

P&ID (PIPING & INSTRUMENTATION DIAGRAM) & ENGINEERING DRAWINGS INTERPRETATION



PROFESSIONAL DEVELOPMENT:

Two classroom days providing 1.6 CEU (Continuing Education Units) or 16 PDH (Professional Development Hours)



BENEFITS OF THE P&ID & ENGINEERING DRAWINGS INTERPRETATION COURSE:

This training course will show how facilities relate to the drawings so that participants can focus on improvements.

- Accurate drawings and the ability to read and understand these drawings are a requirement for the analysis of emergency situations and the assessment of safety, environmental and regulatory compliance issues such as Process Hazards Analysis / HAZOP studies.
- It will also provide engineers dealing with Management of Change the ability to speak the same language as the operators of the facilities.
- It will form the foundation for base level learning and will provide consistent and improved communications between staff.
- It will provide improvement in quality and consistency which will enhance the other processes that rely on the P&ID drawings.



COURSE OVERVIEW:

To effectively assess emergency situations and evaluate safety, environmental and regulatory compliance issues, accurate drawings – and the ability to interpret them – are crucial. This combination of classroom instruction and workshop training exercises focuses on critical documentation essential to the safe day-to-day operation of facilities (e.g., P&ID, PFD, Plot Plan, Electrical Area Classification, Piping Drawing, Isometric Drawing, Line List, Tie-In List and Shutdown Keys).



PREREQUISITES OR RELATED COURSES:

There are no prerequisites for this training course. However this course lays the foundation for:

- PH & RA ENG TÜV (Rheinland) Certificate
- PHA / HAZOP Facilitation



WHO SHOULD ATTEND?

This course focuses on engineering drawings typically used in the chemical and process industries by engineers and technologists in the design phase and by operations and maintenance staff once facilities are up and running. It is suitable for employees, managers, officers of corporations and anyone else with an interest in how these drawings should be created, maintained and used in assessing emergency situations and regulatory compliance issues.

- Facilities, Operations and Maintenance Professionals
- Engineers In Training (EITs)
- I & C, Mechanical Engineers and Technologists
- Professionals responsible for Process Hazards Analysis / HAZOP / Safeguarding studies.
- Health & Safety / HSE Professionals



COURSE OUTLINE:

I. INTRODUCTION

II. PRELIMINARY ENGINEERING DRAWINGS

- Block Flow Diagram (BFD)
- Process Flow Diagram (PFD)
- Material Balance
- PFD Symbols

III. PIPING AND INSTRUMENTATION DIAGRAMS

- Piping and Instrumentation Diagram (P&ID)
- P&ID Symbols
- Line Numbering
- Valve Numbering
- Equipment Identification
- Abbreviations

IV. INTERPRETING P&IDS - VALVES

- Valve Types
- Valve Identification
- Valve Fittings

V. INTERPRETING P&IDS - EQUIPMENT

- Vessels
- Pumps
- Heat Exchangers
- Compressors
- Equipment Identification

VI. DRAWING INTERPRETATION WORKSHOP #1

VII. INTERPRETING P&IDS – CONTROL & SAFETY SYSTEMS

- Distributed Control Systems (DCS)
- Safety Instrument System (SIS)
- Instrument Symbols
- Instrument Signal Lines
- Pressure Instruments
- Temperature Instruments
- Flow Instruments

VIII. DETAILED ENGINEERING DRAWINGS

- Plot Plan
- Electrical Area Classification
- Piping Drawing
- Isometric
- Material Take Off
- Line List
- Tie-in List
- Shutdown Key

IX. DRAWING INTERPRETATION WORKSHOP #2

X. ENGINEERING DRAWINGS FOR CONSTRUCTION AND OPERATION

- Developing As-Builds
- Preparing for a PHA (HAZOP, What-If, etc)
- Management of Change (MOC)

XI. CAPSTONE EXERCISE

XII. COURSE WRAP-UP



THE ACM EXPERIENCE:

Our courses and workshops are experiential, interactive and provide participants with practical knowledge and tools that can be immediately applied back at work.



COURSE TESTIMONIALS:

Here are a few quotes from over 3,300 participants we've trained;

- *"My first time involved with this level of detail in a P&ID and it was very informative."*
EIT Systems Integrity
- *"Great course. I learned a lot. A must for anyone using P&IDs."*
Operations Maintenance Specialist
- *"The extensive field experience of the instructor really impressed me."*
Plant Operations
- *"Great teacher. Very knowledgeable."*
Production Foreman
- *"I feel I learned a lot of new concepts. I would recommend this training."*
Lead Field Operator
- *"Very helpful instruction and activities in this course helped me get what I was looking for from it!"*
Project Coordinator
- *"The instructor was very interactive, encouraged discussion and welcomed feedback."*
Process Engineer
- *"Great course! The instructor made the course very enjoyable. With their wealth of knowledge and experience they could answer all of the questions, as well as provide a real life situation in which it applied."*
New Grad EIT

- “Great course content, coverage and length. Superb instructor who presented material as it applies to real world scenarios.”

I&C Engineer



COURSE INSTRUCTORS:



Marcel Leal-Valias

Expert Advisor & Instructor

Mr. Leal-Valias has more than 50 years of experience in engineering/design and project management in the petrochemical industry in North and South America and Australia and 27 years as a certified PHA specialist and trainer. He holds a diploma in Mechanical Engineering from Centro de Treinamento Industrial, Rio de Janeiro, Brazil and diplomas in Management and Supervision from People Growth Inc., Los Angeles, USA. Mr. Leal-Valias has conducted a multitude of PHA studies that comply with OSHA Process Safety Management guidelines in North and South America, the Middle East, Asia and the Caribbean and also has delivered P&ID and PHA training courses to many companies in Canada and overseas.

He is a member of ASET, the Society of Piping Engineers and Designers, Project Management Institute and the Canadian Institute of Energy.

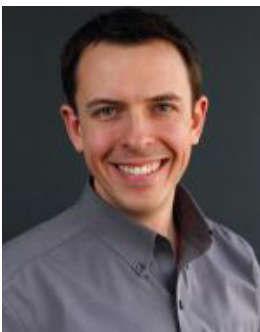


Jamie Merriam

B.Sc. Elec. Eng., P. Eng., TÜV (Rheinland) F.S. Eng. Functional Safety Engineer / TÜV (Rheinland) PH & RA Functional Safety Engineer / Instructor

Mr. Jamie Merriam is an Electrical Engineer (automation) with over 24 years of experience in the energy industry. His experience includes construction, maintenance and project engineering. Mr. Merriam began leading Hazop/LOPA reviews in 2002 as part of his duties with Suncor. Now with ACM, Mr Merriam continues to support Suncor, Cenovus and other clients execute effective hazard analysis. He has applied knowledge in Instrumentation, