

NNB Generation Company (HPC) Limited

Managing Counterfeit, Fraudulent and Suspect Items Guide Book

Document No: 100852062
Rev: 001



Contents

1	Foreword	1
2	Introduction	3
3	Collaboration	4
4	Background	5
5	Definition of CFSI As Defined by the Office for Nuclear Regulation (ONR)	6
6	International Experience	7
7	CFSI Impact Statement on the UK	8
8	CFSI Examples	9
9	Reporting of Counterfeit Material	20
10	HPC Contract Terms and Conditions	22
11	Summary and Conclusion	24
12	Additional Information	25



1 Foreword

This guide book is intended to promote a greater understanding of Counterfeit, Fraudulent and Suspect Items (thereafter CFSIs), their potential impact and what the HPC project expects of its supply chain on this important issue, including some real life examples of CFSI to illustrate how it has penetrated our established supply chains.

CFSIs are a growing concern worldwide and are an increasing concern for nuclear facilities. They can pose immediate and potential threats to worker safety, facility performance, the public, the environment and can negatively impact facility costs.

Concerns about CFSIs extend beyond the component or equipment level to raw materials. Even when the equipment is purchased from the original equipment manufacturer (OEM), there is a possibility that the materials or components used by the manufacturer may be counterfeit or fraudulent. Nuclear facilities and their suppliers should be aware of the issues and implement measures to detect and prevent the introduction and use of CFSI, including raw materials and components.

Experience has shown that a lack of control of the processes involved in the sourcing, receipt, use or disposal of items can lead to the introduction of counterfeit or fraudulent items into a nuclear facility. This has led in some cases to plants being shut down until the impacts of such materials can be assessed and mitigated as required.

Supply chain and procurement processes have a role in detecting and preventing the entry of such counterfeit or fraudulent items, or indeed any non-conforming substandard item, into nuclear facilities.

The HPC project aim is to support the delivery of excellence in all aspects of services of products and operating safely, securely, reliably and predictably.

// CFSIs need to be identified as early as practicable, and their individual impact on safety, costs and work schedules need to be evaluated to determine an appropriate course of action. This includes communicating and documenting information internally and sharing the resulting lessons learned with the nuclear industry. //

2 Introduction

Many factors contribute to the growing number of CFSIs entering the marketplace. CFSIs may have been inadvertently procured and already installed in nuclear facilities.

The infiltration into the global supply chain of CFSIs is a growing concern worldwide. Suppliers risk losing profit, intellectual property and reputation, and workers risk losing their jobs.

CFSIs need to be identified as early as practicable, and their individual impact on safety, costs and work schedules need to be evaluated to determine an appropriate course of action. This includes communicating and documenting information internally and sharing the resulting lessons learned with the nuclear industry.

Engineering and procurement personnel also face challenges related to the increasing number of CFSIs being introduced into the supply chain. These challenges can stem from items from the original manufacturer no longer being available or the manufacturer no longer being willing to support the rigorous testing and documentation, or material certification processes needed for some items. Engineering and procurement personnel thus often rely on commercial items because the nuclear grade compliant items are not available. Unfortunately, these conditions are well suited to vendors that are willing to intentionally supply CFSIs to increase their profit margins.

Some vendors can take advantage of weaknesses in the processes used to prevent or address CFSI issues. There may be poorly defined procurement specifications, weak or absent procurement clauses prohibiting CFSIs, weak or absent vendor qualification processes, weak or absent receipt inspection acceptance criteria, lack of consequences if CFSIs are discovered in shipments, or lack of information sharing about non-conforming vendors among nuclear facility operators.

A robust safety culture throughout the organisation promotes openness and transparency for communicating potential problems and lessons learned, including the incorporation of new processes and applications.

When abnormal conditions are identified that involve a product or service, the item should be considered suspect until a subsequent investigation or test demonstrates the item to be genuine, non-conforming, counterfeit or fraudulent.

