be subject to a host of health and safety standards. The following discussion identifies the most likely applicable chapters of WAC 296 and specific sections within them that address particular activities unique to the facility, such as rail operations, handling of crude oil, and longshore, stevedore, and waterfront-related operations. However, the Applicant recognizes that other standards will also apply, and intends to work with agencies during project review to refine and ensure compliance will all potentially applicable regulatory requirements. Many of the requirements of WAC 296 that apply to the Facility will overlap, with the more stringent requirements of a section prevailing over another. In developing the safety program for the construction, operation and decommissioning phases of the Facility the Applicant will review the entirety of WAC 296 and determine the scope of applicability of each chapter to the activities that are proposed to occur at the Facility.

WAC 296-24, General Safety and Health Standards

These regulations establish standards for the design and operation of specific equipment that may be installed and operated at the Facility, including the handling of rolling railroad cars and design standards for electrical systems.

- WAC 296-24-21501: Use of Mechanical Equipment
- WAC 296-24-21509: Clearance limits
- WAC 296-24-21511: Rolling railroad cars requirements; Under normal operating conditions, the unit trains will be moved by locomotive, which is exempted under this regulation;

However, the regulation requires the employment of a clearly audible warning system when cars are being moved by car pullers or locomotives, and when the person responsible for the moving does not have assurance that the area is clear and that it is safe to move the car or cars

- WAC 296-24-21513: Guarding requirements
- WAC 296-24-235 through 296-24-23533: Overhead and gantry cranes requirements.
- WAC 296-24-237: Construction, operation, and maintenance standards for chain and electric hoists
- WAC 296-24-238: Air hoists requirements
- WAC 296-24-240 through 296-24-24019: Crawler cranes, locomotive cranes, wheel mounted cranes or other variations used for construction or operation
- WAC 296-24-245 through 296-24-24519: These regulations apply "to guy, stiffleg, basket, breast, gin pole, Chicago boom and A-frame derricks of the stationary type, capable of handling loads at variable reaches and powered by hoists through systems of rope reeving, used to perform lifting hook work, single or multiple line bucket work, grab, grapple, and magnet work."
- WAC 296-24-294 through 296-24-29431: These regulations apply if rigging is used in the construction or operation of the project
- WAC 296-24-295 through 296-24-295-29505: Compressed gases general requirements
- WAC 296-24-33013: This section provides the standards for a bulk plant, which is defined as "that portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car, or tank vehicle, and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, or container, including tank storage requirements under WAC 296-24-33005 and piping, valves, and fitting requirements under WAC 296-24-33007."
- WAC 296-24-56525: Automatic sprinkler system requirements
- WAC 296-24-56527: Fire alarm signaling systems
- WAC 296-24-567 and WAC 296-24-56701: Employee emergency plans and fire prevention plans, as required by particular WISHA standards
- WAC 296-24-592 through 296-24-62911: These regulations govern the standards for fire suppression equipment depending on what type is used
- WAC 296-24-73501 through 296-24-73511: Requirements for walking-working surfaces
- WAC 296-24-75003 through 296-24-75011: Requirements for guarding floor and wall openings and holes
- WAC 296-24-76503 through 296-24-76555: Requirements for fixed industrial stairs
- WAC 296-24-85501: Requirements for dockboards
- WAC 296-24-92002 through 296-24-92011: Inspection requirements of compressed gas cylinders
- WAC 296-93003: General requirements for safety release devices for compressed gas cylinders
- WAC 296-24-93503: General requirements for safety relief devices for cargo and portable tanks storing compressed gas cylinders
- WAC 296-24-95701 through 296-24-95713: Design safety standards for electrical systems, especially WAC 296-24-95711 which covers the requirements for electric equipment and wiring in locations that are classified depending on the properties of the flammable vapors,

liquids, gases, or combustible dusts or fibers that may be present therein and the likelihood that a flammable or combustible concentration or quantity is present
- WAC 296-24-960 through 296-24-985: Electrical safety-related work practices.

