



Human Performance Fundamentals Training Standards

 UK NUCLEAR
HUMAN PERFORMANCE FORUM

 cogent
*Skills for Science
Based Industries*

 The National
Skills Academy
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Document History

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No	Revision Details	Author	Checked	Approved
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Major contributors to this document

The content of this document has been developed by UK and US industry working groups consisting of nuclear human performance specialists.

- **UK Nuclear Human Performance Forum**

The UK Nuclear Human Performance Forum was established in 2008 to focus upon the development of human performance across the UK. At this time there were no established UK or European standards for human performance training for practitioners, or any consistent approach to the development of human performance in the UK nuclear industry. In addition there was no national network for learning and sharing best practice in human performance across the nuclear industry, despite the growing field of interest and commitment to human performance within the UK.

Members of the UK Nuclear Human Performance Forum include:

- Cogent SSC
- EDF Energy
- Low Level Waste Repository
- Magnox Ltd
- National Nuclear Laboratory
- National Skills Academy for Nuclear
- Rolls Royce
- Sellafield Ltd
- Urenco
- Westinghouse UK

- **Institute of Nuclear Power Operations**

Established by the nuclear industry in December 1979, the Institute of Nuclear Power Operations (INPO) is a not-for-profit organisation with its headquarters in Atlanta, USA. The INPO mission is to promote the highest levels of safety and reliability – to promote excellence - in the operation of commercial nuclear power plants.

This mission is achieved through:

- Establishing performance objectives, criteria and guidelines for the nuclear power industry
- Conducting regular detailed evaluations of nuclear power plants
- Providing assurance to help nuclear power plants improve their performance

INPO consists of 27 US utility members who operate nuclear power plants and 41 utility associate member co-owners. Human Performance Practitioner Training Standards © Cogent SSC Ltd 2012 – Issue 1.0 4

- **Cogent Sector Skills Council**

Cogent is the Sector Skills Council (SSC) for the Chemicals, Pharmaceuticals, Nuclear, Oil and Gas, Petroleum and Polymer Industries established in 2003. Cogent are licensed by UK Government to help employers in these industries to address their workforce development needs so that they can compete successfully in a global market.

As an employer-led Sector Skills Council, Cogent works with industry to research and forecast skills needs and develop fit-for-purpose standards and qualifications and other skills solutions.

Cogent has a unique place in the UK's skills infrastructure and operates or engages with employers, providing a voice for employer demand.

- **National Skills Academy for Nuclear**

The National Skills Academy for Nuclear was officially launched by the UK Government in January 2008. It was established at the request of nuclear employers to address the key skills and training challenges facing the nuclear industry.

The Skills Academy is the lead strategic body that represents the industry to stimulate, coordinate and enable excellence in skills to support the Nuclear Programme.

The National Skills Academy for Nuclear is an employer led membership organisation established to ensure that the UK Nuclear Industry and its Supply Chain has the skilled, competent and safe workforce it needs to deal with the current and future UK nuclear programme, including all sub sectors: Defence, Decommissioning, Operations, Uranium Supply, Enrichment & Manufacture, Waste Management & Disposal and New Nuclear Build.

Authorised for use

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Introduction

Human Performance (HU) is a unique blend of behaviours, managing organisational defences, safety culture, preventing errors to avoid or mitigate the impact of events and accidents. Simply defined HU is “Behaviour + Results;” HU=B+R

*“Human Performance focuses on both *reducing errors* and *managing defenses* to create immunity to significant events.

$$Re + Md = \emptyset E$$

Reducing active errors (Re) and managing defences (Md) will lead to no significant events ($\emptyset E$). “

Recent significant research and analysis of accidents has highlighted the need to focus on the human performance aspects of organisational arrangements within the nuclear industry to enhance the development of High Reliability Organisations. Regulatory authorities now increasingly require employers to provide a clear demonstration of organisational competence in the area of human performance.

These Training Standards set out the required level of competence to be achieved by training programmes designed for introducing human performance theory, tools and techniques to all nuclear workers.

These Industry Training Standards have been developed with employers from the UK (UK Nuclear Human Performance Forum) and the US (Institute of Nuclear Power Operators INPO) to identify the skills, knowledge and understanding needed for effective training to take place. The training standards themselves are established under the collaboration agreement between INPO and the NSA Nuclear and form part of Covent’s Nuclear Industry Training Framework which provides a skills benchmark for world class performance for the nuclear industry.

Industry Training Standard – Human Performance Fundamentals

Aim and Purpose

To provide the learner with an appreciation of the fundamentals of Human Performance theory as well as introducing tools and techniques that aim to reduce the severity and frequency of events, and thus improving organisational performance.

Audience

Nuclear licensee employees, long term contractor (> 3 months) and agency staff.

Human Performance

“Human Performance (HU) is a unique blend of behaviours, managing organisational defences, safety culture, preventing errors to avoid or mitigate the impact of events and accidents.”

Human performance can be defined as all aspects of human action (behaviours) relevant to the safe operation of a hazardous installation, in all phases of the installation from conception and design, through operation, maintenance, support, decommissioning and shutdown.

Specific human performance principles outlined in INPO / WANO documentation, include:

- People are fallible, even the best make mistakes
- Error likely situations are predictable, manageable, and preventable
- Individual behaviour is influenced by organisational processes and values
- People achieve high levels of performance based largely on the encouragement and reinforcement received from leaders, peers, and subordinates
- Events can be avoided by an understanding of the reasons mistakes occur and application of the lessons learned from past events

Human Performance Nuclear Worker

The training standards are aimed at Front-Line Workers (‘plant touchers’) – that is, anyone who touches plant equipment and is capable of altering its status and, Knowledge Workers (‘paper touchers’) responsible for the processes supporting safe and compliant work

Human Performance Fundamentals Training Standard

1. Strategic Foundation of Human Performance theory and principles
2. Reducing Error
3. Managing Defences
4. Anatomy of an Event
5. Error Avoidance Tools and techniques

Assessment Methodology

The purpose of assessment is to ensure that effective learning has taken place. Assessment of the candidate's performance will be against the stated learning objectives and should involve both written and practical assessments.

