INCREASE PRODUCTION
DECREASE ENVIRONMENTAL IMPACT

ABSOLUTE™
CLEAN

NO **WATER** CONSUMED

LOWER **GHG** EMISSIONS

LOWER **FUEL** CONSUMPTION

NO **DEEPWELL** DISPOSAL

REDUCE **SAFETY** RISKS

INCREASE **THROUGHPUT**

60% FASTER **CLEAN**

ABSOLUTE
Throughput Solutions Inc.

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DID YOU KNOW
Cleaning of a single heat exchanger consumes approximately 20,000-100,000 gallons of water

NO WATER CONSUMED

ABSOLUTE cleaning process consumes no water

DID YOU KNOW
Reduced efficiency of the heat exchangers due to fouling, represents an increase in fuel consumption.

LOWER FUEL CONSUMPTION

Creating higher production throughput through a cleaner 'clean' and minimizing downtime losses

ABSOLUTE™ CLEAN

DID YOU KNOW
Between 20,000 -100,000 gallons of contaminated water is disposed of down a deep well for each heat exchanger that is cleaned

NO DEEPWELL DISPOSAL

ABSOLUTE creates no waste there for having no need for deep-well disposal

DID YOU KNOW
A 1°C drop in coil inlet temperature creates an estimated 1 ton of CO emissions (1)

LOWER GHG EMISSIONS

Through more efficient plant operations and faster methods, we help lower emissions

(1) Imperial College London, Sandro Macchietto 2010-2011

SERVICES

OUR VISION

To be the global leader in the efficient, effective and environmentally sustainable cleaning of hydrocarbon process equipment, consuming no water and creating no waste.

ABSOLUTE™ CLEAN

OFF SITE CLEANING

Specifically designed and engineered to handle and clean heat exchangers experiencing extreme hydrocarbon fouling at Upgraders, SAGD and Refineries.

MOBILE CLEANING

Engineered to handle and clean heat exchangers (HEX) with extreme hydrocarbon fouling. Safely and effectively cleans shell side and tube side simultaneously.

