EUROPEAN
TURBINE
NETWORK

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Annual General Meeting
ETN Best Practice Award

15 March 2018, Bucharest, Romania

ETN 2017 Best Practice Award

- Established in USA in 2005, by CCJ
- To date, over 200 power and process facilities have participated in this valuable form of information exchange and even more have benefitted
- The ETN network and CCJ joined forces to expand the award internationally
- 2 categories:
  - Workforce development / knowledge management ,
  - EHS
- Deadline was extended to the end of February 2018
- Selection of winner in each category by CCJ
- Award ceremony planned for 2018 ETN AGM

Overview of Entries

- **Category 1:** Workforce development / knowledge management
  - ConocoPhillips (Global)
  - ExxonMobil (Usan FPSO, Nigeria)
  - General Electric Global O&M Center of Excellence (Switzerland)
- **Category 2:** EHS
  - ConocoPhillips (Darwin LNG)
  - Sutton Bridge Power Station (General Electric O&M, UK)
  - Nestle Oil Porvoo Refinery (Finland)

Category 1:
Workforce development / Knowledge Management

Knowledge transfer between different plants of the same company in different countries

ConocoPhillips

Oil exploration and production company

Challenge:

Sites and business units are scattered around the world. How to ensure and accelerate organizational learning from individual experiences on locations around the world?

Solution:

- 2006: introduction of knowledge sharing networks
- Core teams with at least one representative of each business unit
- Share experiences through teleconferences
- Sharepoint site: questions, discussions, success stories, daily/weekly updates

Outcome

- Unprecedented sharing of knowledge across business units and country borders
- Networking across global organization

Identification of best practices

ExxonMobil
Energy lives here™

Oil exploration and production company

Challenge:

GT fleet reliability below expectation

Usan FPSO, Nigeria

Solution:

- Aggressive, pro-active and systematic program to address reliability issues, based on existing support (asset support team, site engineer, OEM)
- Clear Ownership and Stewardship from opening to closure
- Set objectives for trips, open reliability issues and close out time
- Assess known issues, analyze and monitor pro-actively any emerging threat.
- Aggressive periodic follow up and review: daily with core team, weekly with asset O&M team and bi-weekly with OEM

Outcome

- Ownership and aggressive systematic approach lead to a reduction of new issues in 2017 and an increase in closed issues
- GT fleet reliability improved by 38% in period of 2015 to 2017

Reliability increase in the GE O&M fleet

GE O&M is a digital industrial company that provides O&M services around the world

Challenge:

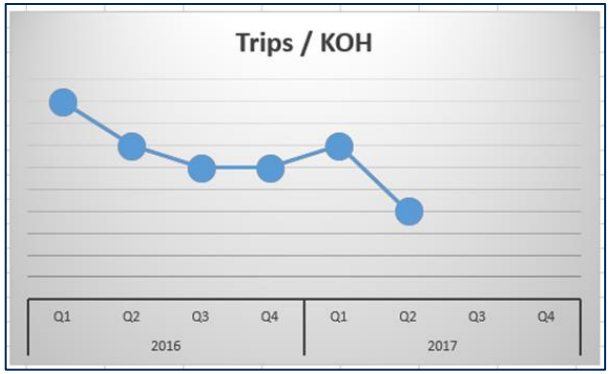
Avoid interruption of the power generation process within O&M fleet

Solution:

- Create awareness of trip indicators with management team
- Notification of plant managers and weekly call to share experiences between plant and Center of Excellence (COE)
- Sharing of solutions between sites through O&M instruction letters (OMIL)
- Feedback OMIL experience with COE

Outcome

- In 18 months, trips slashed in half through awareness and full-circle knowledge sharing



Category 2:
EHS: Environment, Health and Safety

Tooling Certification & Proper Use

ConocoPhillips

Oil exploration and production company

Challenge:

Avoid repetition of HSE incident during HPT rotor replacement, related to tooling. Incident was related to tool malfunction and lack of awareness of associated risks.
Tool and manpower were hired from OEM

Facility:

- Darwin LNG

Solution:

- Purchase tools to have better control of certification and functioning and further to also ensure that procedures are followed.

