Application Of Water-based Hydraulic Systems On Dredges

Todd Olson - President, BOC Water Hydraulics
Vinton Bossert – Marine Engineer, USACE MDC

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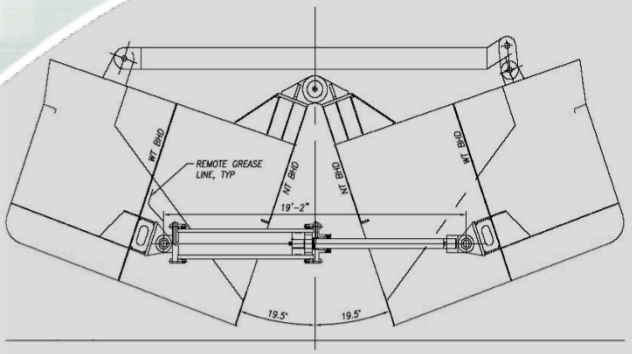

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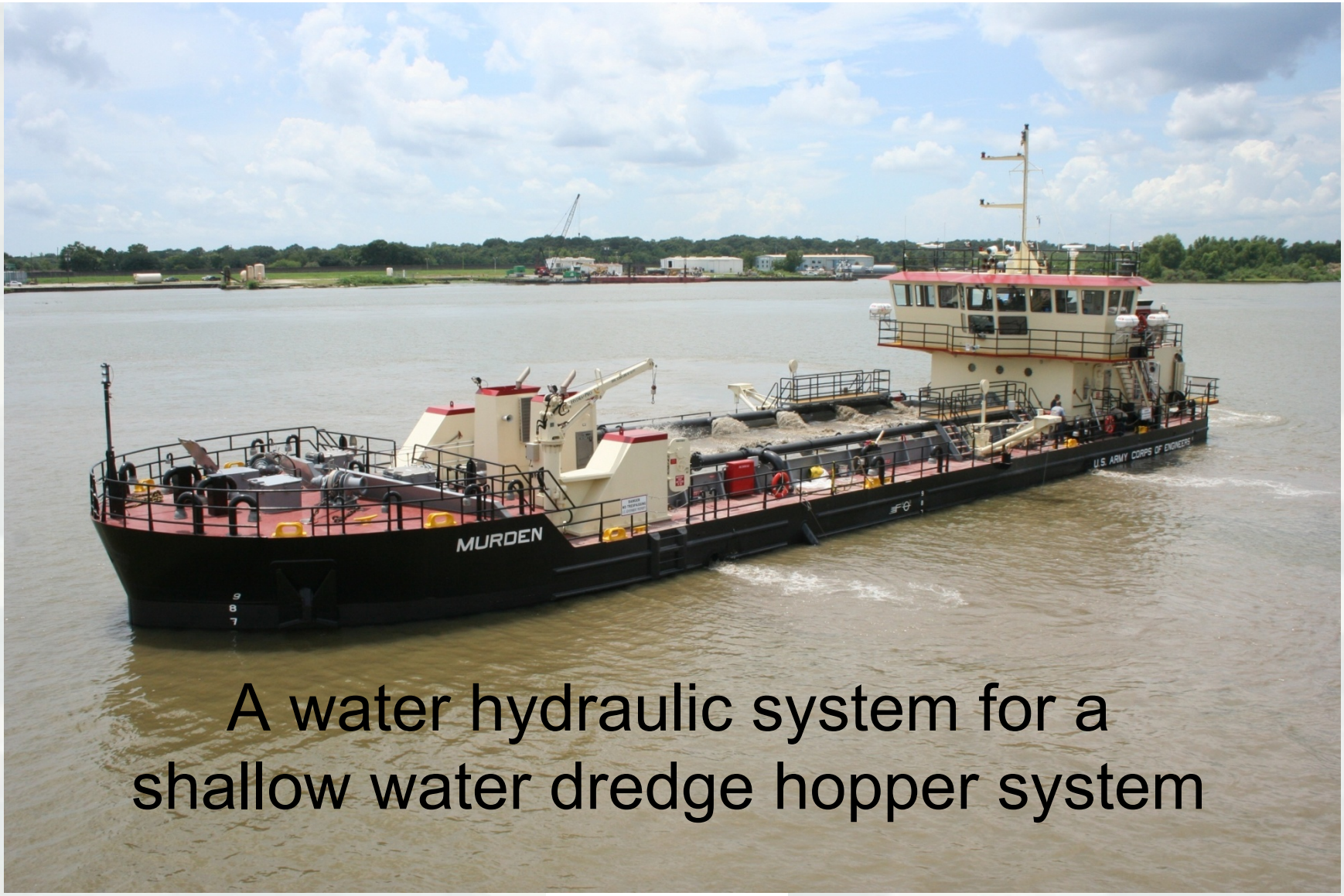

A water hydraulic system for a shallow water dredge hopper system

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Application of Water-based Hydraulics on Dredges - Outline

- Key hydraulic components
- Controls
- Materials of construction
- Cost of the system
- Lessons Learned