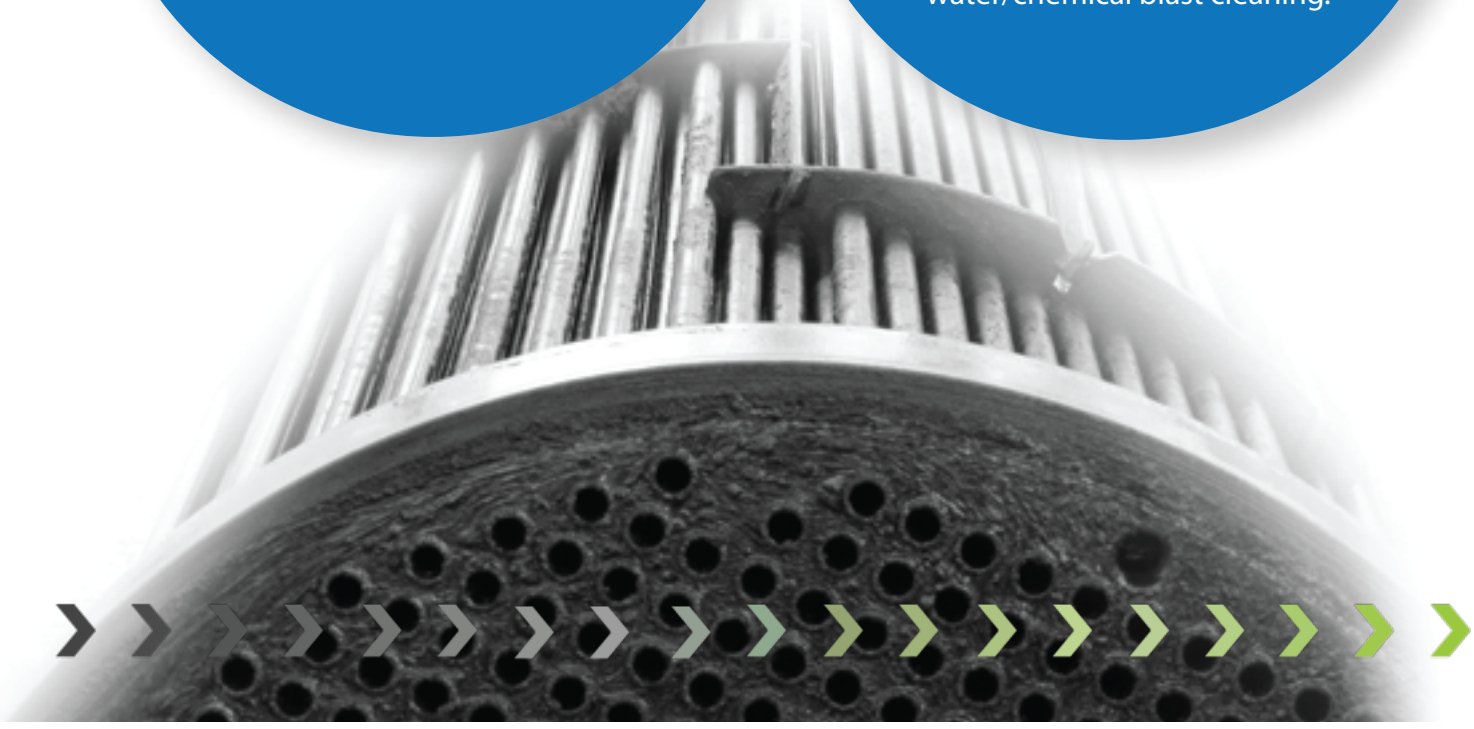
ABSOLUTE™ CLEAN

INSITU CLEANING

Designed to circulate our proprietary organic solvent or other detergents and cleaning agents through refinery systems.

COMMERCIAL CLEANING

Our mechanized equipment allows full submersion of the asset. Our organic solvent contacts all surfaces particularly those surfaces that are difficult reach for conventional high pressure water/chemical blast cleaning.



OFF SITE CLEANING

SERVICES

Specifically designed and engineered to handle and clean heat exchangers experiencing extreme hydrocarbon fouling at Upgraders, SAGD and Refinery operations. It can handle heat exchangers 30 feet long and 78 inches in diameter with a weight of 60,000 lbs. Cleaning is complete with minimum worker exposure and effectively cleans shell side and tube side simultaneously.

BENEFITS

Safe

Fully mechanized to reduce or eliminate risk of operator injury and damage to assets

Efficient

Cleaning completed in hours rather than days

Faster

Assets are back online 60% faster than conventional cleaning

Effective

All fouled tube surfaces contact ABSOLUTE organic solvent, allowing a more complete removal of hydrocarbon fouling

No Water Consumed

Unlike traditional water-blast cleaning which can use more than 22,000 gallons of water per HEX

Environmental Stewardship

No waste water and no spent toxic chemicals. This is a level of stewardship unprecedented in the oil industry

SPECIFICATIONS

Built for duty, accommodating virtually all sizes of Heat Exchanger Bundles (HEX), up to 30 feet in length, and 78 inches in diameter and weight up to 60,000 lbs

Solid construction allowing technician access for inspection and job monitoring

Fully mechanized to eliminate risk of injury and damage to assets

The cleaning chamber first mechanically submerses HEX into a heated solution of ABSOLUTE organic solvent and then commences a controlled rotation of the bundle. Then a submerged spraying action is introduced along the entire length of the bundle, delivering ABSOLUTE organic solvent to all outer diameter tube surfaces. At the same time, pumps circulate ABSOLUTE organic solvent longitudinally, and with an indexer intermittently addressing and delivering solvent to the inner diameter of each tube.

ABSOLUTE™ CLEAN

SERVICES

IN SITU CLEANING

Specifically designed for cleaning process equipment at refinery sites, our circulation unit can flow solvents, detergents or other cleaning agents through refinery systems. The ABSOLUTE CLEAN design includes emergency cut outs and isolation t hat will eliminate the need to blank in most circumstances.

