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What's Been Learned

The History and Development of the US Coast Guard Policy for Dynamically Positioned Offshore Supply Vessels

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Abstract

This paper documents the efforts undertaken by owner/operators of dynamically positioned (DP) offshore supply vessels to assist in the development of US Coast Guard policy. In spring of 2001, the Coast Guard published an opinion that held that DP vessels were in violation of pollution prevention regulations if they conducted transfer of oil or hazardous materials while operating in the DP mode.

This paper will examine the foundations of the initial USCG opinion, and the process spanning over a year to develop and promulgate an official policy that satisfactorily addressed USCG concerns without imposing undue hardship on vessel owners and operators. It will also address the positive role of trade associations in flushing issues and building consensus.

The substance of the resultant USCG policy will be discussed, with special emphasis on the means operators may use to determine compliance, including the role of classification societies.

Background

In spring of 2001, USCG MSO Morgan City published an opinion that the transfer of oil or hazardous materials between a facility and a vessel while the vessel is maintaining position using a Dynamically Positioned system is in violation of Title 33 Code of Federal Regulations Part 156.120.[1]

The opinion was contained in an article in the MSO Morgan City newsletter, a publication that is intended to advise local maritime interests of regulatory developments and events related to marine safety. The article is quoted below:

> "OIL TRANSFERS BY DYNAMICALLY POSITIONED OFFSHORE SUPPLY VESSELS
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> Dynamic Positioning (DP) is a term used to describe the technology where a shipboard computer receives signals often from passing satellites, to determine its exact location, then sends signals to the vessel's propulsion system to keep the vessel in one location. Many Offshore Supply Vessels (OSVs) use their DP system to maintain their position when loading to and from an offshore platform or MODU. Unfortunately, many OSV operators use their DP system while transferring oil and hazardous materials. This is in violation of Title 33 Code of Federal Regulations Part 156.120, which requires that: "The vessel's moorings are strong enough to hold during all expected conditions of surge, current, and weather...." Using a DP system, without being moored to the rig, is not considered to be in compliance with this portion of the regulations."

Following the publication of this article, operators of offshore facilities and vessels that employed DP began discussion of this issue with Commanding Officer, MSO Morgan City. This resulted in a USCG recommendation that the offshore industry request a determination establishing DP as an equivalent to mooring for the purposes of Part 156. The vessel and facility operators responded through their respective trade associations, the Offshore Marine Services Association (OMSA) and the Offshore Operators Committee (OOC) and produced a "White Paper" to define issues and advise the USCG concerning the technology, application and equivalency of DP systems in use in the Gulf of Mexico.

Momentum was lost on this issue following the events of 9/11. In the late fall/winter of 2001, the USCG reinitiated a dialog with representatives of OMSA and OOC regarding the White Paper and industry practices. In the spring of 2002, a draft "strawman" policy document, developed by participants of the Offshore Marine Service Association and the Offshore Operators Committee, was submitted to the Eighth District. Following a number of meetings and discussions over various points in the draft policy, in July of 2002, the Eighth District issued a draft policy document to OMSA and OOC. A number of meetings were

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[1] 33 CFR 156.120 is a part of pollution prevention regulations applicable to vessels. It states in part that during oil transfer operations, "…the vessel's moorings are strong enough to hold during all expected conditions of surge, current, and weather...."

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conducted to address specific issues where industry and the USCG had differences, and a final Eighth District Policy was signed January 22, 2003.

Regulatory Analysis

At first glance, 156.120 might appear to be a misapplication of regulation, as part 156 is limited in its applicability to Navigable Waters of the United States and the Contiguous Zone,[2] and the vast majority of Offshore Supply Vessels operate on the Outer Continental Shelf beyond the Contiguous Zone. However, under the requirements of 33 CFR 155.720[3], vessels subject to U.S. regulations, regardless of where they are operating, must provide Oil Transfer Procedures which meet the requirements of part 155 and part 156. This part 155 reference requires vessels operating under U.S. regulations – including floating OCS facilities inspected under 46 CFR Subchapter I-A – to conduct their oil transfer operations consistent with the requirements for U.S. waters and the CZ.

The current regulatory framework in part 155 requires that floating facilities and vessels each develop and maintain oil transfer procedures, but do not require these procedures to be submitted to or approved by the USCG. These procedures are also applicable to transfers of bulk hazardous materials.

