

# Choke Manifolds

Engineered configurations for all pressure-sensitive applications



## Choke Manifolds: Tailored solutions that keep the lid on pressure, and flow

The inability to precisely contain and control wellhead pressures during critical onshore and offshore operations can have profound HSE and economic ramifications. With our all-inclusive suite of customized manifolds, M-I SWACO can design application-specific configurations of chokes, gate valves, fittings and technical specifications to give you precise pressure and flow control in any operation requiring a choke to control surface casing pressure.

Available in pressure ratings from 5,000 to 15,000 psi and bore sizes ranging from 2 1/16-in. to 4 1/16-in., our durable and cost-efficient Manifolds are configured with redundant parallel chokes providing alternate flow regimes that allow operations to continue uninterrupted during routine maintenance.

# Uniquely configured manifolds keep the pressure off your most demanding applications

## Features

- Allows for multiple choke and gate valve configurations
- Pressure ratings from 5,000-15,000 psi
- Available bore sizes from 2-1/6 to 4-1/6-in.
- Dual-choke configurations
- Adaptable for all location requirements
- Meets H<sub>2</sub>S service requirements per NACE MR0175 and standard service Manifolds optionally available
- Optional double-block and bleed configurations
- Accommodates remotely operated, manual and positive chokes monogrammed to API 6A and/or API 16C
- Hydraulic or manually operated gate-valves monogrammed to API 6A
- Manifolds available with API 16C monogram option

## Benefits

- Regulates pressure and flow control
- Adaptable to variety of chokes and gate valve configurations
- Facilitates application-specific configurations
- Allows for safely circulating out a kick
- Offers small footprint configurations
- Meets all industry safety, durability standards
- Minimizes downtime
- Reduces blowout risks
- Assures equipment integrity
- Contains harmful H<sub>2</sub>S emissions
- Enhances HSE profile

Our suite of rugged Manifolds are engineered to accommodate the full gamut of M-I SWACO, a Schlumberger company, chokes from the industry-standard AUTOCHOKE<sup>†</sup> and SUPERCHOKE<sup>†</sup> to manually adjustable and positive chokes, as well as competitive hydraulic chokes. In addition, gate valves are available in either hydraulically or manually adjustable configurations, giving us the flexibility to configure a manifold to meet your most demanding applications, including:

- Managed pressure drilling
- Underbalanced drilling
- Well control
- Frac plug drill out
- Frac flow back
- Well testing

Our Manifolds are designed to direct flow from the well through the drilling chokes to protect downstream equipment from the high well flow pressures encountered during operations.

Regardless of the application, you can count on our industry-recognized specialists to ensure a configuration of pressure-control equipment that is of the utmost integrity. For you, this means not having to concern yourself the physically dangerous and economically harmful consequences of improperly designed pressure control systems. In addition, our Choke Manifolds help to safely manage hydrogen sulfide emissions and prevent release of toxic fluids.

What's more, our manifolds are designed to accommodate parallel chokes, which allows us to periodically service the equipment without interrupting the operation. By incorporating dual chokes on our manifolds, we can safely isolate one choke for servicing while controlling pressure and flow through the other. That way you are assured our equipment continues to deliver the utmost in safe pressure control without unnecessary and profit-reducing downtime.



# Flat Design MPD Manifolds

Engineered specifically for MPD/UBD applications, our flat design MPD Manifolds feature double block and bleed valves that for two pressure barriers.

These dual barriers optimize safety during both operation and maintenance. Isolation of the gauge port allows for safe connections while the dual choke flow paths provide safety-enhancing redundancy.

DNV, ABS, CE and PED-certified units are available upon request.

## Design Specifications

- All components certified to API 6A
- Skid-lift tested in accordance with M-I SWACO T-1067 @ 2.5X rated load
- Service: Sour Gas
- Rated pressure: 5,000 PSI
- Material Class: DD and EE
- Temperature Class: P-U -20°F - +250°F (-6°C - +121°C)
- Product specification level: PSL2
- Performance requirement: PR 1
- Ring groove inlay option available

## Connections:

- Inlet: 4-in. Fig 602 female union
- Outlet: 4-in. Fig 602 male union
- Gauge port: 2-in. Fig 1502 female union
- Bleed ports: ( ¼ NPT) upstream and downstream of chokes

## Approximate weights:

- With chokes: 14,000 lb ((6364 Kg)
- Without chokes and adapters: 12,350 lb (5614 Kg)
- Skid only: 1,650 lb (750 Kg)

## Dimensions:

- Length: 162 in (4m)
- Width: 81 in (2m)
- Height: 48 in (1.2 m)



# MPD L-Shape Manifolds

Our MPD L shape Manifolds are configured in a cost-effective space-saving design making them ideal for installation in closed containers for use in MPD/UBD applications in harsh environments. The design reduces the wellsite footprint and, if necessary, provides assistance in modular designs.