Dredge MURDEN Split-Hull Hopper

First All Water Hydraulics Hopper System

Environmentally Safe Operation

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Filling the Hopper

View
Video

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Emptying the Hopper

View
Video

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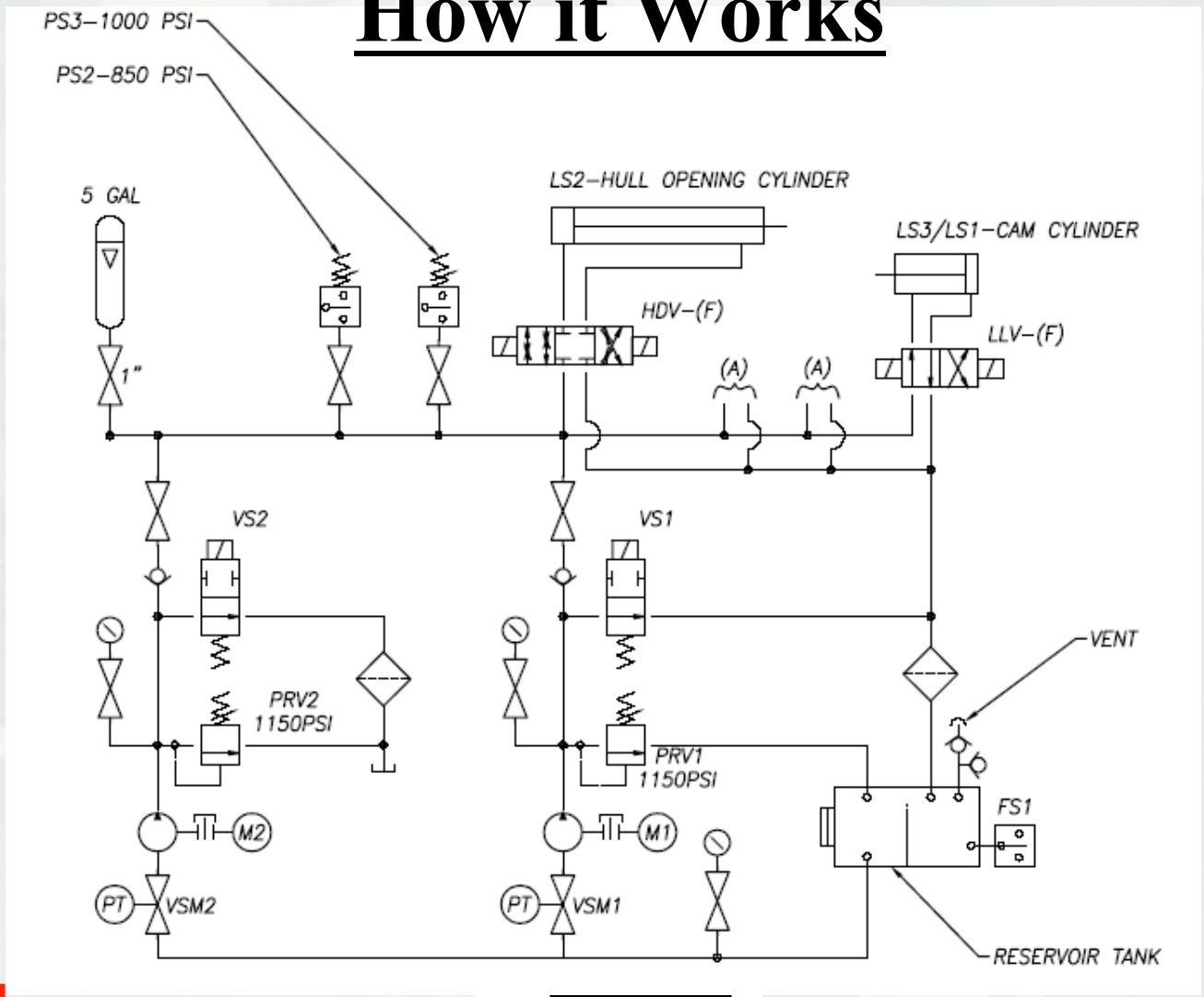
How it Works



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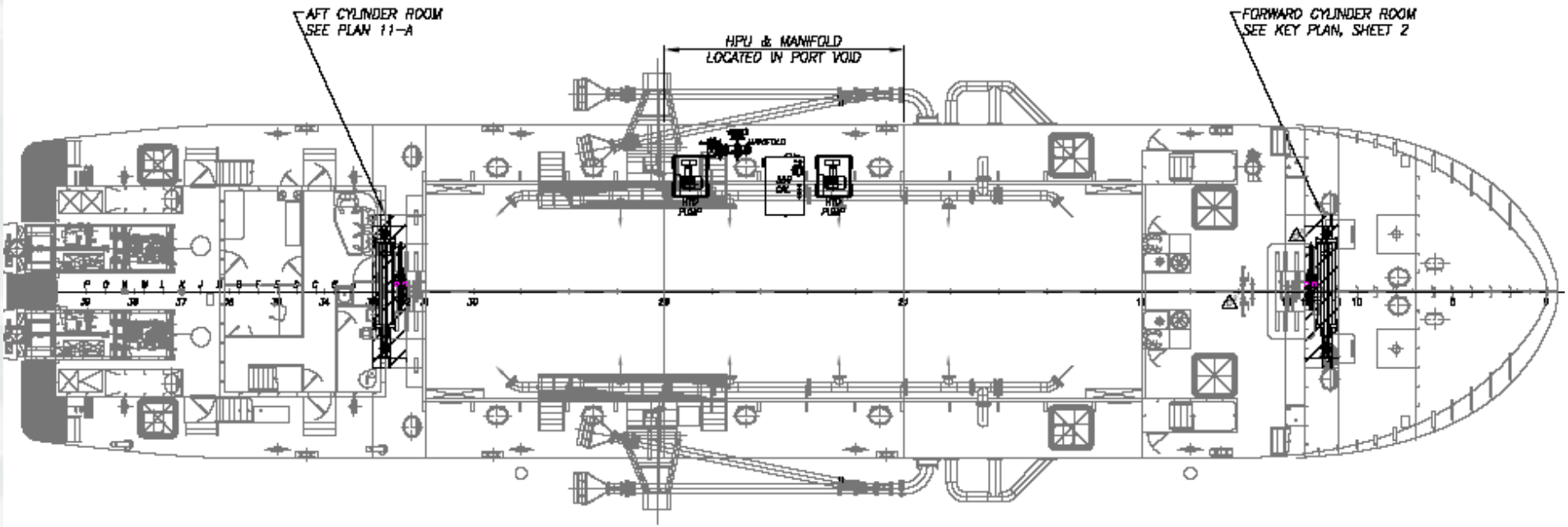
Fore and Aft Hull Cylinders and Latches