Notwithstanding these references in regulation to the vessel's moorings during transfer operations, the inferred violation of regulation in the Morgan City article was not recognized by the numerous producing, drilling, and vessel operating companies engaged in these operations. The absence of a regulatory definition of "moored," or any clear mooring equipment requirements established in 155 Subpart B reasonably permit the reader to conclude that any system which is capable of meeting the performance standard of "holding [the vessel on position] during all ***expected*** conditions of surge, current, and weather...." would constitute a "mooring" and satisfy the intent of the regulation. Additionally, since the regulations in 155.750[4] for oil transfer procedures do prescribe a requirement for "Procedures and duty assignments for tending the vessel's **moorings** during the transfer of oil or hazardous material," many vessel and facility operators have incorporated specific procedures addressing DP-related operations.

Since the USCG recommended pursuit of an equivalency determination, some discussion of what that means is appropriate. USCG regulations contain provisions for the acceptance of alternative systems, equipment or procedures to those specified in regulation. To obtain such a determination normally requires clear delineation of the regulations that apply, reference to an alternative standard or code, and proving to the USCG that (1) the standard adequately covers all risks that the regulations are intended to mitigate and (2) that the presented equivalency meets the alternative standard.

The language of the equivalency clause varies among different USCG regulations. The pollution prevention regulations in 155.120 prescribe that "such fitting, material, appliance, or apparatus is at least as effective as that required by subpart B. Substitution of operational methods to control the discharge of oil in place of those design and construction features prescribed by MARPOL 73/78 that are also prescribed by subpart B of this part is not allowed." In this regard, the regulations establish three essential criteria for equivalency.

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[2] The seaward limit of the Navigable Waters of the United States coincides with the boundary line of U.S. territorial waters, 3 miles (or 3 marine leagues in Texas and Florida) seaward of the coastline. The Contiguous Zone includes adjoining waters seaward to a distance of 12 miles.

[3] §155.720 Transfer procedures.

The operator of a vessel with a capacity of 250 or more barrels of oil, hazardous material, or liquefied gas as regulated in Table 4 of 46 CFR part 154 shall provide transfer procedures that meet the requirements of this part and part 156 of this chapter for transferring--

(a) To or from the vessel; and

(b) From tank to tank within the vessel.

[CGD 86-034, 55 FR 36254, Sept. 4, 1990, as amended by CGD 79-116, 62 FR 25127, May 8, 1997]

[4] §155.750 Contents of transfer procedures.

(a) The transfer procedures required by § 155.720 must contain, either in the order listed or by use of a cross-reference index page:

* * * * *

(3) Procedures and duty assignments for tending the vessel's moorings during the transfer of oil or hazardous material;

- The alternative must be presented to satisfy a specific requirement set forth in Marpol 73/78 or Subpart B of Part 155;

- The alternative must be at least as effective as the specific requirement;

- An operational method may not be substituted for any item of equipment required under Subpart B.

Although equivalency had been recommended, attempting to demonstrate the components for an equivalency determination were problematic, for the following reasons:

- The mooring system that DP systems are purported to "replace" are not a fitting, material, appliance or apparatus specifically required by Marpol 73/78 or Part 155, Subpart B, but rather is only referred to under the oil transfer procedures in terms of ***the function it performs*** and not any specific equipment or operational requirement.

- Mooring systems are referred to, but are in no way specified in regulations in terms such as the diameter, number, or breaking strength of lines and fittings. Like mooring systems, DP systems are fit for purpose, with greater strength and redundancy contributing to improved performance and suitability for more harsh environments. DP performance is indisputably "at least as effective" as a mooring system, and is in many aspects superior to a mooring system in the same environment. In either case the lack of specificity in regulation can be construed as an acknowledgement that the experience and judgment of the vessel's Master is to be relied upon to use the appropriate measures necessary and to recognize when the particular environmental conditions have the potential to overwhelm the mooring (or DP) system. Thus, the issue of effectiveness is highly variable – both DP and physical mooring are dependent on the level of redundancy and the maximum set of environmental forces the system is designed to withstand.

- The third criterion for use of equivalency was not an obstacle, since DP systems require significant investment in hardware, plus appropriate operational procedures, use of DP cannot be characterized solely as the substitution of an operational method for required equipment.