WAC 296-56, Safety Standards -- Longshore, Stevedore and Waterfront-Related Operations

This chapter sets out the specific safety standards for the waterfront-related operations at the facility. The following list is a summary of provisions anticipated to apply to the waterfront activities conducted at the facility:

- WAC 296-56-60006: Personnel requirements
- WAC 296-56-60007: Housekeeping requirements
- WAC 296-56-60009: Accident prevention program
- WAC 296-56-60010: Emergency action plans
- WAC 296-56-60011 through 296-56-60047: Waterfront operations requirements
- WAC 296-56-60049 through 296-56-60053: Requirements for hazardous cargo, hazardous materials, and hazardous atmospheres and substances. It is necessary to first determine whether crude oil is a hazardous cargo, material, substance, or atmosphere which is defined in WAC 56-60005
- WAC 296-56-60071 through 296-56-60099: Cargo handling gear and equipment requirements
- WAC 296-56-60109 through 296-56-60133: Personal protection requirements
- WAC 296-56-60209: Requirements for fixed ladders
- WAC 296-56-60211: Requirements for portable ladders
- WAC 296-56-60213: Requirements for Jacob's ladders
- WAC 296-56-60215: Requirements for fixed stairways
- WAC 296-56-60217: Requirements for spiral stairways
- WAC 296-56-60219: Requirements for employee exits
- WAC 296-56-60221: Illumination requirements
- WAC 296-56-60223: Requirement for passage between levels and across openings
- WAC 296-56-60225: Requirements for guarding temporary hazards
- WAC 296-56-60229: Sanitation requirements
- WAC 296-56-60231: Signs and marking requirements
- WAC 296-56-60233: Machine guarding requirements for related terminal operations and equipment
- WAC 296-56-60235: Welding, cutting and heating (hot work) requirements
- WAC 296-56-60237: Requirements for spray painting connected with maintenance of structures, equipment, and gear at the marine terminal and of transient equipment serviced at the terminal. It does not apply “to overall painting of terminal structures under construction, major repair or rebuilding of terminal structures, or portable spraying apparatus not used regularly in the same location.”
- WAC 296-56-60239: Requirements for working with compressed air
- WAC 296-56-60241: Requirements for compressed air receivers and equipment used for operations such as cleaning, drilling, hoisting, and chipping. It does not apply to equipment used to convey materials or in transportation applications such as railways, vehicles, or cranes

- WAC 296-56-60243: Fuel handling and storage requirements
- WAC 296-56-60245: Battery charging and changing requirements
- WAC 296-56-60247: Prohibited operations
- WAC 296-56-60249: Petroleum dock requirements

WAC 296-62, Occupational Health Standards

This chapter provides the general occupational health standards related to the handling of toxic and hazardous substances, if such standards are present during construction or operation of the Facility:

- WAC 296-62-055 through 296-62-05520: Requirement to retain Department of Transportation Labeling
- WAC 296-62-060: Control requirements for hazardous conditions in addition to those specified in this chapter
- Parts F through L: Specific control requirements for certain toxic and hazardous substances

WAC 296-155, Safety Standards for Construction Work

This chapter provides the safety standards for construction of the Facility and addresses:

- General safety and health provisions
- Occupational health and environmental control and hazard communication
- Personal protective and life-saving equipment, and fall protection requirements for construction
- Fire protection and prevention
- Signaling and flaggers
- Storage, use, and disposal
- Rigging requirements for material handling
- Tools—hand and power
- Welding and cutting
- Electrical
- Stairways and scaffolds
- Cranes, rigging, and personnel lifting
- Motor vehicles, mechanized equipment, and marine operations
- Excavation, trenching, and shoring
- Concrete, concrete forms, shoring, and masonry construction
- Steel erection
- Underground construction
- Miscellaneous construction requirements
- Demolition
- Power distribution and transmission lines
- Rollover protective structures and overhead protection

WAC 296-800, Safety and Health Core Rules

This chapter is applicable to the non-waterfront-related operations, and regulates:

- WAC 296-800-110 through 296-800-11045: Employer responsibilities for a safe workplace
- WAC 296-800-120 through 296-800-12005: Employee responsibilities