The potential for CFSIs to enter nuclear facilities can be reduced significantly by adopting a strong safety culture.

3 Collaboration

The HPC project is committed to working together with its supply chain to deliver excellence in everything it does; this is achieved by having the right people, with the right skills in place to deliver products and services at the right time.

This requires the HPC project and its suppliers to develop a supportive relationship, working together to deliver to the required standards, identifying opportunities to improve performance and resolving issues promptly through:

- Open and honest communication.
- Raising queries and concerns as they become known - at all levels and tiers, throughout the supply chain.
- Checking for understanding and compliance at all levels and tiers of the supply chain – ensuring that specifications, requirements, and identified processes are flowed down, understood, and met.
- Sharing learning.
- Identifying and building on best practice.
- Utilising operating experience (OPEX), Retour d'Experience (REX) to prevent issues and improve performance.
- Documented process for lessons learnt to demonstrate improvement and repeat success.
- Implementing robust corrective and preventive actions.

4 Background

There are many factors that contribute to the ever-growing numbers of CFSIs entering the marketplace.

- Approximately 10% of all worldwide products are counterfeit
- There is no sign that the impact is going to decrease soon. In fact, the indications are that the problem is going to increase

Counterfeiting in Perspective



- Negatively impacts safety
- Damages the economy
- Victimises legitimate manufacturers and suppliers
- Causes loss of customer confidence
- Compounds the product liability issue

5 Definition of CFSI

As Defined by the Office for Nuclear Regulation (ONR)

Counterfeit

Items intentionally manufactured or altered to imitate a legitimate product in order to pass themselves off as genuine. Counterfeit product can be deficient materially or have an inability to reliably function to the specified conditions.

Fraudulent

Fraudulent items are misrepresented with intent to deceive, including items with incorrect identification or false certifications. They may also include items sold by entities that have acquired the legal right to manufacture a specified quantity of an item but produce a larger quantity than authorised and sell the excess as legitimate inventory.

Suspect

An item about which there is an indication by visual inspection, testing, or other preliminary information that it may not conform to accepted standards, specifications and/or technical requirements and there is a suspicion that the item may be counterfeit, fraudulent or nonconforming.

Additional information or investigation is needed to determine whether the suspect item is acceptable, non-conforming, counterfeit or fraudulent.

Item

Although **I** stands for item, it can be a product but can also be a service.

6 International Experience

Experience shows that CFSIs include a wide range of items, such as threaded high strength fasteners, piping, mechanical components, electrical and electronic components. Bulk materials and chemicals can also be of concern, including those provided to tier 1 suppliers by their sub-suppliers. Recently, there have been documented cases within the nuclear industry related to fraudulent material, testing certifications and fraudulent records associated with the delivery of services.

CFSIs are more likely to appear when:

- There is significant financial benefit for the counterfeiter.
- The items are difficult to verify or not typically verified.
- Procurement requirements (technical specifications) are poorly defined.
- Methods or criteria for verifying that procurement requirements are met are inadequate.
- Urgent replacement of an item is required (i.e. there are schedule pressures).
- The item is supplied from a single source with unreliable or unverified performance.
- The item is difficult to source.
- Poor visibility of the entire supply chain.
- There is not a strong safety culture within the organisations involved.

7 CFSI Impact Statement on the UK

Counterfeit goods have cost the UK economy an estimated £17.3bn and threatened 72,000 British jobs in 2016, a report claims.

The rise of online shopping has bolstered the counterfeit economy, with UK consumers now twice as likely to see fakes on sale online as they were a year ago, according to new data released by the Centre for Economic and Business Research (CEBR) and online brand specialist NetNames.

As a result, counterfeiting is estimated to have threatened around 2.5 million jobs worldwide, the report said.

Counterfeits are now costing G20 governments more than £100bn collectively every year.

About 20 organised crime groups are known to be involved in food and drink fraud in the UK, with food fraud thought to be costing families up to £1.17bn a year. The report also found that 2.5 million British shoppers have either knowingly or accidentally bought counterfeit electronics over the past 12 months.