In summarizing the regulatory analysis, there was a feeling among industry participants that the original USCG opinion was flawed, in that a tertiary reference to the performance of the mooring system had been interpreted as a ***requirement*** for conventional mooring system hardware composed of lines and associated fittings. Moreover, the author's reference to satellite navigational systems did not reflect an understanding of the interactive position referencing systems in widespread use. Although issuance of an equivalency determination would appear to be a simple method for the USCG to reconcile the published opinion without necessarily reversing itself, the issue did not lend itself to an easy determination.

Nuts and Bolts

In exploring a determination of equivalency, the technical issues associated with DP seemed to move from one impasse to another. While USCG and industry both believed a uniform policy statement at the Eighth Coast Guard District level would be the best means to permit continued DP use and satisfy USCG pollution concerns, the parties had differing visions for the scope and form of that policy.

The degree to which the policy would ***prescribe requirements*** as opposed to ***establish guidelines*** was a primary facet of the debate. As the USCG learned more about the specifics of DP, and the adaptations that had evolved in the Gulf of Mexico OSV fleet, prescriptive requirements seemed inevitable for the USCG to be assured of some minimal level of safety. However, the USCG does not regulate DP systems, and the use of a policy to establish new regulatory requirements could be a problem under Administrative Procedures Act.

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The document most central to the development of the DP Policy was the International Maritime Organization (IMO) Circular 645[5]. The Guideline establishes three levels of DP that are based on increasing levels of redundancy in propulsion, sensing, or control systems. Some Classification Societies include a fourth level, DP-0, which incorporates certain integrated control features, but is not automatic. Since DP-0 does not meet the definition of a dynamically positioned system, it was excluded from discussion in the development of the policy. Most existing DP systems are designed to or may be defined by reference to this guideline. The initial USCG approach was to select the level of DP from the Guideline that they found acceptable, and require that level (or higher) in order to conduct oil or hazardous material transfers. Industry proponents of DP argued that reference to the Guideline alone was insufficient since it did not address concerns associated with close-in operations, and specified some equipment redundancies that were not considered necessary in the Gulf of Mexico.

The IMO Guideline defines DP as a system that automatically maintains a vessel position or track exclusively by means of thruster force. The typical Gulf of Mexico DP systems are automatic, and involve computer-integrated controls of multiple propulsion devices and position referencing inputs. The example cited in the USCG article (satellite positioning) is an example of an "absolute" positioning system whereby the vessel's controls interact with a satellite navigation system to determine its absolute position on the earth. Systems that employ relative positioning technology are also in widespread use, sometimes in conjunction with absolute systems. Relative positioning systems rely on optical, infrared or other technology to determine a vessel's bearing and range to a specific target. This technology is useful for floating facilities where both the target (facility) and the vessel are subject to environmentally induced motions. The USCG article did not reflect consideration of the interactive features of relative positioning systems.

A key element in any discussion of DP is redundancy. The IMO criteria were developed solely[6] to address operations where a vessel was to maintain a fixed geographical position, in applications such as drilling, construction, or diving where the vessel may be required to hold station for days or weeks at a time. These criteria are expanded and further qualified by classification societies that may certify a vessel's DP system to one of their listed classes, which generally align with the IMO DP group designations. However, it must be noted that close-in vessel-to-vessel or vessel-to-facility operations were not envisioned in the development of the Guideline, and additional requirements appropriate to close-in operations were not considered. Increased redundancies, realized through having multiples of key equipment or systems and segregation/isolation of redundant systems in multiple compartments, contribute to greater reliability and performance of a DP system. However, simple adoption of IMO DP-2 or -3 criteria does not address the risks associated with close-in operations. This position is supported by the International Marine Contractor's Association (IMCA) study[7] on North Sea DP operations. As observed in this study, when DP technology began to be applied to close-in operations, even though many of the vessels were classed as DP-2 or -3, the number of collision incidents increased. The vast majority of these incidents were related to human error. Additionally, a large number of the so-called mechanical faults had a root cause in human error. For example, a thruster failure attributable to changing of oil filters while in the DP mode is reflected as a mechanical error despite the human involvement. IMO also has not revised or augmented the DP criteria for close-in considerations. Participants in the IMO development of the criteria and subsequent studies assert that the large number of variables associated with close-in operations and the critical role of human factors demands a risk-based approach to the selection of equipment and development of operational procedures appropriate to the operating environment.

