New Approach to Revamps

Larry Denk, P.E.
Principal Process Engineer
Aggreko Process Services

Jeremy Ockwig
Operations Engineer
Flint Hills Resources

aggreko

External Forces on CPI

- Return On Capital Employed
- Advances In Engineering Science
- Decrease In Numbers Of Projects; Growth In Services Sector
- In-Class Comparisons
- Feedstock Changes
- Staff Reductions
- Regulatory Changes
- Emerging Technologies
- Demand For High Stream Factor

aggreko

New Approach vs. Traditional Approach

Aspect of Revamp	New Approach	Traditional Approach
Definition of Basis	As thorough as time & inputs permit	As thorough as time & inputs permit
Evaluation of Solutions	Process study, utilizing characteristics of available equipment	Process study, generally with no limits on modifications
Selection of Preferred Solution	Cost & Benefit. Schedule has little impact.	Cost, Schedule & Benefit
Design Effort	Fast track design, performed at site, teaming with Owner	Design performed at Contractor's remote offices
Design Approach	Design based on characteristics of available equipment	Design assumes equipment, bulks to be acquired
Design Review	Full review, consistent with current best practices	Full review, consistent with current best practices
Procurement	Not applicable; leased equipment and bulks ready to ship	Acquire equipment and bulks per the project commercial framework
Construction	Modular assemblies are fitted together with a minimum of labor	Traditional, labor-intensive installation
Commissioning, startup	Modules have been pre-tested; systems are checked for integrity	Check all equipment and systems

aggreko

2.4 Figure 1.

- Temporary project, located within the battery limits of a processing unit.