8 CFSI Examples

Example of CFSI in certification – Impact on HPC

Problem statement

HPC received a notification that an NDT (Non-Destructive Testing) company (NDT International PTE Ltd) had its certification withdrawn due to falsified certificates being generated.

Supporting information

The British Institute of Non-Destructive Testing (BINDT) who manage PCN qualification for NDT engineers has withdrawn the approvals and certification relating to NDT International PTE Ltd. NDT International PTE Ltd.'s approval to examine, qualify and certify NDT engineers has been withdrawn.

All NDT engineers who had been certified by NDT International PTE Ltd have had their PCN certification withdrawn and are being made to re-test. (It should be noted that not all certificates issued were falsified).

Acting on suspicions raised about the SQEP of certain NDT engineers BINDT carried out 'secret shopper' investigations and found that PCN qualification were being falsified by NDT International PTE Ltd.

BINDT are stating that this has affected around 3200 engineers (roughly 6500 certificates).

Further information can be found on the BINDT web site at

<http://www.bindt.org/Certification/pcn-news/>

There was obviously a concern about any material that was tested by engineers certified by NDT International PTE Ltd.

Impact statement

Possible impact on the supply chain of HPC/EDF NGL/EDF SA.

8 CFSI Examples

Example of CFSI in certification – Impact on EDF Nuclear Generation Ltd

Problem statement

In June 2015, EDF NGL became aware of OPEX from Ontario Power Group of a UK supplier supplying valve products with misrepresented test certification.

Subsequent investigations by Supply Chain confirmed that a material supplier to this UK valve supplier falsified test certification relating to American Society of Mechanical Engineers (ASME) material utilised in the manufacture of valves.

Supporting information

The issue was first known to the supplier in 2013 (from a Korean customer), although the matter was not made public until March 2015. Customers were notified progressively from April 2015.

Following the OPEX, REX, EDF NGL contacted the supplier and received a draft letter with preliminary information containing details of the falsification issue along with the number and type of affected valve components supplied to EDF NGL. The formal letter was received from them in July 2015.


Impact statement

Over 1,000 valve components had been supplied to EDF NGL with potentially misrepresented certifications, although after a filtering exercise, the supplier concluded that only 87 valves required more detailed justifications.

The affected valves and components include pressure parts (bonnets, body connectors, etc.) and valve internals (discs, pistons, valve stems, etc.)


The falsification of records took place for some years between 2001 and 2011.

NDT CERT- Impact on EDF Nuclear Generation Ltd



N. D. T. LTD.
MATERIALS TESTING,
TRAINING AND CONSULTANCY

MALTRAVERS ROAD
SHEFFIELD
SOUTH YORKSHIRE S2 5AD
TEL : 0114 272 7317
FAX : 0114 272 7319



Date Recd 29.11.04 | Date Of Test 29.11.04 | Test No. M3660 | CAA Ref No. AI/9038/86

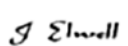
Date 29/11/04 | Report No. M3660 | Order No. Z59423/P3102F | Material Specn. ASME SA479 GR 315 ASME SA370 2002a

Sample 1 off test piece | Size : 2" Diameter | Cast No. : 413947

TENSILE TEST : ASME SA370 2002a

Test Piece				Tensile Strength N/mm2	EI SD GI	EI 60.8 GI	R of A %	HBW/10/3000	
Dimensions mm	Area mm2	2% Proof N/mm2	1% Proof N/mm2					HB	HR
11,31	100,5	320,0	370,0	635,0	56,0	71,0		180	

IMPACT TESTS


 WE HEREBY CERTIFY THIS TO BE
 A TRUE AND FAITHFUL COPY OF
 THE ORIGINAL
 SIGNED AND DATED
 DATE 11/11/04

Tensile testing machine verified to grade 1.0 requirements of BS EN 10002-2 & ASTM E4

J Elwell
 J Elwell
 Supervisor, Metallurgy & Inspection Services

This certificate may not be reproduced except in full, without the permission of the issuing laboratory

8 2 5 4 2.