The MPD L shape Manifold is a double block/double bleed design with a single gate valve in the gut line.

## Design Specifications

- All components certified to API 6A
- Skid-lift tested in accordance with M-I SWACO T-1067 @ 2.5X rated load
- Service: Sour Gas
- Rated pressure: 5,000 PSI
- Material Class: DD and EE
- Temperature Class:  
P-U -20°F - +250°F (-6°C - +121°C)
- Product specification level: PSL 2
- Performance requirement: PR 1
- Ring groove inlay option available

## Connections:

- Main inlet: 4 1/6-in. 5K flange
- Pump inlet: 4-in.
- Outlet (s):  
Three 4-in. Fig 1502 male union
- Gauge/transducer port:  
2-in Fig 1502 female union

## Approximate weights:

- With chokes: 11,500 lb (5227 Kg)
- Without chokes and adapters:  
9,800 lb (4455 Kg)
- Skid only: 1,700 lb (773 Kg)

## Dimensions:

- Length: 86-in (2.1m)
- Width: 87-in (2.2m)
- Height: 66-in (1.6 m)



# MPD U-Shape Manifolds

The compact MPD U shape Manifold is the configuration of choice for offshore and other applications where space is a premium. The design is ideal for offshore MDP/UBD applications in areas where regulations require DNV and/or Norsok-approved equipment.

The lifting frame and skid of the M-I SWACO MPD U shape Manifold is available certified to DNV 2.7-3.

## Design Specifications

- All components certified to API 6A
- Temperature Class: P-U
- Material Class: EE
- Product specification level: PSL3
- Performance requirement: PR 1
- Rated pressure: 5,000 PSI
- Ring groove inlay option available
- **Connections:**
  - General: 4 1/16-in 5K
  - Inlet: 4 1/6-in. 5K flange
  - Pump inlet: 4-in. Fig 1502 female union
  - Outlet (s): 4-in. Fig 602 male union

## ■ Approximate weights:

- Max. gross weight (MGW) dry: 20,000 lb (9091 Kg)
- Tare weight (skid and lift frame only): 3,900 lb (1773 Kg)
- Without chokes and adapters: 9,800 lb (4455 Kg)

## ■ Dimensions:

- Length: 88 in (2.2m)
- Width: 99 in (2.5m)
- Height: 96 in (2.4 m)



# Frac-Plug Drill Out (FPDO)/ Flow Back (FFB) Manifold (2-1/16-in)

Engineered specifically for drilling out frac plugs for flow back operations, the 2-1/16-in version of our FPDO/FFB Manifolds feature dual isolation valves upstream of the choke, thereby enhancing safety during maintenance or choke change-outs.

The light weight design optimizes mobility while the lifting eyes, forklift pockets and drag lugs simplifies on-location movement and set-up.

## Design Specifications

- All components certified to API 6A
- Skid-lift tested in accordance with M-I SWACO T-1067 @ 2.5X rated load
- Temperature Class:  
P-U -20°F - +250°F (-6°C - +121°C)
- Rated pressure: 15,000 PSI
- Material Class:  
Chokes & valves (EE-0.5);  
fittings (DD-NL)
- Product specification level: PSL 3
- Performance requirement: PR 1
- Ring groove inlay option available

