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INDEX OF REVISIONS

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0	ORIGINAL

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
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SUMMARY

1 OBJECTIVE

This Technical Specification defines the Operational Modes for each system, process or equipment of a Stationary Production Unit. It should be used as a reference for the General Technical Description - BOT.

2 REFERENCE DOCUMENTS

2.1 PETROBRAS Standards

Filosofia de Operação e Manutenção para Unidade Estacionária de Produção (DR-ENGP-M-I-1.23_R4)

3 GLOSSARY

- AEPR = Automation and Electrical Panels Room
- BOT = Build, Operate and Transfer
- CCR = Central Control Room
- CSS = Control and Safety System
- ESA = Electrical System Automation
- HMI = Human-Machine Interface
- O&M = Operation and Maintenance
- Operation = Actuation
- SOS = Supervision and Operation System
- Supervision = Monitoring

4 OPERATIONAL MODES

4.1 General Conditions

4.1.1 Operational processes shall be identified and mapped. The activities and tasks necessary for executing them, especially those considered critical, shall be detailed proceeded and standardized.

4.1.2 Each operational process, where applicable, shall have an Operational Mode defined in order to serve as a subsidy in the tasks identification.

4.1.3 The Operational Modes defines the automation levels required to actuate and monitor the main equipment of the stationary production unit.

4.1.4 The Operational Modes shall be defined considering the processes, the variables, workers' exposure to risk under normal operating conditions, emergency and response time to maintain operability and safety levels.

4.1.5 Priority shall be given to remote operation of equipment through the operating stations in the CCR.

4.1.6 The Operational Modes for stationary production units are:

- **Operational Mode 1 (MOP1)**

Operation, Supervision and Control are executed locally by the Operator at the equipment.

Note: When the Operational Mode is not specified, MOP1 shall be the reference mode to be adopted, if compatible with such operation. It can also be present, in a complementary way, within more complex Operational Modes.

- **Operational Mode 2 (MOP2)**

Operation, Supervision and Control are remote at the CCR. Operation and Supervision executed by HMI of the SOS. Control and Interlock executed by CSS.

- **Operational Mode 3 (MOP3)**

Operation, Supervision and Control are locally executed at the equipment, through the dedicated HMI of the local panel. Remote supervision summary is available on SOS' HMI's.

- **Operational Mode 4 (MOP4)**

Operation, Supervision and Control are remotely executed through the HMI of the panels installed at the AEPR. Remote supervision summary is available on SOS' HMI's.

- **Operational Mode 5 (MOP5)**

Operation, Supervision and Control are remotely executed through the HMI of the panel installed at the AEPR. It is also available a dedicated HMI at the CCR. Remote supervision summary and relevant variables are available on SOS' HMI's.

- **Operational Mode 6 (MOP6)**

Operation, Supervision and Control are remotely executed through the HMI of the panel installed at the AEPR. It is also available a shared HMI at the CCR. Partial Remote operation and remote supervision summary is available on SOS' HMIs.

- **Operational Mode 7 (MOP7)**

Operation, Supervision and Control are remotely executed through the HMI of the panel installed at the AEPR. It is also available a dedicated HMI at the CCR. Operation and supervision can also be remotely executed through the SOS' HMIs at the CCR.

- **Operational Mode 8 (MOP8)**

Operation and Supervision are executed at the equipment or through the ESA (Electrical System Automation) at AEPR. It is also available a redundant ESA at the CCR.

- **Operational Mode 9 (MOP9)**

Operation, Supervision and Control are executed locally at the equipment by the Operator. Only remote supervision is available at the AEPR (ESA) and at the CCR (redundant ESA).

4.1.7 All equipment in the production facility that requires routine manual operations/maneuvers must have a permanent structure for access.

4.1.8 For processes that have automatic activation defined in accordance with safety requirements, Operation Mode 2 (MOP2) must be adopted as a reference mode, such as

Fire Fighting Pumps, Jockey Pumps and Water Mist Systems. However, these systems must also have remote manual and local manual activation options,

4.1.9 When mentioned Operation, Supervision or Local Control, this location is the equipment or close to it (panel, button panel, etc.) and when it is remote, it can be either in the CCR or in the AEPR, properly identified in each Operation Mode.