The IMO criteria identify various systems and subsystems related to power, thrusters, and controls/sensors. Two of the classification societies incorporate additional evaluation tools intended to quantify the overall reliability and station keeping rating of the DP system. The IMO criteria are illustrated in Table 1.

[5] Guidelines for Vessels with Dynamic Positioning Systems, IMO Marine Safety Committee, Published June 6, 1994
[6] While this assertion is not stated or evident in the text of the Circular, two participants of the committee that drafted the circular confirmed that dynamic positioning controls were never discussed in the context of maintaining a vessel's position relative to a facility or another vessel.
[7] Risk Analysis of Collision of Dynamically Positioned Support Vessels with Offshore Installations (Revised); 115 DPVOA, October 1994; International Marine Contractors Association (IMCA)

Table 1
Dynamic Positioning Criteria (IMO)

Subsystem or Component			**Minimum Requirements in Group Designation**			
			DP-1	**DP-2**	**DP-3**	
Power	Generators & Prime Movers		Non-Redundant	Redundant	Redundant, Separate Compartments	
	Main Switchboard		1	1 with Bus tie	2 normally open bus ties in separate compartments	
	Bus Tie Breaker		0	1	2	
	Distribution System		Non-Redundant	Redundant	Redundant, Separate Compartments	
	Power Management		No	Optional – If installed, must have adequate redundancy/reliability		
	Uninterruptible Power Supply		1	1 per computer	2, 1 in separate compartment	
Thruster	Arrangement of		Non-Redundant	Redundant	Redundant, Separate Compartments (Single fault operation in *maximum* environmental condition)	
	Hold Station with Single Thruster failure		No	Yes	Yes	
Control	Auto Control - Number of Computer Systems		1	2	3, 1 in separate compartment from main control station & separated by A.60	
	Manual Control; Joystick with auto heading		Yes	Yes	Yes	
	Single Levers for each Thruster		Yes	Yes	Yes	
	Alternate Control System		No	No	Yes	
	Consequence Analysis		No	Yes	Yes	
Sensors	Position Reference Systems		2	3	3	1 connected to backup system & separated by A.60
	External Sensors	Wind	2	2	3	
		VRS/MRU	2	2	2	
		Gyro	2	2	3	
		Other	2	2	3	

Gulf of Mexico Practices

A wide variety of vessels and operators exist in the Gulf of Mexico. A sampling of vessel capabilities through OMSA revealed that use of a specific IMO class of DP capability should not be the sole factor in considering the equivalence of a transfer operation to the requirements of 156.120. OMSA polled members representing the majority of DP Offshore Supply vessels in operation to ascertain the processes and safeguards currently employed. The following is a summary of the data reported:

- The majority of DP vessels have no independent or classification society certification of their DP system to the IMO criteria. A small percentage of vessels have their systems certified to the requirements of a Classification Society.

- Virtually all DP vessels engage in transfers of oil while operating in the DP mode. Many of these limit oil transfers to beyond 12 miles offshore (based on their reading of Part 156). Some of these vessels also engage in transfers of hazardous materials, such as methanol, liquid muds, or oilfield waste.

- An estimated half of the vessel operators have incorporated DP-specific procedures into the vessel's oil transfer procedures.

- An estimated half of the vessel operators have collaborated with their facility customers to address DP specific procedures in the facility's oil transfer procedures.

- Several vessel operators have conducted either internal or contracted risk analysis in conjunction with the development or employment of DP capability. Some vessel operators which did not conduct their own analysis have adopted the systems and redundancies used by their competitors.

In considering the best practices of these operators, and in discussion with persons familiar with the development of the IMO guideline, operators should take a "risk-based" approach to assess the adequacy of a DP system for a particular employment and environment. Operating conditions in the GOM also vary considerably, and consequently environmental limitations should be prescribed in the respective operating manuals of the vessel or facility.

Many deep-water facilities are currently 100% reliant on DP, in that mooring systems either were never installed, or have been removed. These deep-water facilities are typically high volume producers with greater needs for fuel and other bulk liquids such as methanol. This dependency was stressed by the operators in the development of USCG policy. The operators regarded their practices and equipment as "non-regulatory solutions" proven both safe and environmentally sound over several years of operations.

