Efficiency, Reliability, and a Whole Lot More: Combining Aeration Systems for Big Savings at the South Austin Regional WWTP

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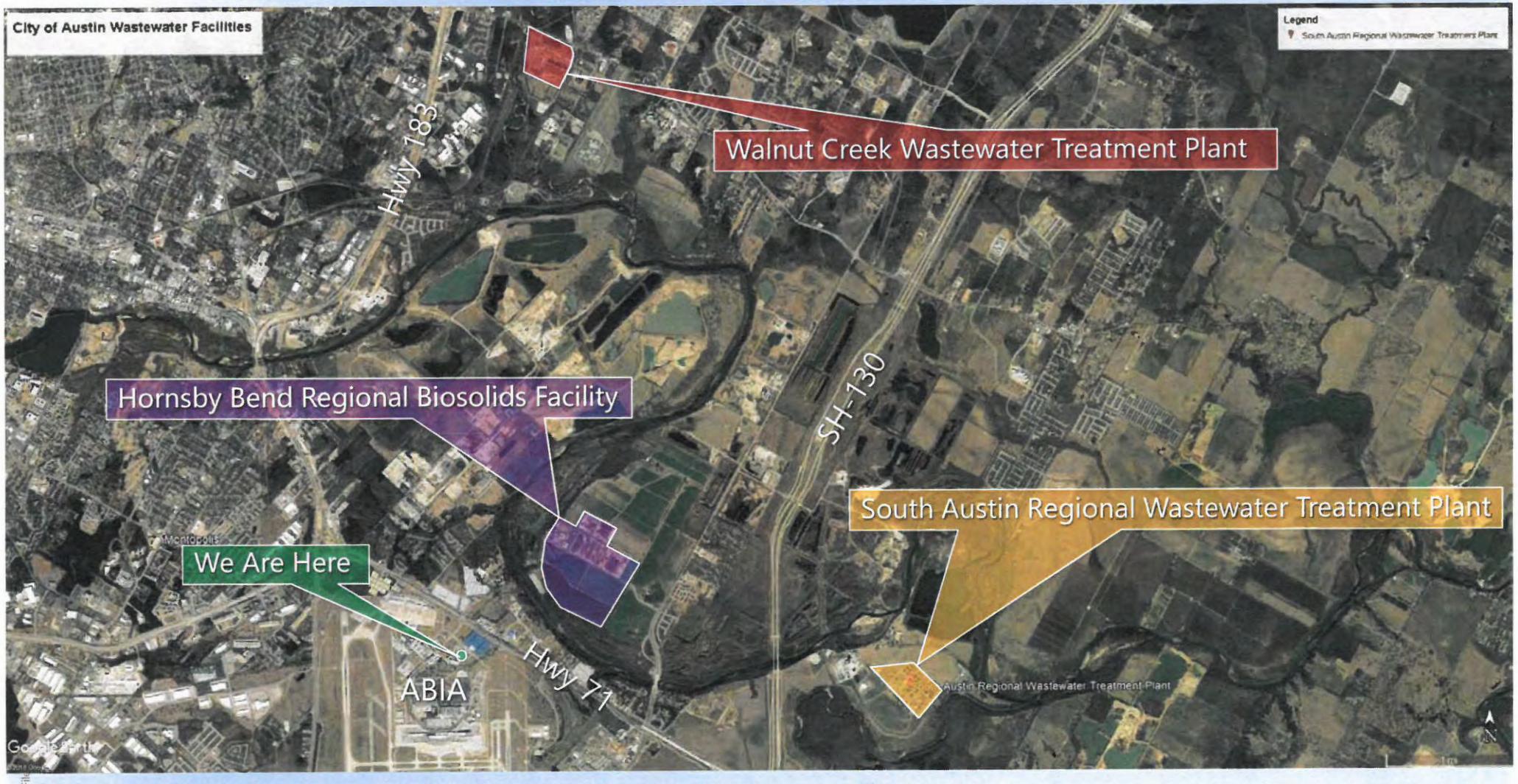
Presentation Outline

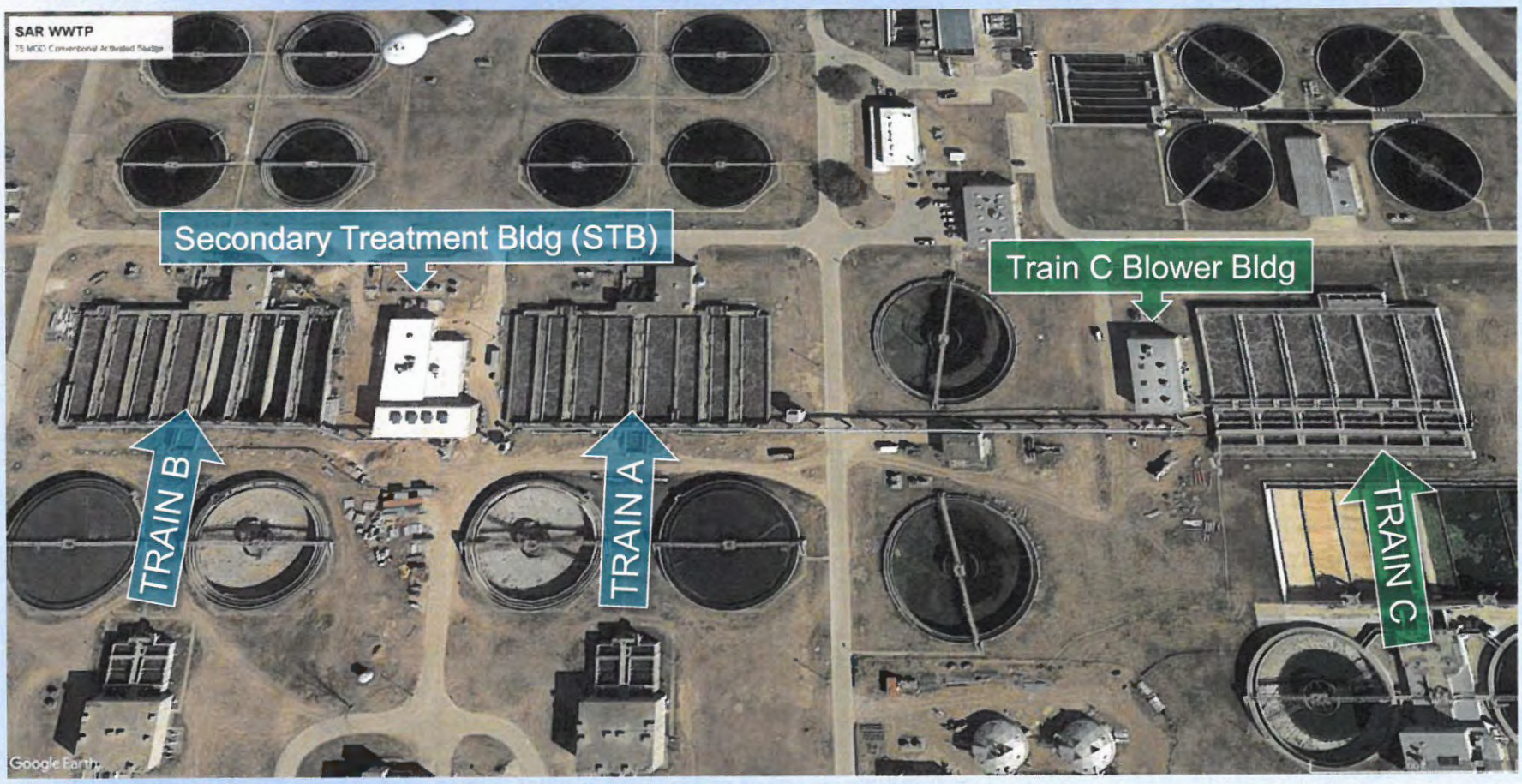
- Overview of City of Austin main wastewater treatment facility locations
- Overview of South Austin Regional WWTP (SAR)
- Summary of blower project drivers
- Project approach
- Construction highlights
- Operational results


