

ULC
Energy



SMR

Global Supply Chain Webinar – Rolls-Royce SMR



5 February 2025

Safety is crucial to our license to operate



USE LIGHTS IN THE DARK - IT CAN MAKE ALL THE DIFFERENCE

A Nuclear
Development
Company

Using Tried and
Tested
Technology

To Accelerate
Decarbonisation

Dutch Companies

- ULC-Energy's mission is to develop nuclear energy projects in the Netherlands.
- ULC-Energy is the exclusive project developer for Rolls-Royce SMR, a proven, factory manufactured, light water reactor technology.
- Each Rolls-Royce SMR saves 2-3 million tonnes of CO₂ per year.
- ULC-Energy has organised this webinar primarily for Dutch manufacturing companies that are:
 - Interested to know more about Rolls-Royce SMR
 - Interested to become a supplier to Rolls-Royce SMR's international programme

Agenda

- Introduction by Dirk Rabelink (ULC-Energy)
- Rolls-Royce SMR
 - Sophie Macfarlane-Smith (Head of Customer Engagement)
 - Rich Everett (Group Head of Supply Chain)
 - Stephen Hill (Senior Supply Chain Manager)
- A supplier experience by John Prothero (Nuclear Director BAM Nuttall, UK)
- Q&A
- Qualifying to Supply Rolls-Royce SMR
 - Pim Reuderink (Regional Technical Manager of Bureau Veritas)

Attendees will be muted without video.

Chat function will not be operational.

Questions can be posed via the Q&A function (V&A in Dutch-bottom of screen).

You can vote on questions raised to prioritize that question during Q&A.

Q&A will be moderated.

The webinar will be recorded.

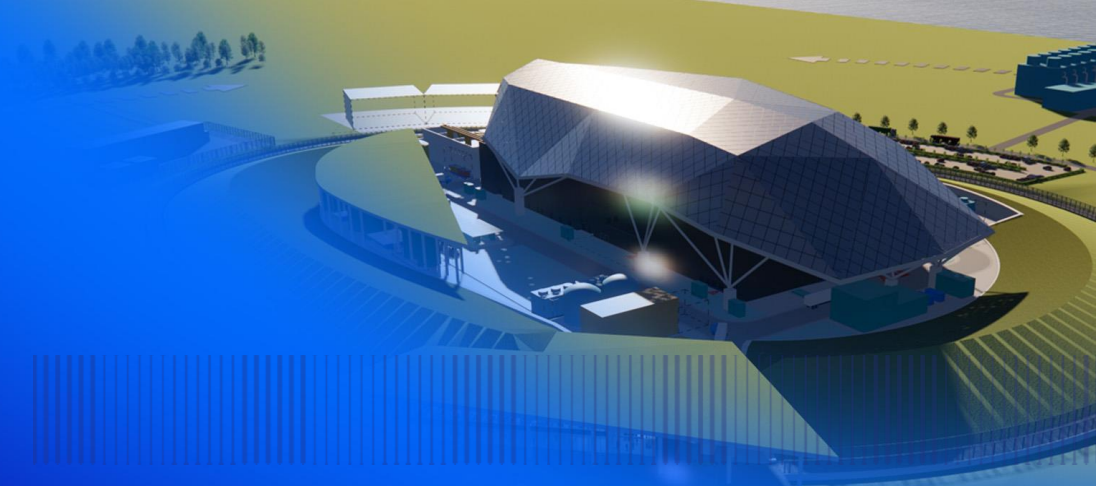


SMR

ROLLS-ROYCE SMR GLOBAL SUPPLY CHAIN WEBINAR 2025

Hosted by ULC Energy

Clean, affordable energy for all.





SMR

WELCOME



SMR

AGENDA

16:20 – 16:30

Business briefing

16:30 – 17:10

Rolls-Royce SMR Procurement Programme

17:10 – 17:20

BAM Nuttall, A Supplier Perspective

17:20 – 17:40

Questions & Answers (first session)

17:40 – 17:50

Bureau Veritas – Qualification for Rolls-Royce SMR

17:50 – 18:00

Questions & Answers (second session)

Times are approximate



SMR

ROLLS-ROYCE SMR BUSINESS BRIEFING

Sophie Macfarlane-Smith

Rolls-Royce SMR Ltd Shareholders

Rolls-Royce SMR Ltd is a technology vendor offering a complete SMR power plant on a turnkey basis.

Our development programme is fully funded with £495m through commercial equity and UK Government grant funding



Rolls-Royce Group

60 years designing, manufacturing, supporting and operating nuclear technology



Constellation Energy (previously Exelon Generation Ltd)

Operates the largest U.S. fleet of zero-carbon nuclear plants with over 18.7GW from 21 reactors at 12 facilities



BNF Resources UK Ltd

Extensive investments in the energy space and represented and advised by BNF Capital Limited, an FCA regulated UK-based investment advisory



Qatar Investment Authority

Invests in the energy transition and funds technologies that enable low carbon electricity generation



Department for
Energy Security
& Net Zero



**UK Research
and Innovation**

UK Department of Energy Security and Net Zero

Rolls-Royce SMR Ltd received the Low-cost nuclear (LCN) grant award by UK Research and Investment (UKRI)



SMR



Reactor Island
Containment

Turbine Island
Turbine Hall





SMR

SMR is about doing things differently, not replicating large plants on a smaller scale



Small

- Maximise power for physical constraints around manufacturability and transportability
- Not about designing around an arbitrary power level

Modular

- Standardisation, factory repeatability in a production line approach.
- Avoidance of large modules that must be disassembled for transportation - defeats the benefits of modularisation
- Modules tested in factories to reduce site activity

Reactor

- Rolls-Royce SMR provides the whole power plant, not just the reactor
- Reactor is ~20-25% of the power plant by capital
- Modularisation of the full power plant including civil construction
- Enables delivery, by Rolls-Royce SMR, under single EMA contract

✗ EPC (mega project)

Conventional EPC (e.g. Large nuclear)

- Mega project
GBP10bn+
- Reactor only, *not* whole plant
- Government driven
- Commercially complex



Designed for LCOE
and simplicity of
deployment



Reducing Project Risk

Factory product



Standardization



EMA (factory product)