Page 1 of 1

Regd. in England No. 1992209 Regd. Office: MALTRAVERS RD.SHEFFIELD S2 5AD

1. 'NAMAS' logo not used since late 1990s
2. Test number incorrect; in all reports from July 2004 start with '13***' and not 'M'
3. Incorrect signature; all NDT reports are signed by hand and have an inspection stamp

8 CFSI Examples

Example of CFSI in certification – Impact on EDF SA and Areva Creusot Forge NP

Problem statement

In 2016, Areva NP highlighted irregularities in certain manufacturing files for nuclear pressure equipment manufactured by its Creusot Forge plant (Saône-et-Loire département). EDF SA and Areva NP conducted a manufacturing quality review in its Creusot Forge plant (Saône-et-Loire département), which revealed the existence of irregularities in certain manufacturing files.



Supporting information

The first investigations carried out on these files in 2016 identified 89 irregularities concerning EDF SA reactors in operation. Autorité De Sûreté Nucléaire (ASN) who are the French Nuclear Regulator asked EDF SA to extend the review to all the manufacturing files for components forged in this plant.

The purpose of this extended review was to detect any deviation from either the technical baseline requirements chosen by the manufacturer, or the plant's internal requirements, or from the contractual or regulatory requirements applicable at the time of manufacture.

Starting in July 2017, EDF SA transmitted the results of the manufacturing file reviews for twelve reactors for which restart following a refuelling outage was scheduled between September and November 2017. At that stage, the review led to the detection of 601 conformity deviations. ASN analysed the results transmitted by EDF SA before it authorised the restart of these reactors.

Impact statement

This led to significant recovery actions from Areva NP, this involved the suspension of manufacturing and the loss of customer confidence.

Since this multinational inspection, the ONR has developed its intervention plans to ensure that the licensee has in place and implements adequate management and assurance arrangements to clearly demonstrate that all components are manufactured to the required standards.

HPC also has its own inspection and quality assurance programme to provide the required confidence that the components manufactured by Areva NP (now Framatome as of July 2018) for the HPC project to meet those exacting standards.

8 CFSI Examples

Example of CFSI in certification – Counterfeit pipe failure at Datong power station

Problem statement

There was a steam line failure from a 300MW unit at the Datong Power Station Unit 2 in China. The investigation indicates that the pipe was actually manufactured by a Chinese pipe mill, then sold to another Chinese “pipe producer” who did not perform the specified heat treatment, then sold to a third “pipe company” that polished the OD and sized the ends. The pipe was then shipped to a company in Houston which certified it as “Made in the USA” and shipped it to the fabrication company, which then supplied it for installation on the Datong station.

Supporting information

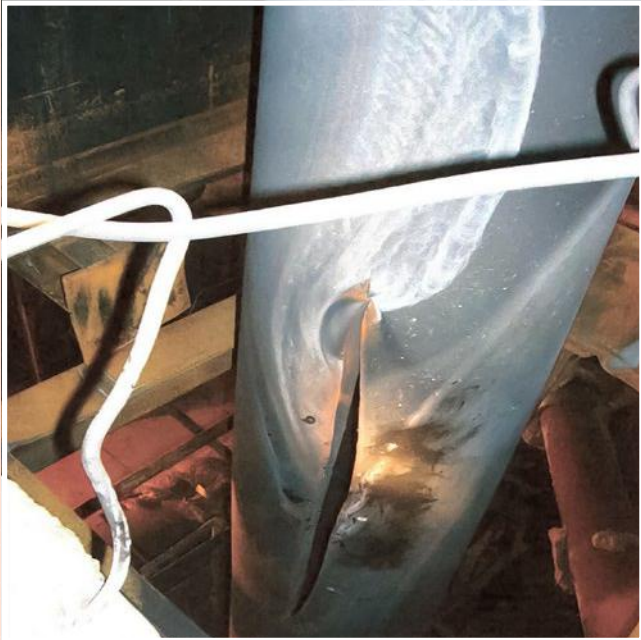
The pipe was installed early to mid-2006 and had been in operation for less than six weeks when the rupture occurred. Tragically, two people died, and many were injured. These details have been confirmed by the Bechtel QA Manager of Power. Bechtel China has also conducted an investigation and the supply chain is complex due to the extent of how many agents, brokers, and mills are involved.