BENEFITS

Safe

Fully mechanized to eliminate risk of injury and damage to assets

Efficient

Cleaning completed in hours rather than days
Reduced downtime by eliminating pulling the HEX bundle

Effective

All fouled surfaces contact ABSOLUTE organic solvent, allowing more complete removal of hydrocarbon fouling

No Water Consumed

Unlike traditional water-blast cleaning which can use more than 22,000 gallons of water per HEX

Faster

No need to pull bundle for cleaning, so assets are back online 60% faster than conventional cleaning
Schedule process cleaning based on actual HEX performance

Maximize Productivity

Isolate the asset in question, so no need to shut down the whole network

Use Fewer Resources

No scaffolding, cranes and associated labour
No damage to equipment. Bundle is neither pulled nor handled

Environmental Stewardship

No waste water and no spent toxic chemicals. This is a level of stewardship unprecedented in the oil industry

SPECIFICATIONS

25,000 bpd flow rate at 100 psi circulating our organic solvent or other cleaning agents for optimum cleaning power. The flow is reversible to maximize solvent efficiency and contact with foulant

Heat added with steam or glycol

Lab equipment for samples includes viscosity testing

24 hour maximum cleaning time, with majority of cleaning completed in less than 6 hours

COMMERCIAL CLEANING

SERVICES

At Absolute we take your hydrocarbon contaminated asset, and we return it to you clean…normally within a few hours. Absolute's unique process, starts with our organic solvent selected over years of testing. Our specially designed mechanized equipment allows full submersion of the asset. This allows our organic solvent to contact all surfaces particularly those surfaces that are difficult reach for conventional high pressure water/chemical blast cleaning. Our organic solvent binds to the molecules of hydrocarbon fouling, removing them from the asset, leaving it Absolute Clean.

BENEFITS

Safe
Fully mechanized to reduce or eliminate risk of operator injury and damage to assets

Efficient
Cleaning completed in hours rather than days

Effective
Full submersion means that all fouled surfaces contact Absolute organic solvent, allowing a more complete removal of hydrocarbon fouling

No Water Consumed
Unlike traditional water-blast cleaning which generates waste water and spent detergents and cleaning chemicals

Faster
Assets can be cleaned and returned to client same day

Environmental Stewardship
No waste water, and no spent toxic chemicals. This is a level of stewardship unprecedented in the oil industry

Custom Cleaning Units
We will custom fabricate a commercial cleaning system for your particular needs. Keep it on your site and we will attend regularly to monitor the equipment and the ABSOLUTE organic solvent to ensure constant optimum performance

SPECIFICATIONS
10' L x 6'W x 5' H tank to submerse hydrocarbon contaminated assets

Accommodates virtually all sizes of process equipment and oil field tools: pumps, valves, pigs, smart pigs, drilling equipment, scaffolding and other assets

Safe for seals and gaskets

ABSOLUTE™ CLEAN

SERVICES

MOBILE CLEANING

Engineered to handle and clean heat exchangers (HEX) with extreme hydrocarbon fouling at Upgraders, SAGD and Refinery operations on your site. The heat exchanger is transferred directly from bundle puller to the chamber, eliminating transport to wash bay.
It can handle heat exchangers 30 feet long and 74 inches in diameter weighing 60,000 lbs. Cleaning is complete with minimum worker exposure and effectively cleans shell side and tube side simultaneously.

BENEFITS

Safe
Fully mechanized to reduce or eliminate risk of injury and damage to assets, with built in double wall containment

Efficient
Cleaning completed in hours rather than days

Faster
Assets are back online 60% faster than conventional cleaning

Effective
All fouled tube surfaces contact ABSOLUTE organic solvent, allowing more complete removal of hydrocarbon fouling

No Water Consumed
Unlike traditional water-blast cleaning which can use more than 22,000 gallons of water per HEX

Cost Effective
No need to risk transportation of asset – we bring our unit to you

Environmental Stewardship
No waste water, and no spent toxic chemicals. A level of stewardship unprecedented in the oil industry

SPECIFICATIONS

Built to accommodate most Heat Exchanger Bundles (HEX), up to 30 feet in length and 72 inches in diameter and weight up to 60,000 lbs.