City of Austin Wastewater Facilities
Legend
Walnut Creek Wastewater Treatment Plant
Hwy 183
Hornsby Bend Regional Biosolids Facility
SH-130
South Austin Regional Wastewater Treatment Plant
We Are Here
ABIA
Hwy 71
Austin Regional Wastewater Treatment Plant
Google Earth

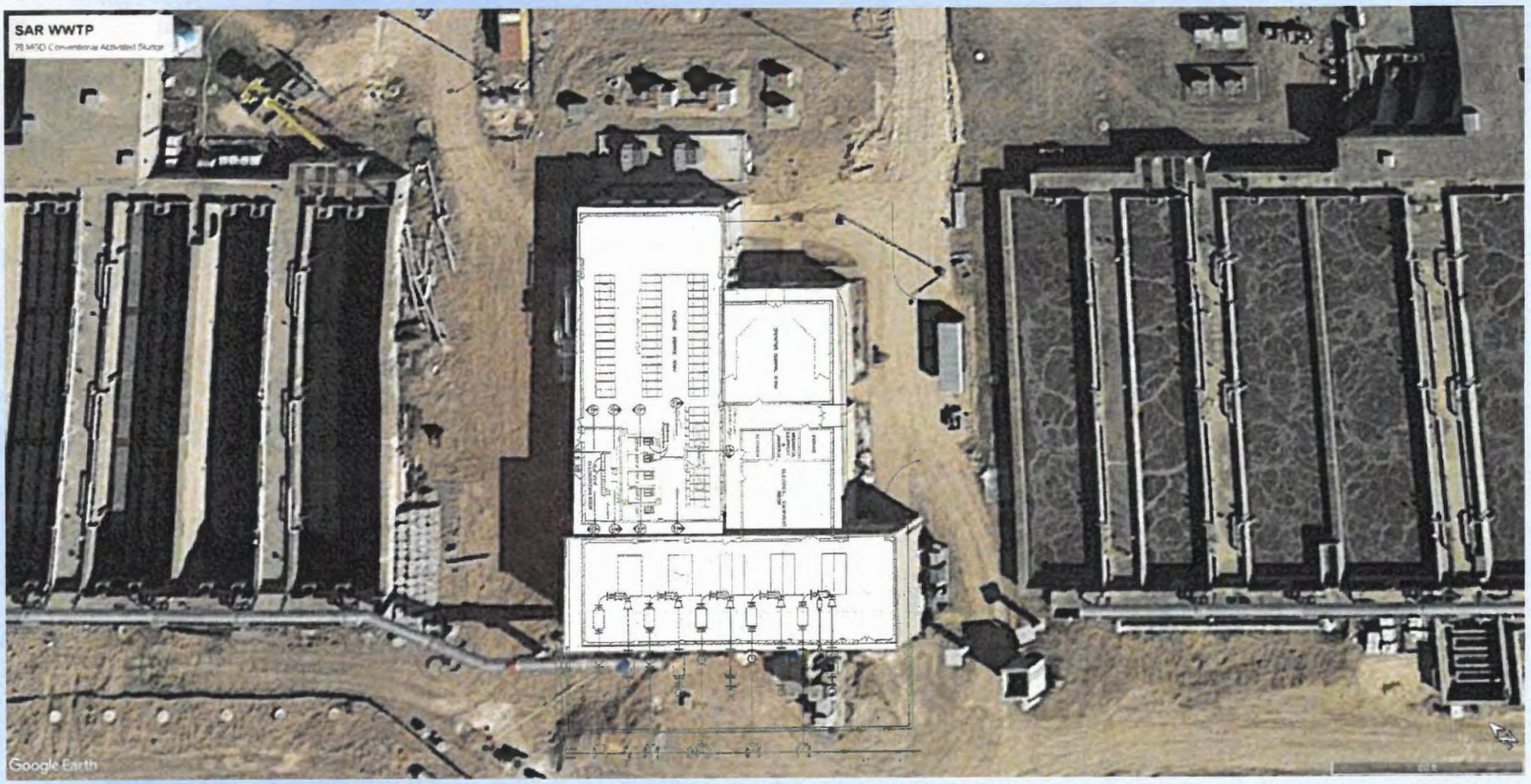
SAR Overview

SAR is a conventional activated sludge facility rated at 75-mgd ADF, with three 25-mgd treatment trains

Trains A, and B were constructed in the early and mid-80s, while Train C was constructed in 2006

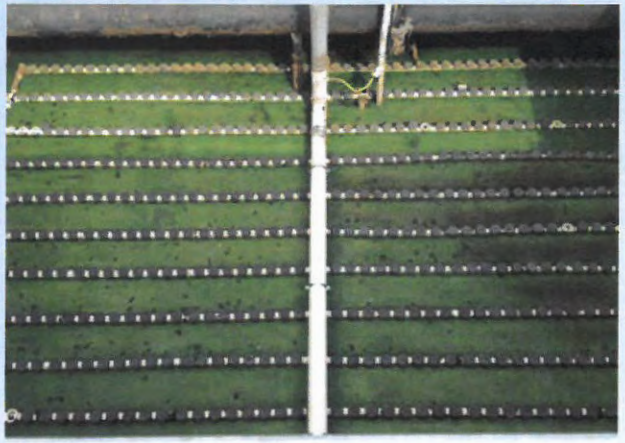


The STB originally housed gaseous chlorine storage and feed, the Plant Control Room, and the Train A & B blowers

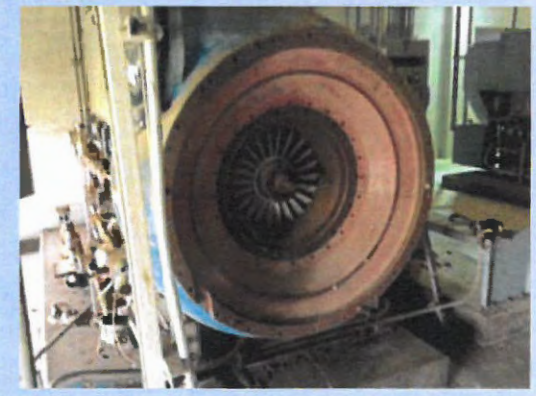


Project Drivers

There were many issues that needed to be addressed in a 30-year old aeration system

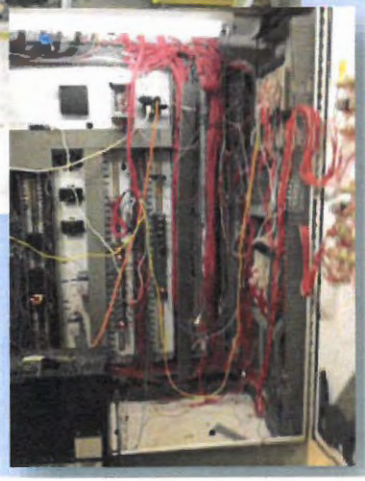


- Leaking underground air headers
- Fouled and broken ceramic diffusers
- Blowers beyond their service life



- And the biggest issue that arose in 2011...