Risk-Based Approach

Deep-water floating facilities present both increased need and increased risk associated with boat operations. Unlike fixed platforms, unintentional contact with some floating facilities carries the risk of potential serious consequences for the facility as well as the vessel. Most floating facilities initially employed a back down buoy mooring system. In the mid 1990s, vessels equipped with an integrated "joystick" control were regularly employed and found advantageous for special crane lifts where the supply vessel needed to station itself in a position outside the constraints of the back down mooring system. In support of this needed flexibility, boats were equipped with multiple thrusters manually controlled by the single integrated joystick. Captains relied on visual aids, such as range markers on the facility and standard navigating equipment to manually maintain position.

As deep-water operations recognized improved efficiencies, greater safety, and increased flexibility in boat position and orientation, automatic position controls were evaluated. DP was already recognized as being fully capable of "holding [the vessel on position] during all ***expected*** conditions of surge, current, and weather...." It was also recognized that full time DP operations could increase the potential exposure to mishaps. Using extensive fault-tree and quantitative risk analysis conducted by American Bureau of Shipping, and the IMCA study, one operator assembled a team consisting of ABS, vessel captains, facility operators, providers of DP controls, risk engineers, and regulatory consultants, spending approximately two years evaluating the risks of DP operations and the risk-factored costs of varying levels of redundancy. The preferred primary positioning system was the fan-beam laser – an optical relative positioning device that continually measured bearing and range to reflectors placed on the target facility. The back-up positioning system was RPMS, a satellite positioning system. While the RPMS system alone provided absolute position when employed solely on the vessel, it was modified to include a second RPMS unit on the facility with a feedback link to the vessel that corrected for any relative movement between the vessel and target.

The extensive risk analysis allowed the operator to identify the hardware configurations that afforded the best protection against higher probability-higher consequence events associated with close-in operations. Many of the vessels engaged in DP are not certified to any of the IMO standard levels, but represent hybrid arrangements that combine DP-1, 2 or 3 in specific areas. This approach was considered consistent with the structure of the guideline[8].

Additionally, the staff of both the production and vessel operating companies shared in developing both the vessel and facility operating procedures in order to eliminate gaps or conflicts. In the risk studies, some redundancies were considered unnecessary or obviated by the high reliability of other selected options. As a further safeguard, the DP control system incorporated a "dead reckoning" feature. In the event of a loss of positioning, or a disagreement between the positioning inputs, the controls were programmed to alarm, but maintain all thruster speed and direction inputs based on the last good signal. This allows the Captain

[8] "The equipment class of the vessel required for a particular operation should be agreed between the owner of the vessel and the customer based on a risk analysis of the consequence of a loss of position. Else, the Administration or coastal State may decide the equipment class for the particular operation." – Operators understand this to mean that risk analysis would be acceptable to determine equipment and systems employed, but in cases where risk analysis was not performed, the flag state could prescribe the class to be used.

time to assess the situation and take immediate manual control if the automatic system failed to recover positioning inputs.

Because operators had invested significant time and expense in addressing the risks of close-in DP operations, they regarded the intended direction expressed by the USCG (to require DP-2 or higher) as an unsatisfactory result, since it would require several expensive upgrades to their vessels in areas that their risk analysis had shown were not significant in reducing risk of close-in operations. For example, most OSVs are equipped with a single gyrocompass, while the guideline specifies two gyrocompasses for DP-2. This underscores another concern of the operators. Although the IMO Circular was a ***Guideline***, its incorporation into USCG policy could impart to it the "force of regulation" and thereby eliminate the flexibility intended in its formulation.

USCG Policy

The Eighth Coast Guard District published the policy January 22, 2003. The policy referred to the IMO Circular 645 DP criteria and cited DP-2 or DP-3 as the minimum requirements for vessels during the transfer of oil or hazardous material. In reviewing the detailed requirements of the IMO criteria, and the corresponding rules of several classification societies (ABS, DNV and Lloyds), the USCG noted differences in specific requirements. These differences are illustrated in an attachment to the policy. Based on the oversight and certification role that class societies perform, the USCG policy also accepts vessels certified by a classification society to the corresponding DP level 2 or 3 under the class society rules.

The Policy also incorporates two provisions for vessels that did not meet IMO or classification society criteria. A third option represents a compilation of the Gulf of Mexico Practices discussed above and certain elements from IMO or classification society requirements that the USCG considered desirable. This option will be discussed in detail below.

As a final option, the USCG includes use of a "breakaway" hose fitting, that would separate and self-close if the vessel drifted outside the target operating area. The use of these fittings was proposed by one operator during the discussion phases of the effort. Participants reported mixed opinions of these devices, but ultimately had no objection to their use as a fourth option.