- WAC 296-800-130 through 296-800-13025: Safety Committees and Safety Meetings
- WAC 296-800-140 through 296-800-14025: Accident prevention program
- WAC 296-800-150 through 296-800-15040: First aid summary
- WAC 296-800-160 through 296-800-16070: Personal protective equipment
- WAC 296-800-170 through 296-800-18020: Chemical hazard communication and material safety data sheets
- WAC 296-800-190 through 296-800-19005: Safety bulletin board
- WAC 296-800-200 through 296-800-20005: WISHA poster requirement
- WAC 296-800-210 through 296-800-21005: Lighting requirements
- WAC 296-800-22005 through 296-800-22022: Housekeeping requirements
- WAC 296-800-22025 through 296-800-22030: Drainage requirements
- WAC 296-800-22035 through 296-800-22040: Storage area requirements
- WAC 296-800-230 through 296-800-23075: Sanitation and hygiene facilities and procedures
- WAC 296-800-240 through 296-800-24005: Environmental tobacco smoke in the office
- WAC 296-800-250 through 296-800-25015: Stairs and stair railings
- WAC 296-800-260 through 296-800-26010: Floor openings, floor holes, and open-sided floors
- WAC 296-800-270 through 296-800-27020: Workplace structural integrity
- WAC 296-800-280 through 296-800-28045: Basic electrical rules
- WAC 296-800-300 through 296-800-30025: Portable fire extinguishers
- WAC 296-800-310 through 296-800-31080: Exit routes and employee alarm systems
- WAC 296-800-320 through 296-800-32025: Accident reporting and investigating

WAC 296-817, Hearing loss prevention (noise)

This chapter addresses requirements applicable for hearing loss prevention in the workplace.

WAC 296-841, Airborne Contaminants

This chapter is applicable when employees are, or could be, exposed to an airborne hazard. WAC 296-841-100 lists examples of airborne contaminants that may become airborne hazards in some workplaces, including the chemicals listed in Table 3 of WAC 296-841-20025. Emissions of hydrogen sulfide (H_2S) are a hazard associated with activities involving the handling of crude oil. H_2S is a colorless gas with a rotten egg odor, but odorless at poisonous concentrations. H_2S deadens the sense of smell so that odor cannot be relied upon to warn of the continuous presence of this gas. It is also heavier than air and will tend to accumulate at the bottom of poorly ventilated spaces. Facility employees working in areas where they can be exposed to H_2S will be required to wear personal H_2S detectors, which will alert them of poetically dangerous concentrations of the gas, and allow them to evacuate problem areas. Fixed H_2S sensors will also be located in enclosed spaces, setting off evacuation alarms should safety threshold concentrations be reached in the ambient air, in the unloading buildings for example.

- WAC 296-841-20003: Employee protective measures
- WAC 296-841-20005: Requirements for exposure evaluations
- WAC 296-841-20010: Exposure controls
- WAC 296-841-20015: Respirators
- WAC 296-841-20020: Notification requirements
- WAC 296-841-20025: Permissible exposure limits

WAC 296-824, Emergency Response
This chapter is applicable if employees are, or could become, involved in responding to inadvertent releases of hazardous substances in a workplace or any other location. For example, the requirements of this chapter would apply in the event of an inadvertent release of crude oil. The chapter addresses:

- WAC 296-824-200 through 296-824-20005: Requirement for employers to anticipate and plan for emergency response operations by developing an emergency response plan
- WAC 296-824-30005: Training for employees
- WAC 296-824-400 through 296-824-40010: Medical surveillance requirements
- WAC 296-824-500 through 296-824-50030: Incident requirements
- WAC 296-824-600 through 296-824-60015: Personal protective equipment requirements
- WAC 296-824-700 through 296-824-70005: Post-emergency response requirements

WAC 296-860, Railroad clearances and walkways in private rail yards and plants
This chapter applies to all railroad clearances and walkways in rail yards and plants, including logging railroad yards, such as mill yards, maintenance yards, and sorting yards.

In addition, the Applicant commits to having every train attended upon taking control of the unit train from BNSF until the time control is released back to BNSF when the train leaves the Facility.