Engineering
Manufacturing
Assembly

- Much lower risk
- Reduced capital
- Shorter time to build

= Reduced financing cost

Schedule certainty



Commercial
simplification

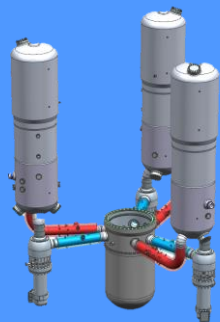




SMR

Nuclear Technology

Design based on 60+ years of nuclear design & manufacturing experience



REACTOR PLANT

- Up to 470 Mwe and 1358 MWt output enough to power ~1 million homes
- 60+ years design life
- Up to 95% availability factor
- Load following



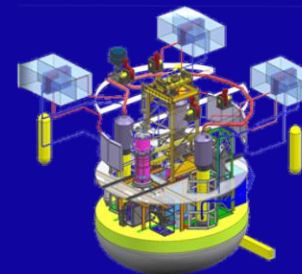
FUEL

- Industry standard Uranium Dioxide fuel
- Standard enrichment <4.95% enriched
- Existing fuel supply chain
- 18-24 month re-fuelling cycle
- Adaptable to utilise MOX fuel



WASTE MANAGEMENT

- Designed to minimise all forms of waste
- Boron free design significantly reduces tritium waste
- The fuel pond is sized to house used fuel for 6-10 years.
- Total volume of spent fuel for 60-year operation: 2.5 London buses



SAFETY

- Multiple active and passive safety systems with internal redundancy
- Safety functions designed to minimise burden on operators
- Seismic isolation of safety significant structures



SMR

What the Rolls-Royce SMR approach delivers



A LOW-COST SOLUTION

Repeatable cost, driven by factory manufactured product

Clean, reliable electricity at scale, at a price competitive with intermittent renewables



DELIVERABLE PLANT

Rapid deployment – four years (nth of a kind) on-site construction time

Low risk, single entity delivery model under an EMA contract

Minimised site disruption during construction (average of 500 people on site removes requirement for extensive worker infrastructure)



GLOBAL PRODUCT

Highly scalable through innovative production methodology

Can fit within existing infrastructure (grid, transport)

Compact footprint increases site flexibility and maximises potential plant locations (including replacement for existing coal or gas-fired plants)

Indirect cooling option increases siting flexibility

Sustainable, long-term job creation, in factories and supply chain, avoiding the boom and bust cycle associated with large one-off infrastructure projects

Multi-use electricity and/or heat output adaptable to on and off-grid applications

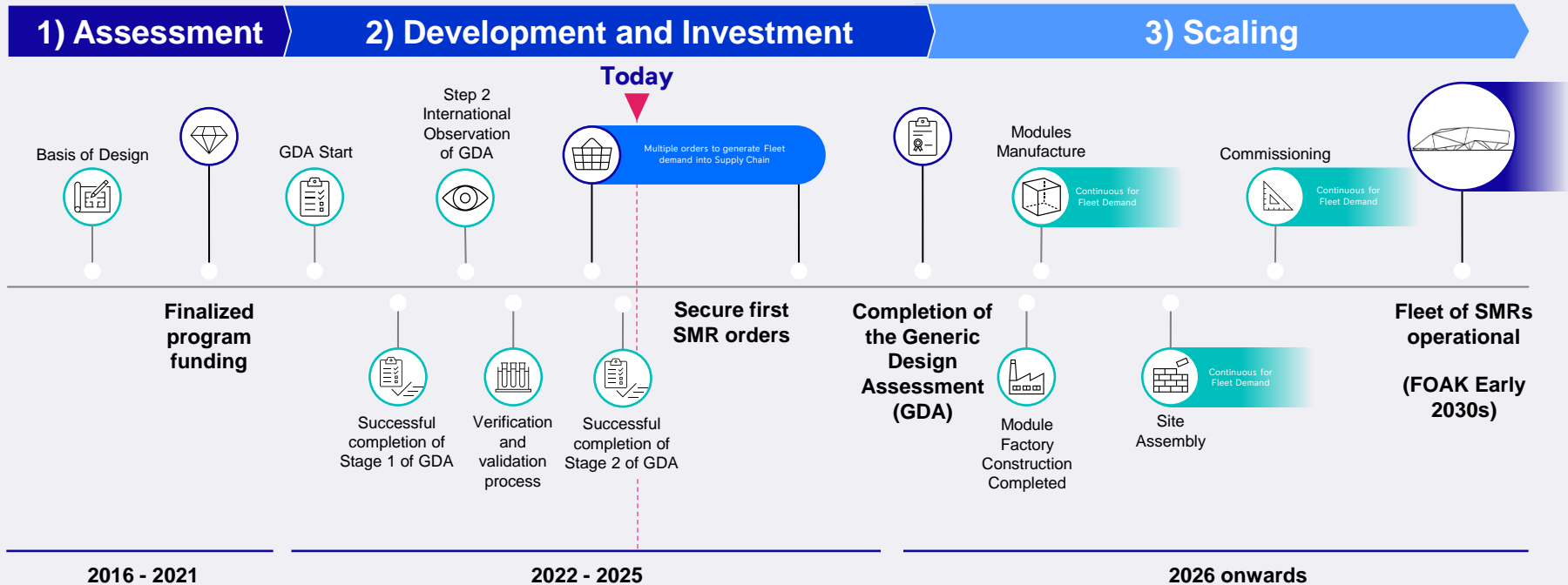


INVESTABLE PROPOSITION

Lower capital cost, risk and build time enables investment by commercial entities on a standard debt and equity basis

Repeatable, low-cost, factory product rather than large one-off infrastructure project

Low completion risk given standardised manufactured nature of the product and repeatable turnkey solution