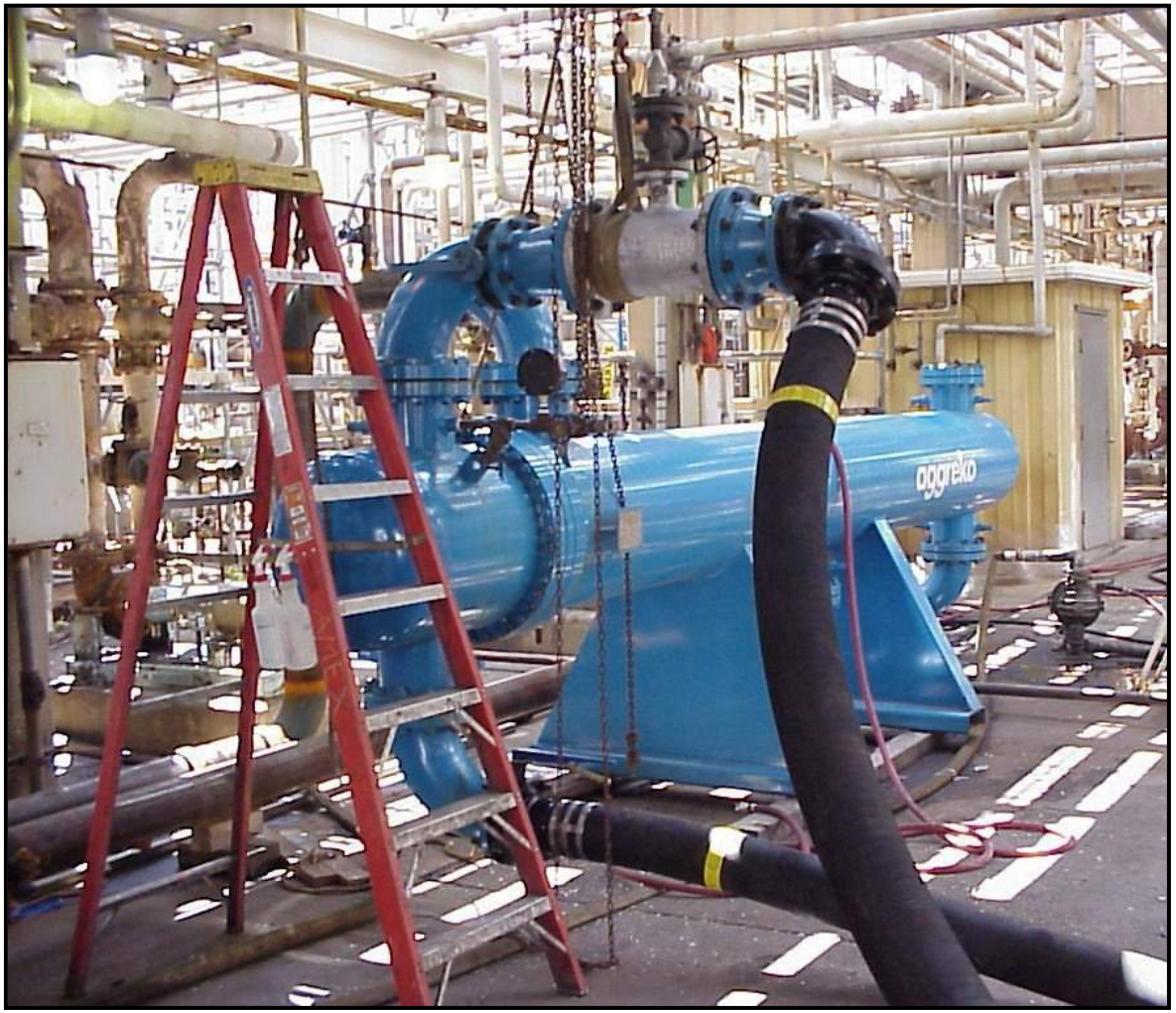
aggreko

Cold Water as a Process Tool

aggreko

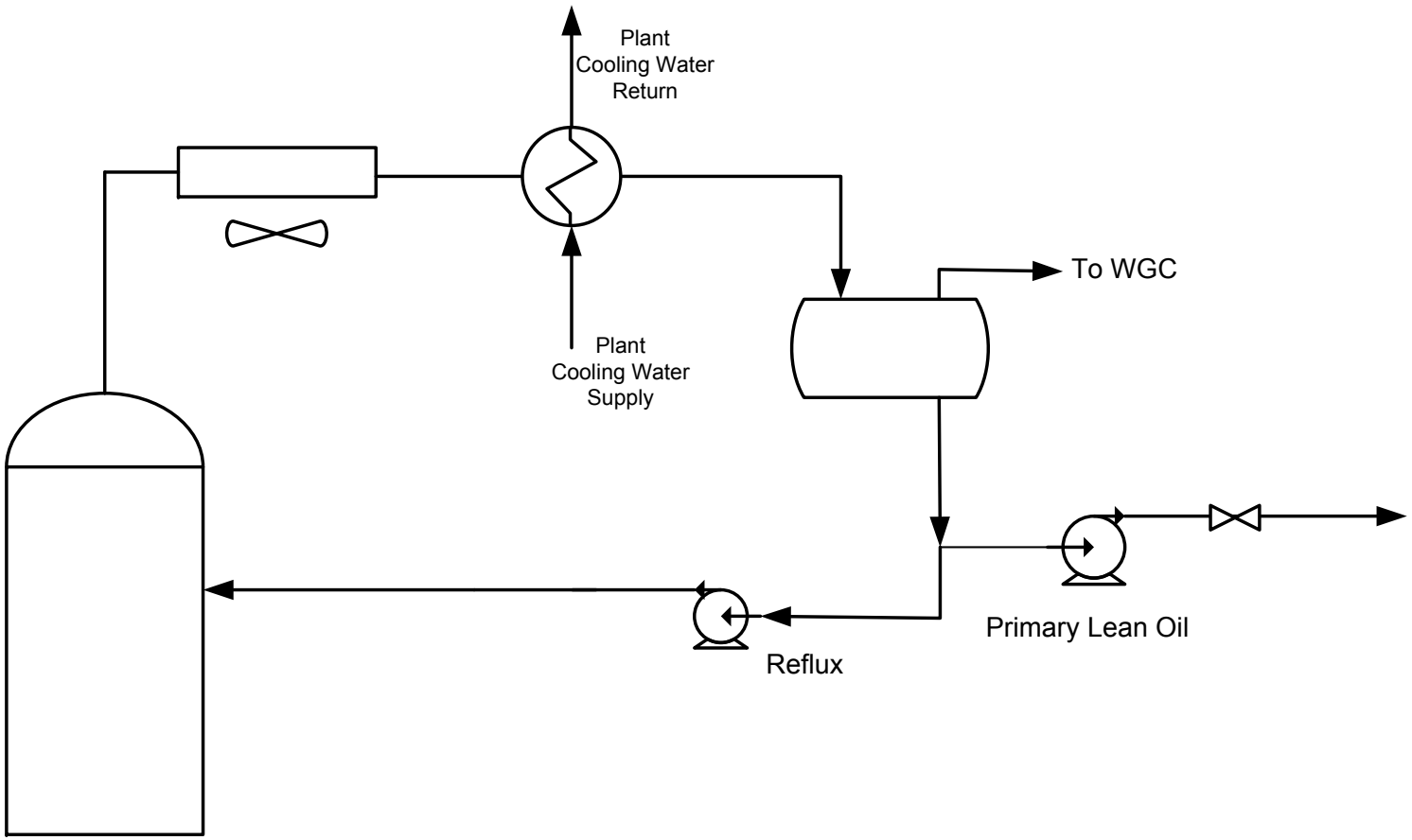
2.9 Figure 1.