In 2011 a chlorine leak caused particular damage to blower electrical and control components

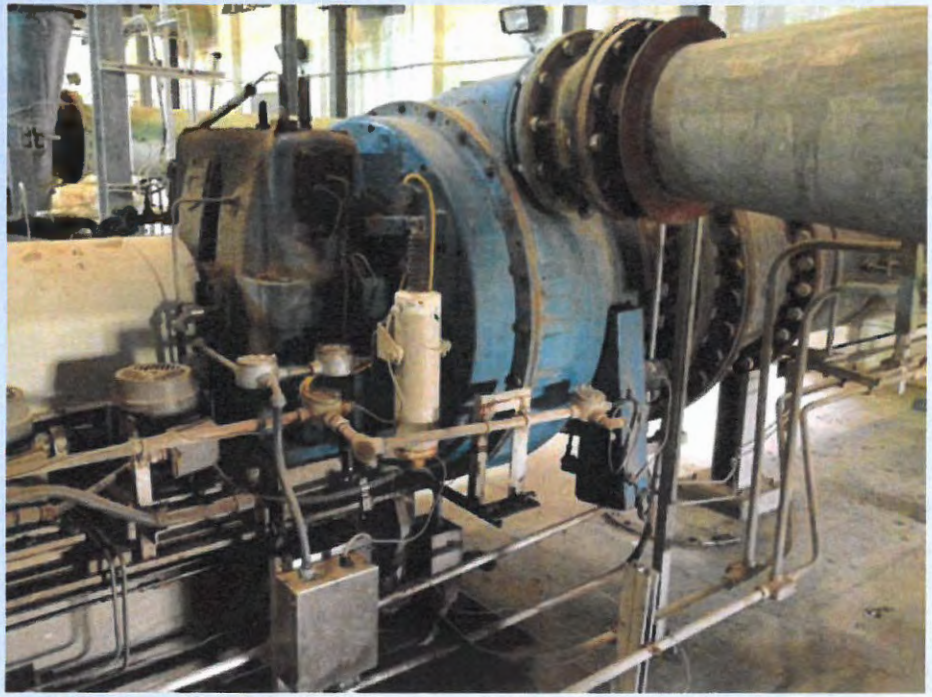


Corrosion on metal duct and roof decking

The original five blowers were already more than 25 years old when the chlorine leak occurred

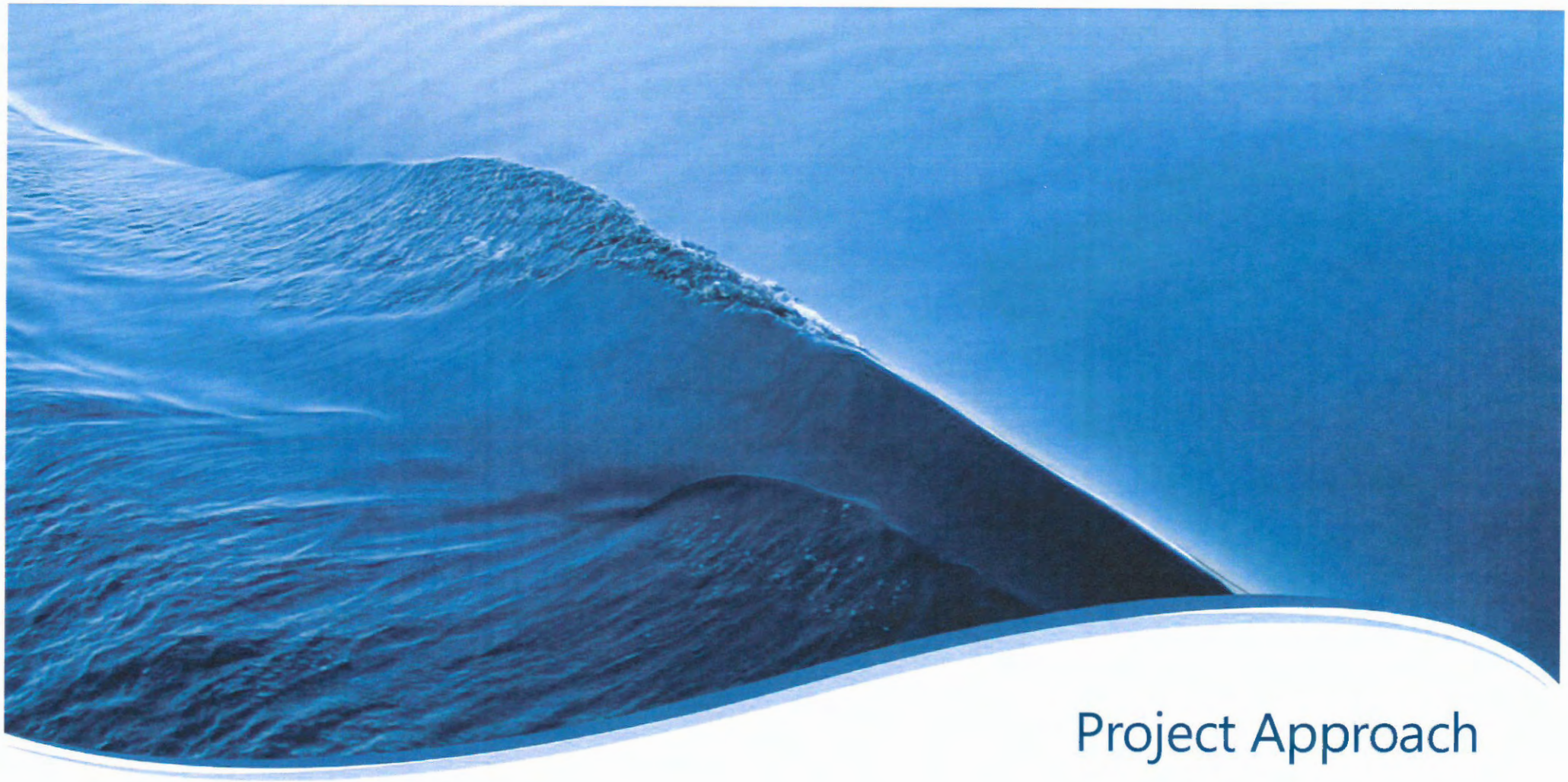
Three Atlas-Copco Blowers,
20,000 scfm each @10.9 psig