Outcome

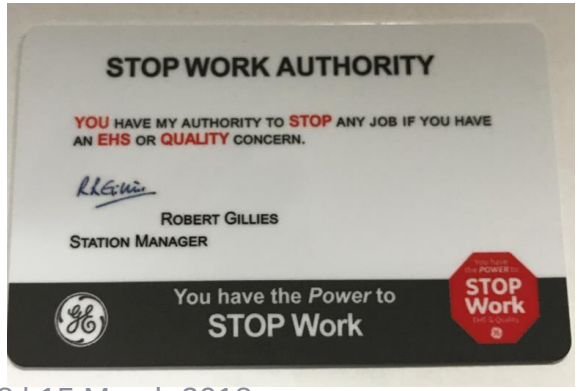
- Unprecedented sharing of knowledge across business units and country borders
- Networking across global organization

Stop work authority

GE O&M is a digital industrial company that provides O&M services around the world

Challenge:

Everyone must feel empowered to stop work if they are concerned over any aspect of its safety of quality requirements



Facility:

- Sutton Bridge Power Station (UK)
- Owned by CALON ENERGY Ltd, operated by GE O&M

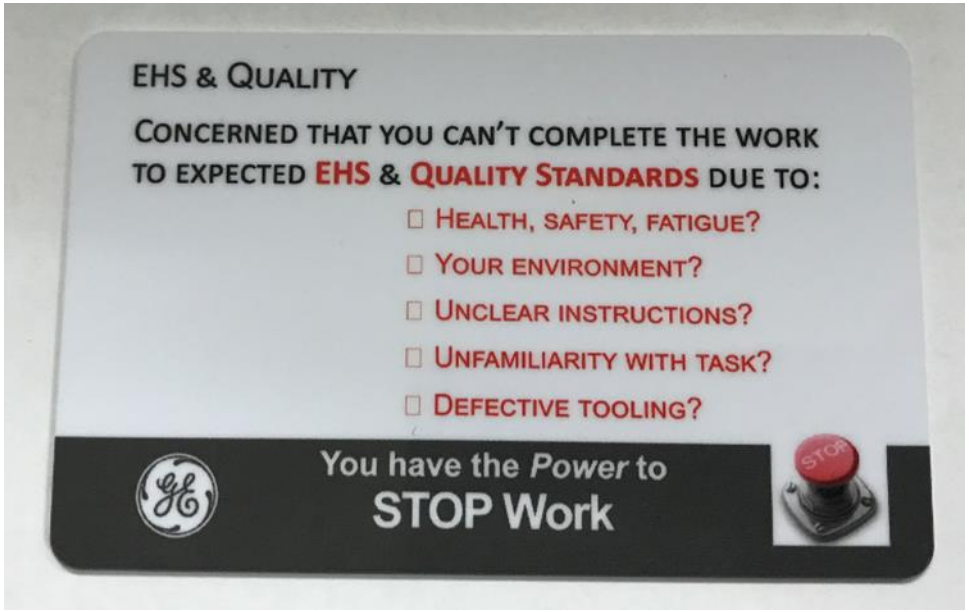
Solution:

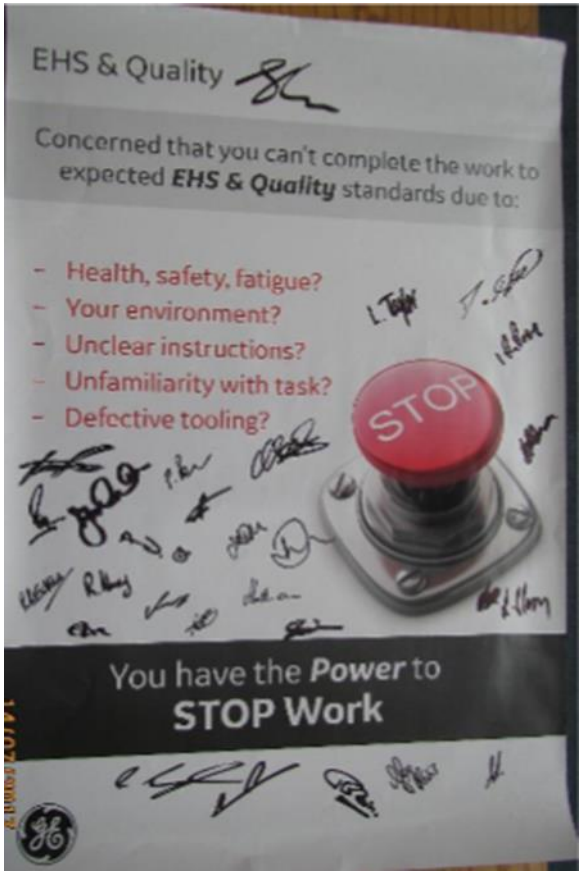
- Global “Stop Work” campaign on all sites by GE
- At Sutton Bridge, it was decided to extend campaign to subcontractors
- Talking at meeting is not enough
- Site created “commitment card” to hand out to every new person during induction
- Credit card size, signed by plant manager
- All lead contractor managers and safety reps signed “stop work” poster as an additional visual commitment