4.1.10 The summary of the Operational Modes is presented on Table 01. Tables 02 to 14 present the Operational Modes for each system or equipment.

Table - 01 – Operational Modes – General

OPERATION MODES									
MOP	DESCRIPTION	OPERATION				SUPERVISION			
		Feld	AEPR	CCR		Field	AEPR	CCR	
MOP1	Local Operation and Local Supervision	Equipment				Equipment			
MOP2	Remote Operation Remote Supervision			SOS				SOS	
MOP3	Local Operation, Local Supervision and Summary Remote Supervision	Local Panel				Local Panel (field)		SOS (Summary)	
MOP4	Remote Operation, Remote Supervision and Summary Remote Supervision		Panel				Panel	SOS (Summary + relevant variables)	
MOP5	Remote Operation and Summary Remote Operation, Remote Supervision and Summary Remote Supervision		Panel		Dedicated HMI		Panel	SOS (Summary + relevant variables)	Dedicated HMI
MOP6	Remote Operation and Partial Remote Operation, Remote Supervision and Summary Supervision		Panel	SOS (Main Command)	Shared HMI		Panel	SOS (Summary + relevant variables)	Shared HMI
MOP7	Remote Operation and Dedicated Remote Operation, Remote Supervision and Dedicated Remote Supervision		Panel	SOS	Dedicated HMI		Panel	SOS	HMI Dedicated
MOP8	Remote Operation and Dedicated Remote Operation, Remote Supervision and Dedicated Remote Supervision for Electrical Equipments		ESA (Electrical System Automation) or Equipment		Redundant HMI Dedicated HMI		ESA (Electrical System Automation) or Equipment		Redundant HMI Dedicated HMI
MOP9	Remote Supervision for Electrical Equipment	Equipment				Equipment	ESA (Electrical System Automation)		Redundant HMI Dedicated HMI

- Dedicated HMI – Exclusive HMI for Operation and Supervision of one determined equipment / system.
- Whenever there is no mention, Integral Operation / Supervision shall be considered as: All data, information and variables acquired by the associated control system will be available at the associated HMI.
- Main Commands - Comands that act in the process for the most relevant actions.
- Summary - UAM, UAS, ON, OFF and Shutdown.
- Relevant variables – Process variables, status and equipment indications for issues which are considered relevant for Operation and Supervision of the process.

Table 02 – Production Systems Operational Modes (1/7)

PRODUCTION SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Natural Lift System	Production well (TPT, PDG)	MOP2
	Production tubing	Not applicable
	Wellhead equipment (x-us tree valves, automatic valves, manual valves)	MOP7
	Conductors, lines and umbilicals for hydraulic control	
	Production well control panel	
Progressive Cavity Purrging System	Production well (tubing)	MOP2
	Well autorrotion equipment (SSV, USV, FSV, PSHL and TSE)	MOP7
	Wellhead equipaiuent (X-mas, Autorrntic Valves, Manual Valves)	
	Progressive cavity purrg	
	Polished rod	
	Electrical energy supply system (cable, transformers, panels e VSD)	
	Drive head (motor, brake and coupling)	
Electrical Submersible Purrg (ESP) System	Production well (tubing, downhole)	MOP2
	Well autorretion equipment (SSV, USV, FSV, PSHL and TSE)	MOP7
	Wellhead equipaiuent (X-mas, Autorrntic valves, Manual valves)	
	Bottom well assembly(motor, submersible pump, gas separator, sand separator and protector)	
	Electrical energy supply system (cable, transformers, panels and VSD)	
	Production well ESP control panel	
Continuos Gas Lift System	Production well (Production tubing, annulus, downhole, gas lift valves)	MOP2
	Well autorrotion equipment (SSV, USV, FSV, PSHL and TSE)	MOP7
	Conductors	
	Lines and Hydraulic control urréilicals	
	Production wells control panel	
Water Injection System in Reservoir	Injection well	MOP7
	Well autorretion equipment (SSV, USV, FSV, PSHL and TSE)	
	Wellhead equipaiuent (X-mas, Autorrntic valves, Manual valves)	
	Injection well control panel	
CO2 Injection System in Reservoir	Injection well	MOP7
	Well autorretion equipment (SSV, USV, FSV, PSHL and TSE)	
	Wellhead equipaiuent (X-mas, Autorrntic valves, Manual valves)	
	Injection well control panel	

