ESHB 1578 Tug Escort Implementation
Framing Safety Risk Management

On May 8, 2019, State of Washington Engrossed Substitute House Bill 1578 (ESHB 1578) was signed by the Governor with an effective date of July 28, 2019. A key element of the legislation was the requirement for tug escorts to accompany articulated tug barges (ATB's), and towed waterborne vessels in Rosario Strait and connected waterways to the East as of September 1, 2020. On December 6, 2019, the State of Washington Board of Pilotage Commissioners (PC) released a document entitled *ESHB 1578 Implementation Plan- Section 2: Concerning Rosario Strait and Connecting Waters East* (BPC Implementation Plan)[1] which provided a general framework for BPC working with the State of Washington Department of Ecology (Ecology) in the rulemaking process pursuant to ESHB 1578.

Objective

Our organizations have and continue to work proactively to meet the intent of ESHB 1578. Further, we support the BPC and Ecology in current efforts defining modeling protocols as a critical part of the rulemaking process. **This analysis has been prepared to assist BPC and Ecology in framing the key safety risk elements of the tug escort policy.** Specifically, this document has been developed with a focus on operational safety elements associated with tug escort for ATB's that our organizations jointly believe are critical to the BPC/Ecology development of escort tug response modeling scenarios and associated tug escort plans.

Operational Safety Overview of Escort Tugs and ATBs

Existing Safety Features of ATB's

ATB's and tank barges are required to have double-hulls. In addition, ATB's and tugs towing tank barges are equipped with redundant critical equipment including:

- **Propulsion Systems:** Dual main propulsion engines, dual drive trains (tail shafts, propellers).
- **Steering Systems:** Dual rudders, dual power sources, multiple steering modes (FU, NFU, Autopilot, Manual).
- **Auxiliary Systems:** Dual AC Generators, multiple DC power sources (battery banks, chargers, converters.

Role of Escort Tugs

The role of an escort tug is to have the capacity to apply sufficient braking and steering forces to a disabled ATB or towed barge to avoid or limit the impact of collision or grounding. The escort tug applies corrective forces by pulling on lines or pushing at various locations on the disabled vessel. The application of braking and steering forces individually or in combination is dependent on the specific circumstances of the tank vessel equipment failure.

Escort tug response can be categorized by four general techniques:

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[1] State of Washington Board of Pilotage Commissioners, *Implementation Plan: ESHB 1578 Reducing the Threats to Southern Resident Killer Whales by Improving the Safety of Oil Transportation*, December 6, 2019.

- **Assist:** The intent of the assist maneuver is to enhance the effect of the ATB's rudder or tank barge sheer and make the tank vessel turn as tight as possible.

- **Oppose:** The goal of the oppose maneuver is to oppose the turning force of the ATB's rudder or tank barge sheer and slow the ship's turn rate or hold its original heading.

- **Retard:** The objective of the retard maneuver is to take the speed off the tank vessel as quickly as possible without concern for the tank vessel's heading.

- **Combination:** There are several escort tug maneuvers that combine braking and steering forces simultaneously to gain positive control of the ATB or tank barge. The most familiar example is indirect or direct towing while tethered to the tank vessel's stern. However, other escort configurations can create combination forces as well.

Operational Factors of Tug Response

The primary factors in executing an effective escort response to a disabled tank vessel include:

- Time
- Speed
- Operator experience and training

The greater the time interval between the tank vessel propulsion or steering disablement and the escort tug's application of a corrective force, the greater tank vessel momentum in the undesired direction, and as a consequence the greater corrective force required of the escort tug. Speed can have a critical cause and effect on emergency response with regard to off-track carry, extent of corrective force, effectiveness of an escort tug pushing or pulling requirements. Finally, operator training and experience in maneuvering an escort tug efficiently into an effective position to assist, oppose or retard a disabled tank vessel is a key factor as escort response is such a time-sensitive action.

Suggested Risk Management Considerations

The towing industry performance history along with improvements to tank vessel and tug design suggest that an ATB or towed tank barge casualty that might cause a pollution event in Washington State waters would be an extremely rare event. Developing a risk management strategy for ATB and towed tank barge transits will require an approach that gives ATB, towing tug and escort tug masters sufficient options to address a sequence of unpredictable, unique circumstances in a short time frame.

For reasonable worst-case model simulation, real-world elements to consider in concert with the baseline operational factors identified above may include:

- Multiple combinations of escort techniques that can render an effective response to a tank vessel loss of propulsion or steering.

- Bracketing of response time, a critical element in an escort tug's successful response.

- Alignment of escort tug horsepower and type of propulsion with barge types and sizes.

- Recognition that effective tug escort response techniques for an ATB may be inappropriate for a towed tank barge.

- Necessary actions by the escort tug(s) under the direction of the tank vessel master or pilot, to influence the speed and direction of travel of the tank vessels in the event of a casualty, steering

or propulsion failure, thereby reducing the possibility of groundings or collisions and the risk of an oil spill from these tank vessels.

In addition to consideration of the controllable risk management factors (transit speed, position of escort tug, free-running or made-fast mode, experience/training, a tug escort risk management should also address the following variables:

- Escort Tugs: Propulsion Type, Fendering, Winches, Manning Levels, Crew Qualifications.
- ATB/Barge: Manned/Unmanned Situation, Freeboard/Vessel Access, Trailing Lines.
- Transit Route: Waterway Restrictions, Vessel Traffic Density, Predicted Wind/Sea/Tidal Conditions.

Recommended Additional Next Steps

The BPC has identified the following schedule of activities ("next steps") pursuant to ESHB 1578:

- By December 31, 2021: Complete synopsis of changing vessel traffic trends.
- By September 1, 2023: Complete analysis of tug escorts using the model developed by Ecology.
- By December 31, 2025: Adopt rule regarding tug escorts.

It is recommended that the following steps be considered subsequent to the BPC/Ecology modeling study but in advance of (or concurrent to) the tug escort rulemaking:

- **Live Tug Escort Trials:** Conducting live trials will serve to corroborate the key findings of the modeling study. Further, live trials will provide operator experience and test escort tug capabilities.
- **Solutions for Escorting an Unmanned Barge:** As a variation of a possible event scenario, development in advance of engineered solutions for connecting an escort tug to an unmanned tank barge without requiring transfer of a crewmember from the tug to the barge would be valuable in mitigating safety risk.
- **Crew Training and Qualification Programs:** Noted throughout this document has been the critical aspect of operator experience and capabilities. The early development of tug escort-specific crew training programs and operator experience requirements is considered essential to an effective regulation that meets the safety goals of ESHB 1578.