

CASE STUDY NUMBER:	Case Study 13
DESCRIPTION:	38" BOILER FLANGE CLAMP
CLIENT:	TENGIZCHEVROIL

SERVICE:	H2S
Line size	38"
Design Pressure	5
Operating Presure	1,5
Design Temperature	343
Operating Temperature	280
Material	SA-516 Gr 70N
Line Class	175

ANOMALY DESCRIPTION:

A leak occurred in the connection of 38" piping attached to a reactor furnace burner. It was leaking hazardous H2S gas through both bolt holes and the flange mating surface.



ROOT CAUSES

Deterioration of flange mating gasket

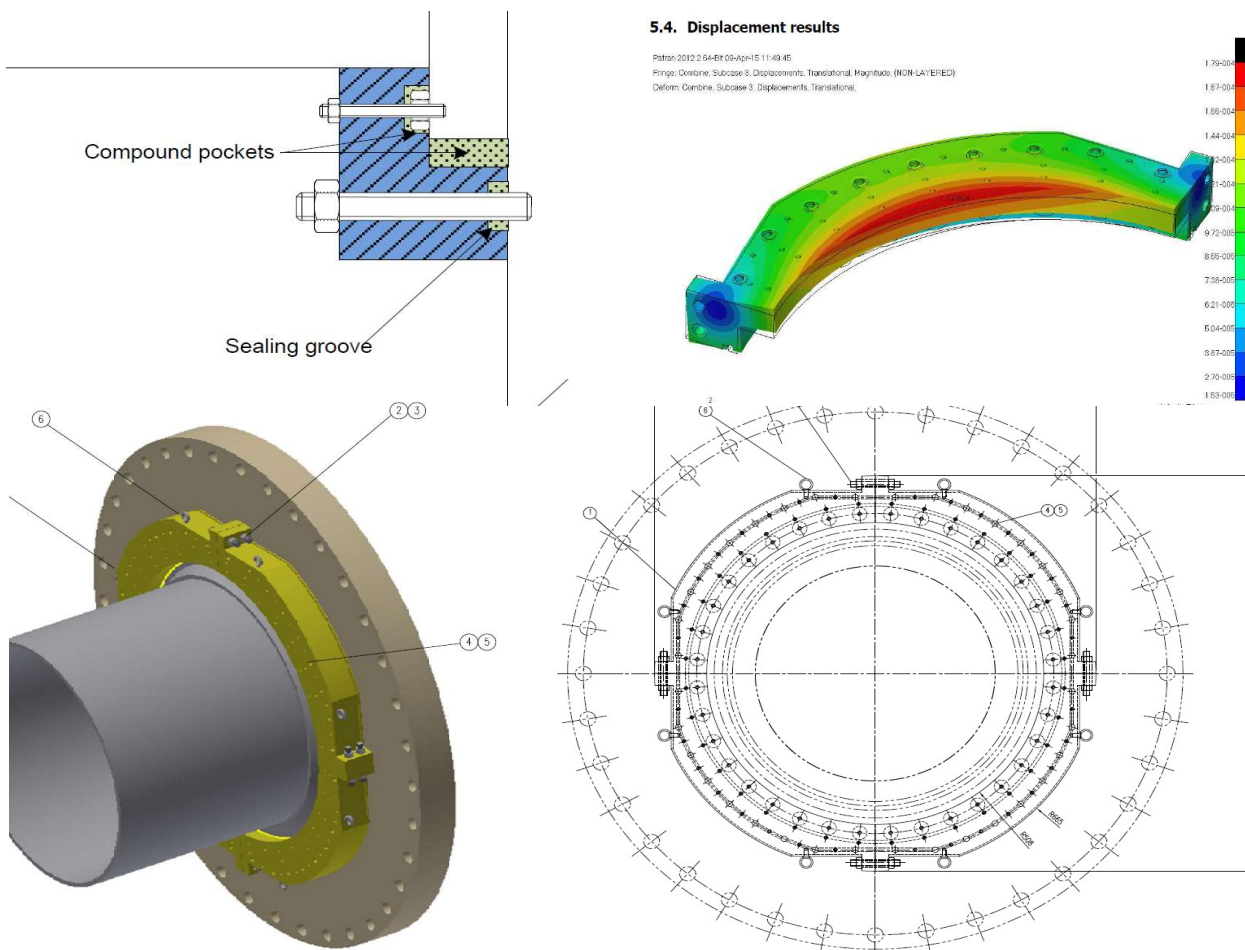
INTEGRITY CONCERNS (INCLUDING PICTURES)

Toxic and flammable H₂S gas active leak.