Two Cord Turbo Blowers,
20,000 scfm each @ 11.5 psig



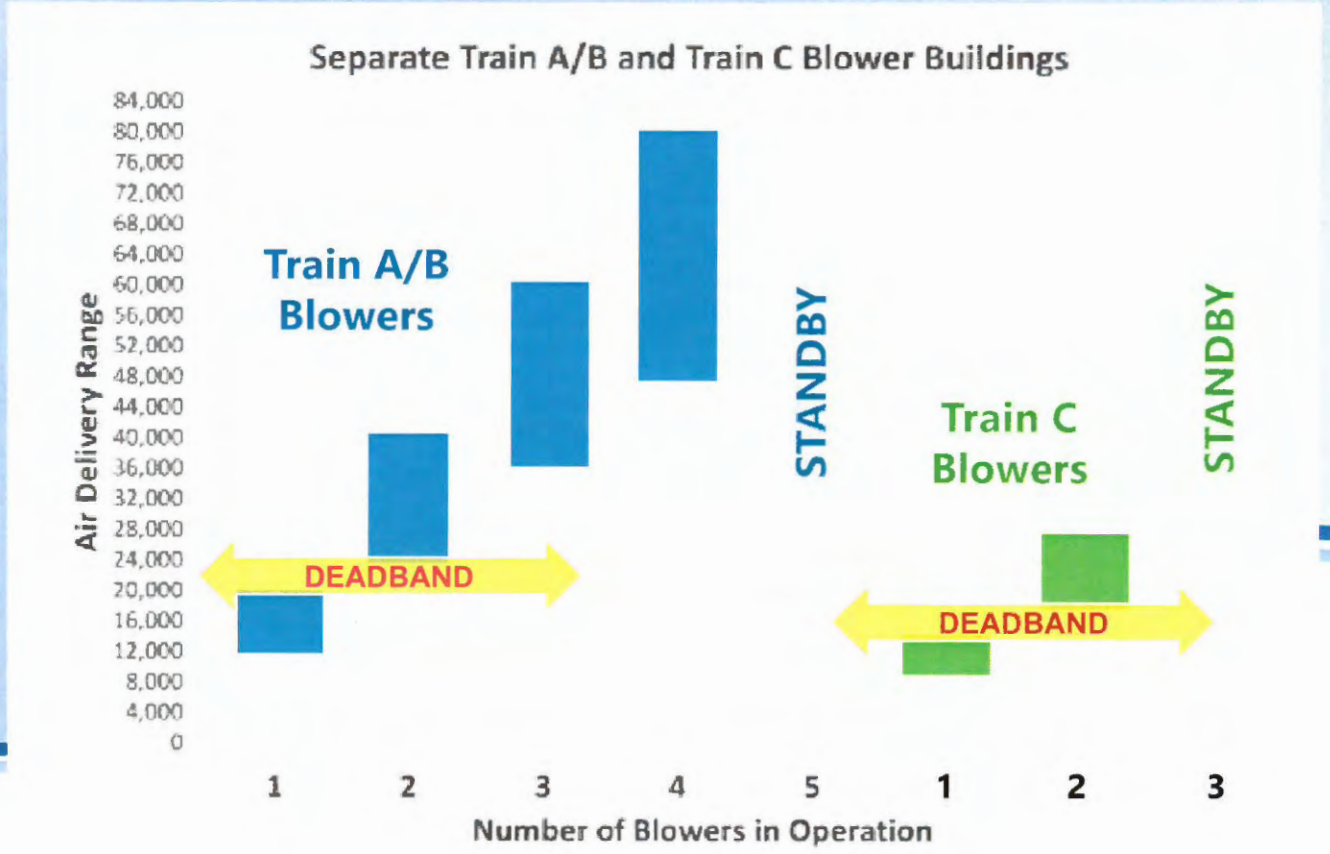
An emergency project added two multistage blowers outside of the STB while blowers were repaired

- Refurbished multistage blowers
- One blower rated at 12,500 scfm @ 9.8 psig
- One blower rated at 12,500 scfm @ 10.5 psi
- Operation of any original blower would be expected to somewhat reduce the output of the temporary blowers



Project Approach

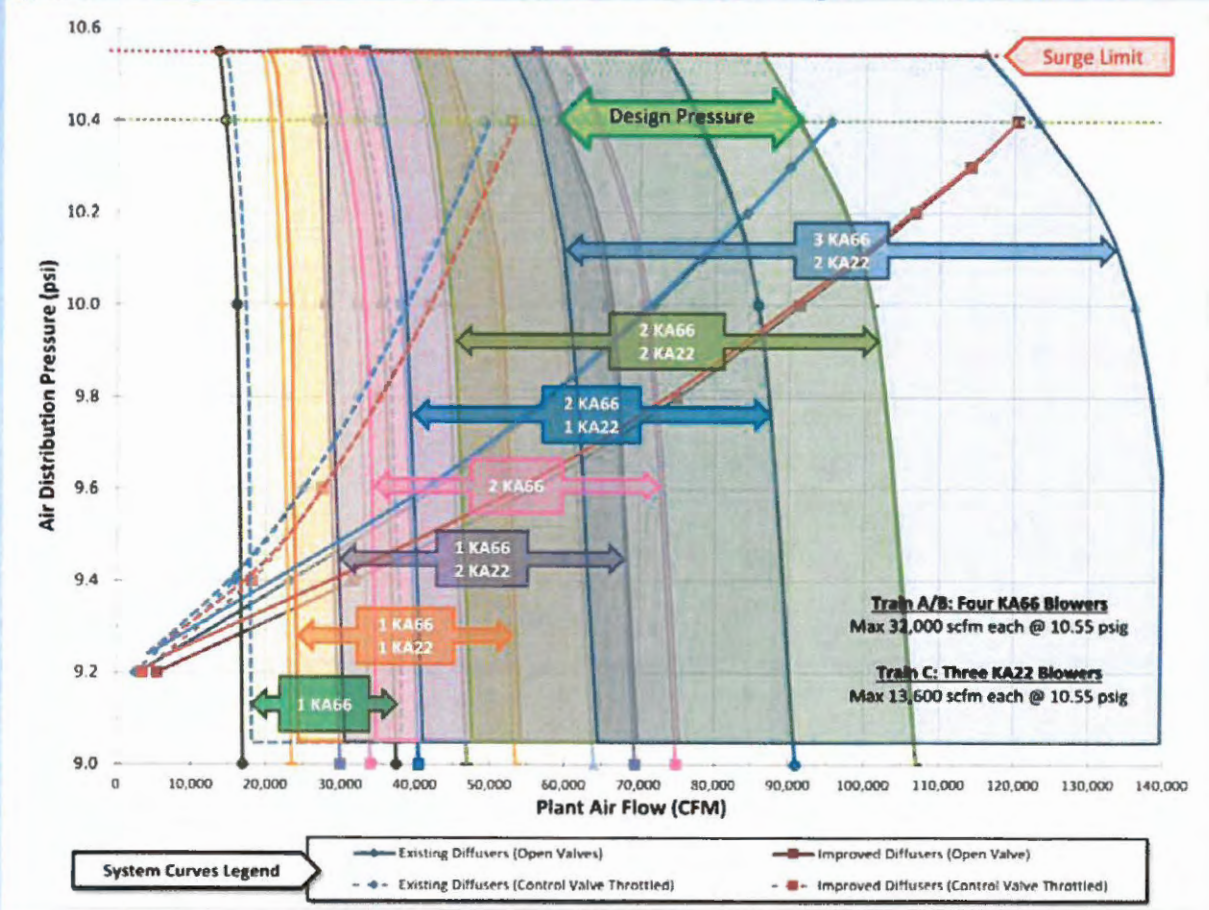
A project began in 2015 that would replace the Train A/B blowers, but would also interconnect the two blower buildings



A 48-inch elevated air header would both tie the two blower buildings together, and bypass leaking underground piping