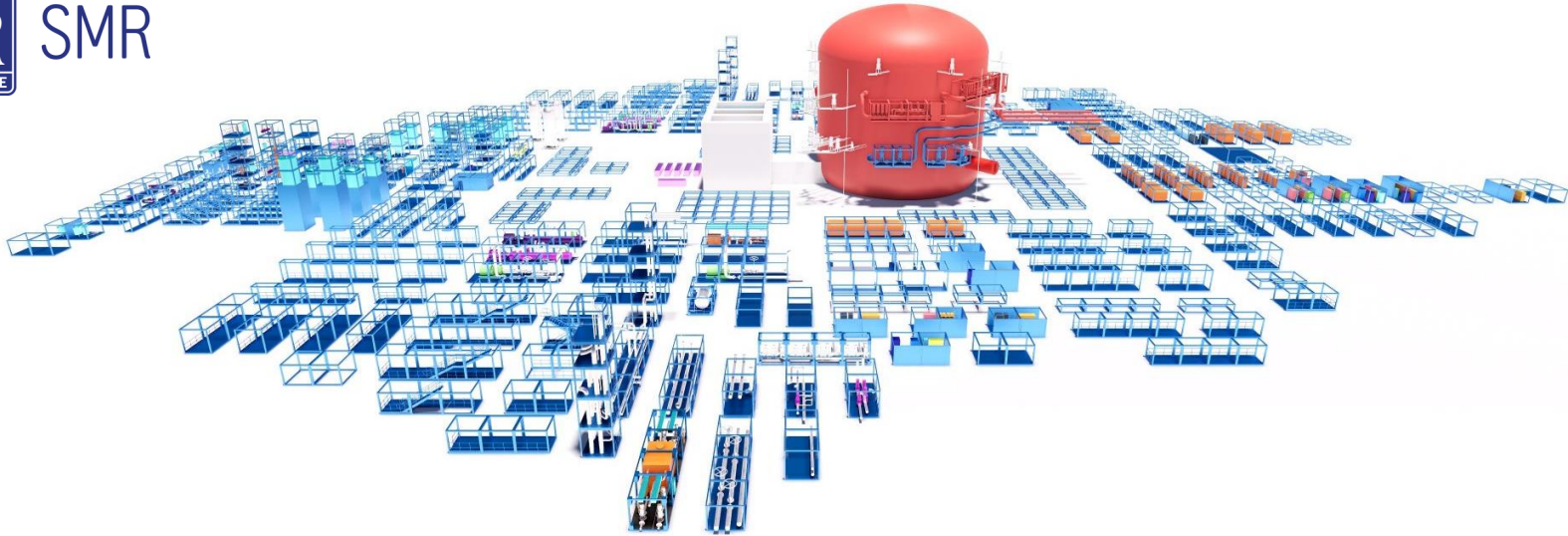
SMR

PROCUREMENT PROGRAMME

Richard Everett and Stephen Hill



SMR



Our procurement programme

01. Why Rolls-Royce SMR is different from a supply chain perspective
02. Our strategy
03. How do we identify suppliers?



SMR

Different. Designed for delivery.

We're not developing new technology; we are bringing our technology to market in a radically different way...