- Temporary shell & tube exchanger. These play a critical role in temporary projects.



aggreko

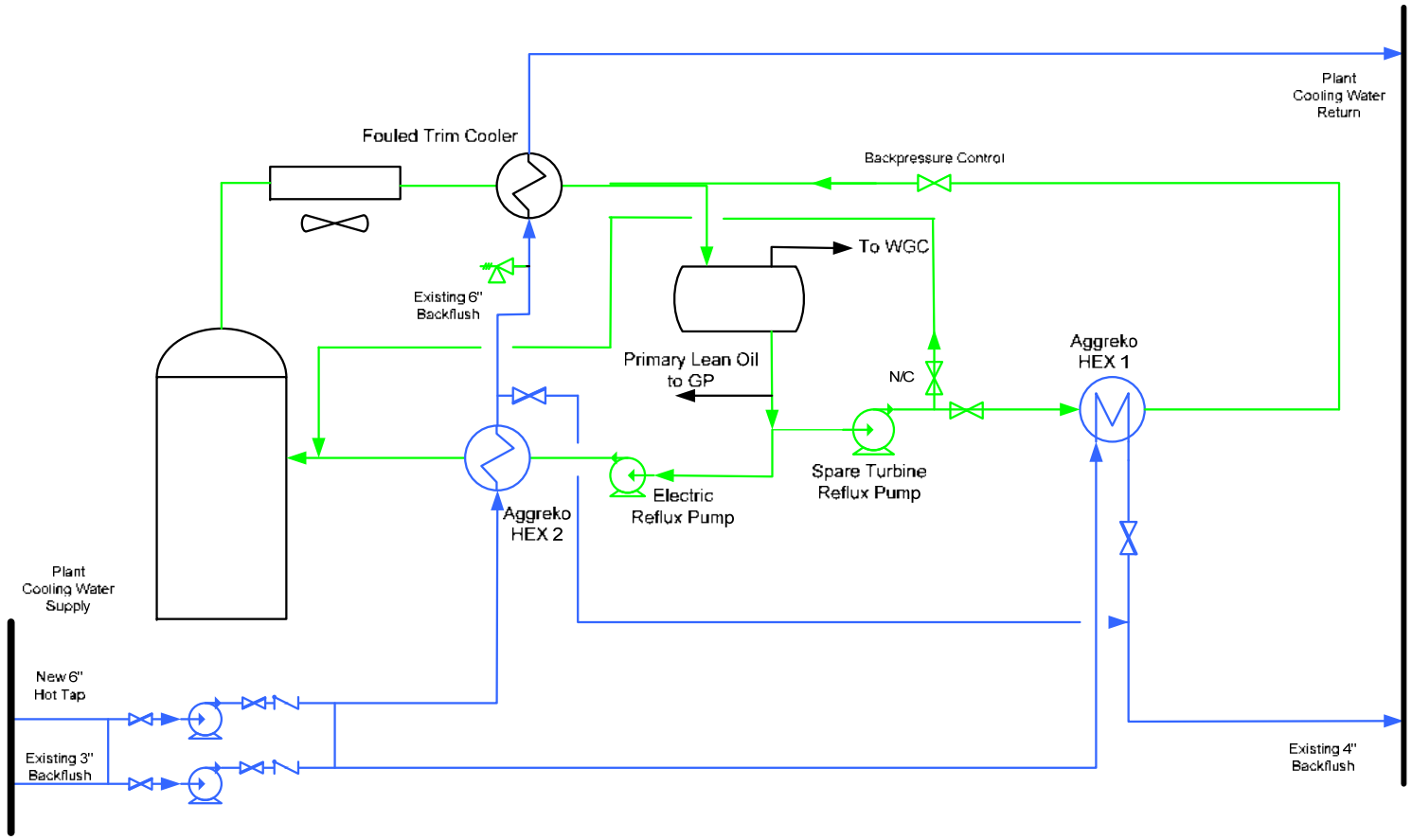
3.1 Figure 1(a).