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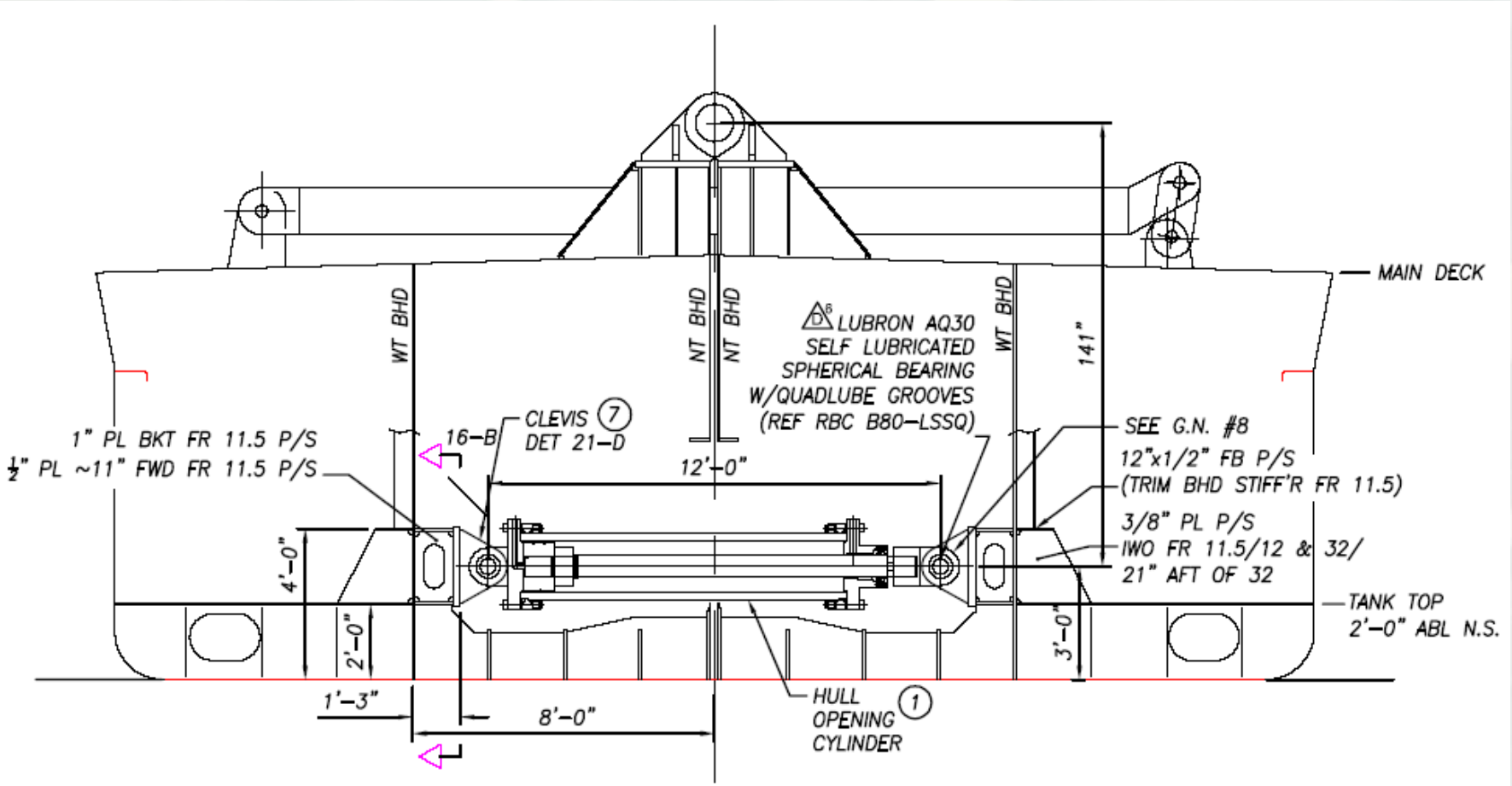
Hull Cylinders - Closed