01. Using currently available solutions

02. Adapting existing opportunities

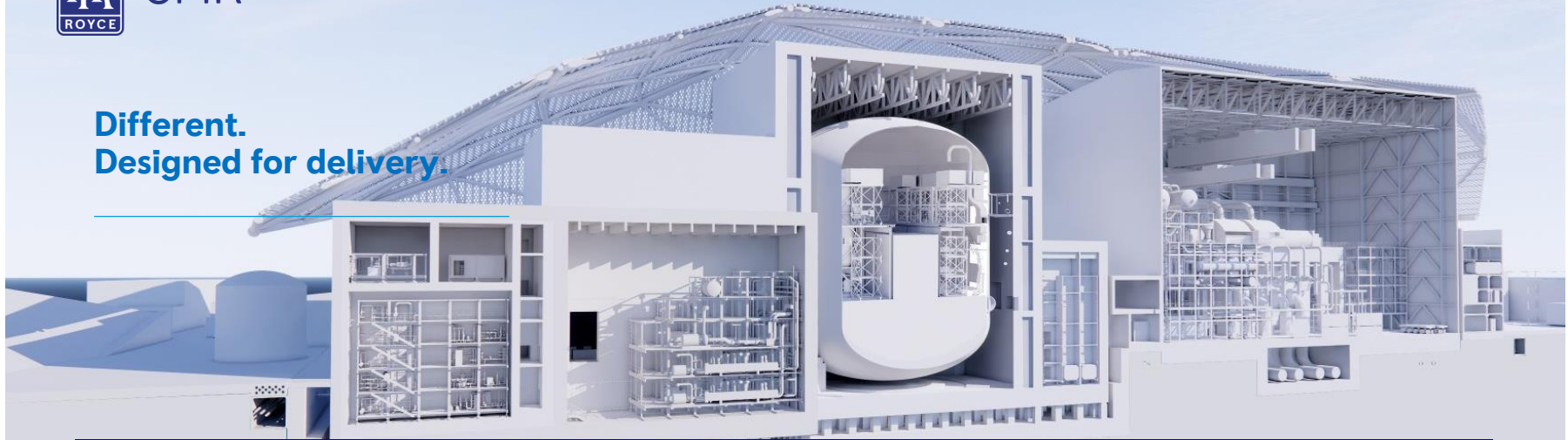
03. A **PRODUCT** not a **PROJECT**





SMR

**Different.
Designed for delivery.**



01. What's the difference between a 'nuclear' and a 'non-nuclear' supplier?

02. How do you make the step from being a 'non-nuclear' to becoming a 'nuclear' supplier?

03. Do you need to make that leap?

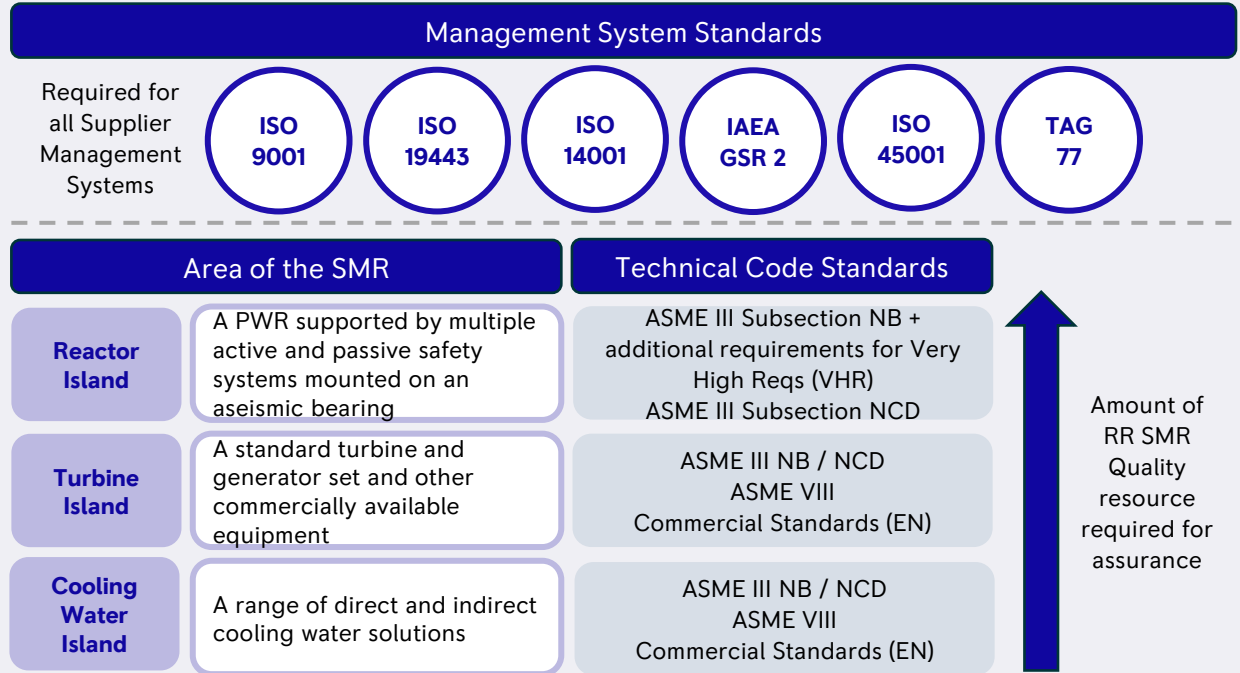


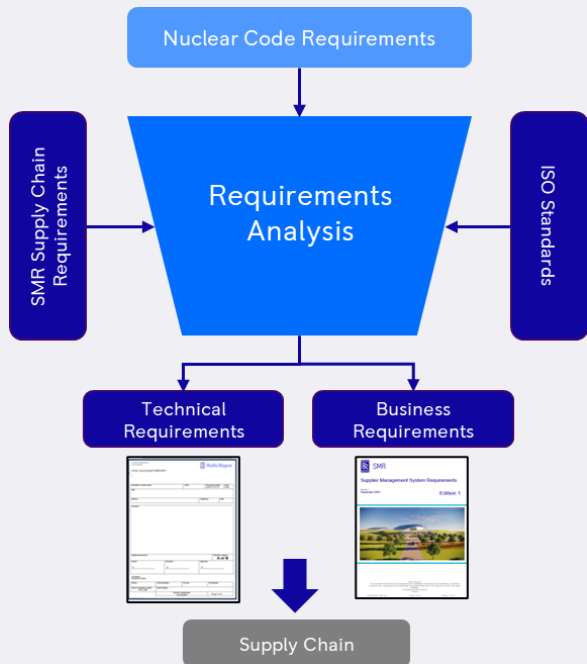
SMR Supply Chain Quality: Standards

All supplier integrated management systems must comply to the **management system standards** listed on this slide covering:

- Quality Management Systems
- Environmental Management Systems
- Safety requirements relating to a Nuclear or Radiological Emergency
- Health and Safety Management
- Supply Chain Management for Nuclear Safety Related Items

Graded approach to Quality and Safety employed plant wide. Allowing for efficient procurement, and the appropriate supply chain design





Supplier Management System Requirements

Key Attributes
(Applicable to Component Procurement)

- Business Management Requirements
- Security Requirements
- Application of the Graded Approach
- CFSI Controls
- Documentation Requirements
- Quality Plan Requirements
- Change Management Controls
- HSE Requirements
- Nuclear Safety Culture
- Quality Assurance Requirements
- Surveillance Requirements
- Competency, Training and Awareness
- Non-Conformance Controls
- Design Requirements

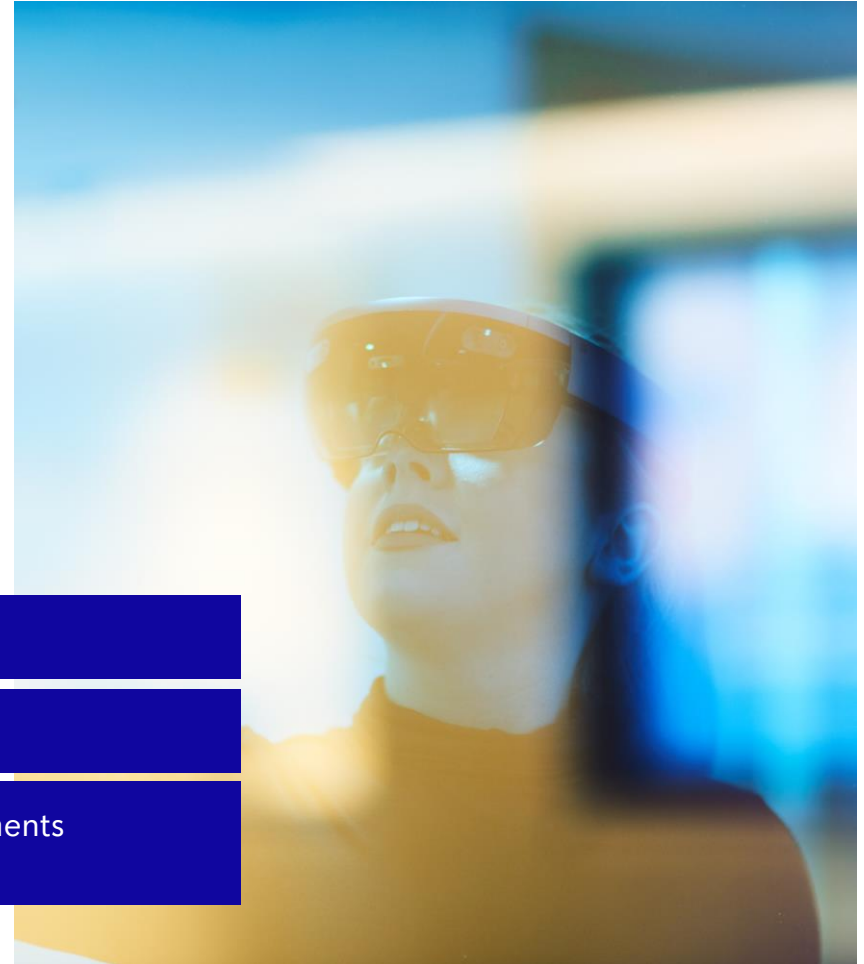




SMR

International supply chain

01. Supply Chain design (international and local needs)
02. Supply Chain Capability (assessments and analysis)
03. Optimise our supply chain to support global requirements through use of digital platforms and live data sharing





SMR

Social value

We are committed to supporting the delivery of our social value objectives through an engaged and diverse supply chain.