Impact statement

There is evidence to support that over 30 plants contain similar or other “fake pipe” all over China. Documented instances exist where this type of pipe has been transferred into the US market.

The Chinese government has called for a formal investigation and banned Chinese-made pipe for use in major power plant critical applications.

Counterfeit pipe failure at Datong power station



8 CFSI Examples

Example of CFSI – Counterfeit Yokogawa Transmitters

Problem statement

Yokogawa have become aware of several instances in which counterfeit field instruments, bearing the Yokogawa logo, have reached some of their customers. At first glance, they are nearly indistinguishable with a semblance of functionality and interface that mimics the correct product.

Supporting information

A thorough investigation has confirmed that these counterfeit instruments are being produced by unauthorised manufacturers in China who have gone to great lengths to imitate Yokogawa products. Performance test results show that they are severely inferior in quality, and performance and that they pose a serious safety risk.

It is important to note that these counterfeit instruments carry tagging that indicates they are conformant, but they are not conformant for use in ExD (Explosive Devices) and other hazardous areas. They also do not meet the engineering and manufacturing requirements of regulatory bodies.

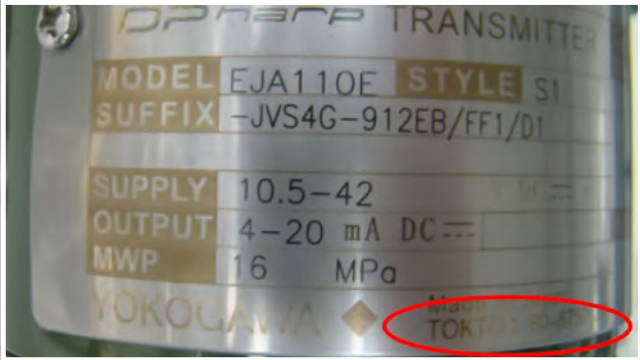
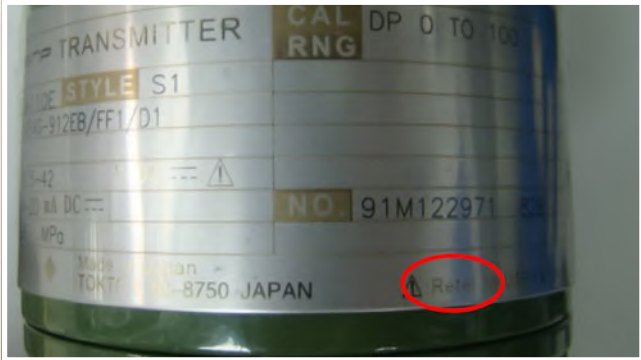
Impact statement

Instruments cannot be relied upon to operate as specified in all conditions.

Yokogawa are working with authorities to reduce or eliminate the delivery of counterfeit instrumentation to its customers.

Counterfeit example of a Yokogawa Transmitter

Top Works Name Plate of a counterfeit has several typos



- 1. "Reter" instead of "Refer"
- 2. Some units will state "Tokto" instead of "Tokyo"



- 3. Thread type identification letter stamp "N, A or M" is missing on counterfeits.

8 CFSI Examples

Example of CFSI in certification – Impact on Kobe Steel Ltd

Problem statement

Although the problem of companies using substandard materials usually involves SMEs, the most recent incident regarding counterfeiting material involves a large corporation like Kobelco (Kobe Steel Ltd) based in Japan.