Table 03 – Production Systems Operational Modes (2/6)

PRODUCTION SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Miscible Gas System for Reservoir Injection	Injection well	MOP7
	Well automation equipment (SSV, USV, FSV, PSHL and TSE)	
	Wellhead equipament (X-mas, Automatic valves, Manual valves)	
	Injection well control panel	
Subsea Gathering System	Flexible lines	MOP7
	Subsea production manifold (SPM) and Subsea production lines	
	Slug control and chokes	
	Control umbilicals	
Surface Gathering System	Slug control and chokes	MOP2
	Support structure and line connections (plataforms)	
	Manifold and Production lines	
	Manifold and Test lines	
	Heat exchanger (plate exchanger)	
	Pig launcher and/or receiver	MOP1 *
Gas Lift Distribution System for Injection in Production Well	Subsea manifold control panel	MOP6
	Injection choke	
	Subsea and Surface injection manifolds, headers, lines and accessories	
Water Distribution System for injection	Subsea and Surface injection manifolds	MOP7
	Headers, lines and accessories	
	Injection choke	
CO2 Distribution System for Reservoir Injection	Manifolds, headers, lines and accessories	MOP6
	Injection choke	
Miscible Gas Distribution System for Reservoir Injection	Manifolds, headers, lines and accessories	MOP6
	Injection choke	
Gas Lift Supply System for Injection in Production Well	Lines and accessories	MOP2
Produced Water Supply System for Reservoir Injection	Injection Motor Pumps and Control Panel	MOP6
	Booster and Main Pumps	
	Filters	
Sea Water Supply System for Reservoir Injection	Dearator	MOP6
	Injection Motor Pumps and Control Panel	
	Sulphate Removal Unit (SRU) - Chemical Injection Unit	
	Booster and Main Pumps	
	Filters	
CO2 Supply System for Reservoir Injection	CO2 supply system	MOP6
	Headers, lines and accessories	
	Low and high pressure compressors	
	Vessels	

Table 04 – Production Systems Operational Modes (3/6)

PRODUCTION SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Miscible Gas Supply System for Reservoir Injection	Compressor	MOP6
	Vessel	
	Headers, lines and accessories	
C3+ Injection System in Reservoir	Injection well	MOP7
	Well automation equipment (SSV, USV, FSV, PSHL and TSE)	
	Wellhead equipment (X-mas, Automatic valves, Manual valves)	
	Injection well control panel	
C3+ Distribution System for Reservoir Injection	Manifolds, headers, lines and accessories	MOP6
	Injection choke	
C3+ System for Reservoir Injection	Pump	MOP6
	Vessel	
	Heat exchanger	
	Headers, lines and accessories	
Production Test System	Heat exchangers	MOP2
	Test separator	
	Pressure and interface control valves	
	Test separator pumps	
Primary Separation System	Settling tank	MOP2
	Settling tank pumps	
	Heat exchangers	
	Primary production separator	
	Secundary production separator	
	Pressure and interface control valves	
	Desander	
	Desander pumps	MOP3
	Subsea separation equipment (VASPS, MOBO, SSAO)	MOP7
Atmospheric Separation System	Level control valves	MOP2
	Atmospheric separator or surge vessel	
	Atmospheric separator pumps	
Oil Treatment System	Heat exchangers (oil heaters)	MOP2
	Electrostatic oil pre-treatment	
	Electrostatic oil treatment	
	Water flow rate metering	
	BSW analyzer	
	Degasser	
	Dessalter	
Oil and Condensate Tax Metering System	Devices, piping, accessories and associated instruments	MOP5
	Metering station	
	Flow rate metering	
	Flow rate computer	
	BSW analyzer	
Subsea Metering System	Subsea devices, piping, accessories and associated instruments	MOP5
	IHM (included inside Subsea Control Panels)	
	Flow rate metering	
Vapour Recovery Unit System	VRU - Vapor Recovery Unit (booster compressor, scrubers, heat exchanger)	MOP7
	Oil lubrication pump	