01. Commitment to building a thriving domestic supply chain

02. Maximising diversity

03. Digital platforms





SMR

Netherlands - Supply Chain Engagement



| Supplier | Existing Nuclear Supplier | ASME experience | NDA Signed |
|--|---------------------------|-----------------|------------|
| ANDRITZ GOUDA B.V. | ● | ● | |
| ANTONIUS Vesselheads B.V. | ● | | ● |
| Apparatenfabriek Aalmeer | | ● | |
| Arcadis | ● | | ● |
| BAM Netherlands | ● | | |
| Beele | ● | | |
| Beton | ● | | |
| BOIS Equipment Rentals B.V. | | | ● |
| Bosal Nederland B.V. | | ● | |
| Bronckhorst Heat Transfer B.V. | | ● | |
| Cajaflex B.V. | ● | | ● |
| Cryovet International / Rootseleer Group | | | |
| Curtiss-Wright, EST Group B.V. | ● | | ● |
| DE BOER HEEG B.V. | ● | ● | |
| Dorstman B.V. | | ● | |
| DUMETA B.V. | | | ● |
| Dutch Machining Group | | | ● |
| Enalco bv | | ● | |
| Evides Industriewater | | ● | |
| Expansor Nederland B.V. | | | |
| FB Group | | | |
| FB Industries B.V. | | ● | |
| Filtration Group B.V./ Filtration Group Industrial | ● | | |
| Fruigo GeoServices Limited | ● | | ● |
| Gulpen Rotterdam B.V. | ● | ● | ● |
| GPI Tanks | | ● | ● |
| Hamel | ● | | |
| Heerema | | | |
| Hollandia Systems B.V. | | ● | |
| Houdman Mironov BV | | ● | |
| Hubert Stavoren BV | ● | | ● |
| Miksan | | | |

| Supplier | Existing Nuclear Supplier | ASME experience | NDA Signed |
|--|---------------------------|-----------------|------------|
| IHC Holland B.V. | | | ● |
| InterDam B.V. | | | ● |
| Jvrb Holland | | | ● |
| Jumbo-SAL Alliance | | | |
| Kin Machinebouw B.V. | | ● | |
| Klip B.V. | | ● | |
| Koolman Apparatenbouw b.v / Rootseleer Group | | ● | |
| Lasbedrijf Wilderink BV | | ● | |
| Lemtech BV | ● | | ● |
| Mammecet | | | |
| MGI Netherlands B.V. | | ● | |
| Nuclear Research and consultancy Group (NRG) | ● | | ● |
| Nuclear Shields B.V. | | | ● |
| Ommeren Metaaltechniek B.V. | | ● | |
| Pontier X Flow | | | |
| Red Point Alloys B.V. | ● | | |
| Rodella Pumps International | | | ● |
| Schelde Exotech b.v. | ● | ● | |
| Seatools B.V. | | | ● |
| Stalshijp | | | |
| Stork Thermex B.V. | ● | ● | |
| Tankbouw Rootseleer / Rootseleer Group | | ● | |
| Teening | | | |
| Titan Projects BV | | ● | |
| Traiberg Riederkerk BV | ● | | ● |
| ULC Energy B.V. | ● | | ● |
| Van Oord | | | |
| VDI Group | | | |
| Vermeer Eemhaven International B.V. | ● | ● | |
| Venlo Special Equipment bv | | | |
| Wilson Heat Transfer Services B.V. | | | ● |
| Vuus Engineering | | ● | |



SMR

Supply chain engagement

01. Supply Chain Portal
02. Bi-annual supplier conferences
03. Online and face to face 'meet the buyer' events





SMR

A SUPPLIER PERSPECTIVE

BAM Nuttall – John Prothero



SMR

Key Rolls-Royce SMR principles

01. We need certainty

02. Collaboration

03. Be bold

04. Bring innovation

05. Think differently...don't be comfortable

06. Challenge

07. We expect excellence

08. We need the best people



History

BAM Commence working with Rolls-Royce SMR prior to Phase 1

Phase 1 Works (UKRI)

- BAM investment

Phase 2 Works SMR (Supplier)

- WP9 – Civil (Site Factory)
- WP14 – Site layout
- WP3 – Build certainty

BAM Investment

- Site Factory design
- Patent applications



BAM contracts

Seconded Agreements

Key staff have been seconded into Rolls-Royce SMR to manage and deliver key elements of work

Managed Service Agreement (MSA)

Key tasks have a defined scope of work, that are delivered under lump sum agreements