The "third option" represents the hard-gotten gain from this effort. The result does not merely represent the consensus between the USCG and industry, but many hours of discussion among operators of vessels and facilities, who believed their particular approach and configuration to be optimum, and who also did not want to see a competitor's particular solution forced on the rest of the fleet. The process employed by the operators was to first seek consensus among themselves, and present that consensus position to the USCG. It was necessary for all parties to recognize that there was no "one-size-fits-all" solution. The vessel market contained and required vessels of differing sizes and capabilities, which demand different day rates. Higher-end vessels demanded greater day rates, but also cost more to build and operate. Operators and the USCG needed to see DP as a performance characteristic of a vessel. Just as a vessel's size and engines determine is sea keeping ability, carrying capacity, and speed, DP performance must be defined in terms of maximum sea state or other logical parameters. The USCG should not require every vessel to perform to the same standard.

The USCG, OMSA and OOC met this challenge with the third option. In terms of the IMO Group Designations, it approximates "DP-1¾", or as some preferred to call it, "DP-2 minus". As stressed by the operators, it includes requirements supported by risk analysis associated with close-in operation. The USCG also included reference to systems already required for vessels regulated under subchapter I, L, or T[9]. This reference allows vessel operators to easily identify equipment and systems that may already be in place by virtue of the vessel's compliance with the appropriate subchapter. Referring to Table 1, DP-2 minus generally adheres to DP-2, with the following exceptions or qualifications:

[9] 46 CFR Subchapter L applies to Offshore Supply Vessels. OSVs may under some circumstances be regulated under Subchapter I (Cargo and Miscellaneous Vessels), or if under 100 gross tons, Subchapter T (Small Passenger Vessels).

- An automatic bus tie breaker is required per IMO DP-2. Certain older OSVs are not required to have this equipment but must install it to transfer oil or hazardous materials in DP.
- DP-2 requires one uninterruptible power supply per computer. The third option permits one UPS where multiple computers are provided; one UPS is acceptable if it can provide power to each computer.
- The policy clarifies that the term "thrusters" may include fixed shafts with controllable or fixed pitch propellers, tunnel thrusters, Z-drives, etc. Based on the configuration of some vessels, a configuration with 2 stern thrusters & one bow thruster is acceptable as long as the vessel can still hold station long enough to safely disconnect after losing any one of these thrusters.
- DP-2 requires two control systems. The policy recommends two, but permits a DP-1 standard of one since some redundancy is achieved by having Manual Control as back up.
- DP-1, 2 and 3 require an integrated joystick control. Where the Integrated Joystick is computer controlled, that computer shall be independent of the Automatic Control computer and shall have UPS provided.
- DP-2 and 3 require three position-referencing systems. The policy accepts two position reference systems based on different principles of operation, or if both are GPS-based then the differential corrections shall be from independent sources and shall be transmitted/received separately.
- DP-2 requires two gyrocompasses. The policy permits substitution of other sensors that read or compute vessel heading information for the second gyrocompass (e.g. corrected magnetic compass output or satellite compass).

The third alternative is illustrated in Table 2, which is excerpted from the USCG Policy.

The USCG policy sets forth general requirements for training of personnel. The intent of the training is to ensure that personnel responsible for operation of a DP system are familiar with its performance, appropriate response to failure alarms and limitations of the system.

The USCG does not impose any formal inspection or approval burden on the industry, or specify enforcement roles for their own personnel. Operators of DP vessels are required to comply with the policy, and may be subject to verification when USCG inspectors come aboard for other purposes. The USCG also requires that the vessel maintain written operational procedures addressing the transfer of oil or hazardous material while in the DP mode. These procedures may be part of the Oil Transfer Procedures required under 33 CFR Part 155. Although these procedures are not required to be submitted for approval, the procedures may be reviewed by USCG personnel during vessel inspections or incident investigations.

