Cook Inlet Pre-Winter Meeting ♦ October 27, 2010

Tug Vigilant ♦ Kenai, Alaska

TESORO

CROWLEY®
People Who Know™

History of Crowley

- Thomas Crowley founded the company in 1892
- He began with an $80 Whitehall rowboat and a dream.

From those modest beginnings arose a diversified industry powerhouse with nearly $2 billion in annual revenue, over 4,200 employees and interests in worldwide logistics, liner services, ship assist and escort, energy support, contract towing and transportation, and petroleum and chemical transportation, vessel design and management.

CROWLEY®
People Who Know™

Crowley Today

- Liner Shipping Services
- Worldwide Logistics
- Energy Support Services
- Ocean Towing & Transportation
- Ship Assist & Escort Services
- Petroleum/Chemical Transport
- Alaska Fuel Sales and Distribution
- Salvage & Emergency Response
- Ship Management
- Vessel Construction/Naval Architecture

CROWLEY®
People Who Know™

Ship Assist & Escort Services

- Operates some of the most powerful and technologically advanced ship assist and escort tugs in the world.
- Harbor operations in Los Angeles/Long Beach/El Segundo, San Diego, San Francisco Bay Area, Puget Sound, Prince William Sound and Cook Inlet.
- Escort and assist services for tankers, ships, barges and other vessels.
- Firefighting and oil spill response services.

CROWLEY®
People Who Know™

Background

Tesoro chartered and positioned Crowley Tug Protector at Nikiski in January 2007

- Voith Schneider Cycloidal Propulsion
- 5,500 horsepower / 60 tons bollard pull

Winter experience with the Protector showed it was not the optimal design…

CROWLEY®
People Who Know™

Background

A preferred tug was identified with the opportunity to modify for winter/ice operations

- Tug Vigilant
- Built at Nichols Brothers Shipyard in Freeland WA (2007)
- Operated by Crowley on long-term charter to Tesoro

CROWLEY®
People Who Know™

Tug Vigilant Particulars

Length: 100 feet

Beam: 40 feet

Operating Draft: 19 feet

Main Engines: Caterpillar 3516-C (x2)

Horsepower: 6,772 (2 x 3,386)

Bollard Pull: > 90 tons

Propulsion: Rolls-Royce Azimuth Thrusters

Speed: 14 knots

CROWLEY®
People Who Know™

Tug Vigilant Features

- Bow Winch: Markey Model DEPC 52
  - Full Render / Recover Capability
  - Full Wheelhouse Control
  - Maximizes Ship Handling Versatility & Safety
  - Samson Amsteel 12 Strand 7 ½" SpectraLine
    - 588,000 lbs Breaking Strength
- Tow Winch: Jon Rie Model A525
  - Drum Capacity 2,500 ft with 2 ½" Wire
  - Emergency Tow Package
    - 450 ft Amsteel 12 Strand 7 ½" SpectraLine
    - Orville Hook

CROWLEY®
People Who Know™

Tug Vigilant Features

- Deep Forward Skeg Design
  - Excellent Directional Stability
  - Additional Indirect Pull
    - Enhances Pulling Forces
  - Key Advantage in Assists and Tethered Escorts of Laden Deep Draft Vessels
- Classification:
  - ABS ♦ A1 U.S. Domestic Towing Vessel

CROWLEY®
People Who Know™

Tug Vigilant Specifications

FLAG
United States

PORT OF REGISTRY
San Francisco, CA

BUILDER
Nichols Brothers
Boat Builders, Inc.
Freeland, WA

OVERALL DIMENSIONS
Length: 100'
Breadth: 40'
Depth: 17'

TONNAGE
Gross Tons 194

CONSTRUCTION
Steel

LIGHT DRAFT
16' 6"

LOADED DRAFT
19' 3"

FUEL CAPACITY
70,000 gallons

POTABLE WATER
8,000 gallons

LUBE OIL
1,100 gallons

MAIN ENGINES
2 Caterpillar 3516-C

AUXILIARY ENGINES
2 Caterpillar C-9 rated at 215 KW
1 Caterpillar 50 KW

PROPULSION
2 Rolls-Royce Aquamaster
US255 360 degree
Azimuth Thrusters

HORSEPOWER
6,772 maximum
continuous BHP

BOW WINCH
Markey Model DEPC 52

TOW WINCH
Jon Rie Model A525

BOLLARD PULL
182,000 lbs.

NAVIGATION/ COMMUNICATIONS EQUIPMENT
1 Furuno 8111 D radar
4 SEA VHF radios
2 cellular phones
1 communication computer
1 Robertson auto pilot
1 Furuno LS 6000 depth finder
1 Trimble GPS

CLASSIFICATION
ABS ✠ A1 U.S. Domestic
Towing Vessel

CROWLEY®
People Who Know™

Ice Modifications

- Steel plate ice belting above & below the water line
- Under deck heaters for fore deck
- De-icing circulators for sea chests
- Immersion heaters for ballast & potable water tanks
- Ice & abrasion resistant paint on hull
- Window de-icers for pilot house
- Additional heaters throughout living & machinery spaces

Ice Operations

- Z-Drives were designed to be operated in ice strewn waters like Cook Inlet
- They have operated many years in Scandinavian waters in heavy ice
- Z-Drive tugs have been based in Anchorage and operated in ice for many years

Z–Drive Technology

- Z-Drive is a type of azimuth thruster in which the pod-mounted propellers are driven mechanically rather than electrically
- Thrusters can rotate 360 degrees, giving the vessel exceptional maneuverability
- The rotary motion needed to turn the propeller has to make two right angle turns, thus looking like the letter "Z"

17
16
15
14

CROWLEY®
People Who Know™

CROWLEY
VIGILANT
VIGILANT
SAN FRANCISCO, CA

VIGILANT
SAN FRANCISCO, CA
VIGILANT

VIGILANT
VIGILANT
SAN FRANCISCO, CA

VALOR

CROWLEY