Streamlined construction emphasizing function, duty and portability

Covered controls cabin for operator safety and comfort

Fully mechanized to eliminate risk of operator injury and damage to assets

Cleaning chamber first mechanically submerses HEX into a heated solution of Absolute organic solvent and then commences a controlled rotation of the bundle. Then a submerged spraying action is introduced along the entire length of the bundle delivering Absolute organic solvent to all outer diameter tube surfaces. Simultaneously, pumps circulate Absolute organic solvent longitudinally with an indexer intermittently addressing each tube delivering the solvent to the inner diameter of each tube.

CASE STUDIES

OUR MISSION

To provide the refining and upgrading industry with safe, professional and environmentally sustainable removal of hydrocarbon fouling deposits.

ABSOLUTE™ CLEAN

Case Study

"An ABSOLUTE Mess"

Straight Tube Heat Exchanger

the CLIENT

The client operates one of the largest volume upgrader's in Northern Alberta.
The heat exchanger that was sent to ABSOLUTE had a combination of bitumen and coke on the both shell & tube side. The heat exchanger was 20 feet long, 61" diameter and had 1460 x 1" tubes. The total delivered weight to our cleaning facility was 52,700 lbs.

the CHALLENGES

- The extent of fouling was extreme on the shell side and included significant coking on tube side
- This was due to the uncontrolled shutdown with an operational process upset overloading the exchanger with foulants exceeding over five times the normal levels of fouling
- This type of extreme fouling would typically take 10+ days to clean using traditional processes utilizing well over 1 million gallons of water
- It is important to note that any water blasting process would become increasingly ineffective on shell side as it works its way towards the centre of the exchanger and at some point would begin to fail to remove fouling due to lack of penetration. This traditional method would also continually push foulants to centre of exchanger creating a compacting mechanism rather than a removal process.

the SOLUTION

We used Absolute's patent pending process in Phase 1 to remove hydrocarbon fouling.
This cleaned the shell side fouling and all tubes except coke plugged tubes without any high pressure or manual labor.
Phase 2 was the successful removal of coke using high pressure water blasting.
With coke plugs removed the exchanger was given a clean in our organic solvent to remove any hydrocarbon trapped behind coke plugs.

The exchanger was completely cleaned in 5 shifts and was returned to the customer at a weight of 38 600 lbs.

the BENEFITS

- ABSOLUTE's processes were remarkably effective, removing a staggering 14,100 lbs of fouling from both shell and tube sides of the exchanger
- Our process was up to the task of removing fouling more than five times heavier than expected. In fact, we cleaned a significant level of fouling that was left behind from previous cleaning service providers
- Our unique process fully penetrated and removed heavy foulant through to the centre of shell as well as tubes
- The heat exchanger was cleaned very efficiently when compared to previous durations at over 50% saving
- We avoided the use and disposal of large volumes of fresh water
- Hydrocarbon and majority of fouling was removed without manual labor and the associated safety risks and hazards

"The Twisted Challenge"

Twisted Tube Heat Exchanger

Case Study

the CLIENT

The client is an international integrated oil and gas company which operates an upgrading facility in the Athabasca oil sands basin. Part of the client's operating assets in its primary area include multiple twisted tube type heat exchangers. For this particular exchanger the process heat transfer was from diluent tube side to bitumen on the shell side. The exchanger was 24 feet long, 60" overall diameter with 2,666 tubes at 0.75" diameter, weighing 55,000 pounds & heavily fouled. Due to broader surface areas, twisted tube bundles allow greater heat transfer compared to straight tube exchangers. However, it becomes fouled more quickly and the twisted tube design makes it very challenging to clean.

