

Mercredi  
27 septembre  
9h/18h  
À Cadarache

# LES rencontres — ITER —

Rendez-vous d'affaires & opportunités de marchés

Le réseau des

 CCI PROVENCE  
ALPES CÔTE D'AZUR



# David WILLIAMS

Head of fusion activities  
Orano Projets

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 CCI PROVENCE  
ALPES CÔTE D'AZUR



# Orano nuclear engineering involvement on ITER project

Les rencontres ITER, Cadarache  
27 Septembre 2023

David WILLIAMS



# 1 • ORANO IN BRIEF

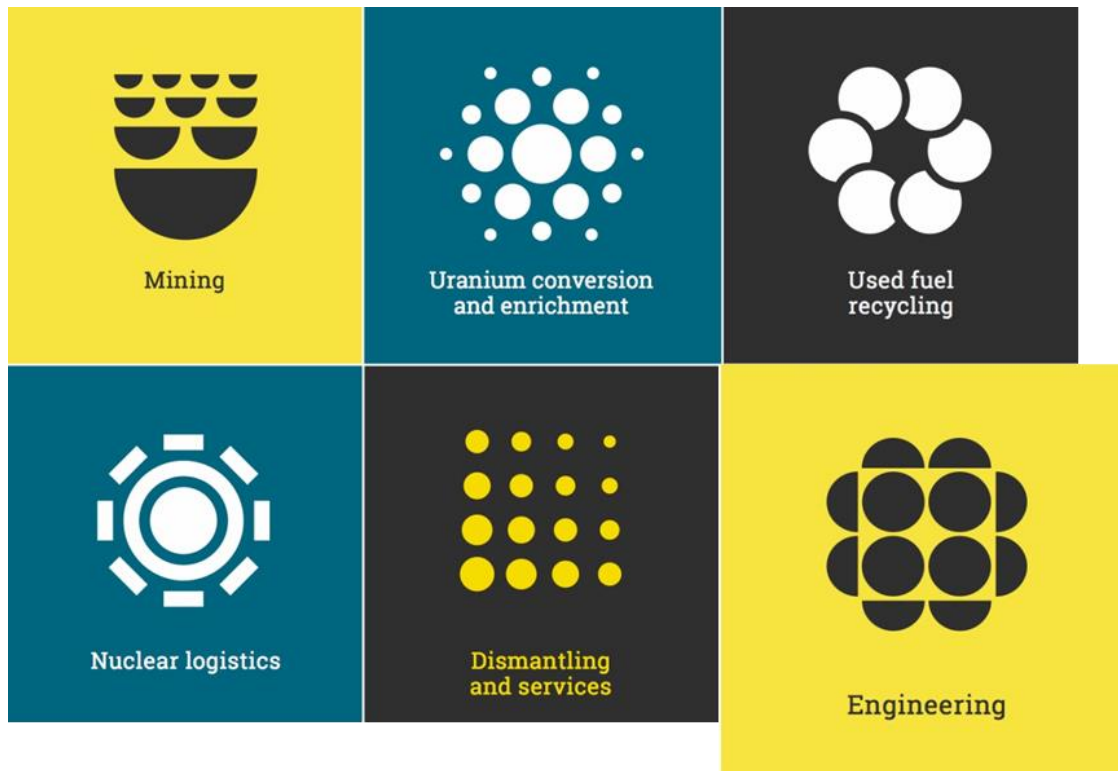
# Orano worldwide experience

**Unique designer // owner // operator**  
**First of a kind nuclear facility experience**



Les rencontres ITER, Cadarache, 27 septembre 2023

# Orano Group's engineering



# Orano Projets Key figures



> More than **40 specialized competences**



> **250 experts**



> More than **2000 employees** around the world



> **60 years** of experience



> Turnover in 2022 : **272 million €**



> **400 projects** from **10 K€** to **1 billion €**



> Development and qualification of processes center, close to La Hague plant : **Beaumont Research Hall facility**