Table 05 – Production Systems Operational Modes (4/6)

PRODUCTION SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Gas Compression System	Safety K.O. drum (separated gas vessel)	MOP2
	Main Turbo and Moto-Compressors	MOP7
	Scrubbers	
	Heat exchangers (gas coolers)	
	Headers, lines and accessories	
Primary Gas Treatment System	Scrubbers	MOP2
	Headers, lines and accessories	
Gas Sweetening System	Fixed bed system	MOP6
	Amine contactor tower	
	Amine regeneration unit	
	Heat exchangers (gas coolers)	
	Headers, lines and accessories	
	Safety gas scrubber	
CO2 Removal System	Amine contactor tower	MOP6
	Amine recovery vessel	
	Amine regeneration unit	
	CO2 removal system by membrane	
	Headers, lines and accessories	
Gas Dehydation System	Contactor tower (MEG or TEG)	MOP6
	Reclamation unit	
	Degasser (MEG or TEG)	
	Regeneration unit (MEG or TEG)	
	Headers, lines and accessories	
	Molecular sieves	MOP2
	Molecular sieves regeneration unit	
Hidrocarbon Dew Point Control System	Heat exchanger	MOP6
	Vessel (cold separator)	
	Joule-Thomson system	
	Refrigeration unit	
	Headers, lines and accessories	
Gas Metering System	Orifice Plate	MOP5
	Devices, piping, accessories and associated instruments	
	Flow rate metering	
Produced Water Treatment System for Reinjection	Separation tanks	MOP2
	Flotation	
	Hydrociclone	
	Filters	
	Degasser	
	Manifolds, headers, lines and accessories	
Produced Water Treatment System for discharge	Separation tanks	MOP2
	Flotation	
	Hydrociclone	
	Filters	
	Degasser	
	Headers, lines and accessories	
Produced Water Transfer System	Pumps	MOP2
	Manifolds, headers, lines (rigid and/or flexible) and accessories	
Produced Water Discharge System	Pumps	MOP2
	Overboard	
	Caisson	
	Headers, lines and accessories	

Table 06 – Production Systems Operational Modes (6/6)

PRODUCTION SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Produced Water Injection System	Injection well	MOP2
	X-mas tree (Conventional, wet, pumping tee)	MOP6
	Well control panel	
	Lines and well service system	
	Pumps	
	Manifolds, headers, lines (rigid and/or flexible) and accessories	
Oil Transfer System - Import	Pig receiver for oil pipeline import	MOP1 *
	Leak detection system for oil import pipeline	MOP4
	Headers, lines and accessories	MOP2
Oil Transfer System - Export	Pig launcher for oil pipeline exportation	MOP1 *
	Leak detection system for oil export pipeline	MOP4
	Lines and pipelines (rigid and / or flexibles) and accessories	MOP2
Oil Transfer by Pipeline System (Custody)	Pig laucher	MOP1 *
	Booster and transfer pumps	MOP6
	Lines and pipelines (rigid and / or flexible) and accessories	MOP2
Storage Gas in Reservoir System	Heat exchangers	MOP4
	Scrubbers	
	Manifolds, headers, lines and accessories	
	Turbo or moto-compressor	
	Gas injection well	MOP2
Fuel Gas System	Fuel gas scrubbers	MOP2
	Fuel gas filters	
	Heat exchangers (fuel gas heaters)	
	Headers, lines and accessories	
Flare / Atmospheric Vent System	High pressure flare vessel	MOP2
	Low pressure flare vessel	
	High and low pressure flare pumps	
	Flare system vapour recovery compressor	MOP4
	Quick open valve (QOV)	
	Flare burners	MOP3
	Flare pilot	
	Flare purge system	MOP2
	Flare ignition system	MOP4
	Flare water cooling pump	MOP2
	Flare gas flow rate stage control	MOP4
	Header line for atmospheric vent	MOP2
	Headers, lines and accessories	
Import System	Pig launcher for import gas pipeline	MOP1 *
	Headers, lines and accessories	MOP2
Export System	Pig launcher for import gas pipeline	MOP1 *
	Lines and pipelines (rigid and/or flexible) and their accessories	MOP2