Supporting information

Employees at Kobe Steel Ltd had falsified Material Test Certificates (MTC's) to make the materials meet the customer specifications when in fact they did not. The fraud lasted over a decade and had cost the company millions. Two days after the announcement, Kobe Steel shares price fell 30% in value, wiping \$700 million USD off its market value.

The scandal has forced some of Japan's best-known manufacturers to confirm the safety of products sourced from Kobe Steel.

Toyota, Nissan and US carmaker General Motors are among about 500 affected companies, and Hitachi said it had used Kobe Steel parts in trains built for the UK market.

Impact statement

The chief executive of Kobe Steel has said a deepening scandal over false inspections data may have spread beyond Japan and conceded that his company now had "zero credibility".

Kobe Steel Ltd admitted its data fraud has been going on nearly five decades and revealed new cases of cheating, highlighting the challenges facing the 112-year-old company mired in compliance failures and malfeasance, throwing global supply chains into turmoil.

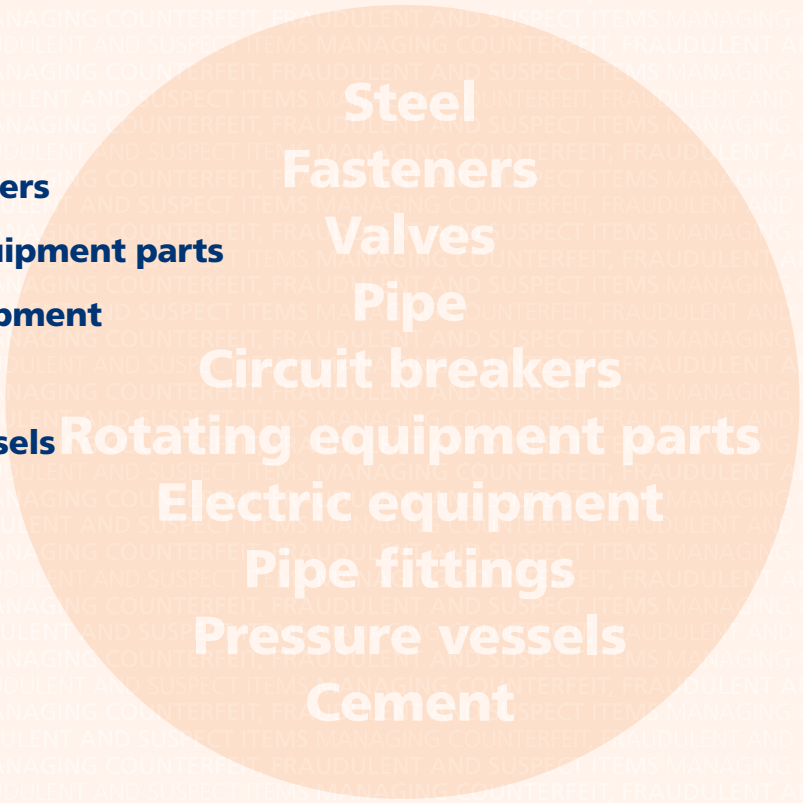
8 CFSI Examples

CFSI within the steel industry

Top ten list of fake steel products

The Construction Industry Institute (CII) study had found that raw, substandard steel was the most counterfeited commodity among the materials (within the construction industry). CII outlined a top ten list of the most counterfeited commodities:

- **Steel**
- **Fasteners**
- **Valves**
- **Pipe**
- **Circuit breakers**
- **Rotating equipment parts**
- **Electric equipment**
- **Pipe fittings**
- **Pressure vessels**
- **Cement**



9 Reporting of Counterfeit Material

The supplier shall determine the rigour of inspection and test requirements for the acceptance of material. This shall be commensurate with the risk of the material being counterfeit and the criticality of the material in relation to safety and performance.

If material is suspected of being counterfeit at any point in production or service provision, then additional testing shall be considered to confirm if it is counterfeit material.