## Connections:

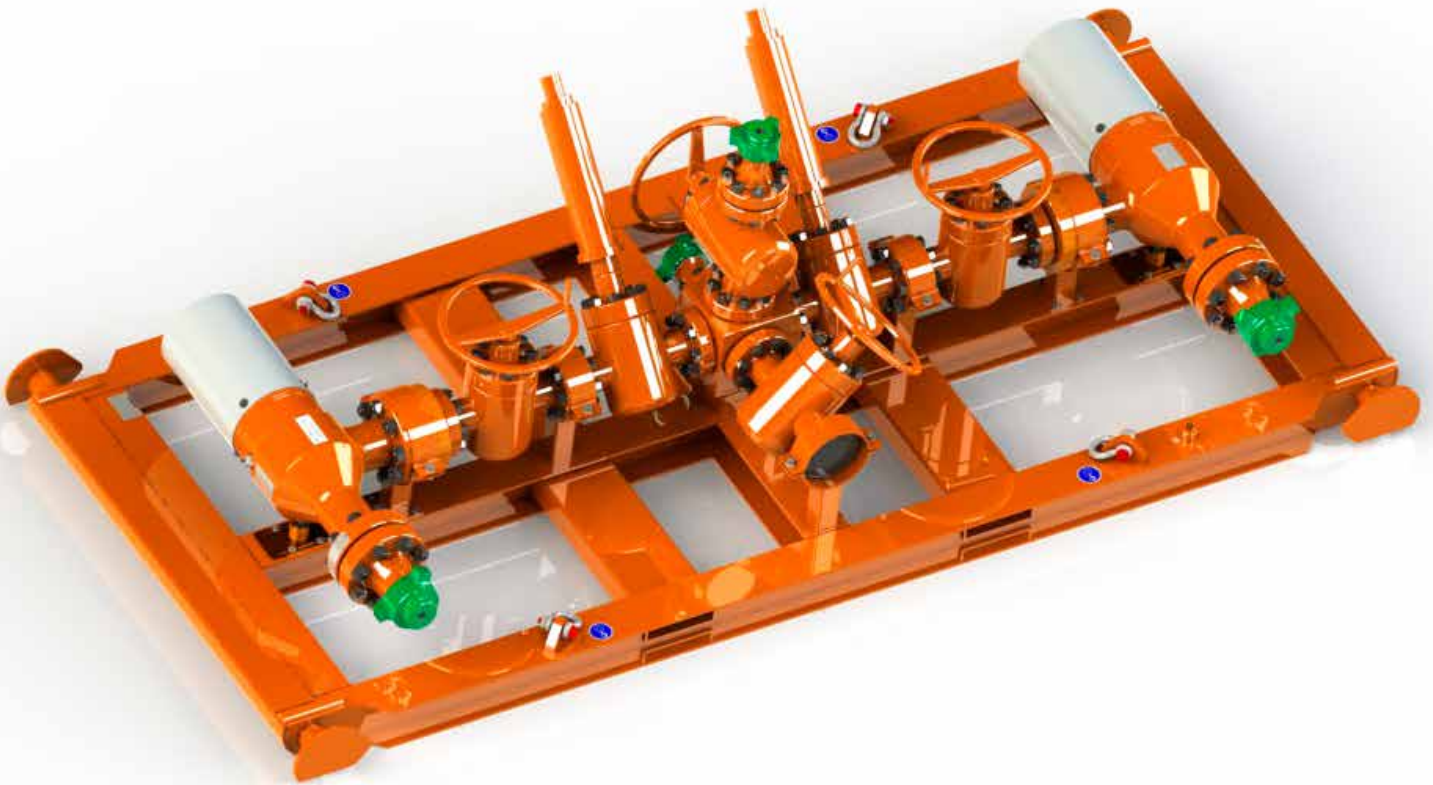
- Inlet: 2-in. Fig 2202 female union
- Outlet:
  - (2) 3-in Fig 2202 male union
  - (1) 2 1/16-in 15K flange
  - Gauge port: 2-in. Fig 2202 female union

## Approximate weights:

- With chokes: 6,350 lb (2886 Kg)

## Dimensions:

- Length: 159 in (4m)
- Width: 61 in (1.5m)
- Height: 52 in (1.3 m)



# FPDO/FFB Manifold (3-1/16-in)

Also engineered specifically for drilling out frac plugs for flow back operations, the 3-1/16-in. version of our FPDO/FFB Manifolds likewise features dual isolation valves upstream of the choke to improve safety during maintenance or choke change-outs. The isolation valve at the gauge port facilitates safe connection and maintenance.

Though larger, the 3-1/6-in. also is a light weight design optimizes mobility while the lifting eyes, forklift pockets and drag lugs simplifies on-location movement and set-up.