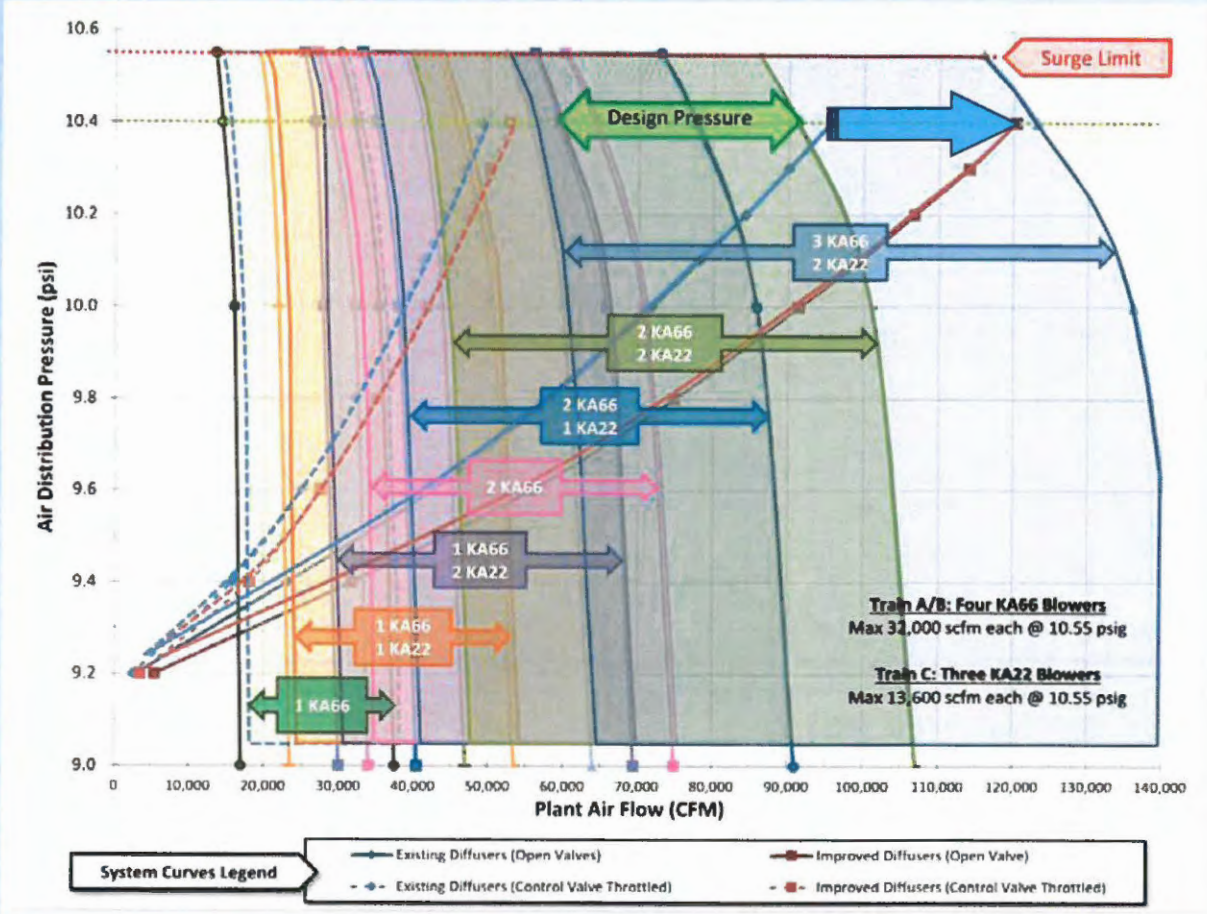
Having the smaller blowers in Train C in a combined system presented an opportunity to upsize the new Train A/B blowers

- KA66 frame blowers at 32,000 scfm worked well with the KA22 frame blowers at 13,600 scfm
- The number of installed blowers was reduced from eight to six



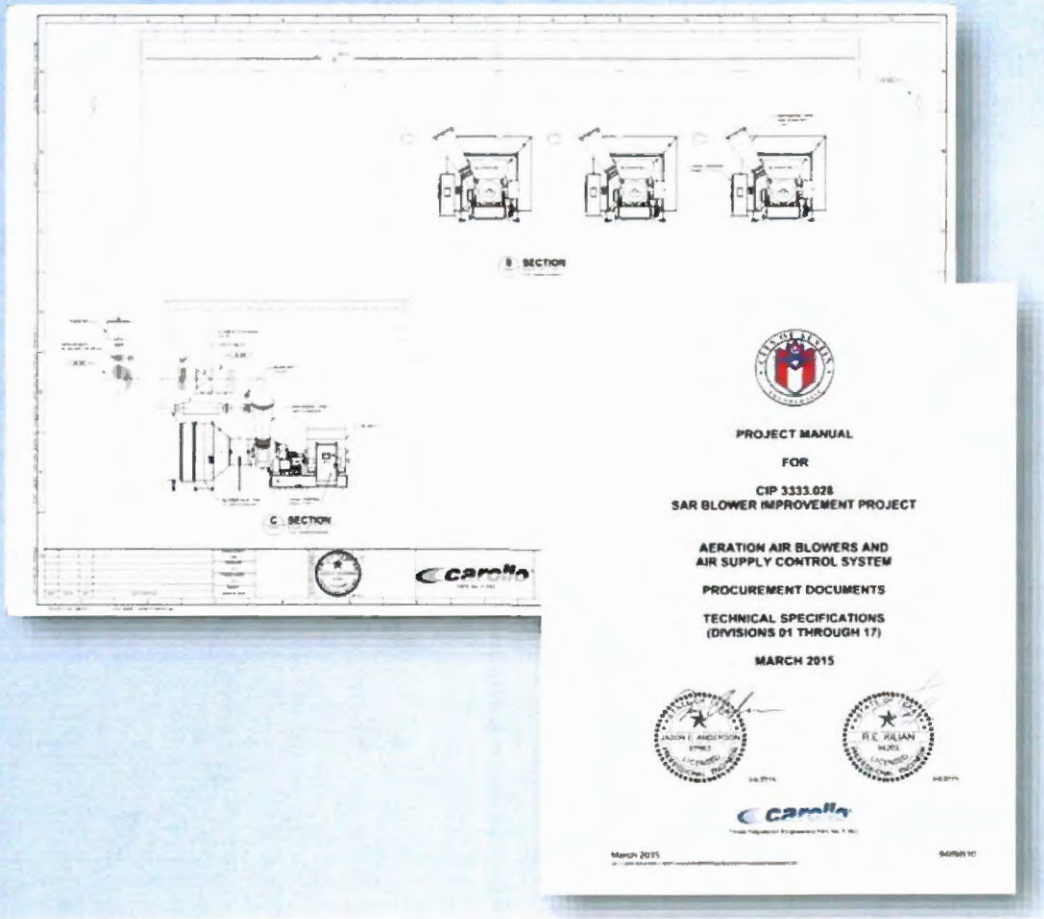
AW recognized that to realize the full potential of the new blowers diffusers would need to be added