WAC 296-901, Globally harmonized system for hazard communication
This chapter requires all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, safety data sheets, and information and training. It applies to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

4.1.4.2 U.S. Coast Guard (USCG) 33 CFR Part 154 Subpart E – Vapor Control Systems

During ship loading, crude oil is conveyed from the transfer pipeline through ~~high velocity~~ loading hoses into the cargo tank of the vessel. During this loading, vapors inside the vessel tanks are displaced. Vapors displaced from vessels~~, ships or barges~~ as they are filled with crude oil will consist primarily of hydrocarbons. These vapors are conditioned, as needed, with natural gas to ensure a safe concentration in excess of the upper flammable limit. All vapors, including any conditioning gases, will be collected and routed to the MVCU for safe disposal.

Subpart E, regulates the manner in which these vapors are collected, conditioned, and then disposed of to ensure the safety of the loading operation at all times.

The regulations address the following topics:

- vapor line connection
- facility requirement for vessel liquid overfull protection
- vessel pressure protection
- cargo vapor conditioning
- protection from fire

- explosion and detonation
- equipment requirements for flame and detonation arrestors
- vapor compressors, vapor blowers and vapor recovery and destruction units
- personnel training and operational requirements

The regulations require that a "certifying entity" review the plans and calculations for the MVCU, and conduct inspections and witness tests that demonstrate the facility conforms to the certified plans and specifications, meets the requirement of the applicable regulations and operates properly. Prior to beginning operations, and based upon the inspection and testing, the facility must receive a letter of adequacy from the USCG Captain of the Port (COPT) with jurisdiction over the geographical location where the facility is located.

The facility will incorporate a dock safety unit and MVCUs as described in section 2.3, in compliance with 33 CFR 154 Part E. The Applicant will seek the necessary review and approval of the dock safety unit and MVCU from the USCG prior to beginning operations of the marine vessel loading components of the Facility.

4.1.4.3 Representative Industry Codes and Standards

Numerous industry codes and standards apply to the design, construction and operation of the facility and its specific elements. The Applicant will incorporate the requirements of these codes and standards as applicable, including but not limited to the codes of the following associations:

- ACI - American Concrete Institute
- AISC - American Institute of Steel Construction
- ANSI - American National Standards Institute
- API - American Petroleum Institute
- AREMA - American Railway Engineering and Maintenance of Way Association
- ASCE - American Society of Civil Engineers
- ASME - American Society of Mechanical Engineers
- AWS - American Welding Society
- BNSF -Burlington Northern Santa Fe Railway Company
- BPVC - Boiler and Pressure Vessel Code of ASME
- FM - Factory Mutual
- FMEA - Factor Mutual Engineering Association
- IBC - International Building Code, 2012
- ICEA - Insulated Cable Engineers Association
- IEEE - Institute of Electrical and Electronic Engineers
- ISA - Instrument Society of America
- MSHA - Mine Safety and Health Administration
- NACE - National Association of Corrosion Engineers
- NEC - National Electric Code
- NEMA - National Electrical Manufacturer's Association
- NESC - National Electrical Safety Code
- NFPA - National Fire Protection Association
- NIST - National Institute of Standards and Technology
- SMACNA - Sheet Metal and Air Conditioning Contractors National Association

4.1.4.4 Methods of Compliance with Safety Standards

The Applicant will demonstrate compliance with all applicable safety standards as follows:

Project Design

The Applicant will cause the Facility to be designed in compliance with all applicable safety regulations and requirements, including applicable industry standards. Prior to beginning construction of the Facility the Applicant will submit a complete set of construction plans to EFSEC for approval. These construction plans will identify the safety regulations and industry standards that apply to the Facility, and as appropriate will specify which standards apply to specific element designs.