Control of Non-Conforming Material

The supplier shall establish arrangements to:

- Control suspected counterfeit material to prevent its unintended use or re-entry into the supply chain.
- Ensure suspected counterfeit material is not returned to the sub-supplier unless under controlled circumstances for validation or testing.
- Ensure that material confirmed as being counterfeit does not re-enter the supply chain and is not returned to the sub-supplier.

Reporting of Counterfeit Material

The supplier shall establish arrangements to ensure that occurrences of counterfeit material are reported to:

- The customer.
- The supplier of the material.
- The owner of the Intellectual Property Rights of the genuine material.
- Appropriate information/data gathering organisations including, but not limited to:
- Anti-Counterfeiting Forum.
- National Law Enforcement Authorities (see note).
- **Note:** In the UK the occurrences of counterfeit material are also to be reported to the Police and Trading Standards.

What to do if you discover suspect items

Self-questioning Check list:

- Never assume that you will always get the correct product.
- Always request and check the original certification.
- What should I do if I suspect CFSIs – Contact your company’s quality dept. to allow them to investigate further and raise a Non-Conformance Report (NCR).



10 HPC Contract Terms and Conditions

HPC project contract requirements for the supply chain

Our suppliers are contractually required to have robust processes in place to initially assess a prospective supplier and then to monitor their work to ensure that it continues to meet the quality, schedule, safety and price requirements that both they and HPC stipulate.

Suppliers are also required to flow those same standards down to their supply chain tiers and to confirm their understanding.

- All HPC contracts and purchase orders contain requirements that goods and materials will be new not reconditioned, used, or repaired unless otherwise specified.
- Contractors are obliged to ensure that all goods and materials are supplied with original documentation and accompanied with transposed certificates of origin.
- Contracts contain conditions that prohibit delivery of CFSI and ensure that suppliers are aware of their accountability for providing the correct items and the consequences for supplying CFSI.
- Contracts include provisions for retaining part or all of the fee until goods and materials are received that conform to HPC technical requirements and hold contractors accountable for replacing CFSI items at their own expense.

HPC – NEC Contract Clause

“The Contractor warrants that no Plant and Materials or Equipment that are counterfeit in whole or in their component parts or constituents are or will be used or incorporated into the works. Without prejudicing the Employer’s other rights and remedies, the Contractor promptly replaces any suspect or counterfeit Plant and Materials or Equipment with such genuine Plant and Materials or Equipment that are acceptable to the Supervisor.

Any suspect or counterfeit Plant and Materials or Equipment may be impounded by the Supervisor and provided to the relevant authorities for investigation. The Contractor is liable for all costs relating to the removal, replacement and/or impoundment of such items and the Employer is entitled to withhold payment for such items pending the results of any investigation by the Employer or any relevant authority. The Contractor has no entitlement to a compensation event as a result of such removal, replacement and/or impoundment except in accordance with this clause”

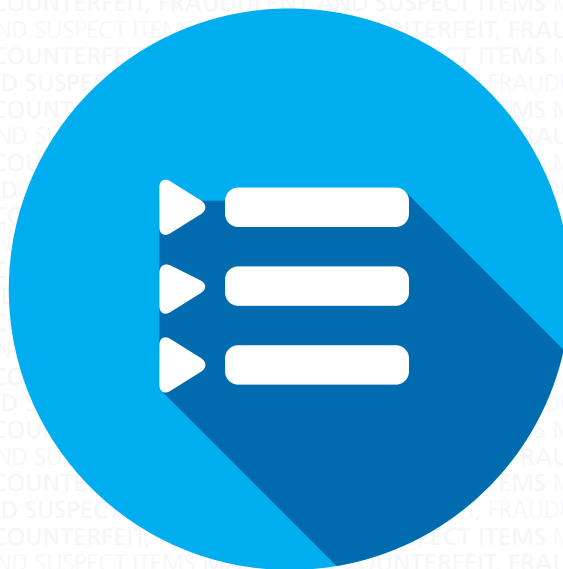
60.1(25).