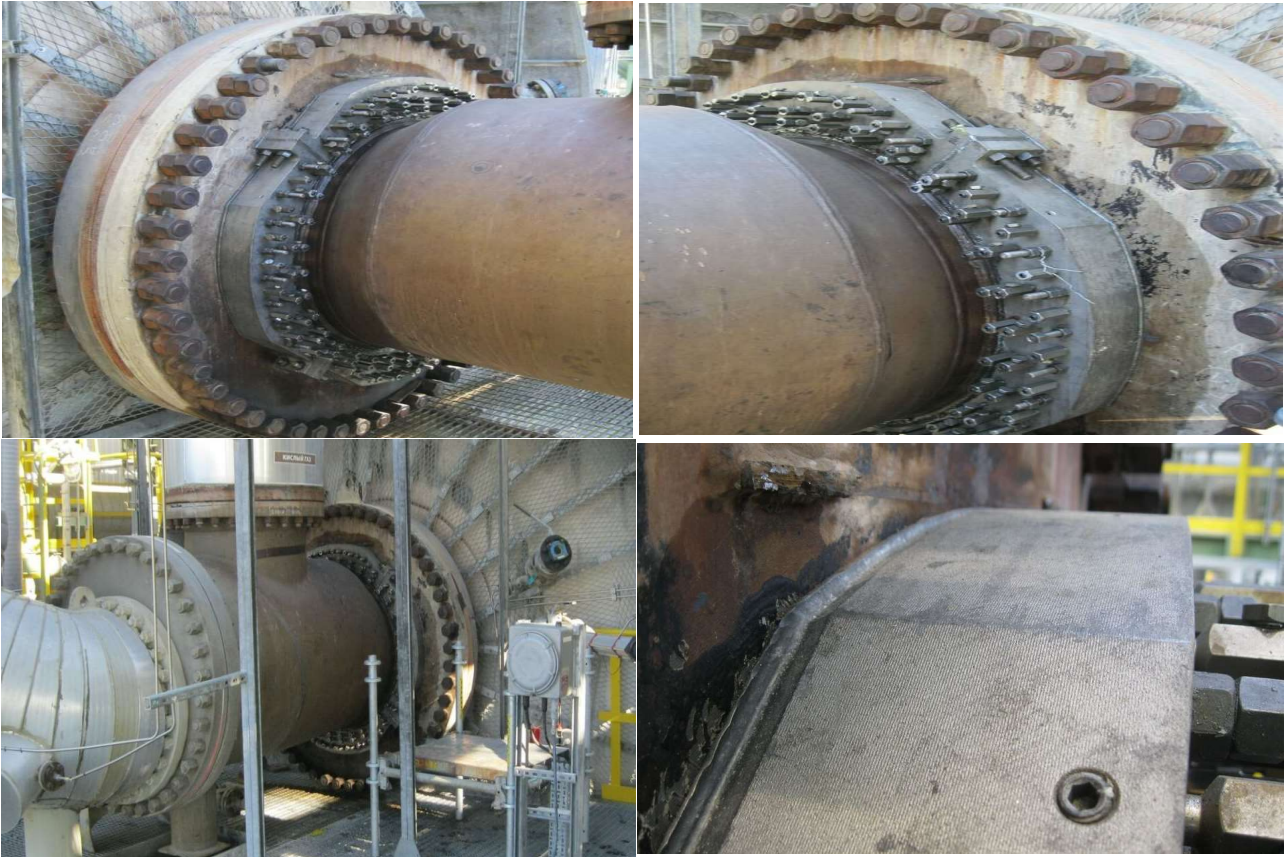
THE BERUSEAL SOLUTION (WITH PICTURES)

Beruseal designed and manufactured a 4piece clamp that would seal off the flange against burners 60" flange. The clamp was designed with a outer sealing groove, a sealant pocket situated at the leaking area and sealant pockets over the bolts. (below picture) This clamp design aided in sealing off the leak and at the same time act as a strongback system to hold the burner flange in place should the bolts fail due to stress corrosion and cracking from being exposed to leaking sour service.

A FEA stress analysis was performed according to the rules of ASME VIII Div2 using allowable stresses from ASME VIII Div1 to simulate the event of catastrophic failure of the flange bolts and its affects on the clamp holding the system in place.



INSTALLATION PICTURES



CONCLUSION

A successful seal was obtained by precision measuring and CNC machining which resulted in no costly downtime to repair the burner flange.