- Normal Configuration - DCU MAIN FRAC OVERHEAD COOLING

aggreko

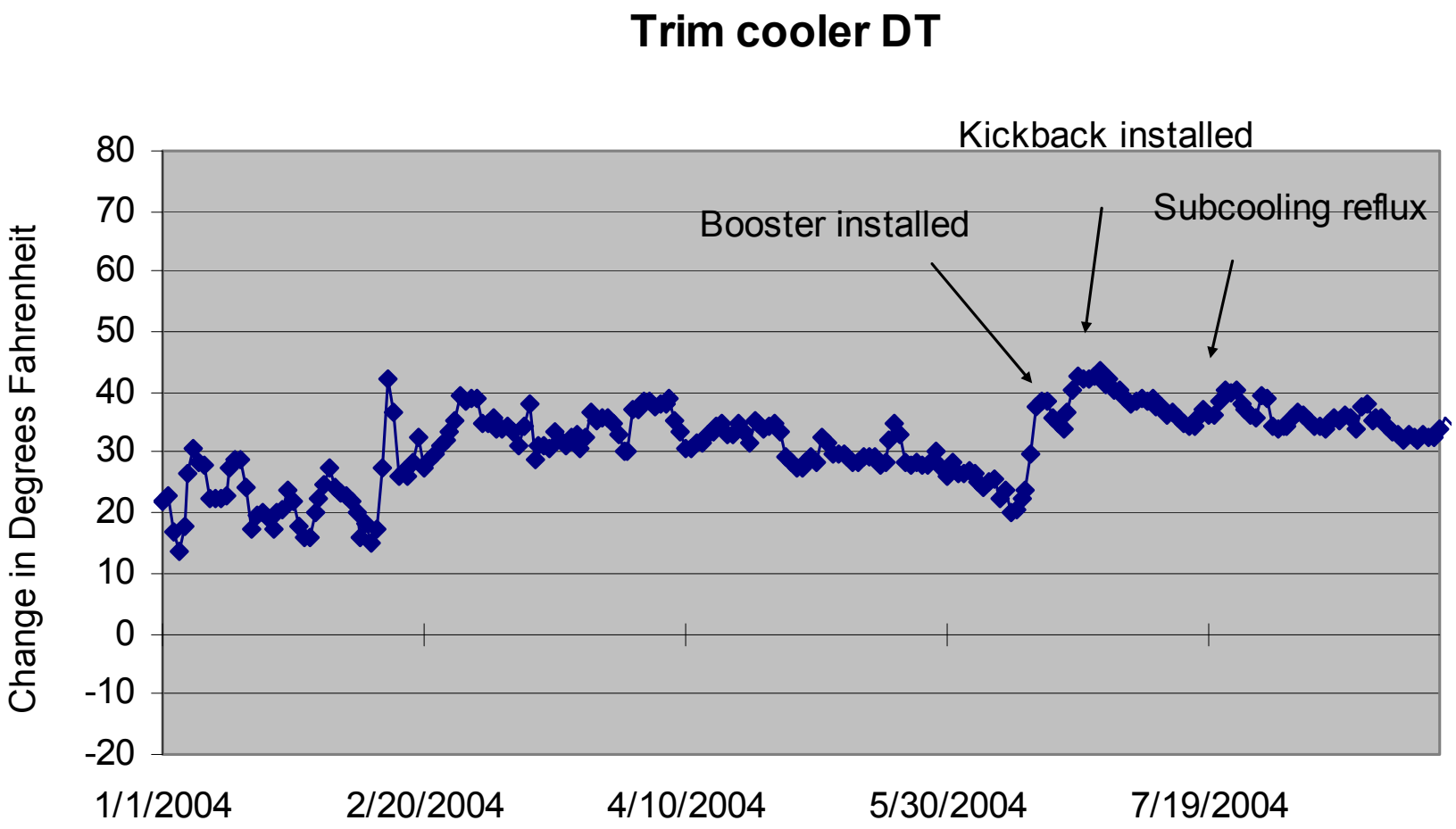
3.1 Figure 1(b).



- Modifications Sketch- DCU MAIN FRAC OVERHEAD COOLING

aggreko

Impact on Performance



aggreko

Significant Project Milestones

Date	Milestone
Feb 19, 2004	FHR first discussed this topic with Aggreko
Apr 28, 2004	Authorization to proceed from FHR
May 3, 2004	Preliminary process design issued by Aggreko
May 25, 2004	Process design documents issued to FHR for review
June 3, 2004	For-Installation process design package issued by Aggreko
June 3, 2004	Aggreko balance of equipment and commodities delivered to site
June 7, 2004	Temporary equipment sited and installation commenced
June 10, 2004	Phase 1 operation commenced (plant water boosted to 23 E-6)
June 22, 2004	Phase 2 operation commenced (kickback)
July 13, 2004	Phase 3 operation commenced (sub-cooled reflux)

aggreko