> Optimal security : frequency rate **<1** for institutions et **<5** pour construction sites

# Added value



## Orano Projets carries out nuclear chemical and mechanical processes

**industrialization** from the conceptual process specifications up to site final test.

By performing all the necessary calculations and the sizing of the equipment and infrastructures, Orano Projets design installations integrating :

- EPC of complex first of a kind nuclear equipment / facilities
- French regulations : nuclear licensing and safety justifications
- Remote Handling in nuclear environment
- Hot Labs full-scale expertise
- Process and I&C engineering and qualification
- Integration of FOH and ALARA in system life cycle
- Nuclear Dismantling studies
- Nuclear wastes management



With its **multi-discipline teams**, Orano Projets can carry out all or part of your "**Turnkey**" installations



Orano Projets provides **daily support to the operator**



# 2 ● CONTRIBUTIONS D'ORANO AU PROJET ITER

# Key contracts on ITER

ITER aims to demonstrate scientific and technical feasibility of fusion power, with a 500MW plant. 14 MeV unusual neutron flux radiation conditions, high contamination level

Orano Projets is involved in several key contracts :

## **Nuclear Safety / Sûreté nucléaire**

- Integrated nuclear engineering contracts (NIE) : transversal safety approach to ITER's system-oriented organization. Assessment and simplification of maintenance plans. ALARA approach. Optimization of safety files aiming at start-up authorization from safety authorities
- RPrS update, with focus on dispersion and fire risk assessment

## **Tritium plant**

- General engineering support for the tritium plant building, fueling and wall conditioning system design
- Specialist support for ISS cryogenic and WDS Water Detritiation equipment design and system design
- Design of Tritium Gloveboxes & Hardshell Enclosures (piping)

## **Other / Autres**

- Human factor / ergonomics studies
- Explosion consequence analysis
- 1<sup>st</sup> of a kind processes nuclearization and industrialization

# 3 ● PERSPECTIVES ORANO SUR LE PROJET ITER

# Perspectives Orano sur les marchés ITER

## Turnkey components supply // Fourniture composants

- Tokamak Complex Detritation System / Procédé chimique
- ICRH Antenna / Procédé électro mécanique
- Hot Cell mechanical / Chemical process equipment / procédés mécaniques et chimiques en chaine blindée

Client final



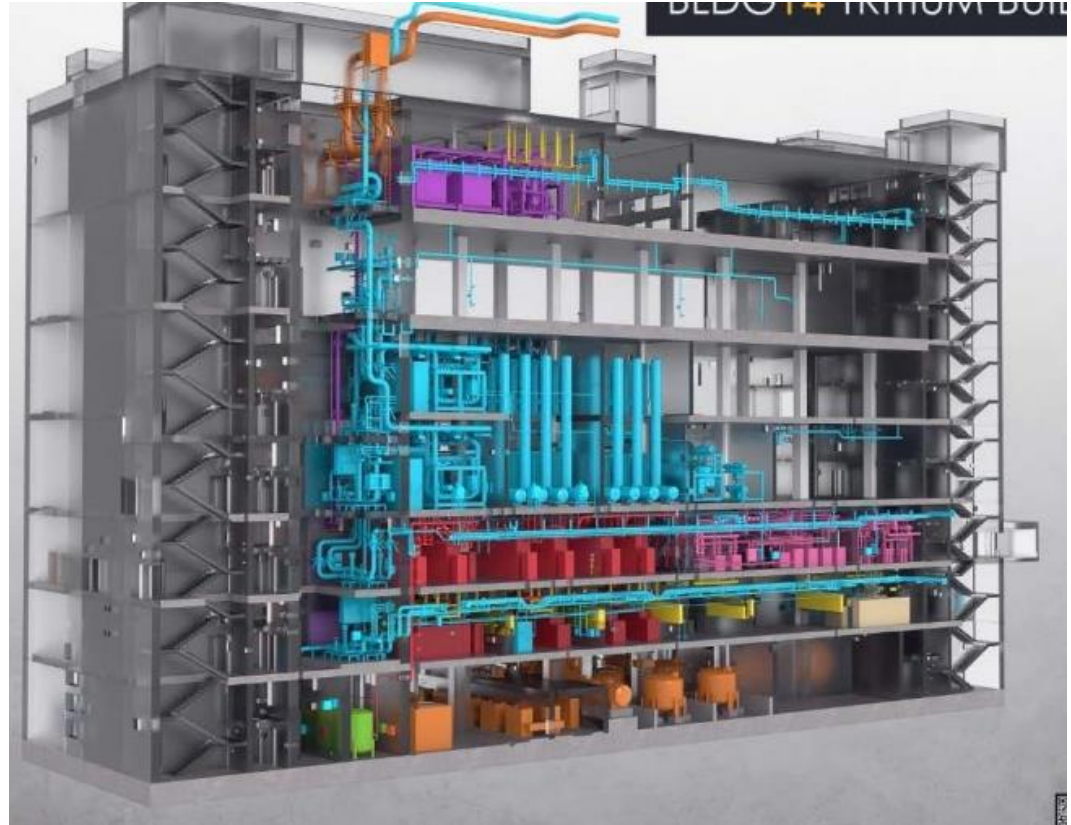
## Nuclear Engineering services // Maîtrise d'Oeuvre