The assessment process should:

- Be fair and clear for those undertaking it.
- Explain clearly the standards for satisfactory completion of the model.
- Be consistent and transparent in its marking.
- Be open to audit by the National Skills Academy or its appointed body.

The Training Provider should arrange for formative assessment to take place in suitable conditions and where appropriate, for the responses to be collected immediately and marked within 24 hours. The learner should be informed of the result as soon as possible and recorded.

Title	Human Performance Fundamentals
Detail	
Aim & Purpose	To provide the learner with an appreciation of the fundamentals of Human Performance theory as well as introducing tools and techniques that aim to reduce the severity and frequency of events, and thus improving organisational performance.
Learning Outcomes The learner will:	Assessment Criteria The learner can:
<p>1. Understand the Strategic Foundation of Human Performance theory and principles</p>	<p>1.1 Define error and how it may be provoked</p> <p>1.2 Understand the need for emphasis on human performance at nuclear sites</p> <p>1.3 Distinguish between behaviour and results</p> <p>1.4 Outline the 5 human performance principles</p>
<p>2. Understand the importance of Reducing Error in decreasing the frequency of events</p>	<p>2.1 Identify the phases of work execution where error prevention can be applied</p> <p>2.2 Describe human fallibility</p> <p>2.3 Identify factors which increase the likelihood of error, including common traps of:</p> <ul style="list-style-type: none"> • Task Demands • Work Environment • Individual Capabilities • Human Nature <p>2.4 Explain the difference between</p> <ul style="list-style-type: none"> • Slip • Lapse • Mistake • Active/Latent Errors <p>2.5 Name the 3 modes of performance</p>

<p>3. Understand the importance of Managing Defences in reducing the severity of events</p>	<p>3.1 Identify the different controls which make up an organisations defences</p>
<p>4. Describe how the Anatomy of an Event applies</p>	<p>4.1 Describe (using an example) an event in terms of:</p> <ul style="list-style-type: none"> • The Event • The initiating action • Flawed Defences • Error precursors • Latent Organisation Weaknesses
<p>5. Be able to use Error Avoidance Tools and techniques relevant to their job tasks</p>	<p>5.1 Describe the use of error prevention tools and techniques and how they can be applied</p> <p>5.2 Describe what can provoke us into error and error likely situations (using own examples and experience)</p>
<p>Additional information about this standard</p>	
<p>Assessment methodology</p>	<p>The purpose of assessment is to ensure that effective learning has taken place. Assessment of the candidate's performance will be against the stated learning objectives and should involve both written and practical assessments.</p> <p>The assessment process should:</p> <ul style="list-style-type: none"> • Be fair and clear for those undertaking it. • Explain clearly the standards for satisfactory completion of the model. • Be consistent and transparent in its marking. • Be open to audit by the National Skills Academy or its appointed body. <p>The Training Provider should arrange for formative assessment to take place in suitable conditions and where appropriate, for the responses to be collected immediately and marked within 24 hours. The learner should be informed of the result as soon as possible and recorded.</p>
<p>Training Delivery time</p>	<p>1 – 2 Days</p>
<p>Resources</p>	
<p>Other Details</p>	

Appendix 1

Person specification – Trainer / Course director

Domain knowledge and experience

Trainers / course directors should:

- Have practical knowledge of Human Performance in a high hazard and/or highly regulated sector, normally by extended periods of working in industry in roles with specific nuclear safety responsibilities
- Have a thorough knowledge of the principles of Human Performance, over and above the specific scope of the course(s) they plan to deliver
- Be able to demonstrate knowledge of relevant regulations
- Ideally, hold an accredited qualification relevant to Human Performance (Psychology, Human Factors, Organisational Development)
- Be recognised as competent via (Human Performance professionals) peer review
- Have a personal commitment to high standards of safety and professional ethics

Pedagogical knowledge and experience

- Trainers / course directors should:
- Have proven experience in delivering professional training and CPD, including experience at the level of seniority appropriate to the course, given the typical learner
- Undertake personal CPD to keep their knowledge and skills up to date
- Be able to provide references as to their training ability and learner satisfaction
- Be articulate and engaging, able to establish interaction and rapport with learners
- Be willing, where appropriate, to undertake pre-course interviews with a view to tailoring delivery to learner needs
- Be conversant with, and able to select and apply, a range of appropriate training techniques and styles
- Be able and willing to adapt their delivery and, where possible, material and examples used, to suit the learners concerned
- Be willing to mentor other presenters in delivery of the course or similar material
- Be willing for their presentation, and the course content, to be subject to feedback and evaluation
- Be willing to provide feedback after each course in order to guide the improvement of course design, content and materials
- Be willing, if requested, to undertake follow-up visits and discussions with learners
- Ideally, have received formal training in teaching/learning techniques

Appendix 2: Recommended Reading

- Human Performance Reference Manual. INPO 06-003, October 2006
- Human Performance Tools for Workers. INPO 06-002, April 2006
- Human Performance Tools for Engineers. INPO 05-002. February 2007
- The Field Guide to Understanding Human Error. Dekker, S. 2006
- HSG 48: Reducing Error and Influencing Behaviour. HSE. 1999

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Appendix 3: Acknowledgements

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