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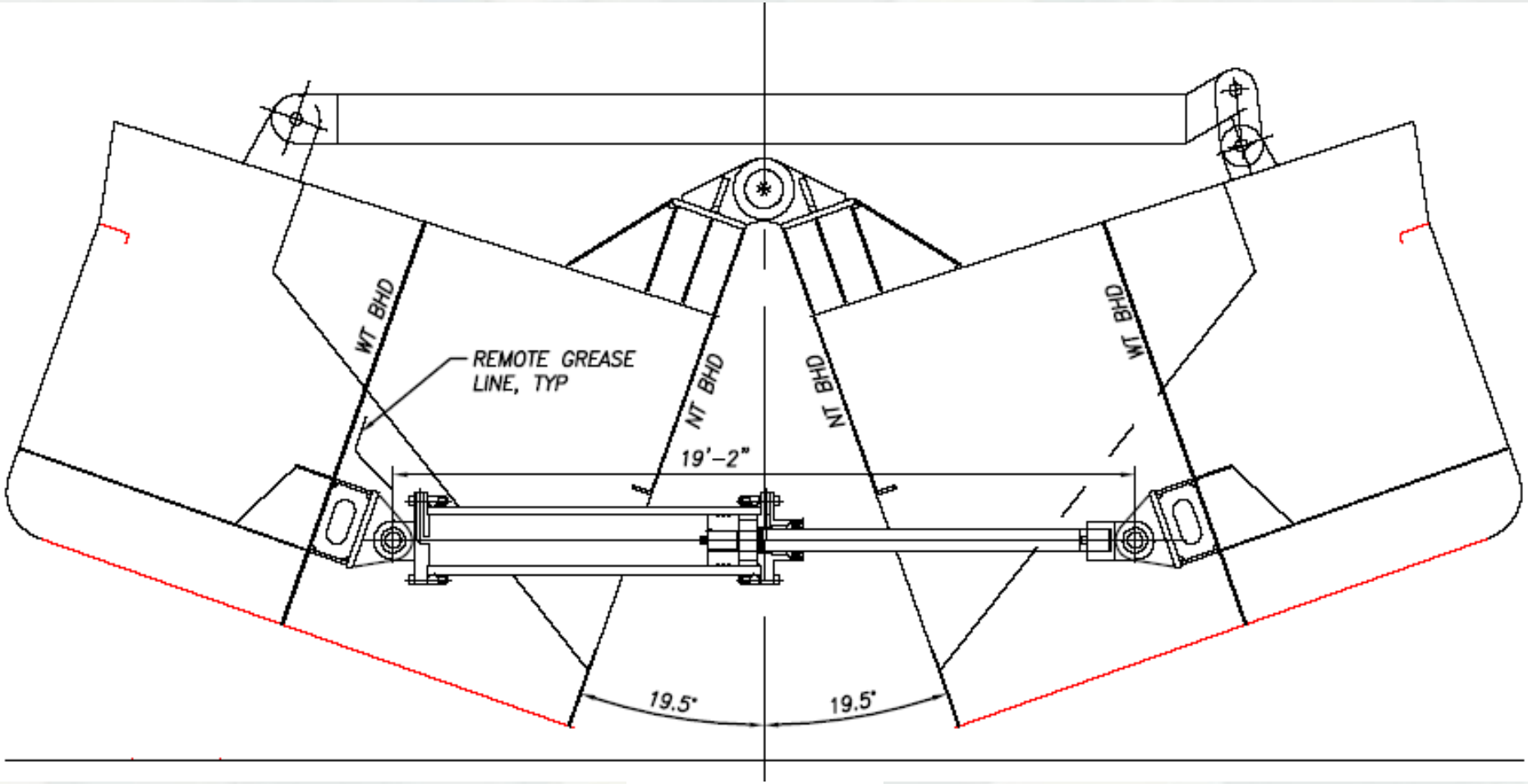
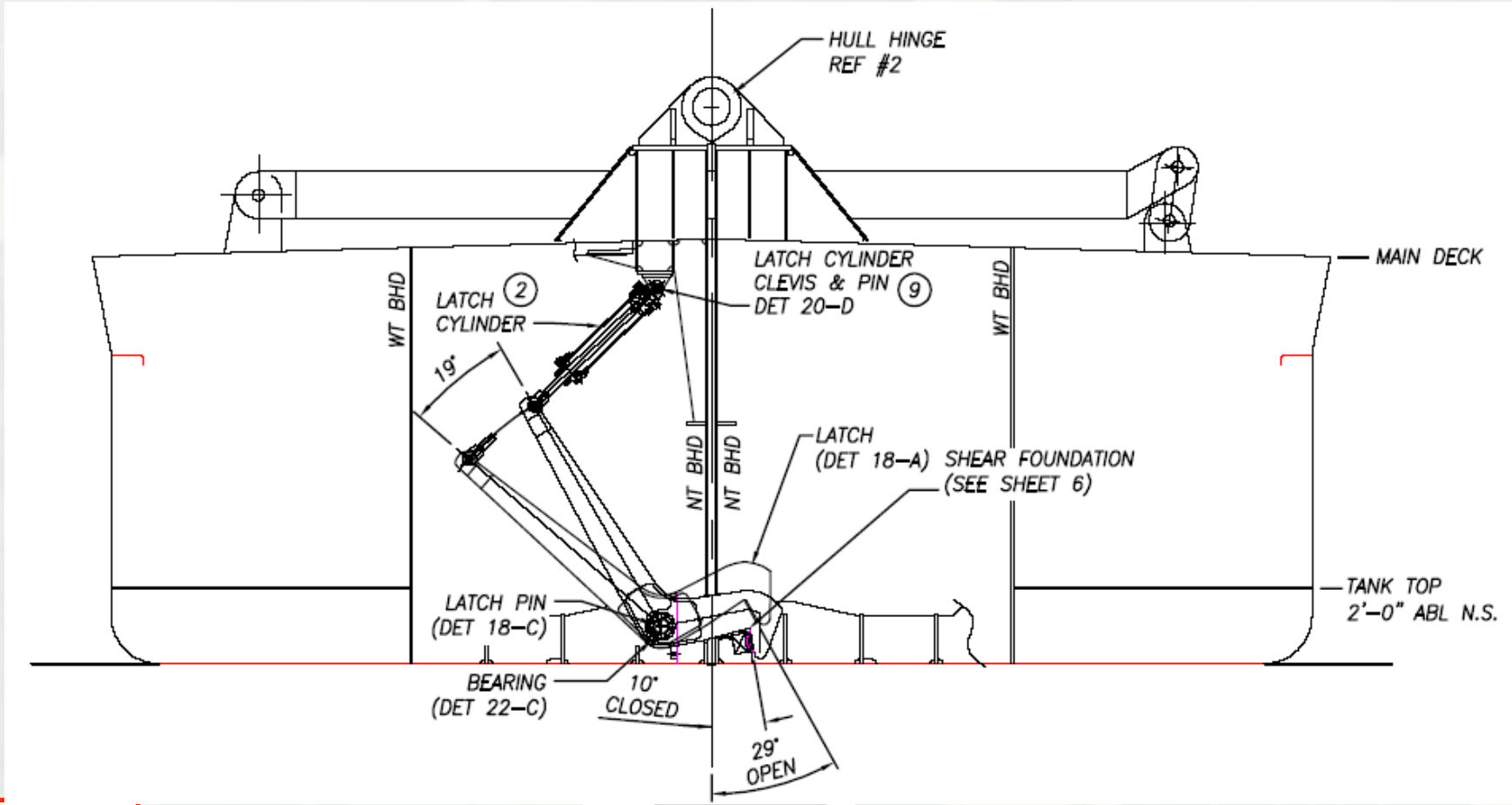
Hull Cylinders - Open