- Architect Engineer II / Focus sur le Tritium plant
- Hot Cell Facility / Atelier de maintenance et gestion des déchets : APD et réalisation



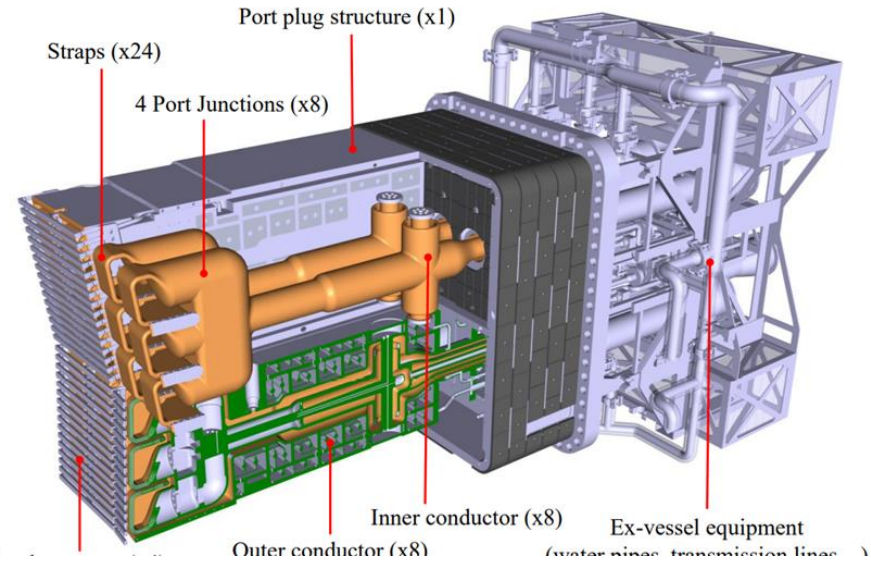
# Tritium Plant / TC-DS

- TC DS : Tokamak Complex Detritiation System
- Final Design / APD
- Manufacturing Design / Phase d'exécution
- Fabrication & Factory acceptance test – I&C platform test / Essais usine / essais plateforme
- Site delivery / Livraison site
- Site assembly and test assistance / Assistance montage / essais site