the CHALLENGES

- This type of exchanger has historically involved at least 6 days of high pressure water cleaning
- High pressure cleaning is a hazardous and labor intensive activity
- In excess of 100 000 gallons of water would be used creating significant waste
- The cleanliness of the exchanger would not be ABSOLUTE
- Consequently, testing of wall thickness and condition could not be performed conclusively
- The cost of this exercise often exceeded $100 000 and with inclusion of all costs would approach replacement cost
- Due to the quality & economic issues the client was no longer attempting to clean these exchangers and was progressively phasing them out
- It is interesting to note the client had accumulated and essentially discarded 8 fouled twisted tube type exchangers due to the inability to successfully clean them
- The client sent us one that was sitting in their boneyard in order for us to demonstrate our technology

the SOLUTION

We used our Absolute patent pending technology to clean the exchanger quickly & ABSOLUTELY. A third party was then engaged to provide an inspection and report.
The independent inspection was performed according to client direction, partial at 451 tubes. equating to 16.9% coverage.

the BENEFITS

- Significant reduction in cleaning time from 6 days to 2 days
- Completed cleaning at a significantly lower cost than previous service providers
- Returned the expensive asset to operating state, eliminating its disposal
- The quality clean achieved allowed conclusive 3rd party inspection
- The client was able to reclaim the operating efficiency in heat transfer that twisted tubes provide and eliminate phase out costs of twisted tube bundles
- Eliminated the labor and water intensive, high pressure blasting, replacing it with a semi–automated and environmentally sustainable process
- Eliminated the water use and waste traditionally generated by this activity

Client Testimonial

"After 12 years in the industry I have never seen a twisted tube exchanger bundle this clean after this short period of time."

Case Study

"A Plugged Pump"

Process Pump

the CLIENT

The Client is a European industrial engineering and manufacturing firm with international subsidiaries including pump manufacturing. This was a large pump with inlets and outlets measuring 12" each and the aggregate weight was approximately 5,000 pounds, making the asset very difficult to handle. This pump is used to supply bitumen to process and our objective was to remove bitumen residue and build-up from the pump as quickly as possible.

the CHALLENGES

- Due to the design of the pump there are numerous areas that conventional water pressure cleaning cannot reach or effectively clean
- Typically low pressure water, steam and consumable chemical are used to clean as "best as possible" so our client can inspect and repair these pumps
- Under conventional methods, cleaning this asset can generate up to 8,000 litres of hydrocarbon fouled water that needs to be disposed of, as well as 160 litres of degreasers that also require disposal
- The average time taken to clean one of these pumps and impellers is typically between 8 and 12 hours, as well as an additional 2-3 hours to clean up work area

the SOLUTION

This large pump case was submerged into the ABSOLUTE cleaning chamber and after 1 hour all of the hydrocarbon fouling and residues were removed. It was as simple as that. The pump case was cleaned in 1/10 of the time, with no generated waste, no mess, and no consumable chemical.

the BENEFITS

- No water was consumed nor any waste-water was created
- Conservatively, we reduced the cleaning time by 90% and returned the asset back to the customer in record time
- Eliminated the labour and risk associated with high pressure water blasting

Client Testimonial

"There is nothing left on it, how did you do that?"

ABSOLUTE™ CLEAN

Case Study

"An ABSOLUTE PIG"

Smart PIG

the CLIENT

A major service provider in the upstream and down hole oil & gas industry with global operations. One of the many services they provide are, "Smart Pigs" which are used to gain valuable data in pipelines for inspection purposes. This data is used for preventative maintenance to alleviate premature failure in the lines and identify the need to replace. These "Smart Pigs" incorporate advanced sensory equipment and cost on average $1 M each. They are constructed for and used in pipelines ranging from 3" to 60". This not so little pig was 8" x 36" in length.

the CHALLENGES

- Cleaning them is tedious and takes chemicals and water
- There is a risk to damage the sensors if the pressure wash is completed too quickly, which is extremely expensive to repair
- Conventional methods to clean pig assets would range between 4 to 8 hour each
- Clients are demanding faster turn-around as regular inspections need to be completed on a higher number of assets
- High stand-by costs for these expensive assets

the SOLUTION

First, we did testing and verification of material composition to ensure compatibility with our process. Once satisfied, we used our patented process and dipped the smart pig in one of our small tanks which was purpose-built to service hydrocarbon fouling on mid to small components. Our gentle process and proprietary solvent eliminates the risk of damage to expensive parts, similar to bathing a prize winning pig.

