CASE STUDY TEMPLATE

CASE STUDY NUMBER:	Case Study 14
DESCRIPTION:	4" STRAIGHT LINE FLANGE CLAMP
CLIENT:	ESSO EXPLORATION ANGOLA

SERVICE:	
Line size	4"
Design Pressure	21
Operating Presure	16
Design Temperature	110
Operating Temperature	110
Material	CAST CARBON STEEL, ASTM A216 GR WCB
Line Class	300

ANOMALY DESCRIPTION:

Numerous 4" ball drain valves sustained leaks on the neck of the valve body.

ROOT CAUSES

The current cause of the leak is not known.
NDT inspection was performed and found that there was no internal corrosion.
This leads us to believe that holes in the valve body were due to manufacturing defects.

INTEGRITY CONCERNS (INCLUDING PICTURES)

Further deterioration of the defect could result in possible shutdown of equipment
Due to the unknown cause of the defect, integrity of the piping is a concern.
Loss of containment of hydrocarbon content poses a possible safety and environmental risk.

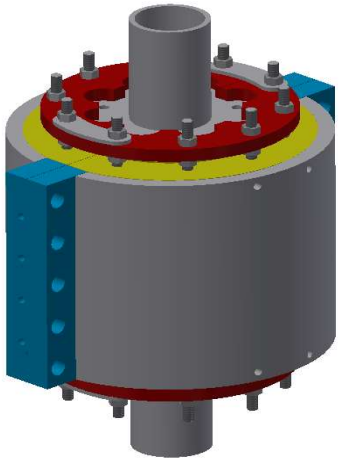
THE BERUSEAL SOLUTION (WITH PICTURES)

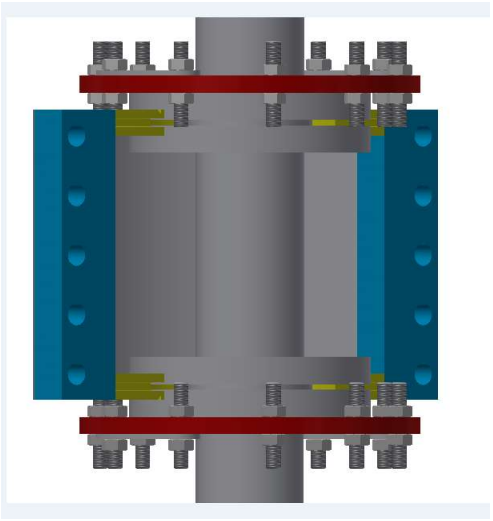
A straightline flange clamp was designed according to ASME VIII Div 1 to enclose the entire body of the ball valve.

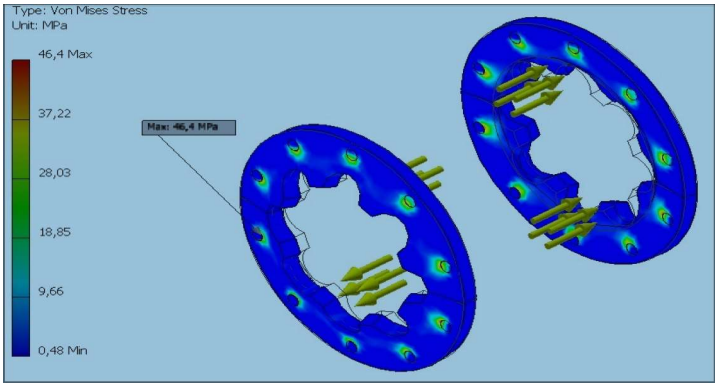
An integrated strongback system was designed with the enclosure to maintain structural integrity of the valve (due to the unknown causes of the leak).

The strongback also acted as a restraint to keep the enclosure in the vertical position.

An FEA analysis was performed on the strongback to analyse total circumferencial failure of the valve body.







INSTALLATION PICTURES

CONCLUSION

A successful seal was obtained by injecting a PTFE based sealant into a sealing groove that runs throughout the seem and bores of the enclosure.

The groove was designed to allow the flow of sealant into the flange gap and bolt holes to eliminate future leaks due to gasket failure.