Latch Cylinders - Closed



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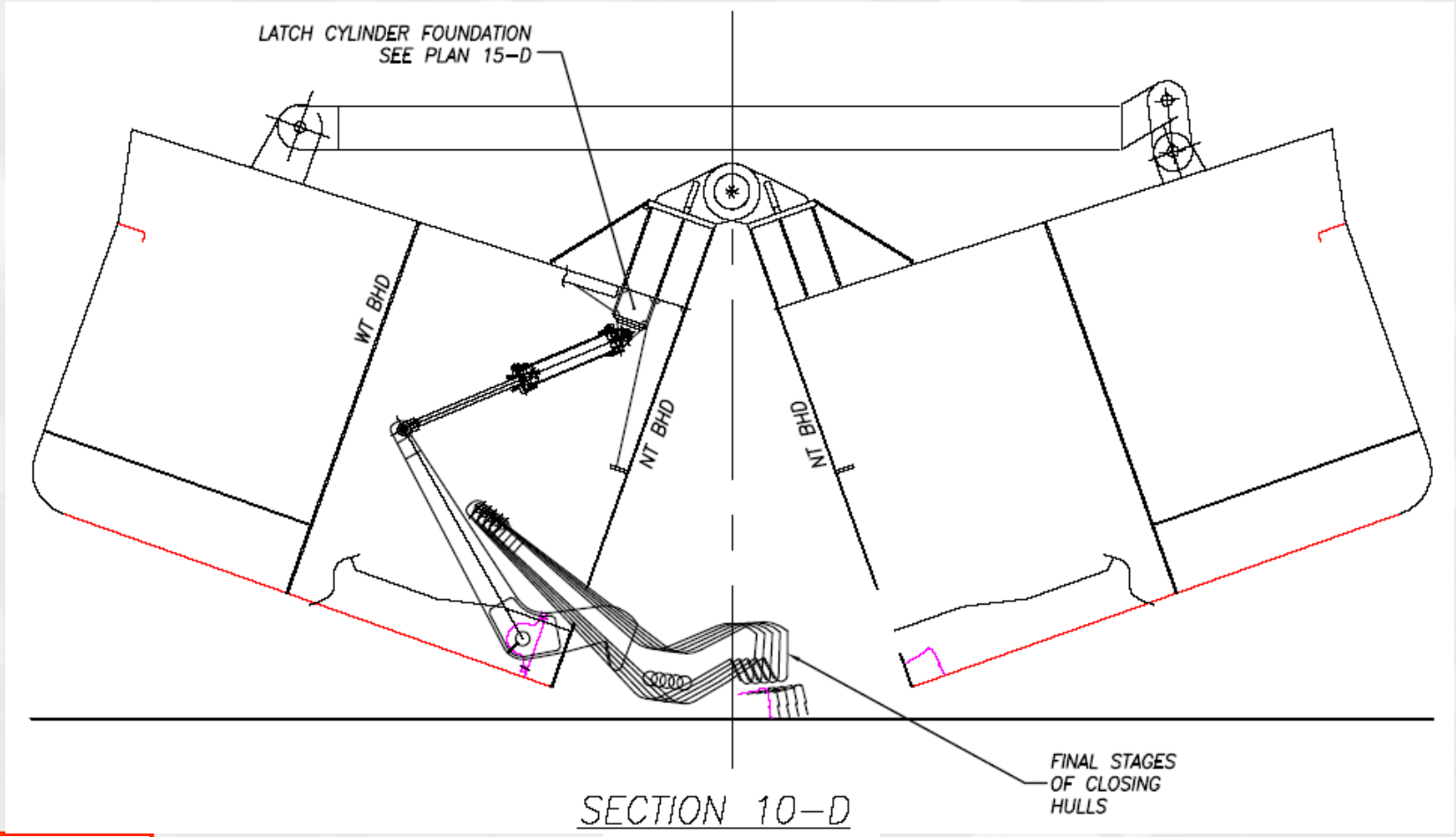
Latch Cylinders - Open



