SYSTEM EXPERT
From Risks to Safety

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PROCESS HAZARD ANALYSIS:
HAZID,
HAZOP,
LOPA

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OUR COURSE:

- FOR OIL AND GAS COMPANIES, PETROCHEMICAL AND CHEMICAL COMPANIES

- FOR PROJECT ORGANIZATIONS

- FOR INDUSTRIAL SAFETY EXPERTS

LEVEL:

- HAZOP FACILITATOR

RESULTS:

- EXAMINATION

- CERTIFICATE OF THE VOLUNTARY CERTIFICATION SYSTEM "SAFETY STANDARD"

- CERTIFICATE OF PROFESSIONAL ADDITIONAL DEVELOPMENT OF THE STATE STANDARD

- INCLUDING TO THE REGISTER OF FUNCTIONAL SAFETY AND HAZOP SPECIALIST "SAFETY STANDARD"

- REGISTRATION ON THE STATE EDUCATION AND QVALIFICATION REGISTER (FIS FRDO)

SIL

FACILITATOR IEC 61511

24

HOUR'S

COURSE DURATION

Base qualification: Industrial Safety Specialist (PS 40.209)

Qualification document: **Certificate of Professional Development**

State Education Accreditation: License reg. no. L035-01298-77/01957606

Voluntary System Accreditation: ROSSTANDART reg.num. POCCRU.33109.04ВШГ0

TRAINER:

- TUV FS Certified Engineer

- HAZOP and LOPA Facilitator. ESD expert

- Expert in certification of instrument systems on Functional Safety

Dmitrii Blokhin

Director of Sistema Expert

DAY 1

9:30-9:45

Introduction

- o Accuaintance
- o Planning
- o Course presentation

9:45-12:30

Goals and methods of risk-based approach

- o Topic 1. Structure of the regulatory framework
- o Topic 2. Risk analysis in the Federal Law, Federal Rules, GOST
- o Topic 3. SIS in Federal Rules
- o Topic 4. Practical assurance of compliance with the Federal Rules requirements for engineering and operating SIS systems
- o Topic 5. Accidents and their causes
- o Topic 6. Safety Layer model
- o Topic 7. Safety and risk level
- o Topic 8. Protection levels and Safety Instrument Systems (SIS)

13:00-14:30

Functional Safety Base

- o Topic 1. What is Functional Safety? Principles
- o Topic 2. Standards GOST R IEC 61508, GOST R IEC 61511
- o Topic 3. Principles of the Functional Safety
- o Topic 4. Positioning of SIS in the structure of the Control System (DCS). Difference between SIS and DCS
- o Topic 5. Reasons and types of failures
- o Topic 6. Functional Safety management and documentation

14:30-17:30

Hazards identification(HAZID)

- o Topic 1. Risk, risk management
- o Topic 2. Risk levels, acceptable risk
- o Topic 3. Risk assessment methods
- o Topic 4. HAZID methodology: objectives of the study
- o Topic 5. Required information, composition and functions of the working group members
- o Topic 6. Checklist of hazards, content and place in the methodology of analysis of hazardous industries
- o Topic 7. HAZID session, worksheet , main aspects
- o Topic 8. Documentation, HAZID Report content
- o Topic 9. Example of HAZID

DAY 2

9:30-17:30

Hazard and Operability Analysis - HAZOP

- Topic 1. HAZOP methodology: objectives, scope of application
- Topic 2. HAZOP at different stages of the life cycle of a hazardous facility
- Topic 3. Risk assessment methods used during HAZOP
- Topic 4. The stages of the HAZOP
- Topic 5. Preparation for HAZOP:
  - initiation,
  - required information,
  - responsibility matrix,
  - composition and functions of the working group members
- Topic 6. Preparation of materials for HAZOP:
  - principles of decomposition of a technological object for analysis,
  - recommendations on the matrix of analyzed risks,
  - requirements for HAZOP results,
  - worksheet,
  - methods of recording the results
- Topic 7. Methods/features of HAZOP at different stages of the project (Preliminary (FEED), Detailed design, operation (subject to changes – Management of change), etc.
- Topic 8. HAZOP session: facilitation, main aspects of methodology
- Topic 9. Analysis of the adequacy of safety measures and recommendations identified at the HAZOP session, including using the LOPA methodology
- Topic 10. Documentation, HAZOP Report content
- Topic 11. Analysis of results and practical conclusions
- An example of HAZOP - practical work using model tasks

DAY 3

9:30-12:30

SIL-analysis.
Layers of Protection Analysis - LOPA

- o Topic 1. LOPA methodology: objectives of the study
- o Topic 2. Preparation, required information
- o Topic 3. LOPA procedure
- o Topic 4. Independence of layers of protection
- o Topic 5. Initiating events
- o Topic 6. The probability of layers failure
- o Topic 7. Conditional modifiers
- o Topic 8. LOPA examples
- o Topic 9. Common mistakes
- o Topic 10. Allocation of Safety Functions to Protection Layers

13:00-15:30

SIS and components

- o Topic 1. Hardware selection. Safety Integrity
- o Topic 2. Architecture. Redundancy and fault tolerance
- o Topic 3. Architectural constraints
- o Topic 4. Limitation on Systematic safety integrity
- o Topic 5. The main differences between SIL components
- o Topic 6. Hardware certification procedure
- o Topic 7. Comparison of safety PLC structures
- o Topic 8. Solutions for safety components

Questions

15:30-17:30

Examination
- o a test based on the completed material.