ITER PROJECT
European TF Coils Radial Plates Manufacturing &
TF Coils Winding Packs Cold Test and Insertion in the Coil Cases

La via verso la competitività globale attraverso la Fusione
Milano, 24 Novembre 2014
SIMIC overview

SIMIC is an Italian company with a solid experience in engineering, manufacturing & installation of large pressure vessels, reactors, cryostats and vacuum vessels, large machined mechanical components with very strict tolerances. Strong division in Site Erection Works.

- 110 M€ – Staff nb. 300
- HQ, Machining & welding facilities in Camerana (CN) Italy
- Facility with 2000 tons capacity in Porto Marghera (Venice), Italy
- SIMIC is also in Germany, Turkey, Mexico and Brasil
For the ITER Divertor, SIMIC has been awarded the following contracts

- **Divertor prototypes** as sub-supplier of
  - Scope: supply of Inner Vertical Target, Outer Vertical Target, Dome Liner, Cassette Body
  - Year: 2004 - 2006

- **Cassette Body prototype** in Consortium with CNIM
  - Scope: supply of 1 Cassette Body
  - Duration: 2013 – 2015
  - Next step: series fabrication 60 CB
  - CNIM group leader
Main Achievements in ITER Project

For the ITER Vacuum Vessel, SIMIC has been awarded the following contracts:

- The full scale prototype of the Vacuum Vessel VVPSM as sub supplier of ANSALDO.
  - Supply of the Vacuum Vessel Poloidal Sector Model
  - Year: 2004 - 2006
Main Achievements in ITER Project

For the ITER Magnet System, SIMIC has been awarded the following contracts with F4E

- **Radial Plates Series** for the ITER TF Coils in Consortium with **ENIM**
  - Supply of 70 Radial Plates
  - Duration 2012-2017
  - SIMIC group leader
  - In progress!

- **TF Coils WP Cold Test & Insertion in the Coil Cases**
  - Scope: supply of 10 TF Coils
    - Cold Test and Insertion into Coil Cases of nr. 10 WP
  - Duration 64 month from 5th May 2014 - 2019
  - In progress!
Radial Plates - Key points

- Large size 13.8m x 8.7m x 110mm
- Very tight tolerances
- High technology welds in AISI 316 LN

Quantities
- 70 to be made in Europe → 10 TF Coils
- 63 to be made in Japan → 9 TF Coils
Radial Plates - Main achievements

- All **Tools** are ready and commissioned
- 4 Portal Machines commissioned and working (SIMIC & CNIM)
- 2 **Mock Ups** are positively completed (SIMIC & CNIM)
- **Radial Plates** manufacturing series in progress
  - First 7 RP delivered within mid December ’14
  - Delivery rate of 2 RP / month
- **Cover Plates** manufacturing series
  - 15 CP sets of straight profiles
  - 4 CP sets delivered
TF Coils WP Cold Test and Insertion

Key points

- **Impressive size & weight:**
  14m x 9m; over 300 tons each TF

- **High technology, critical welds & process**
  - AISI 316 LN material
  - High thickness 40mm /130mm – all from one side
  - Risk to damage the winding pack placed at a distance of only 10mm
  - Difficult to inspect due to large thickness & limited accessibility
  - Tight tolerances, in particular on the straight leg
SCOPE of SUPPLY (10 TF COILS)

- Qualification of the process
- High voltage & Leak Test of the 10 Winding Packs
- Cold Test at 80K of the 10 Winding Packs
- WP Insertion in the 10 Coil Cases
- Closure welding of the Coil Cases
- Filling with resin and curing of the space between WP and CC
- Final machining of the TF coils
- High voltage and leak tests
- Packing & Shipment of the 10 TF coils to ITER site
Main Requirements & Technologies

MAIN TECHNOLOGIES EMPLOYED

- Tig Narrow gap automatic wherever possible
- Tig Narrow gap manual
- UT automatic wherever possible
- Final Machining by portal machine

Portal Machine capacity

- X axis 18000 mm
- Z axis 5500 mm
- Y axis 10.100 mm
- Power 100 KW

Temperature controlled environment (20±1°C)
Working for the ITER project

MAIN BENEFITS FOR SIMIC
A PATH OF CONTINUOS IMPROVEMENT

- Technical & Technological grow
- Project management culture
- Company management culture
- Human resources grow
- New investments

All these aspects are going to generate new OPPORTUNITIES also in NEW MARKETS.
Thank you for your attention!

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