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Hull Cylinder

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Hull Cylinder

- 406 mm (16 in) bore
- 178 mm (7 in) diameter rod
- 2184 mm (86 in) stroke.

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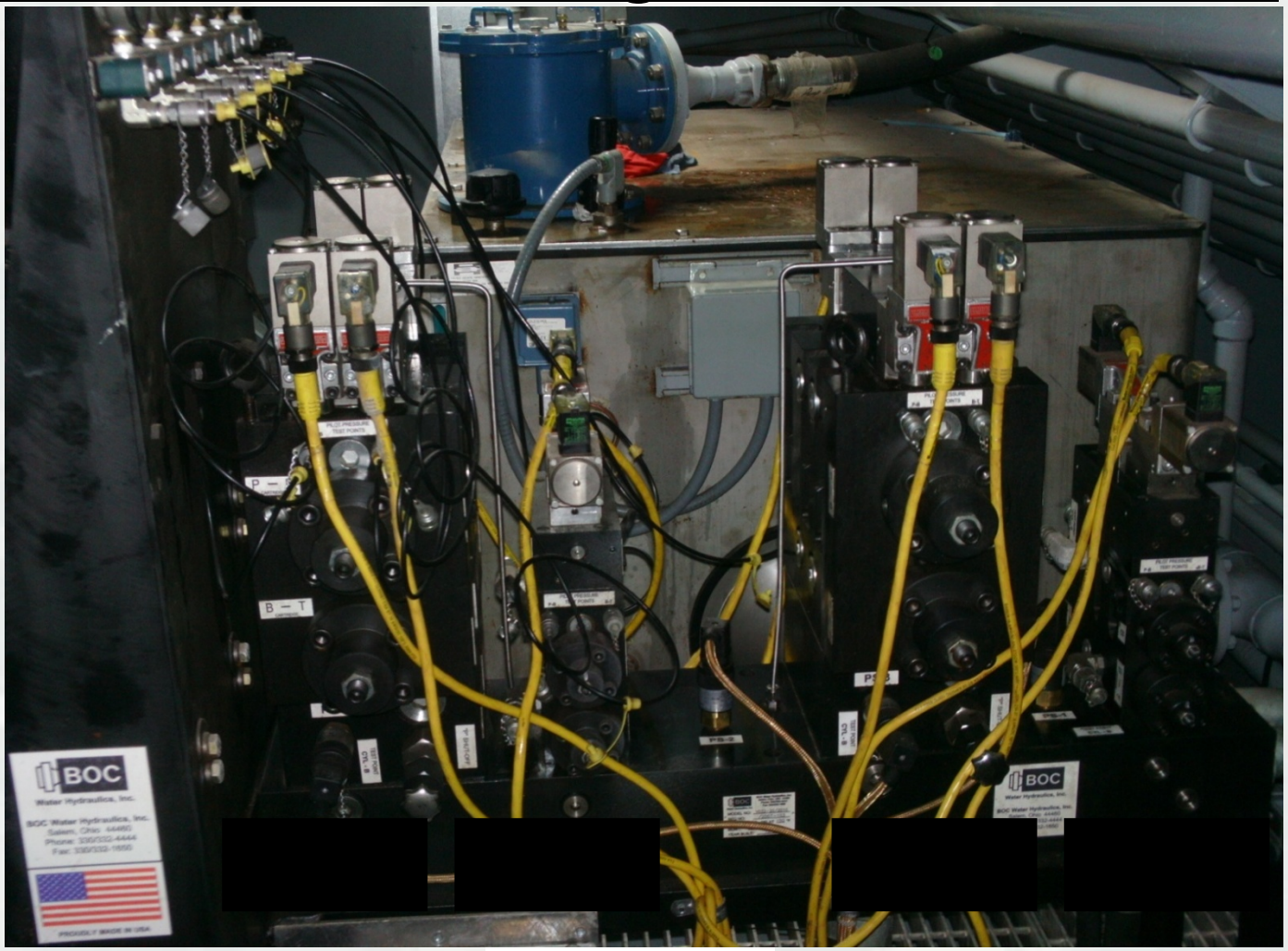
BOC Quad-S Cartridge Valves & Reservior



