

2-3× THE SERVICE LIFE ON A FAILING LNG CRYOGENIC BALL VALVE

A main ship-to-shore isolation valve was leaking every three months and taking half a year to repair overseas. Anthis found the design flaw the original manufacturer missed, re-engineered it to last far longer, delivered locally in under a month.

✓ 2-3× service life

⚡ 83% faster turnaround

💰 1/3 the cost

🔧 Re-engineered to last





EXECUTIVE SUMMARY THE BOTTOM LINE

A major Gulf Coast LNG export terminal was losing a main loading-arm isolation valve to seal failure about every three months. Each repair meant shipping the valve overseas to its original manufacturer, a six-month turnaround at steep cost, with a standing environmental-compliance risk from external leakage.

Anthis diagnosed a design-level flaw in the seat's thermal compensation, re-engineered the Belleville-spring seat, upgraded the seal materials, and refined the ball-to-seat fit, then tested and verified it before it shipped. The rebuilt valve returned to service and has held far longer.

2-3×

longer service life

API 6D

tested & verified

83%

faster turnaround

1/3

the maintenance cost

Why this matters. For an LNG terminal, a loading-arm valve that fails every few months and then takes six months to fix is a production and compliance risk, not a maintenance line item. This paper walks through the failure, the diagnosis, and the fix, and what it means for any terminal running OEM cryogenic valves that keep failing.



INTRODUCTION THE MOST CRITICAL LINK

In the LNG maritime chain, the ship-to-shore interface is where risk concentrates. The main isolation valves on the loading arms cycle constantly, living a double life: one face in Houston's humid air, the bore holding LNG at -161.5°C. Every cycle drives the materials through a full expansion-and-contraction swing, and the seal has to survive all of it.

The Gulf Coast is mid-buildout, adding terminals and high-cycle cryogenic valves in the most critical service on the dock. When an original-equipment valve underperforms, a terminal must live with repeat failures or lose the arm for months to an overseas repair.



Cryogenic valve work in the Anthis shop, staged beside cryogenic test dewars.

WHO THIS PAPER IS FOR



Terminal reliability & maintenance

Reliability and maintenance managers responsible for loading-arm uptime and leak-free operation.



Loading-arm OEM installed base

Teams running Niigata, TechnipFMC, Kanon or Emco Wheaton arms who need a faster, local path.



EPC & third-party O&M

Partners who specify and service critical cryogenic valves for terminal operators.



THE PROBLEM

A VALVE THAT WOULD NOT STAY SEALED



Leaking in ~3 months

Lost its seal far short of a normal service interval under high-frequency duty.



6+ month turnaround

Repairs meant shipping the valve overseas, arm out of service the whole time.



High cost per event

Each return-and-repair cycle carried a steep price on top of lost production.



Compliance exposure

External leakage on a cryogenic service puts environmental limits and dock safety at risk.



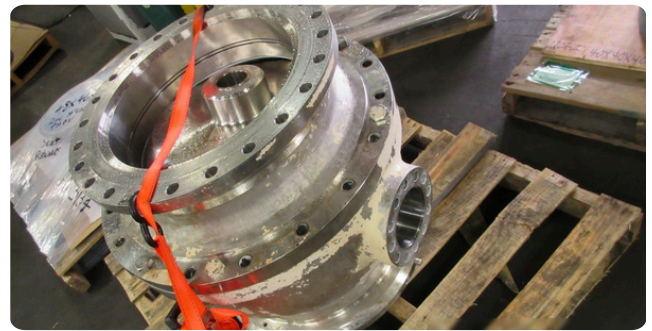
THE DIAGNOSIS

WE DO NOT GUESS. WE TEAR IT DOWN.

Anthis stripped and inspected two units. The failure was not wear from age. It was built into the seat design, which could not hold sealing force through repeated ambient-to-cryogenic cycling.



Inspection of the sealing face during teardown.



As-received valve body at the start of the project. A shut-down loading arm can cost a terminal millions per day.



THE SOLUTION

A REPAIR TO THE DESIGN, NOT THE DRAWING

The original manufacturer rebuilds to the same drawing, flaws included. And they re-engineered this seat to hold a constant seal across the full temperature range.



The rebuilt valve, bore and seat re-engineered and finished to a tight tolerance.



Reassembly and fit-up in the Anthis shop.



THE RESULTS

SEALED, IN SERVICE, DELIVERED FAST

2-3×

API 6D

83%

TURNAROUND: OEM OVERSEAS RETURN VS. ANTHIS LOCAL

OEM overseas return

6+ months

Anthis, local Houston

<1 mo

MEASURE	ORIGINAL-EQUIPMENT PATH	ANTHIS REBUILD
Service life	Leaking in ~3 months	2-3× longer service life
Turnaround	6+ months, shipped overseas	Under 1 month, local
Approach	Rebuilt to the original drawing	Root-cause re-engineering
Sealing	Leak path returns under cycling	Re-engineered seal, tested & verified
Cost	Full OEM repair price	One-third the cost

The bottom line: this was a measured result on a critical cryogenic service, verified on test before it shipped. As the Gulf Coast LNG fleet grows, a local, engineering-led repair and modification path keeps critical valves sealed, in service, and out of a six-month repair queue.

Standards & sources: MSS SP-134 · BS 6364 · ISO 15848-2 · API 6D / 598 · Anthis internal teardown and helium / hydrostatic test records, 2023.



WHY ANTHIS · GET IN TOUCH

THE HOUSTON SHOP FOR THE HARD WORK

Anthis Valve Enterprises has repaired and modified industrial valves since 1971, with more than 1,500 projects behind us. We are an API 6D repair and modification shop with our own engineering team, and cryogenic modification is our specialty. When a valve keeps failing or needs specialty work an original manufacturer cannot turn quickly, we get it right and get it back fast.



Cryogenic service to -350°F



Gate, globe, check, ball & butterfly to 48"



Hydrostatic testing to 20,000 psi



API 6D lock-open levers & slam retarders



Helium / ISO 15848 leak testing



In-house CNC, welding & painting

"Excellent service, quick response, and quality work."

Midstream Valve

"We have a great working relationship with Anthis and will continue to utilize their facility to help us serve clients together."

Microfinish Valves

"Anthis does a good job meeting the delivery requirements. If there's any problem, they fix it."

Patton Myhre Sourcing

RUNNING OEM CRYOGENIC VALVES THAT KEEP FAILING?

Send us the problem valve. We will diagnose the root cause, quote the modification, and turn it around locally, faster than a return to the original manufacturer.

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