Project Construction

Through the construction management program described in section 2.16, the Applicant will ensure that the Facility has been constructed to the specifications of the construction drawings approved above. The Applicant will conduct pre-operational commissioning tests in accordance with industry standards and applicable regulations, including but not limited to the following:

- Hydrostatic testing of piping systems, transfer pipelines and storage tanks
- Testing and certification of the dock safety unit and MVCU in accordance with the provisions of 33 CFR 154 Subpart E
- Testing of fire and alarm systems in accordance with applicable fire and building safety codes

Project Operation

The Applicant will ensure that all safety systems inherent in the project design will be operated according to applicable industry standards and state and local regulations and codes. The Applicant will develop operations manuals to address appropriate measures for operation of facility safety systems and their ongoing maintenance. Facility systems will be tested according to industry standards and applicable state and federal regulations.

The Applicant will implement the usage of personal and facility sub area-wide Lower Explosive Limit (LEL) hydrocarbon detection systems and H_2S detection systems. Personal detection systems will notify individual employees when concentrations of hydrocarbons or H_2S exceed safe thresholds and they must evacuate their immediate work area. The action levels for the LEL (10% of LEL) and H2S meters (10 ppm). Similarly, sub-area-wide detectors will trigger evacuation alarms. LELs used in below grade locations and confined spaces will also detect oxygen levels to ensure safety of personnel in confined spaces.

Safety Program

The Applicant will develop, implement and document a facility safety program to ensure compliance with state and federal requirements. The program will incorporate applicable industry design standards. Appendix D includes the Applicant's preliminary Health Safety Security and Environmental (HSSE) Execution Plan. This plan lays out a process through which the Applicant will develop and implement its facility safety program, and identifies the various safety processes and organizational and staff responsibilities, and the training that will occur as a result of the implementation of the program.

The program will include the preparation of construction and operations safety plans, which will be submitted to EFSEC prior to the beginning of facility construction and operations respectively. The plans will address the requirements of WAC 296, as described above, and the requirements of 33 CFR 154 Part E, as well as any additional related requirements required under other applicable state and federal regulations and spill contingency planning processes described elsewhere in this Application.

4.1.5 Radiation Levels

Pursuant to WAC 463-60-115, the Applicant requests a waiver of the information required by WAC 463-30-352(5). The Facility will not handle, store or use or release any radioactive materials during operation.

The Applicant discloses that controlled use of testing equipment containing very minor amounts of radioactive materials will occur during construction of the Facility and may occur during maintenance activities associated with facility operation. This use occurs only in connection with standard testing equipment used to conduct radiographic testing of welds to ensure weld integrity.

4.1.6 Emergency Plans

4.1.6.1 Emergency Response Infrastructure

The Facility, located within an industrial zone at the Port of Vancouver, will be able to take advantage of the extensive emergency response infrastructure located in the Portland/Vancouver Metropolitan Area. Similar to the broad organization of spill response and contingency planning activities described in Appendix B.1, local, state, and federal agencies and industry cooperatives have established a framework for response for both upland and on-water emergencies.

The Vancouver Fire Department (VFD) responds to fires within the city limits, which includes most waterfront facilities. The Applicant will coordinate closely with the VFD and the Port to ensure the Applicant's emergency plans coordinate with both of these organization's needs with respect to both on-Facility-, and off-Facility-site events.

Vessels moored to piers at the Port of Vancouver are also provided fire by the VFD protection. In addition to the VFD, the Maritime Fire and Safety Association (MFSA), established in November 1983, has in place a system to ensure an adequate, timely, and well-coordinated response to shipboard fires over the entire 110-mile channel of the Lower Columbia River. MFSA established the Fire Protection Agency Advisory Council (F-PAAC) to coordinate this effort. Multiple jurisdictions are involved: two states, seven counties, fourteen cities, seven port districts, and eleven local fire agencies. These eleven agencies comprise F-PAAC. All members have agreed to work and train together, so that when an incident occurs, each fire agency will be familiar with the resources and capabilities of other fire agencies and can rely on their assistance through mutual aid agreements between all F-PAAC agencies. Vancouver has a mutual aid agreement with Portland and all other F-PAAC agencies to provide additional manpower and equipment for waterfront and vessel fires within the City.