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Triplex Plunger Pumps

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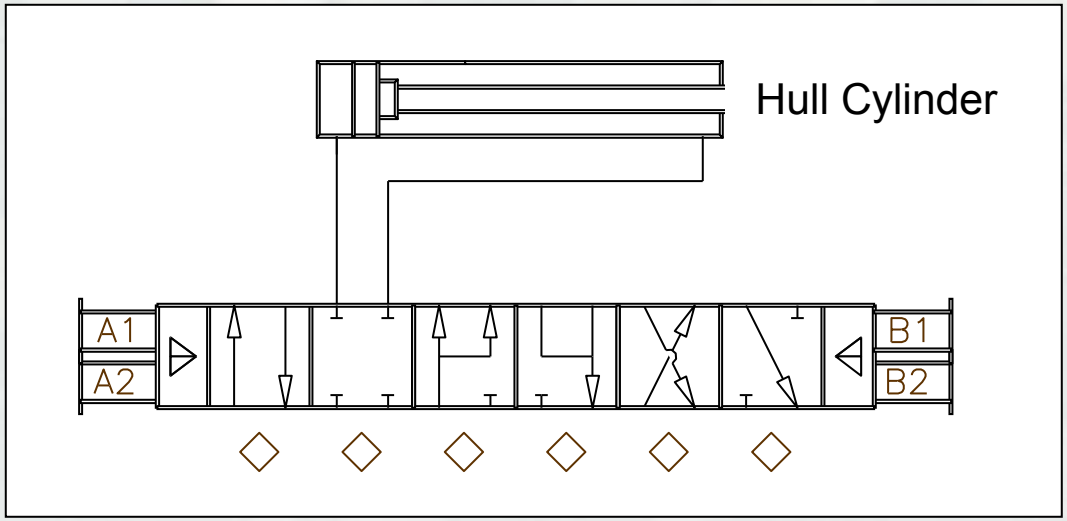
Multi-Position Hull Control Valve



Position	Function	Notes
1	Hull Open	Standard Open
2	Hull Stop	
3	Hull Initial Open	To Equalize Press - Load Opens Hull
4	Cylinder "Float"	Emergency Use Only
5	Hull Close	Standard Close
6	Hydraulic Latch	High Press. Applied Downstream on B Port

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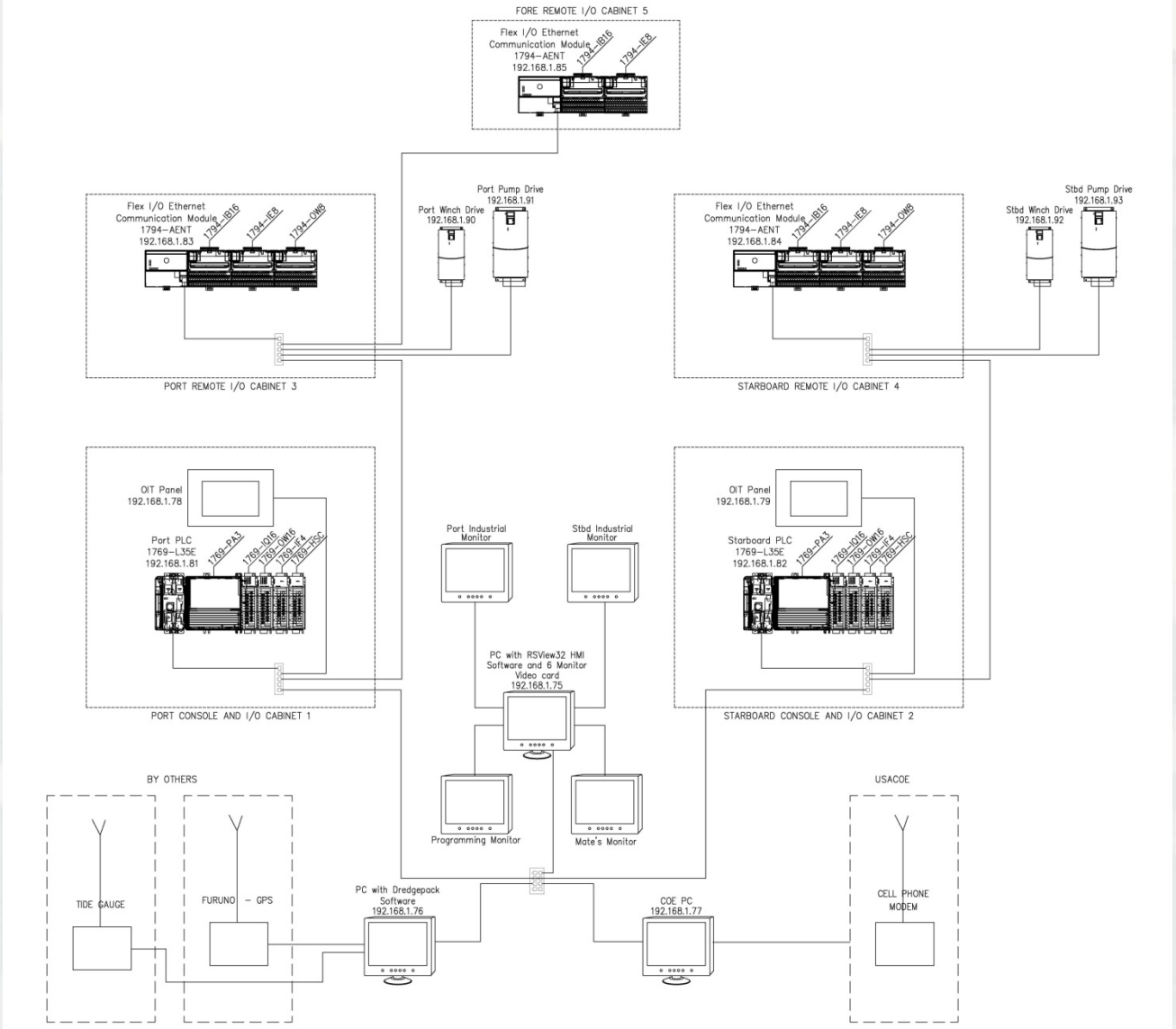
Control System