- All diffusers were replaced
- The number of diffusers was doubled



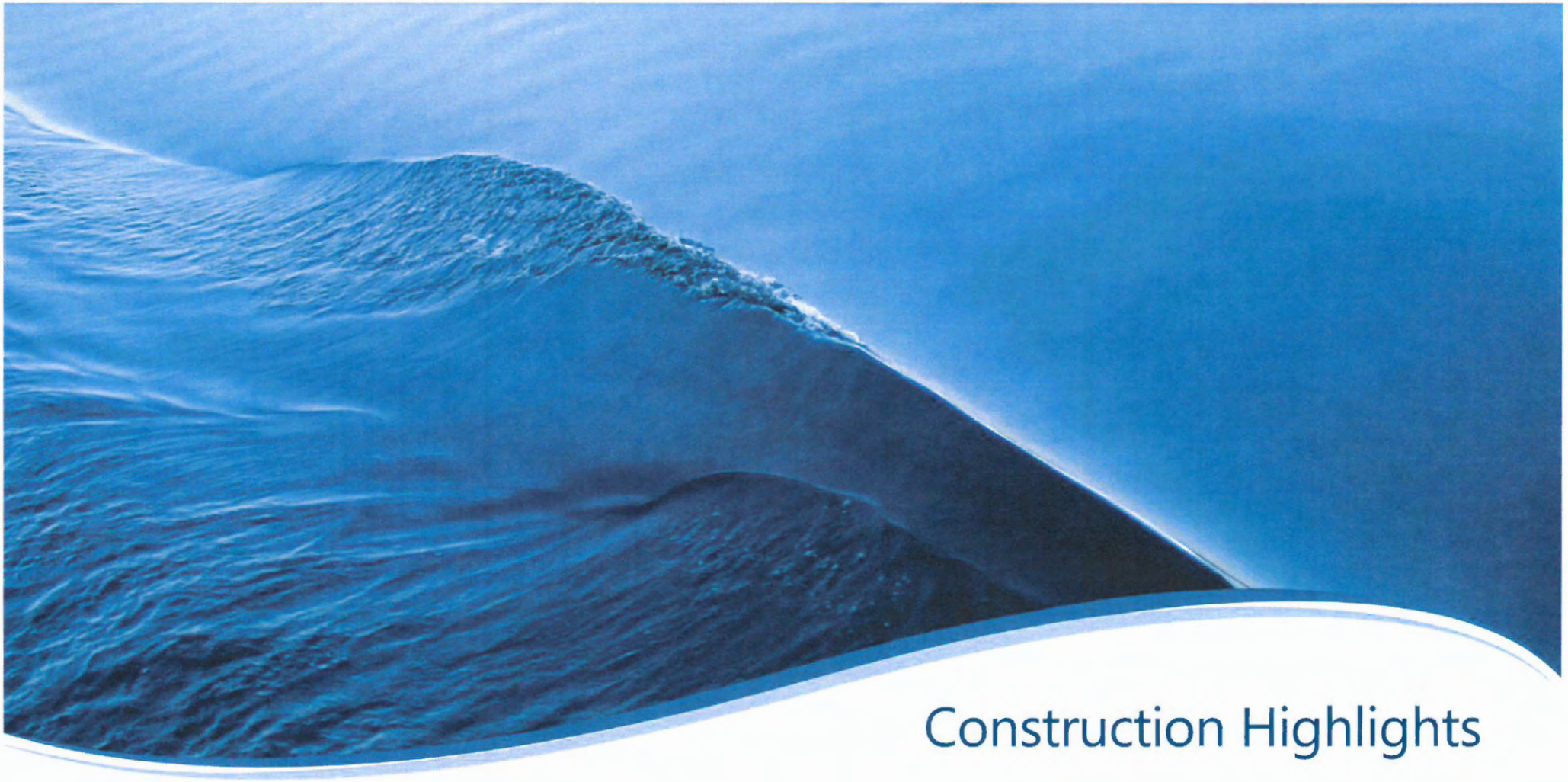
Large blowers have a lead time up to 52 weeks, and lack of concrete work required a way to shorten delivery time

- AW was able to negotiate early procurement for the blowers
  - An early design package for the blower mechanical components was released in **March 2015** during the overall design
  - A final proposal was received from the Manufacturer in **July 2015**
  - AW only paid for the Shop Drawings



Witnessing of factory testing for all three air ends was done in June of 2016, just 15 months after beginning design...

...and 2 months before construction began



Construction Highlights

Construction involved installation of a 48-inch diameter elevated stainless steel air header

- Concrete piers supporting the 48-inch air pipe between Trains A and C

- The last remaining temporary blower, and temporary air connections to the original buried air header

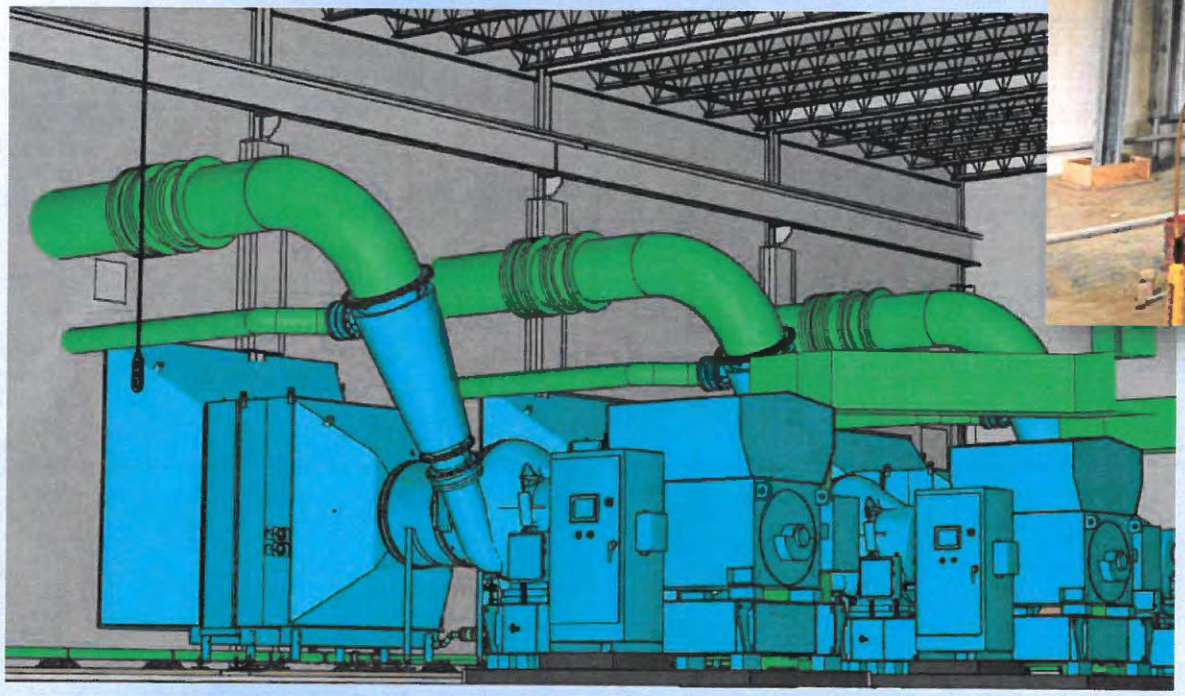
The first new blower was installed while keeping the adjacent existing blower on line

- Temporary connections made between the new header and original buried header allowed for smooth transition between the old and new blowers
- Once the system was completely off the buried air header air demand dropped by the volume of one Train C blower.

Improvements were also made at the Train C Blowers to address operational issues related to heat

- The original oil-air cooling radiators would result in blower shutdown due to the control panel overheating
- The radiators were replaced with tube-in-tube oil-water heat exchangers, matching the new blowers