Table 07 – Production Systems Operational Modes (6/6)

PRODUCTION SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Gas transfer by Pipeline System	Pig launcher	MOP1 *
	Manifolds, Headers, Lines (rigid and/or flexible) and accessories	MOP2
Pull-in / Pull-out System	Hydraulic system	MOP1
	Winches	
	Pulley	
	Steel cables	
Laboratory Analysis System	Laboratory	MOP1
	Analysis equipment	
Hazardous Area Open Drainage System	Separators water / oil	MOP2
	Skid drains and other drains	
	Drainage tanks	
	Drainage tank pumps	
	Headers, lines and accessories	
Hazardous Area Closed Drainage System / Condensate Recovery	Slop vessel	MOP2
	Slop vessel pumps	
	Drainage tanks	
	Drainage tank pumps	
	Headers, lines and accessories	
Chemical Injection System	Tanks	MOP2
	Pumps	
	Metering	
	Manifolds, headers, lines and accessories	
Well Service System	Pumps	MOP3
	Controlling valves	
	Headers, lines and accessories	
Hydraulic Energy Supply for subsea valves	Hydraulic power unit (HPU)	MOP4 **
	Solenoid boxes and panels and their accessories	
	Distribution network	

*Pig passage indicator shall be monitored in the CCR
**Local panel in the equipment, not in the AEPR.

Table 08 – Electrical Facilities Systems Operational Modes (1/1)

ELECTRICAL FACILITIES SYSTEM	MAIN SYSTEM II\ID EQUIPMENT	OPERATION MODE
Main Generation and Distribution System	Main Diesel-engine generator or Turbogenerator and	MOP7
	Medium Voltage Switchgear and Motor Control Center (MCC)	MOP8
	Low Voltage Switchgear and Motor Control Center (MCC)	
	Low Voltage Switchgear and Motor Control Center (MCC) of package	
	VSDs and Soft-Starters	MOP9
	Short-circuit current lirrJting devices	MOP8
	Normal Lighting Systems	MOP1
Auxiliary Generation and Distribution System	Auxiliary Generator e auxiliaries	MOP9
	Low Voltage Switchgear and Motor Control Center (MCC)	MOP8
Essencial Electrical Energy Generation and Distribution System	Emergency Generator e auxiliaries	MOP9
	Low Voltage Switchgear and Motor Control Center (MCC)	MOP8
	VSDs and Soft-Starters	MOP9
	Essential Lighting Systems	MOP1
UPS \C and CC Electrical Energy Generation and Distribution System	Emergency loads UPS and AC Emergency Lighting (Battery + Rectifier + Inverter + By-Pass) or UPS DC (Battery + Rectifier)	MOP9
	AC or DC Emergency Distribution Panel (incorrgng circuit-breaker and Tie)	
	Others UPS AC or DC	
	Others AC or DC Emergency Distribution Panel	MOP1
Control and Supervision of Electrical System	(ESA) Operation and Maintenance Workstation (PLCs, switches, controler, network cable, IEDs, soft starters, VSDs, servers, GPS)	MOP9
	PMS (PLCs, switches, controler, network cable routing, IEDs, soft starters, VSDs, servers, GPS)	MOP8
Process Supervision and Operation System	CSS/PLCs	MOP2
	CSS/Remotes	
	Network devices	
	SOS (Supervision and Operation System)	Not applicable
	Workstation	

Table 09 – Non-Electrical Facilities Systems Operational Modes (1/2)