## Design Specifications

- All components certified to API 6A
- Skid-lift tested in accordance with M-I SWACO T-1067 @ 2.5X rated load
- Temperature Class:  
P-U -20°F - +250°F (-6°C - +121°C)
- Rated pressure: 15,000 PSI
- Material Class:  
Chokes & valves (EE-0.5);  
fittings (DD-NL)
- Product specification level: PSL 3
- Performance requirement: PR 1
- Ring groove inlay option available

## Connections:

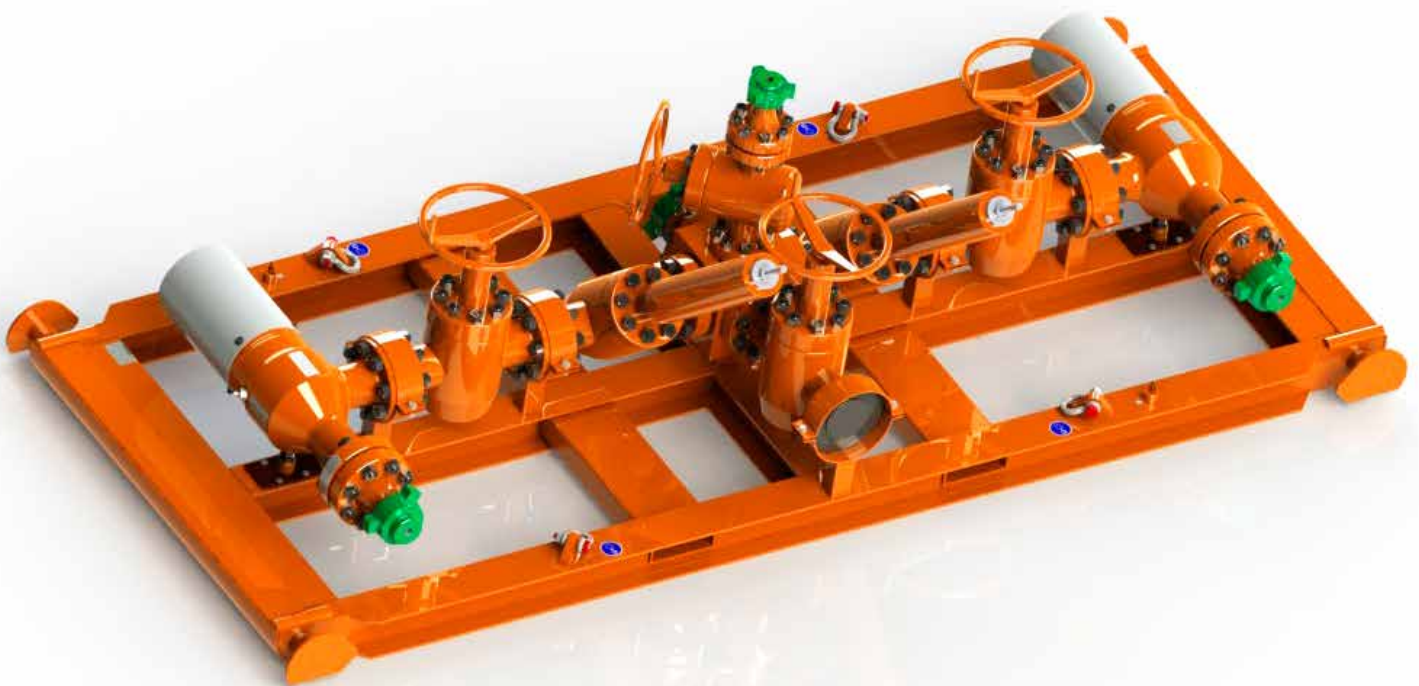
- Inlet: 3-in. Fig 2202 female union
- Outlet:
  - (2) 3-in Fig 2202 male union
  - (1) 3-1/16-in 15K flange
- Gauge port: 2-in. Fig 2202 female union

## Approximate weights:

- Dry weight with chokes:  
10,450 lb (4724 Kg)

## Dimensions:

- Length: 172 in (4.3m)
- Width: 70 in (1.7m)
- Height: 53 in (1.3 m)