Key behaviour requirements

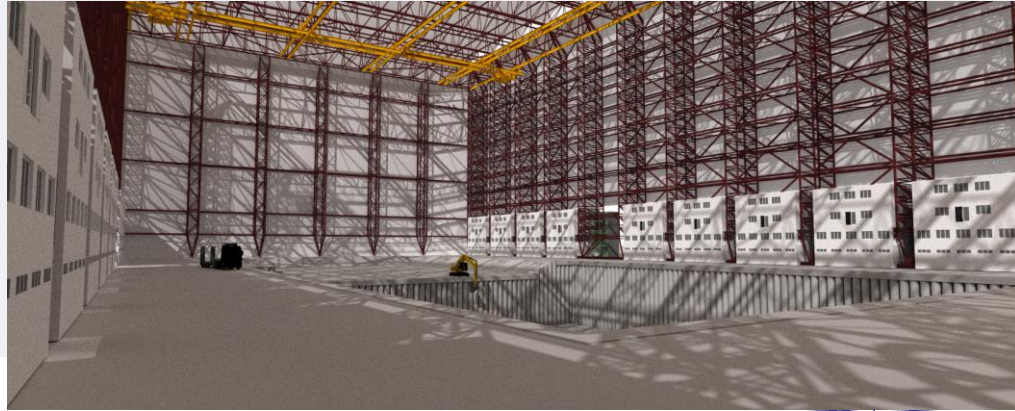
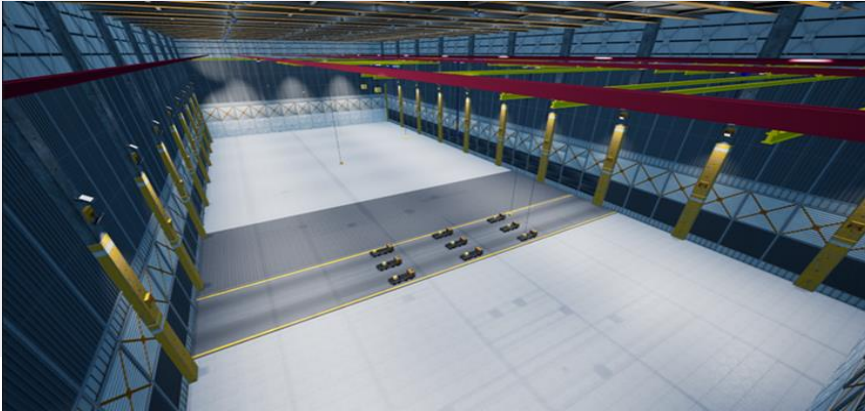
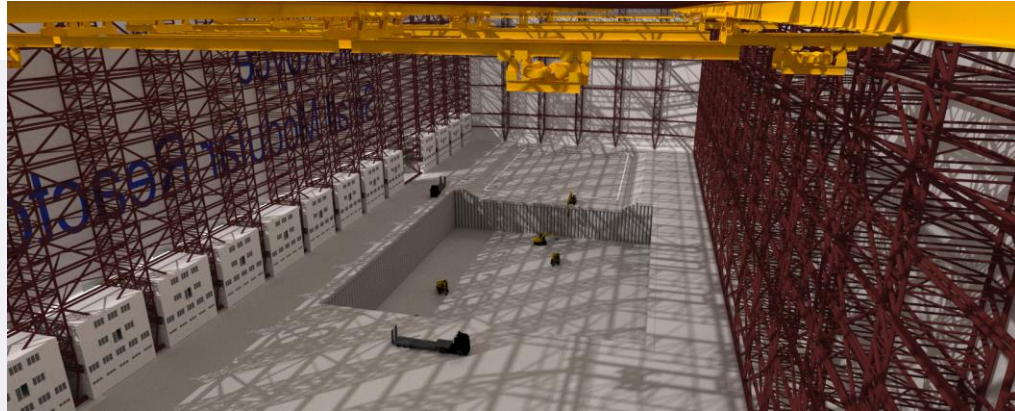
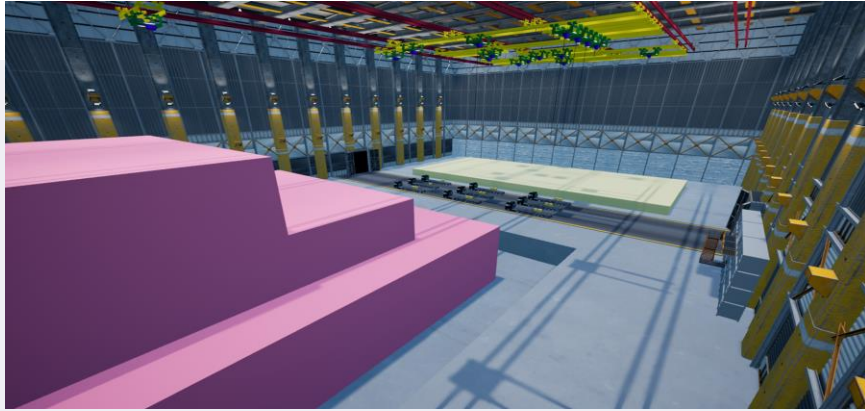
Collaboration is key

01. The delivery programme will require all teams to work extremely collaboratively
02. The civil , MEP & commissioning will all be concurrent
03. The programme delivery requirements will be prescriptive
04. We must be flexible
05. We must be well informed to ensure we understand the impact of our requirements.



SMR

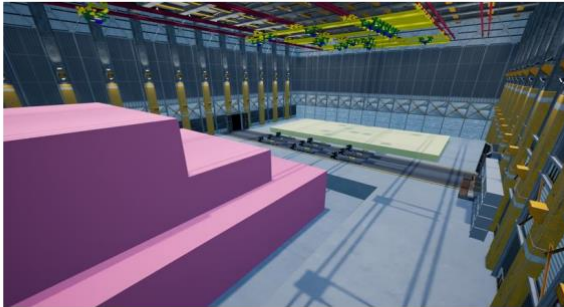
Innovation –BAM Site Factory





SMR

BAM innovation



Collaboration is key

01. BAM site factory
02. Integrated accommodation
03. Rules base algorithms for programme delivery
04. System engineering delivery approach