Table 2
USCG Minimum Requirements for DP Oil and HAZMAT Transfers

Systems or Components		**Minimum Reqmts**	**Comments**	**IMO Group**	**Req'd by Sub I or L?**	**Req'd by Sub T?**
Power Systems	Generators & Prime Movers	Redundant		2	Yes	No
	Main Switchboard with Bus-Tie Breaker	1	This must be an automatic bus-tie breaker, which may not have been installed on some of the older OSVs.	2	Maybe (not on some older OSVs)	No
	Distribution System	Redundant		2	Yes	No
	Uninterruptible Power Supply (UPS)	1 for each computer	Where multiple computers are provided, one UPS is acceptable if it can provide power to each computer.	2-	No	No
Thrusters	Arrangement of Thrusters	Redundant	Thrusters may include fixed shafts with controllable or fixed pitch propellers, tunnel thrusters, Z-drives, etc. A configuration with 2 stern thrusters & one bow thruster is acceptable as long as the vessel can still hold station long enough to safely disconnect after losing any one of these thrusters.	2	No	No

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Systems or Components		Minimum Reqmts	Comments	IMO Group	Req'd by Sub I or L?	Req'd by Sub T?
	Hold Station with Single Thruster Failure	Yes	Long enough to safely disconnect.	2-	No	No
Control	Automatic Control – Number of Computers	1	2 are preferred, but 1 is acceptable since some redundancy is achieved by having Manual Control as back up.	1	No	No
Control	Manual Control – Integrated Joystick with Auto heading	Yes	Where the Integrated Joystick is computer controlled, that computer shall be independent of the Automatic Control computer and shall have UPS provided.	1, 2 & 3	No	No
Control	Individual Control Levers for each Thruster	Yes		1, 2 & 3	No	No
Sensors & Control	Position reference system	2	The 2 position reference systems shall be based on different principles of operation, or if both are GPS-based then the differential corrections shall be from independent sources and shall be transmitted/received separately.	1+	No	No
Sensors & Control	External Wind Sensors	2		1+	No	No
Sensors & Control	VRS/MRU (Vert. Response Sensor/Motion Response Unit)	1		N/A	No	No
Sensors & Control	Gyrocompass	2	Required redundancy may be satisfied by other sensors that read or compute vessel heading information (e.g. corrected magnetic compass output or satellite compass), in which case only one gyrocompass is required.	1+	No	No
Sensors & Control	Consequence Analysis	Yes		2	No	No

General comments:
1. 33 CFR 156.120(a) requires that for oil or HAZMAT transfers "the vessel's moorings are strong enough to hold during all expected conditions of surge, current, and weather …"
2. The following guidance has been developed so OCMIs and OSV owners/operators can determine what minimum requirements a DP system must meet for an OSV to conduct oil and HAZMAT transfers on the Outer Continental Shelf within the Eighth Coast Guard District.
3. The burden is on industry to ensure they comply with this guidance whenever conducting oil or HAZMAT transfers; however, OCMIs may use their discretion to spot-check OSVs and ensure this guidance is being followed.
4. For questions about redundancy, please refer to the definition provided at the bottom of page 2 of this policy letter.

Formula for Operator Compliance

The operator of DP OSVs should take a methodical approach to dealing with this policy. Since formal enforcement of the policy is not anticipated, the operator must ensure that sufficient documentation exists to permit the occasional review that may occur coincident with vessel inspections or incident investigations.

For existing vessels, the operator should create a DP checklist that reflects the requirements of the policy and enables the master or port engineer to evaluate the equipment redundancy and segregation on each vessel. This checklist should allow the reviewer to determine the IMO group applicable to each listed system or piece of equipment. Using the information in Table 2, the operator should have a clear understanding of those areas of compliance that are covered by the regulation subchapter applicable to the vessel, and those where additional compliance is required to satisfy the policy. If a vessel is certified to the Level 2 or 3 group under the rules of ABS, DNV or Lloyds, that certificate constitutes the necessary documentation. This document will allow the reviewing USCG inspector or investigator to determine which option in the policy applies. A significant advantage of this policy is that it permits the operator alternatives that may include, but do not mandate, the use of a classification society to verify compliance.

Operators that are designing or constructing new vessels should consider incorporation of DP features, or what some operators call "DP-ready" construction. This approach builds in the features that are most costly (if not impossible) to retrofit, such as segregation of propulsion and power generation equipment and integrated control systems (i.e joystick). In this way, upgrading of the vessel to DP-2 or DP-3 becomes a primarily matter of adding computers and sensing devices, and not relocation of major hardware or structure of the vessel.

Appropriate DP operating procedures should be developed that address the environmental limits of the DP system, and establish method for transfer of control to manual operation and termination of transfer operations. It is recommended that these procedures be incorporated in the Oil Transfer Procedures for the vessel, but they may be a part of other operation manuals or a standalone document. These procedures will probably be requested by the USCG if a pollution incident occurs in the DP mode.