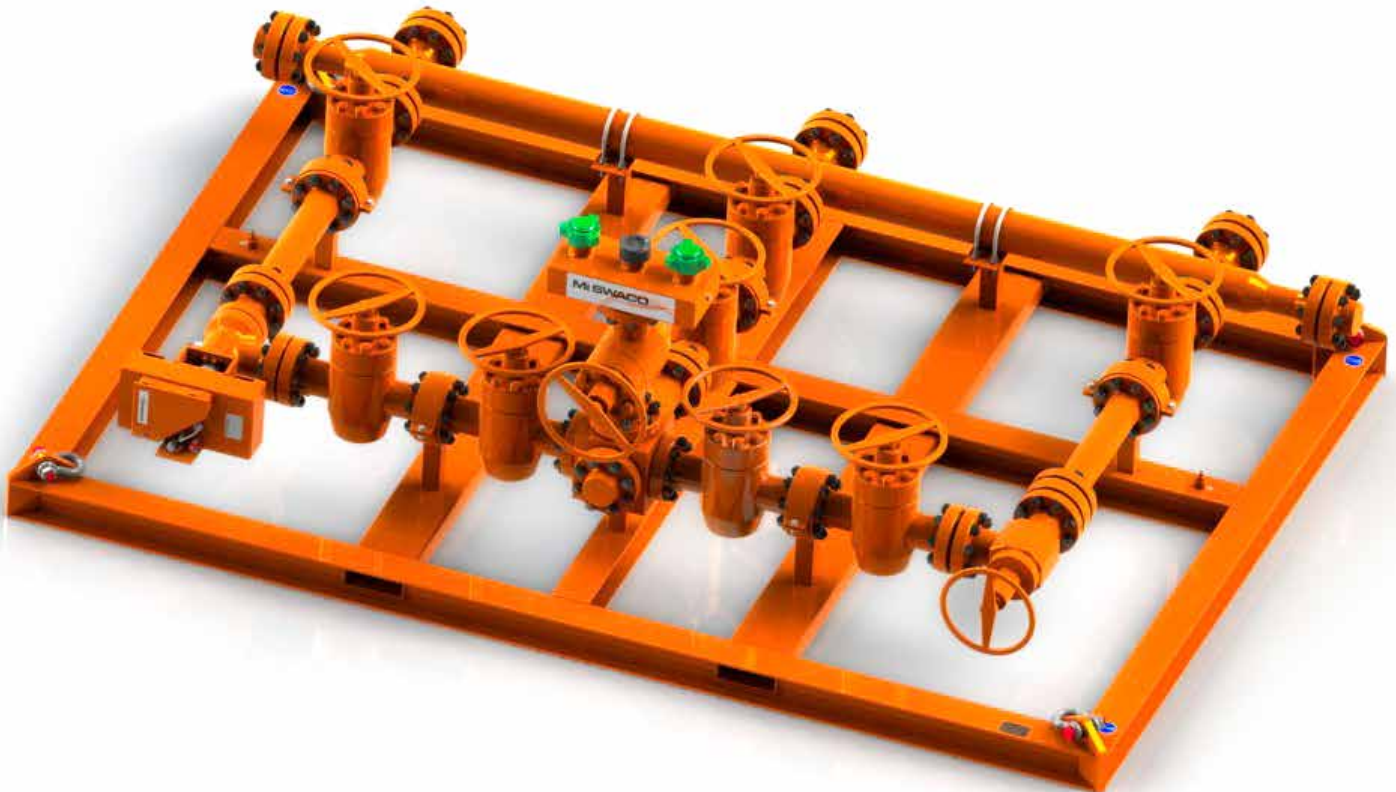
# Choke and Kill/Well Control Manifolds

M-I SWACO offers a comprehensive suite of Manifolds designed specifically for choke and kill applications to circulate out a kick. These Manifolds feature dual-isolation valves upstream of the choke, thus enhancing safety during maintenance or choke swaps. An isolation valve at the gauge port allows for connections and maintenance of gauges to be carried out safely. Buffer chamber absorbs downstream expansion of gases reducing Manifold outlet velocities.

The skid incorporates lifting eyes and forklift pockets, making on-location movement and set-up much easier.