The City recently applied for and received a grant from Federal Emergency Management Agency and the Department of Homeland Security to purchase a Type IV Regional Emergency Response Vessel, to provide emergency service delivery on the lower Columbia River waterway and its tributaries. The City has contracted for the construction of the vessel, and anticipates receipt of the vessel in mid- to late 2014. In addition to fire response, the vessel will have the ability to support multi-capability missions and carry people and equipment for:

- Hazmat Response
- Technical Rescue
- Oil Spill Support and Boom Carrying Capacity

WAC 118-40, implements the provisions of the federal Emergency Planning and Community Right-to-Know Act. Under the requirements of these state and federal regulations, local governments are required to form Local Emergency Planning Committees, and in coordination with other local, state and tribal agencies, and industries, plan for potential emergency events related to the release of hazardous materials. Clark County, the City of Vancouver, and other local jurisdictions located within Clark County conduct this planning exercise through the Clark County Local Emergency Planning Committee (LEPC). The LEPC supports preparedness for chemical emergencies and facilitates communication and coordination among those who have a stake in hazardous materials response and recovery. The LEPC is involved in: maintenance of the Clark County Hazardous Materials Response Plan; making information about chemical inventories available to the public; assessment of industrial and transportation-related chemical hazards; coordinating training and exercises; supporting public-private partnerships for preparedness; and educating the public about chemical hazards and how they should prepare and respond (Clark County LEPC, 2013).

The LEPC is responsible for developing and maintaining the Clark County Hazardous Materials Emergency Response Plan (Clark County, April 2012) which describes the procedures and responsibilities for responding to emergencies caused by releases of hazardous materials within the County. The plan provides direction related to incident notification and response procedures as required by federal regulations. This plan is activated and followed if the release of a hazardous material results in the following; casualties or injuries, evacuations, request from a facility and/or transporter operator for response, required notifications under EPCRA or CERCLA, and when a release may involve multiple jurisdictions or agencies.

Facilities that are required to plan under WAC 118-40-300 and EPCRA are required to coordinate with the LEPC to ensure the LEPC's planning for emergencies is up-to-date. The Applicant will conduct this coordination as required under WAC 118-40-300.

4.1.6.2 Facility Emergency Plans

The Applicant will establish emergency response plans for the construction and operation phases of the Facility to ensure employee safety in the case of the following emergencies: on-site materials or chemicals release, flood, medical emergency, major power loss, fire, extreme weather, earthquake, volcano eruption, and security threat.

The emergency response plan will be developed based on industry standards and regulatory requirements, including but not limited to, WAC 296-24 (Employee Emergency Plans and Fire Prevention Plans), WAC 296-56 (Safety Standards --Longshore, Stevedore and Waterfront Related Operations), WAC 296-824 (Emergency Response), and 29 CFR 1910.38 (Emergency

Action Plan). The emergency action plan will be in writing, and will cover the designated actions employers and employees must take to ensure employee safety from fire and other emergencies. The emergency plan will address the following elements:

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed;
- Rescue and medical duties for those employees who are to perform them.
- The preferred means of reporting fires and other emergencies; and
- Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan.
- Alarm systems established in compliance with WAC 296-800-310.
- Types of evacuation to be used in emergency circumstances.
- Training and review:
  - Of a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees prior to implementation of the plan.
  - Review with each employee when the plan is initially developed, whenever the employee's responsibilities or designated actions under the plan change; and whenever the plan is changed, and
  - Review with each employee upon initial assignment those parts of the plan which the employee must know to protect himself/herself in the event of an emergency.

The Applicant will keep the plan at the workplace and make it available for employee review.

In addition to Facility-specific emergency plans, the Applicant will coordinate with local emergency responders to ensure that major incidents or natural disasters that have the potential to affect the public and the environment off-site will be planned for. For example, the Facility site is located within the Clark County LEPC area of response. The LEPC is required to plan for a variety of emergency situations, including the risk of hazardous materials release under WAC 118-40. The LEPC has prepared and implemented a Hazardous Materials Response Plan to provide guidance for hazardous materials incident notification and response, including events from facilities such as the TSVEDT (Clark County, 2012). Emergency planning will also be coordinated with the Port of Vancouver. It is anticipated that emergency plans coordinated with public responders will include processes to implement an incident command structure to ensure orderly coordination of all response activities.