HPC – FIDIC Contract Clause

“The Contractor warrants that no materials or Goods that are counterfeit in whole or in their component parts or constituents shall be Supplied. Without prejudicing the Employer’s other rights and remedies, the Contractor shall promptly replace any suspect or counterfeit materials or Goods with such genuine materials or Goods that are acceptable to the Employer.

Any suspect or counterfeit materials or Goods may be impounded by the Employer and provided to the relevant authorities for investigation. The Contractor shall be liable for all costs relating to the removal, replacement and/or impoundment of such items and the Employer shall be entitled to withhold payment for such items pending the results of any investigation by the Employer or any relevant authority. The Contractor shall not be entitled to any extension of time for any delay or payment of any Cost arising in relation to the Supply as result of the removal, replacement and/or impounding of suspect or counterfeit materials or goods or their investigation, unless any investigation undertaken by the Employer or relevant authorities demonstrate that the materials or Goods in question were not counterfeit”.

Clause 7.1



11 Summary and Conclusion

CFSIs are an increasing problem for industry. Nuclear facilities need to be aware and put processes in place to detect and report suspected CFSIs. These processes could include ensuring good knowledge among supply chain participants, putting processes in place to transmit requirements down the supply chain, and monitoring and evaluating supply chain performance.

Generally, counterfeiters go after recognised, high demand items to maximise their profit. CFSIs of concern to nuclear facilities are those that look nearly identical to original items but contain substandard, poorly assembled or aged components or material. Such items can be difficult to detect by standard industrial quality control inspections but can cause catastrophic failures or loss of functional capability. The infiltration of CFSIs into industry could also lead to loss of legitimate firms from the marketplace, with an associated loss of jobs and revenue. Nuclear supply chains might have a decreased ability to deliver genuine products when needed, with potential negative impacts on facility reliability, economics and safety.

We must all be vigilant to the risk of using CFSIs and question anything that appears doubtful, whether an HPC employee or a HPC supplier. We must ensure that the process of initially selecting and approving a supplier is robust. Apply monitoring of the supply chain to ensure continuing understanding and compliance with contract and specification requirements.

CFSIs are an ongoing and growing problem, not just within manufacturing but also in our daily lives.

HPC employees, contractors and the supply chain all have a role to play in ensuring that CFSIs do not get into the HPC supply chain, nor onto the site.

12 Additional Information

- (1) **IAEA** Managing suspect and counterfeit items in the nuclear industry
- (2) **Nuclear Energy Agency** Regulatory oversight of Non-conforming, **Committee on Nuclear Counterfeit, Fraudulent and Suspect Items** **Regulatory Activities**
- (3) **Nuclear Energy Agency** Operating Experience Report: Counterfeit, **Committee on Nuclear Fraudulent and Suspect Items** **Regulatory Activities**
- (4) **EDF Nuclear Generation Ltd** Managing the Supply Chain Risk for Suspect and Counterfeit Goods and Items
- (5) **Bechtel** Anti-counterfeiting white paper
- (6) **Electric Power Research Institute** Plant Support Engineering: Counterfeit, Fraudulent and Substandard Items
- (7) **Construction Industry Institute** Product Integrity in Low-cost Sourcing Countries: Counterfeiting within the Construction Industry
- (8) **Office of Nuclear Regulation (ONR) TAG 77** – Procurement of Nuclear Safety Related Items, specifically section 6.8

© 2020 Published in the United Kingdom by NNB Generation Company (HPC) Limited (NNB GenCo), 90 Whitfield Street, London W1T 4EZ. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying and recording, without the written permission of the copyright holder NNB GenCo, application for which should be addressed to the publisher. Such written permission must also be obtained before any part of this publication is stored in a retrieval system of any nature. Requests for copies of this document should be referred to Head of Business Architecture, NNB GenCo, 90 Whitfield Street, London W1T 4EZ. The electronic copy is the current issue and printing renders this document uncontrolled.