## Design Specifications

- Chokes and Manifold assembly certified to API 16C
- All other components certified to API 6A
- Skid tested in accordance with DNV 2.7-3 and Shell OPS0055
- Service: Sour gas
- Temperature Class: P-U -20°F - +250°F (-6°C - +121°C)
- Rated pressure: 10,000 PSI
- Material Class: EE; Chokes & valves (EE-0.5); fittings (DD-NL)
- Optional Chokes include:
  - Manual choke (8275100)
  - SUPERCHOKE (CH1ZZ3PUB10A)
  - AUTOCHOKE (CH2ZZ3PUB10A)
- Product specification level: PSL 3
- Performance requirement: PR 1
- Ring grooves: all with 316SS inlay
- Connections size: 3-1/6-in. 10K
- **Approximate weights:**
  - Skid and Manifold (no chokes): 12,000 lb (5455 Kg)
  - Skid and Manifold (one choke): 12,500 lb (5682 Kg)
  - Skid and Manifold (two chokes): 13,000 lb (5909 Kg)
  - Skid only: 2600 lb (1182 Kg)
- **Dimensions:**
  - Length: 179 in (4.5m)
  - Width: 124 in (3.1m)
  - Height: 60 in (15 m)



# Manifolds complement industry-leading suite of pressure control technologies



Our versatile and durable 5 to 15K Choke Manifolds complement a growing portfolio of new generation pressure control equipment and services that is second to none. The driving force behind our development of industry-leading chokes, operating consoles, the closed-loop PRESSURE AND FLUID MANAGEMENT SYSTEM<sup>†</sup> (PFMS<sup>†</sup>) and other advancements is to allow you to drill safely and efficiently in applications where precise pressure control is paramount.

The M-I SWACO line of high performance pressure control technologies include:

- **New generation 10K and 15K Drilling Chokes:** The AUTOCHOKE, 10K SUPERCHOKE, 15K SUPERCHOKE and the remotely controlled eCHOKE<sup>†</sup> are routinely re-writing industry standards for safe and effective well-kill and high-pressure drilling, well testing and cleanup applications.
- **LOW-PRESSURE AUTOCHOKE CONSOLE<sup>†</sup> (LPAC<sup>†</sup>):** Engineered for low-surface pressure managed pressure drilling (MPD) and underbalanced drilling (UBD), the LPAC is precision-built to accurately and safely control dual AUTOCHOKE configurations. With the LPAC, operators easily can control both chokes and transition seamlessly between the two units.
- **PRESSURE AND FLUID MANAGEMENT SYSTEM (PFMS):** The closed-loop PFMS was engineered specifically for coiled tubing drilling and completions, but is ideal for any operation requiring the utmost in pressure control. With the PFMS, we have effectively addressed the limitations of narrow-pressure gradients, solids removal specifications, as well as the space, weight and time restrictions imposed with coiled tubing applications.

Our industry-leading pressure control offerings also extend to technologies for safe and cost-effective drilling and monitoring in sour gas and similarly hostile environments. Along with our highly reliable D-Gassers and Mud/Gas Separators, we also offer the novel CARBONTRACKER<sup>†</sup> technology that allows operators to measure produced gas during drilling.

**Put our Choke Manifolds to work for you**

**To find out more about how our wide range of Choke Manifolds and how they are performing for our other customers, contact your local M-I SWACO representative.**

# Choke and Kill Manifold proves itself in the field

## Texas: Clean bill of health follows successful 10K Manifold trial

### The Situation

M-I SWACO carried out the first field trial of its newly engineered 10K Manifold, comprising two 10K AUTOCHOKES as well as nine gate valves, a buffer tank and transmitter flange. The Manifold was designed to divert flow to various pressure control components or several other destinations during critical operations.

### The Solution

The Manifold was used successfully during a 22-day drill-out. For the operation, the primary AUTOCHOKE was set to 250 psi with the back-up unit programmed for 275 psi. The fluid flowing through the Manifold was thick with a significant volume of solids. The average flow rate was 1 bbl/min for the duration of the trial for an aggregate of 31,680 bbl or more than 1.3 million gal over the 22-day operation. While no issues with the Manifold were recorded during the project, M-I SWACO wanted to conduct a post-operation inspection to determine if the Manifold incurred any integrity problems that needed to be addressed in subsequent operations.

### The Results

The condition of the Manifold and all components were inspected at the M-I SWACO facility in Tyler, TX. During the inspection, both of the 10K AUTOCHOKES were disassembled with the inspection showing no indications of internal wear. The Manifold iron exhibited no sign of washout or damage. Owing to the successful drill-out and the positive inspection report, the new 10K Choke Manifold performed exactly as designed with no post-operation integrity issues.





**Mi SWACO**  
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