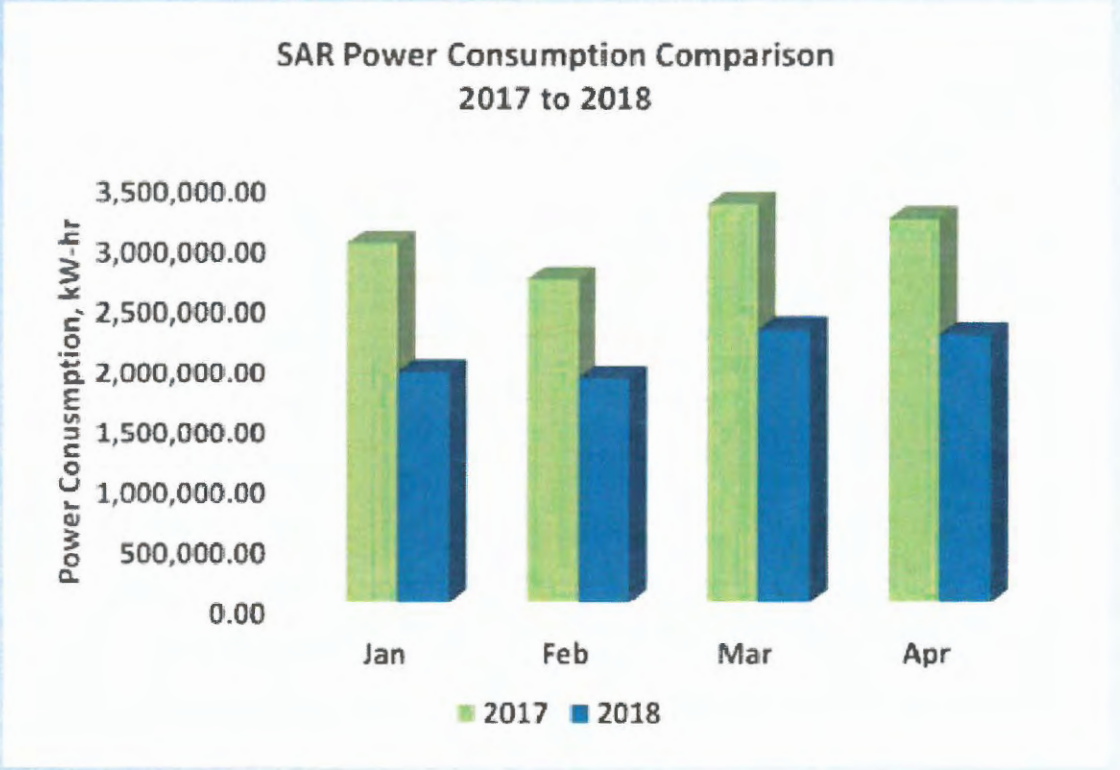
From Design to Reality



Operational Results

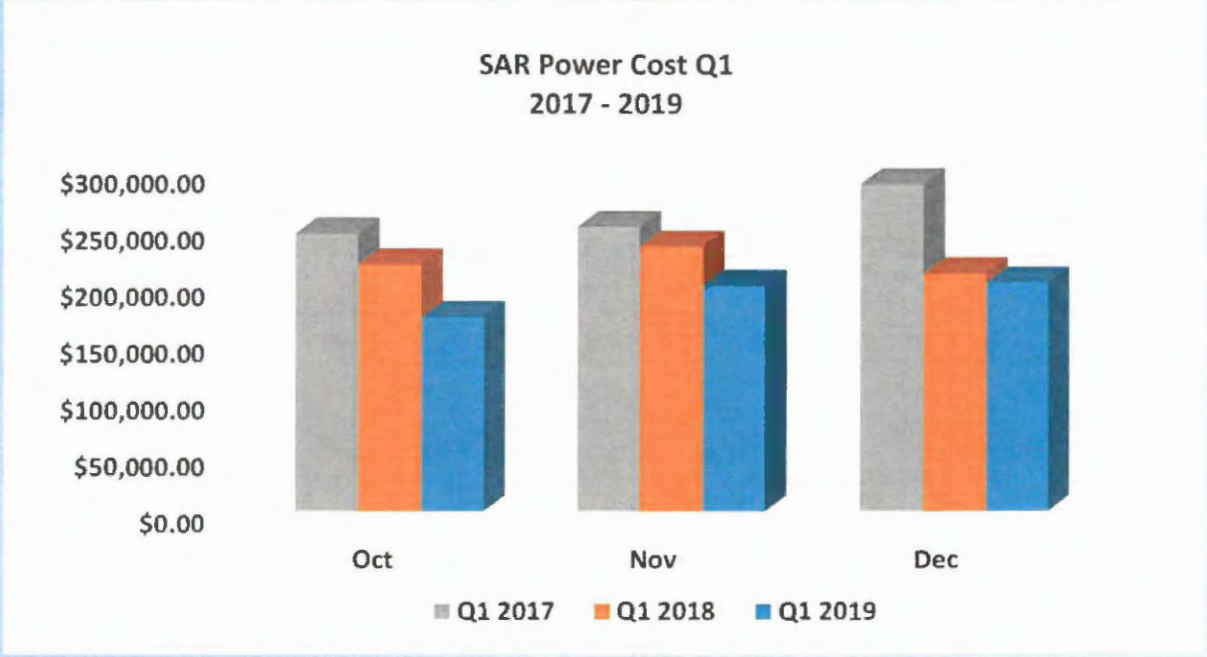
Austin has realized a reduction in power consumption at the WWTP since the new blower system went on line

- Power use at SAR was reduced by over 3.9 million kW-hr in the first four months of 2018
- This reduction equates to a $320,000 savings in 2018 over these four months in 2017



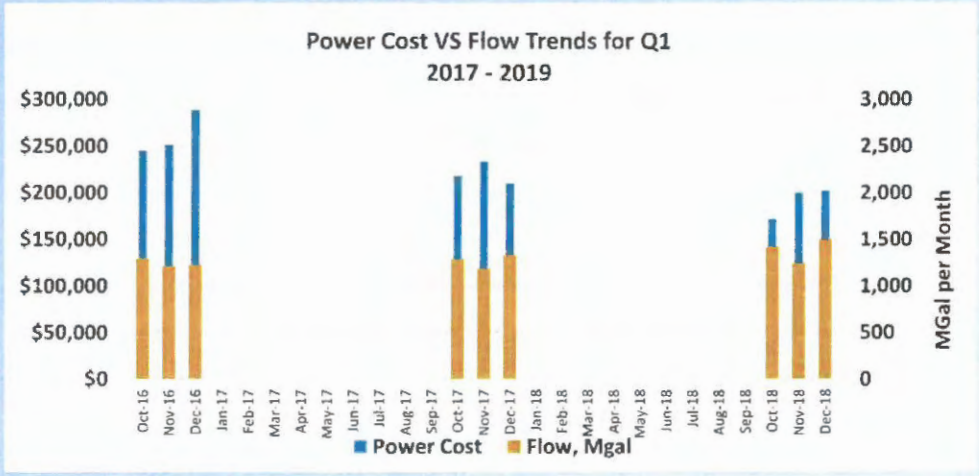
Looking at Q1 for 2017, 2018, and 2019 the power cost trend continues to improve

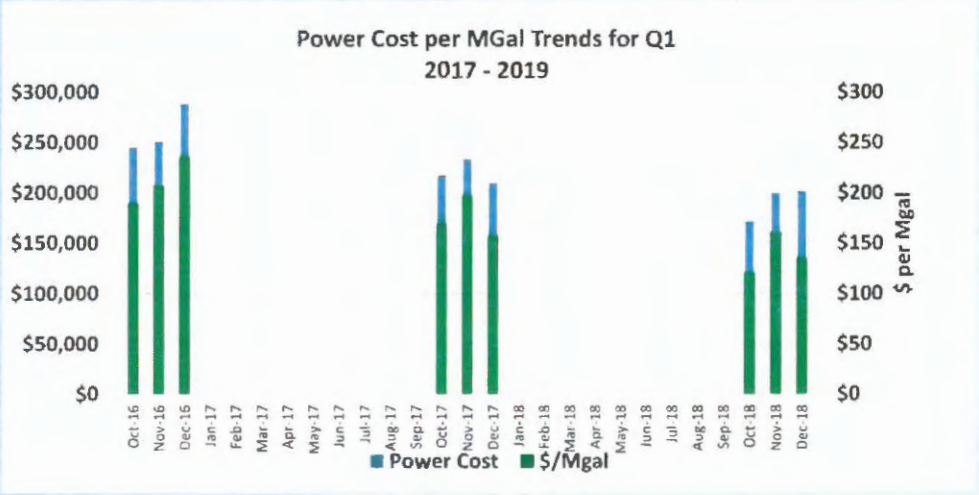
- Billing for SAR shows reduction in power cost of:
  - 16% from 2017 to 2018
  - 13% from 2018 to 2019
  - 27% overall