The Pig was covered and densely packed with hydrocarbon that was thick and waxy in consistency. Our process took a total of 20 minutes and after a 2 minute rinse was able to hand it back to our customer.

the BENEFITS

- No water was consumed nor were any expensive chemicals used which required disposal
- We eliminated the use of high pressure water, which decreased the risk of damage to the asset and injury to personnel
- Quick turnaround to get back into the field, increasing throughput… to keep our pipelines safe

Client Testimonial

"After complete and thorough inspection, all components were found to be exceptionally clean."

"Double Trouble"

Straight Tube Heat Exchanger

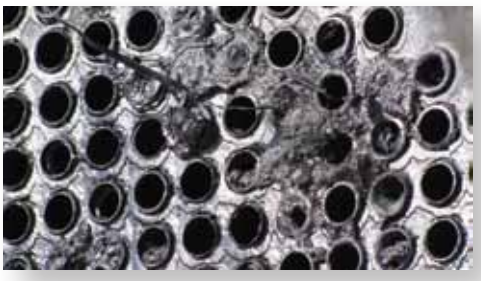
Case Study

the CLIENT

The client operates one of the largest volume upgrader's in Northern Alberta. They have reoccurring & significant fouling issues in their primary conversion units with multiple heat exchangers networks in each unit. The heat exchanger that was sent to ABSOLUTE had a combination of bitumen and coke on the tube side and the shell side was process steam. The heat exchanger was 20 feet long, 4'- 6 5/8" diameter and had 1,056 - 1"10 British Wire Gauge (BWG) tubes. The total delivered weight to our cleaning facility was 41,500 lbs.

the CHALLENGES

- The client confirmed that this type of fouling typically took 8-11 days to clean. This required the client to have duplicate assets on stand-by
- The client confirmed they use thousands of gallons of water daily to remove this type of fouling with limited success
- After cleaning, the assets would often fail quality assurance inspection, requiring rework & more water use to rectify
- The client has limited water capacity to support plant production & processes so water scarcity is a recognized production constraint
- Over 25% of the heat exchanger was completely plugged with coke
- Combined bitumen and coke fouling is difficult to clean because of the binding
- The current methods were hazardous and labour intensive



the SOLUTION

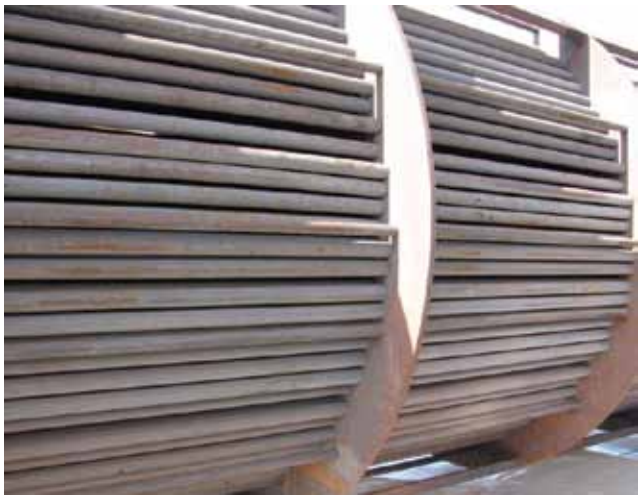
- The client delivered the heat exchanger to our off-site facility, saving precious space on-site
- We used Absolute's patent pending process in Phase 1 to remove all bitumen fouling. This was completed within 12 hours
- Phase 2 was the successful removal of coke. As Phase 1 removed the bitumen binding, we easily removed the coke from the tubes using conventional methods. This was completed within 24 hours
- The exchanger was removed and presented to the client's quality assurance inspector where it received a final inspection which it passed with flying colors. It was 100% clean and all bitumen, coke and other corrosive product were removed