The preventative maintenance system for the vessel should be modified to include appropriate checks and maintenance of DP components and equipment. This should be developed in cooperation with the provider of the DP control systems and hardware, and may be appropriate for inclusion in the vessel International Safety Management (ISM) program for the vessel. Components of the DP system should be protected against unauthorized alteration by a management of change system that ensures total system performance is not compromised. Normal maintenance activities may have to be restricted while the vessel is operating in the DP mode, as in the referenced incident in the IMCA study where the changing of an oil filter precipitated an engine failure.

It is also recommended that vessel operators confer with their facility operator-customers. Many facility operators have extensive policies concerning oil and hazardous material transfers, as well as procedures to minimize risk of collision. It is prudent to conduct a joint review of all applicable procedures to identify gaps or conflicts that may contribute to a future mishap. These may be reconciled by amendments applicable to the specific facility/operator.

Those responsible for compliance for vessel fleets should become familiar with the policy and test the procedures and equipment employed against the alternatives provided. Facility operators also should be aware of these requirements and understand the basis for compliance of vessels that are contracted. Contractual requirements should be adjusted as necessary to reflect appropriate responsibilities for compliance. These tasks are wholly within the capability of the operator's compliance officer, port engineers or operations specialists. If assistance is needed, consulting in this area is available through the classification society as well as other independent sources.

Conclusions and Lessons

The development of the DP Policy yielded a number of observations. These are noteworthy from the perspective of a DP vessel or a facility operator, but also have significance for any effort by industry to attempt to influence or form a policy initiative by the USCG.

First, the appearance of an opinion in print carries significant influence regardless of whether it is complete, accurate or tenable. In this case, the author's underlying assumption was that DP vessels relied upon satellites to maintain their position. Had the author fully researched the configurations and equipment in use such as relative position referencing systems, he may have reached a different conclusion as to whether DP actually constituted a violation of regulation. While this matter was not examined by legal experts within the USCG, the regulatory assertions made by the USCG were "a stretch" in the opinion of regulatory and legal experts in the industry.

In the opinion of some in the USCG, an absence of regulation in a given area is seen as a void that must be filled. In its best light, this process resulted in sanction of equipment and operations and thereby pre-empted future questions of compliance or litigation. In its worst light, this effort was a case of the USCG fixing something that was not broken. While their own initiatives such as Prevention through People encourage partnership and the seeking of "non-regulatory solutions," the reality is a different story. As a result, industry had to commit significant resources to educating the USCG concerning the DP technology and making a case to continue using equipment and practices that were well established and field proven as safe and environmentally responsible.

International standards such as the IMO Guideline are well respected within the USCG. The agency will willingly wrap new regulatory initiatives around such documents rather than generate requirements internally or seek those generated by industry. A major hurdle for industry was explaining the shortcomings of the IMO Guideline in addressing close-in operations, in order to preclude its wholesale application to DP activities with the force of regulation.

Vessel operators can be their own worst enemy. After more than a year of work with OMSA and OOC coordinating input and building consensus, two new issues emerged. One vessel operator, who did not operate any DP vessels, opined that OMSA should have included its full membership in the development of consensus documents. This operator planned to add DP capability to his fleet, and entered the fray largely opposed to the positions that had been settled over a year of negotiation. This set back the consensus effort by at least 1-2 months. Additionally, it was revealed that the original USCG article was prompted by a report to the USCG from one non- DP vessel operator who was aggrieved because DP vessels were taking some of his business.

The process of addressing a major policy concern such as the regulation of DP systems is complex and can be intimidating. The role of trade associations is imperative in building consensus and presenting a united front. However, trade associations do not accomplish these wonders on their own. It takes participating members to provide personnel and resources to fuel the effort and deliver the results.

In conclusion, the policy was considered necessary, not because it would improve safety or protection of the environment, but because the ***regulatory*** climate made it necessary. The prevailing thought with regard to the offshore industry drives the USCG to seek to cover any new or innovative technology with some form of regulation or policy. Without active industry participation, the results are seldom welcome, effective, or well understood. The collective experience of the impacted operators, OMSA and OOC participants and consulting resources enabled the development of a policy that ran with the grain of the existing best practices, and imposed minimal burden on industry.