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Bridge Consoles

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Dredging Consoles

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Dredging Consoles

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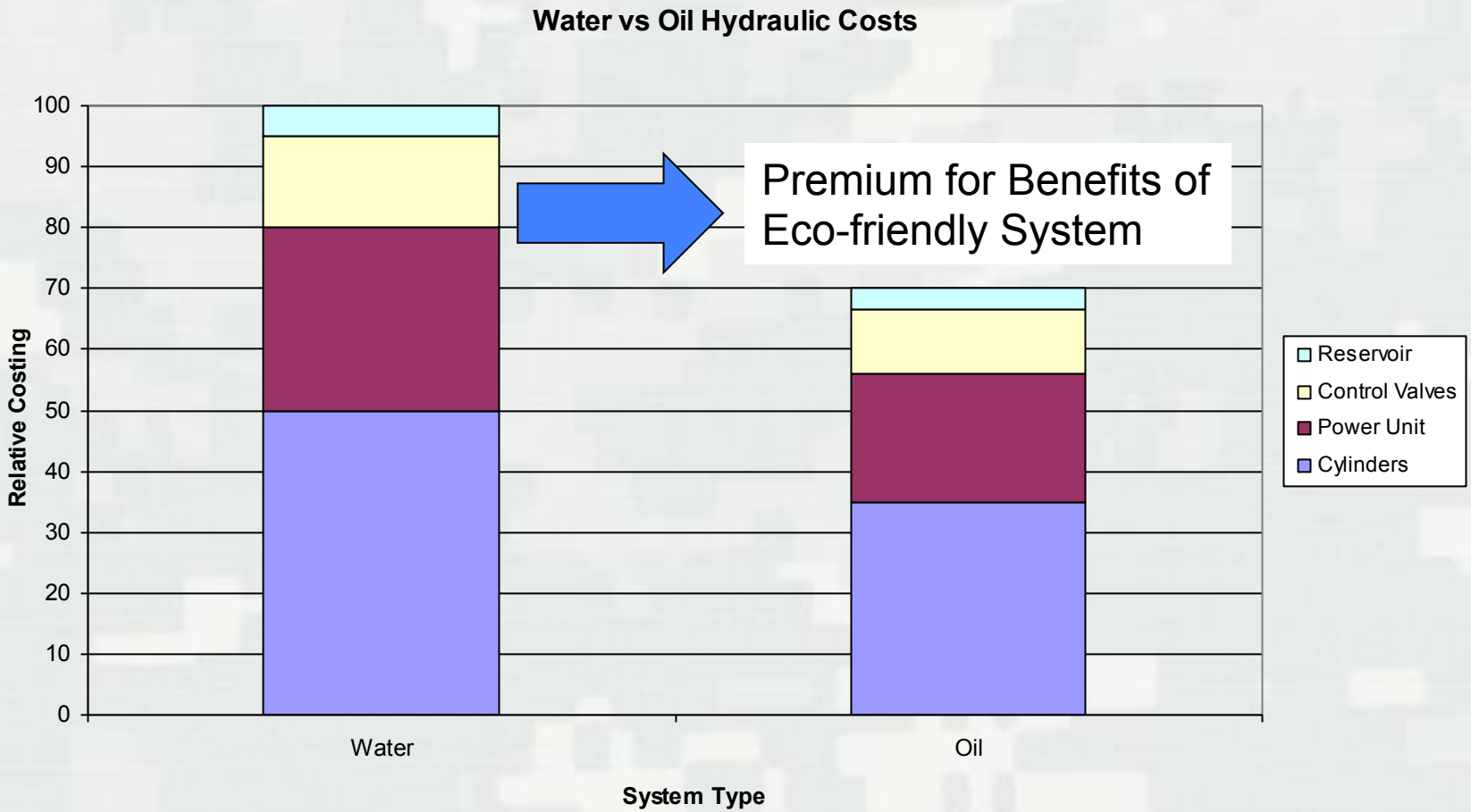
Water Hydraulic Cost Dynamics



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Lessons Learned

- Main Cylinder Hydraulic Latch
- Flow Control Refined (open too violent)
- Cylinder Cofferdam Bottom Drain
- Power Limitation

Summary/Conclusion

- MURDEN demonstrates that water hydraulics is viable for application in commercial navigation and marine projects.
- Water hydraulics can provide an equivalent solution to oil in terms of function and performance (in most cases).
- Additional cost is justified by significant environmental benefit gained by using water as the hydraulic media.

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DISCUSSIONS/QUESTIONS

Contact Information:

Vinton Bossert (215) 656-6162 vinton.c.bossert@usace.army.mil

Todd Olson (330) 332-4444 todd.olson@bocwaterhydraulics.com

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