As flow has increased, power cost has gone down

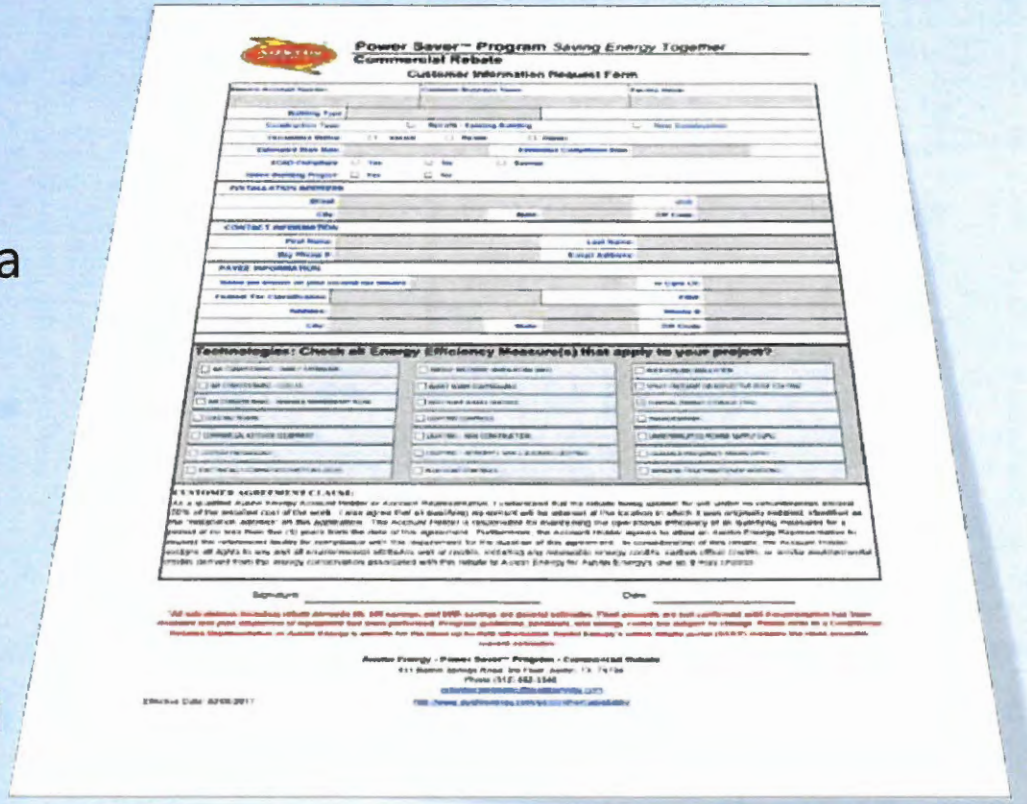
- Flow to SAR has trended upward during the same periods
- Cost per million gallons treated has gone down





In addition to operational savings, AW sought and received a rebate from Austin Energy

- The AE Rebate program is usually sought for more energy-efficient lighting, HVAC, etc, so determining a rebate for 2,000-HP blowers was a new undertaking for AE
- Normally, this process should start before any improvements are actually made
- AE worked with us to determine a savings of 418 kW over the original blowers, and a rebate of $146,500


Power Saver™ Program Saving Energy Together
Commercial Rebate
Customer Information Request Form

Acknowledgments

- Austin Water
  - Ayman Benyamin
  - Arthur Hernandez
  - Charles Celauro
  - James Bennet
  - Chris Wolter
  - Brent Basset
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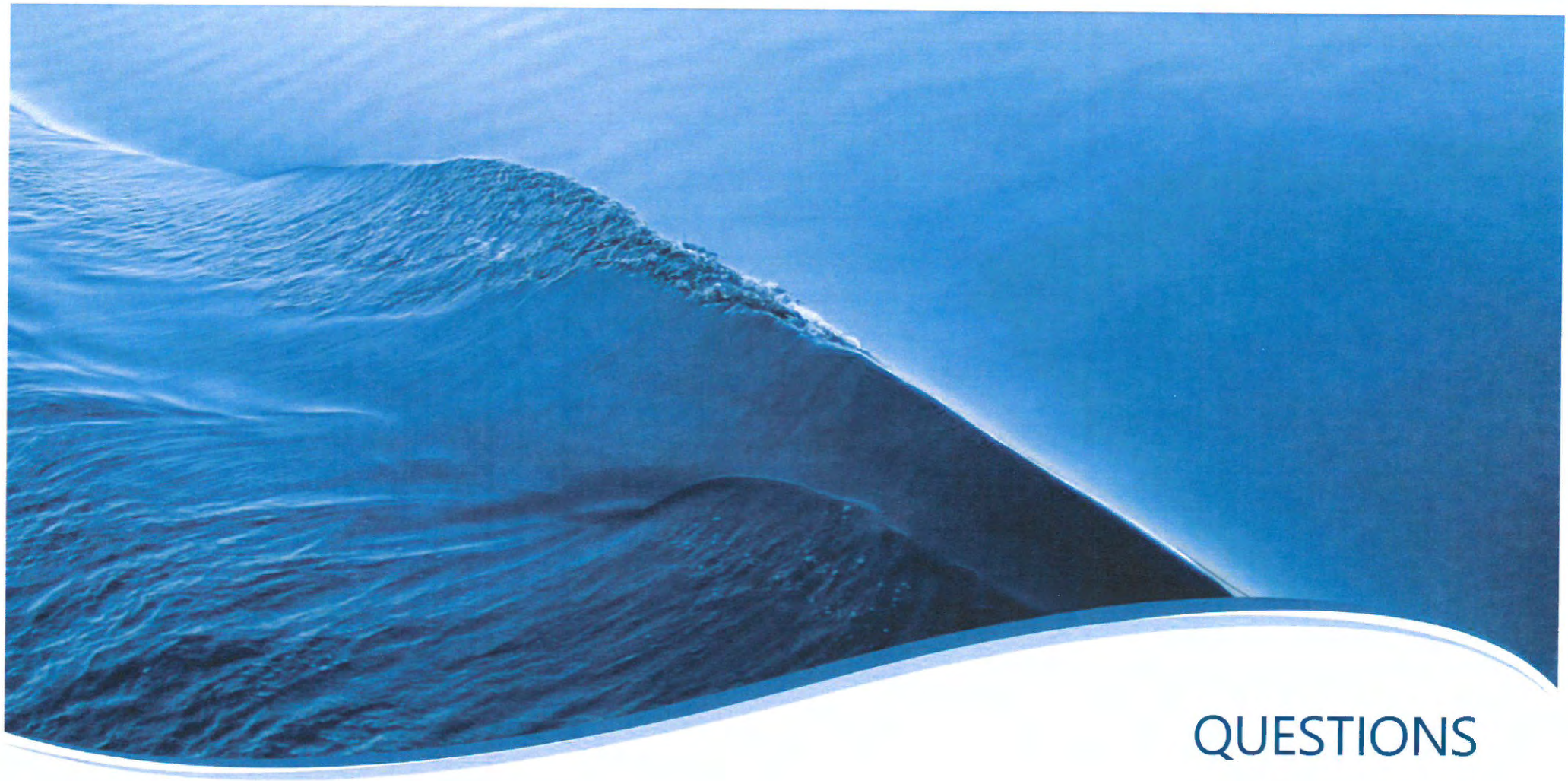
- Carollo
  - Hani Michel
  - Rudy Kilian
  - Tom Wessling



QUESTIONS