Outcome

- Increased awareness

Stop work authority





Saving water & maintaining GT performance by new compressor Anti Fouling Treatment

Neste Oil is a refining and marketing company, with a production focus on premium-quality, lower-emission traffic fuels

UNISWED

United Services Sweden AB

Challenge:

- Reduce amount of water and detergent for compressor washing every year
- Reduce CO2 emission

Facility:

- Neste Oil Porvoo Refinery, Finland
- Frame 6B & Frame 6FA

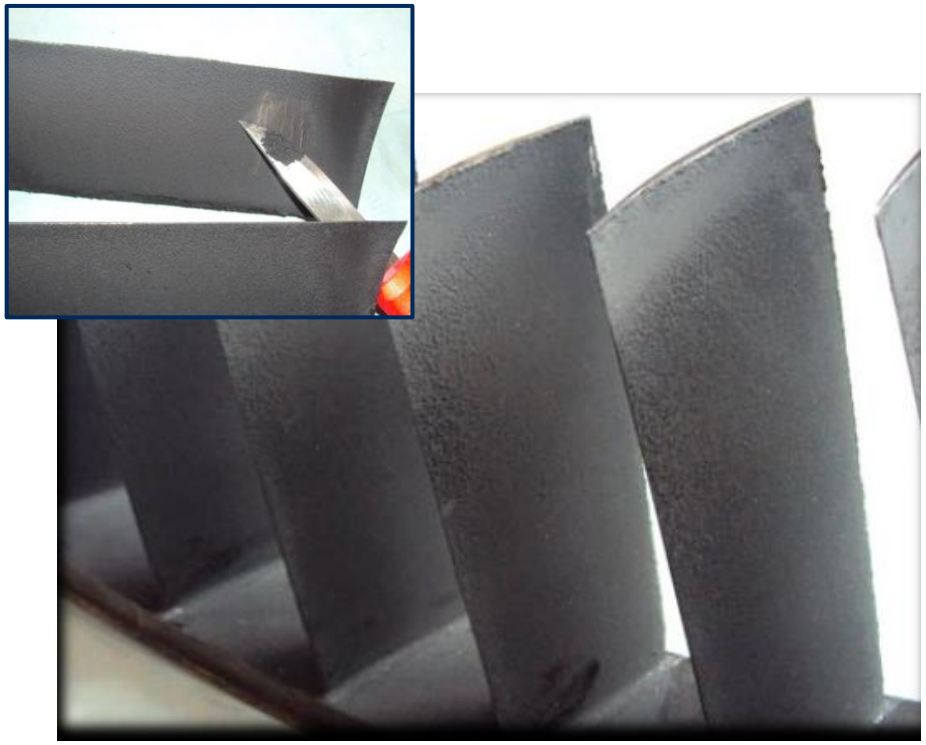
Solution:

- Antifouling treatment to minimize losses
- The AFT (Anti Fouling Treatment) was applied during major overhaul in April 2012

Outcome

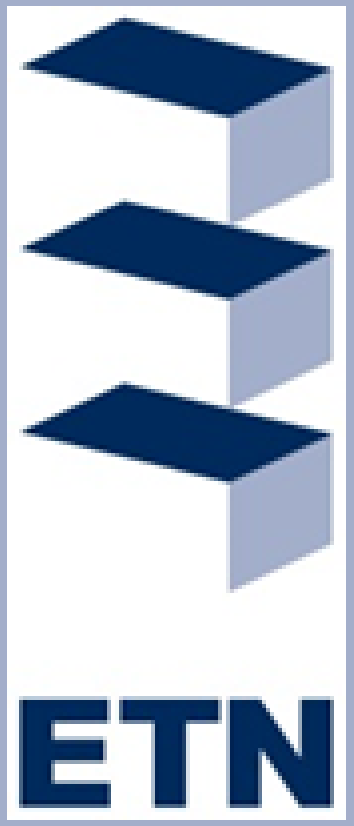
- No noticeable fouling related degradation after 38 000 h of operation without washes
- This also enables Neste Oil to continue using reasonable cost filtration F7/F9

Saving water & maintaining GT performance by new compressor Anti Fouling Treatment



Compressor condition prior to major overhaul 2012 after 40,000h, no washes performed

Same parts after 34,000h, no washes, filtration F7/F9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