FIELD ANALYSIS REPORT

and Potential Solutions

KIMRAY INC.®

SEVERE WASH-OUT THROUGH SEAT AND BODY

WELL CONDITIONS:

Known Vessel Design	Vessel has a partial weir for the water side. Dump is open to entire vessel.
Oil	520 Bbl/D
Water	730 Bbl/D
Gas	8.2 Mmcf/D
Operating Pressure	Unknown

EXTERNAL OBSERVATION:

It was observed that the serial number and name plate indicate that the valve is a diaphragm-balanced valve rated to **175 psi. The body of the valve is rated for 500 psi and does not come from the factory with the 212 SOA bonnet. There is a risk associated to valve operation and personnel safety when this assembly is exposed to more than 175 psi**. We would recommend checking existing stock and active operations to remove any of the found assemblies from service

CAUSES OF FAILURE:

The root cause of the failure was the sand separator being bypassed allowing excessive sand or other particulates in the process fluid causing accelerated erosion. The seat, seat disc, and ratio plug developed a leak path which continued to get bigger (Images A1-4).

Image A1

Image A2

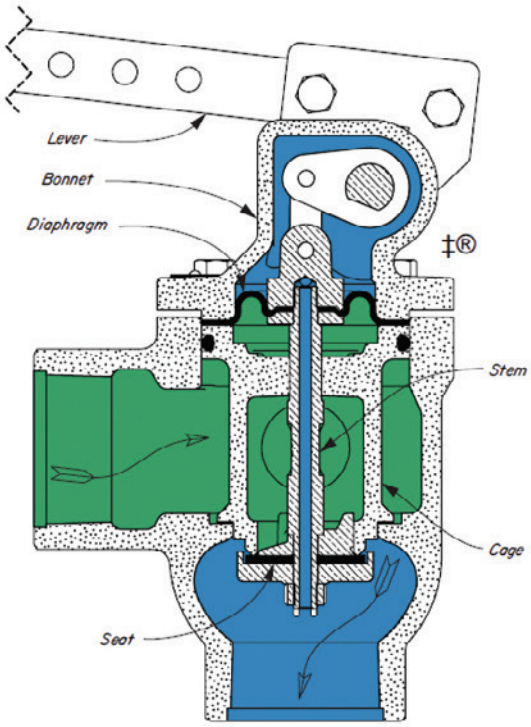
Image A3

Image A4

The fluid, along with sand flowing through the hole, was directed towards the side of the body and eventually created a leak path in the valve body (Image B).

The **Diaphragm-Balanced** version, which was being used in this application, is a good, lower-cost option for normal conditions where erosion is not an issue, but due to the action of the seat, which drops down as it opens, staying in the flow path, it is not suited for erosive conditions.

Image B



Kimray Diaphragm-Balanced Valve

THE SOLUTION:

Kimray offers a **Piston-Balanced Throttling** version where the seat and ratio plug lift up, out of the way of the flow path. This design withstands erosive conditions much longer. The shape of the ratio plug allows for a balanced, less intrusive point of process control. Additionally, Kimray has redesigned the seat to be HSN bonded around a stainless steel core, creating a robust reversible seat (Image C).

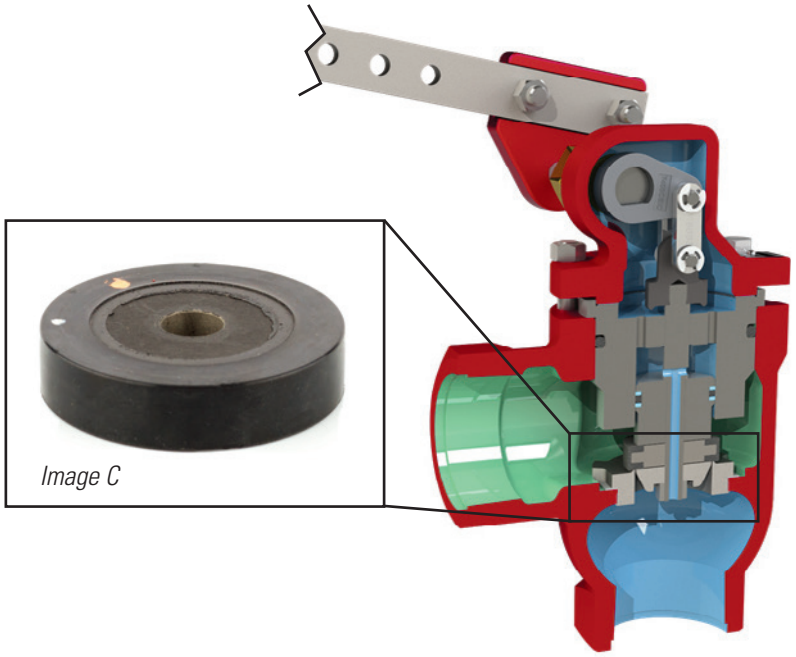


Image C

Kimray Piston-Balanced Throttling Valve