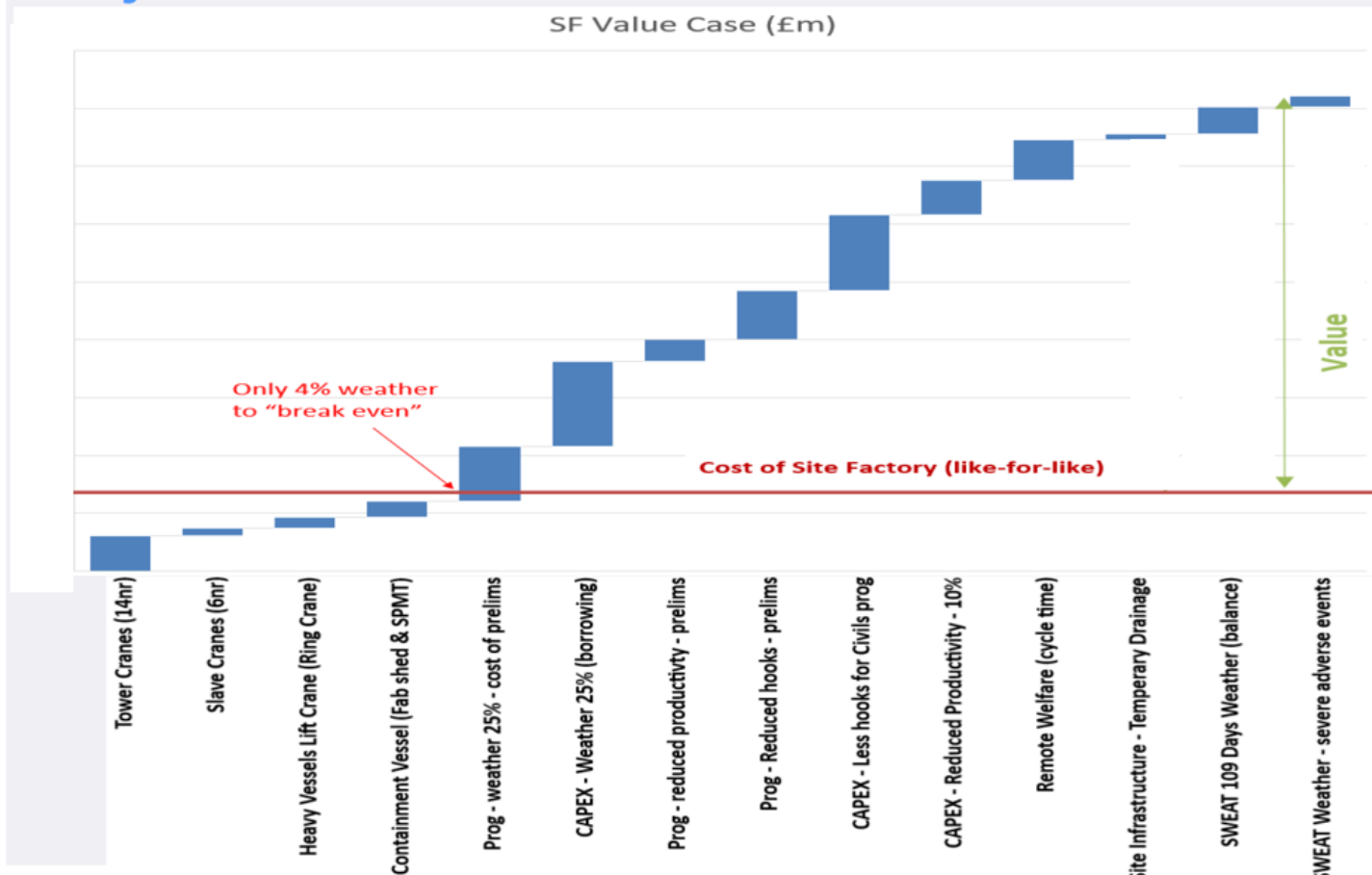
Key approach

01. Delivery of infrastructure in a manufacturing environment
02. Cost and programme reduction
03. Certainty

SMR0011669 [issue 1] Site Factory Value Case - Assessment Report

ROM Calculation of cost for alternative construction methodology if no Site Factory

- Tower Cranes
- Ring Crane
- Containment Fabrication Facility
- Programme elongation due to weather
- Resultant increase in CAPEX





SMR

Intellectual property – full granted patents



| | | |
|-----------------------------------|------------------------|-----------------|
| (AL) Albania | (HU) Hungary | (PT) Portugal * |
| (AT) Austria * | (IE) Ireland | (RO) Romania |
| (BE) Belgium * | (IS) Iceland | (RS) Serbia |
| (BG) Bulgaria * | (IT) Italy * | (SE) Sweden * |
| (CH/LI) Switzerland/Liechtenstein | (LT) Lithuania * | (SI) Slovenia * |
| (CY) Cyprus | (LU) Luxembourg * | (SK) Slovakia |
| (CZ) Czech Republic | (LV) Latvia * | (SM) San Marino |
| (DE) Germany * | (MC) Monaco | (TR) Turkey |
| (DK) Denmark * | (MK) Macedonia | (US) USA |
| (EE) Estonia * | (MT) Malta * | (AS) Australia |
| (ES) Spain | (NL) The Netherlands * | |
| (FI) Finland * | (NO) Norway | |
| (FR) France * | (PL) Poland | |
| (GB) United Kingdom | (JP) Japan | |
| (GR) Greece | (SA) South Africa | |
| (HR) Croatia | (MX) Mexico | |



SMR

Q&A

Panel session 1



SMR

SUPPORT IN THE ROLLS- ROYCE SMR SUPPLY CHAIN

Bureau Veritas – Pim Reuderink



**BUREAU
VERITAS**



SMR

SHAPING A WORLD OF TRUST

Support in the Rolls-Royce SMR
Supply Chain

KEY FIGURES



€5.9
billion

CA EN 2023



83 000
employees*



400,000+
clients



~1 600
offices &
laboratories

IN 140 COUNTRIES

39



HISTORICAL RECOGNITION



| Country | Authorities | Country | Authorities |
|---------|-------------|---------|-------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |



TRACK RECORD IN NUCLEAR



01.

Management system / ISO 19443



BUREAU
VERITAS

MANAGEMENT SYSTEM REQUIREMENTS

Regulatory requirement in the Netherlands:

Regulation on nuclear safety of nuclear installations

Article 8. (effective nuclear safety culture)

Regeling nucleaire veiligheid kerninstallaties

Ensuring that all employees:

1°. understand nuclear safety and their role and contribution to it, and

2°. behave in a sufficiently safety-conscious manner and that this behavior is encouraged and promoted at all management levels by demonstrating leadership for safety;

Compliance to:

IAEA SAFETY STANDARDS SERIES No. GSR Part 2
LEADERSHIP AND MANAGEMENT FOR SAFETY



Meeting regulatory requirements



Meeting client specific and nuclear market requirements

N°1 : NUCLEAR SAFETY

Many definitions, but recognized contributors are:

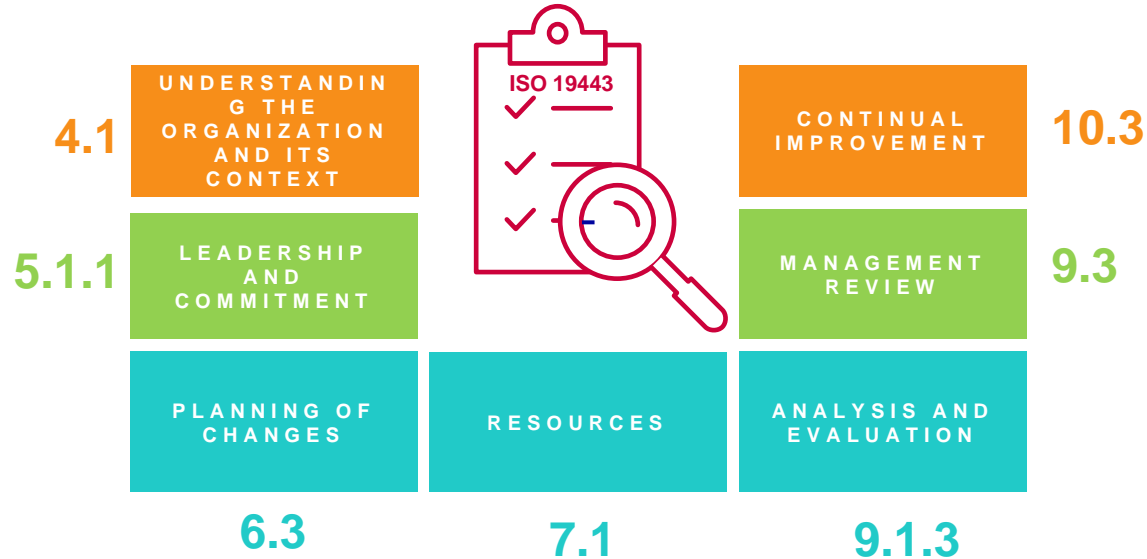
TECHNOLOGICAL FACTOR



HUMAN ASPECTS



ORGANIZATIONAL ASPECTS



SCOPE OF ISO 19443:2018

REQUIREMENTS OF THE ISO 9001: 2015 + REQUIREMENTS OF THE NUCLEAR SAFETY

Organizations in the supply chain of the nuclear energy sector supplying products and services Important To Nuclear Safety (ITNS)

PRODUCTS

SERVICES

ITNS

Management system requirements specific to security management, and nuclear material accounting and control are not addressed in ISO 19443

Requirements specified in ISO 19443 are **complementary (not alternative)** to customer and applicable statutory and regulatory requirements.

ISO 19443

STRUCTURE IS SIMPLE

to complement the
ISO 9001

ISO 9001:2015
replicated as is
TEXT BOX

Slight
adaptations
to
complement
ISO 9001 with
nuclear
specificities

New nuclear
specific
sections

- 4. Context of the organization
- 4.1 Understanding the organization and its context
- 4.2 Understanding the needs and expectations of interested parties
- 4.3 Determining the scope of the quality management system
- 4.4 Quality management system and its processes
- 5. Leadership
- 5.1 Leadership and commitment
- 5.1.1 General
- 5.1.2 Customer focus

ISO 19443:2018(4)

g) ensuring that the quality management system achieves its intended results

h) engaging, directing and supporting persons to contribute to the effectiveness of the quality management system.

i) promoting improvement;

j) supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

NOTE Reference to "business" in this International Standard can be interpreted broadly to mean those activities that are core to the purposes of the organization's existence, whether the organization is public, private, for-profit or not-for-profit.

Demonstrating the above leadership and commitment, top management shall ensure that nuclear safety is taken into account in decision making and is not compromised by any decisions taken.

5.1.2 Customer focus

ISO 9001:2015, Quality management systems — Requirements

5.1.2 Customer focus

Top management shall demonstrate leadership and commitment with respect to customer focus by ensuring that:

- a) customer and applicable statutory and regulatory requirements are determined, understood and consistently met;
- b) the risks and opportunities that can affect conformity of products and services and the ability to enhance customer satisfaction are determined and addressed;
- c) the focus on enhancing customer satisfaction is maintained.

5.1.3 Nuclear safety culture

The organization shall ensure an appropriate nuclear safety culture by consideration of

- a) leadership and commitment of top and line management to nuclear safety, ensuring awareness by all personnel of nuclear safety and encouraging a questioning attitude (see 5.1 and 2.3);
- b) a balanced, rigorous and prudent approach to decision making with respect to quality, cost and schedule such that nuclear safety is not compromised (see 5.1);
- c) transparency in communication (see 2.4);
- d) the use of suitable documented information (see 2.3);
- e) reporting of human, technical and organizational issues (see 9.1 and 10.2);
- f) lessons learned (see 10.1); and
- g) challenging unsafe acts, behaviours and conditions (see 10.2 and 10.3).

© ISO 2018 - All rights reserved. 7

cy
ilities and authorities

portunities
nd activities
tion of quality requirements
to achieve them

of processes
urces

tion



02.

Training



TRAINING FOR THE SUPPLY CHAIN

EXAMPLES

- ✓ RCC-M/MRx construction code for nuclear components
- ✓ **ASME III, ASME VIII, construction code for nuclear components, NQA-1**
- ✓ French regulation (ESPN),
- ✓ **British PSSR/CDM regulations,**
- ✓ Finnish regulation (YVL), applicable to nuclear components
- ✓ **European Regulations: PED, Machine Directives, ATEX**
- ✓ IEC 61513 & 62138 standards applicable to Instrumentation and Control systems important to safety
- ✓ **ISO19443 – Quality Management System for the nuclear sector**

KEY REFERENCES

- › **Close cooperation with ASME**



- › **ASME Standards: Driving Nuclear Progress in Poland's Supply chain** selling, sourcing and manufacturing
- › **Proven track record** in the Netherlands > 100 persons in the Nuclear field. Including authorities, operators and supply chain.

More info, please contact:
Pim Reuderink
Regional Technical Manager



Shaping a World of Trust



[Pim.reuderink@bureauveritas.co](mailto:Pim.reuderink@bureauveritas.com)

[m](#)

+31625053737

WWW.BUREAUVERITAS.COM





SMR

Q&A

Panel session 2

Clean, affordable, energy for all