the BENEFITS

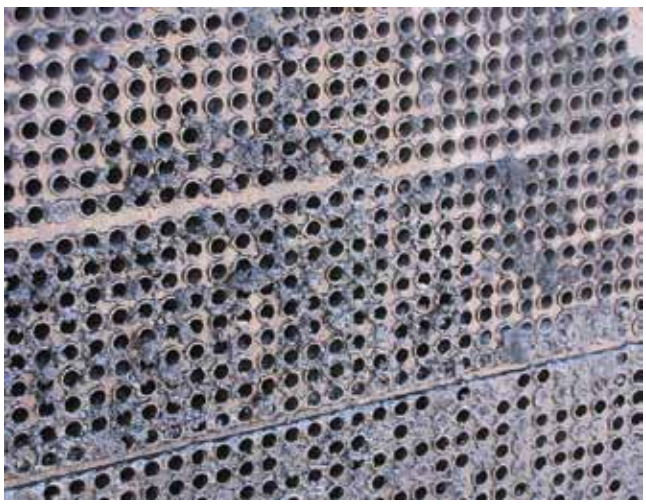
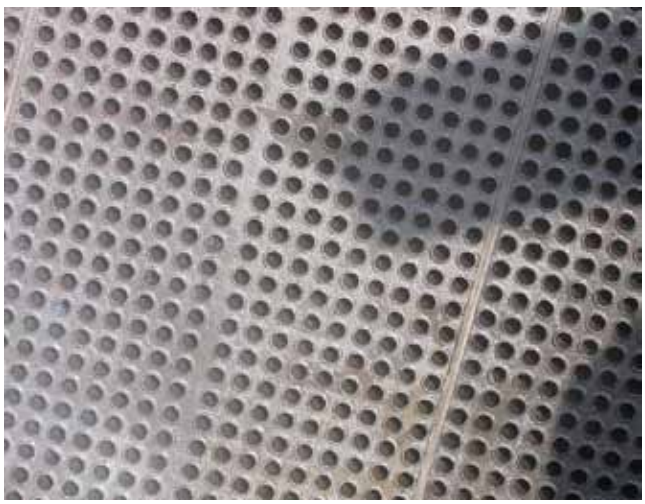
- ABSOLUTE's processes set a new standard previously never achieved before by safely removing 3,500 lbs of fouling in record time
- The heat exchanger was cleaned and passed full inspection within 36 hours, which is 63% faster than their current provider
- The corrosive deposits from the shell side that were left behind after the previous cleaning processes were also successfully removed
- We avoided the use of and disposal of tens of thousands of gallons of fresh water
- The client was very pleased with the short cleaning timeline, the results delivered, and our process reducing exposure to hazardous activities.
- The client has selected our process as a candidate within its established innovation and efficiency program and believes we will be instrumental in enabling them to reduce the shutdown period
- The entire process demonstrated strong work execution combined with ABSOLUTE environmental management
- The asset was ready to return to work cleaner and faster than ever before

Client Testimonial - Quality Control Inspector

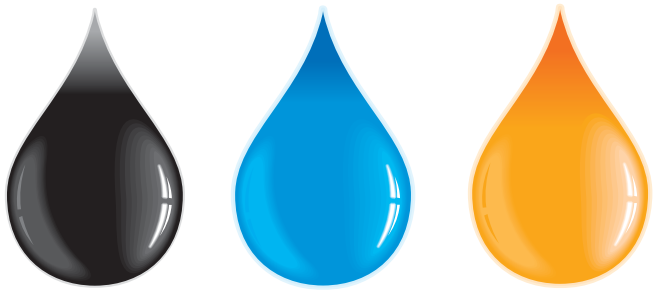
"Immaculate"



EVERY DROP COUNTS



What if we could save millions of gallons of water for each refinery and upgrader in the world? If we could recover thousands of barrels of oil per year typically lost during production and cleaning processes, without using harsh chemicals requiring deepwell disposal.

Absolute Throughput Solutions is doing it: making every drop count.

Be a part of the change.

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