NON-ELECTRICAL FT\CILITIES SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Sanitary Sewage Collection and Treatment System	Sewage treatment unit	MOP3
	Vacuum pumps	
	Collecting and disposal network	
Non-Hazardous Drainage System and Engine Room	Surrgs	MOP2
	Flood sensors	
	Open drain tanks	MOP1
	Drainage pumps	MOP2
	Oil and water separator	MOP3
	Level alarm / indicator system	MOP2
	Maneuvering valves	
	Filters	MOP1
	Drainage network	Not applicable
Catodic Protection System	Control Panel	MOP4
	Impressed current circuit	
Industrial / Potable Water System	Industrial / potable water receiving station	MOP1
	Tanks	MOP3
	Purrgs	
	Anticorrosive injection	
	Desalination Unit	
	Potable Water Unit	
	Hydroforic vessel	
	Maneuvering valves	
	Potable water distribuition network	
	Industrial water distribuition network	
Seawater or industrial water system and cooling water for process and utilities	Lift water purrgs	MOP6
	Filters	MOP2
	Heat exchangers	
	Closed distribution network	
	Open distribution network	
	Maneuvering valves	
Hot water or Heating fluid system for process	Expansion vessel	MOP2
	Hot water pumps	
	Circulation pumps	
	Furnace	MOP3
	WHRU (Waste Heat Recovery Unit)	MOP4
	Chemical product injection	MOP1
	Tanks	
	Maneuvering valves	MOP2
	Heaters (heat exchangers)	
	Distribution network	
Compressed air system for instrumentation and service	Compressors	MOP3
	Compressed air vessel	MOP2
	Compressed air dehydrator	MOP3
	Maneuvering valves	MOP2
	Distribution network	
Start-up Compressed air system	Compressors	MOP1
	Air reservoir	
	Distribution network	
	Maneuvering valves	

Table 10 – Non-Electrical Facilities Systems Operational Modes (2/2)

NON-ELECTRICAL FT\CILITIES SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Diesel oil system	Diesel receiving station	MOP1
	Tanks	
	Centrifuges	MOP3
	Filters	MOP1
	Pumps	MOP2
	Distribution network	
	Maneuvering valves	
Hydraulic energy system for topside valves	Hydraulic Power Unit (HPU)	MOP4 *
	Solenoid rack and their accessories	
	Distribution network	Not applicable
Fire fighting water system	Sea chest	MOP2
	Fire water pumps	
	Jockey purrg	
	Fire water rrnin	Not applicable
	Distribution network	
	ADVs	MOP2
	Maneuvering valves	
	Sprinklers	Not applicable
	Fusible plug network	
	Fire hydrant	MOP1
	Fire hoses	
	Foam generator system (Pumps, tanks, distribution network and process valves)	MOP3
	CO2 fixed fire fighting system (Cylinders battery, distribution network, directional valves)	MOP3
	Water mist fire fighting system	MOP2
	Manual Fire fighting system	MOP1
	Fire alarm push button	MOP2
	Signaling (sound and visual)	
hypochlorite	Hypochlorite generator	MOP3
	Hypochlorite tank	
	Pumps	
	Distribution network	
	Maneuvering valves	
Steam water system	Water treatment unit for boilers	MOP3
	Boilers / Steam Generator	
	Furnace	
	Heat exchangers	
	Distribution network	
Ventilation, Exaustion, Air Conditioned and Refrigeration (VAC)	Air conditioned system	MOP3
	Refrigerator compressors, refrigerating charmers, freezers and refrigerators	MOP1
	Blowers, ventilators and exhaust fans (including aspiration filters and ducts)	MOP2
	Dangers	
	Filters	
	Distribution network (ventilation and exhaustion ducts)	

*** Local panel in the equipment, not in the AEPR.**

Table 11 – Marine Systems Operational Modes (1/3)

MARINE SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Navigation	Auxiliary system for navigation (beacon lights, navigation lights, fog horns, windsock)	MOP2/ MOP1
	Towing system (winches, cables, chains and accessories)	
	Meteocean Station	MOP7
Mooring	Cables	MOP1
	Mooring chain and accessories	
	Fairleads	
	Chain stoppers	
	Winches	
	Dedicated Hydraulic System	
	Tension Monitoring System	MOP2
Positioning	DGPS	MOP4 *
	Gyroscopic Needle	
	Gyrocompass	
Stability	Pontoons	Not applicable
	Columns	
	Ballast tanks (tank, sounding pipe, manhole and venting pipe)	MOP1
	Ballast purrs	MOP7
	Ballast filters	MOP1
	Ballast sea chest (Sea chest valve)	MOP2
	Ballast lines	Not applicable
	Ballast maneuvering valves	MOP2
	Cargo tanks (tank, ullage opening, dome, manholes)	MOP1
	Tanks transfer lines	Not applicable
	Transfer rmneuvering valves	MOP2
	Void Space and Cofferdam	MOP1
	Doors (watertight and weathertight)	MOP1
	Cargo, ballast and services (Diesel, industrial and pottable water) tank level metering system	MOP7
Inert Gas Supply	Inert gas tower / generator (structure and instrurrientaion)	MOP6
	Blowers	
	Water seal (Deck seal) and instrurrientation	
	Distribuition lines	
	Maneuvering valves	
	Pressure Vaccum valves	
	Vent Post	
	Flame arrestors	Not applicable
	Cargo tank pressure metering system	MOP7