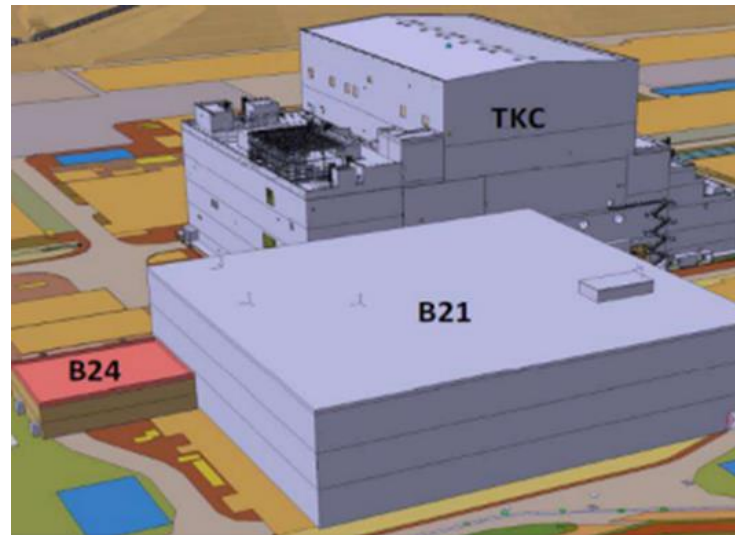
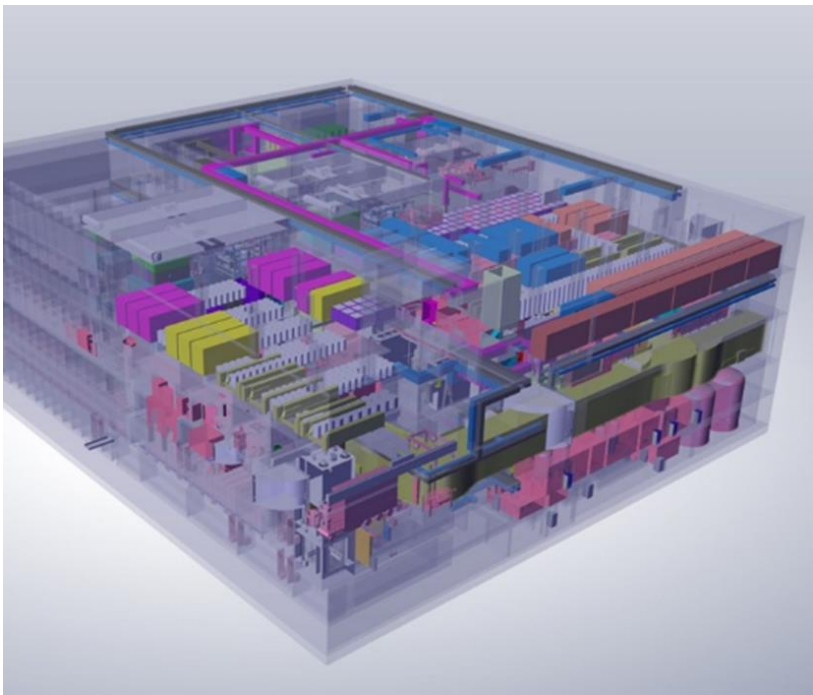


# ICRH Antenna

- Ion Cyclotron Resonance Heating (ICRH) Antenna (but = ignition and sustainment of burning plasmas)
- Firm Part => final design (APD), manufacturing design and production of pre-prototypes (but des pre-prototypes = demonstrate suitability of the welding, manufacturing and inspection of crucial areas) / démontrer la faisabilité des soudure et maintien en condition opérationnelle de l'équipement
- Option 1 => Manufacture full-scale quarter of antenna prototype (but = qualify the overall manufacturing sequence) / Fabrication – essais prototype (1/4 d'antenne)
- Option 2 => Production of two fully assembled final antennas / Fabrication de 2 antennes



# Hot Cell Facility



**APD**  
**Real**  
**Mise en service**

# Your contacts

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**orano**

Giving nuclear energy its full value

## Un évènement :

Le réseau des



## Co-financé :



## Avec le soutien financier :



## Avec la participation :



FUSION  
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ALSYMEX  
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orano



Westinghouse