Table 12 – Marine Systems Operational Modes (2/3)

MARINE SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Cargo Tank Cleaning and Transfer	Cleaning pumps	MOP6
	Eductors	
	Heater	
	Distribuition lines	
	Process Valves	
	Cleaning machines	
Tank Ventilation	Distribuition lines	MOP1
	Vent Post	MOP6
	Flarre arrestors	Not applicable
	Maneuvering valves	MOP6
Hydraulic Energy Supply	Hydraulic power unit (HPU)	MOP3
	Boxes and panels of solenoids and accessories	
	Distribuition lines	Not applicable
Hazardous Area Open Drain	Sumps and drains	MOP1
	Flood sensors	MOP2
	Draining pumps	
	Distribuition lines	Not applicable
	Maneuvering valves	MOP2
	Storage tanks (slops, etc)	MOP1
Life Saving	Pyrotechnics and Messenger Line Thrower	MOP1
	Life buoys and accessories (support, messenger line, facho holrnes, orange smoke signals 15 minutes and self-lightning)	
	Life jackets	
	Davits and winches of life rafts	
	Life rafts	
	Davits and winches of life boats	
	Life boats	
	Davits and winches of rescue boats	
	Rescue boats	
Cargo Handling	Cargo Decks	MOP1
	Cranes	
	Rail cars / trolleys	
	Hoists and Monorails	
	Gantry cranes	
	Auxiliary winches	
	Mobile crane	
	Accessories (nets, cables, lifting slings, straps, shackles, etc)	
Solid Waste Treatment	Waste and / or Recyclable Collectors	MOP1
	Corrgactor	
Industrial Cleaning	Industrial cleaning machines	MOP1
	Distribuition lines	
	Equipment and accessories	

Table 13 – Marine Systems Operational Modes (3/3)

MARINE SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Operation with Vessels	Fendering System	MOP1
	Personnel Transfer Basket	
Operation with Aircraft	Heliport (Structure, lighting, Fire fighting system, Drainage system)	MOP3
	Aircraft refueling system	Not applicable
Oil transfer by Offloading (Custody}	Positioning Reference Systems (PRS): DARPS, Artemis e FANBEAM	MOP5 **
	Offloading stations (Hose Reel): Bow and Stern	MOP3
	Hawser's winch: Bow and Stern	MOP3
	Messenger line winch. Hawser and Hose	MOP1
Cargo tanks	Cargo valves	MOP1
	Cargo pumps	MOP5 **

*Panel near CCR
** No panel at AEPR

Table 14 – Telecommunications Systems Operational Modes (1/1)

TELECOMMUNICATIONS SYSTEM	MAIN SYSTEM AND EQUIPMENT	OPERATION MODE
Energy System	Battery recharger	MOP1
Data Corrzzxinication System	Telephony equipment	MOP1
	Data equipment	MOP1
Videoconxriunication	Corporate videoconference	MOP1
	Nursing/Hospital Videoconference	MOP1
Radio Corrmunication System	Inmarsat-C	MOP1
	Active Repeater	MOP1
	Portable radios	MOP1
	VHF, MF-HF/SSB, EPIRB, SABT Radios	MOP1
INTERCOM (PM\GA}	Priority Microphone	MOP1
	Paging party stations	MOP1
Aeronautical communication system	Voice and video recorder	MOP1
	Fixed and portable radios	MOP1
CCTV	Cameras	MOP1
	Displays and keyboards	MOP1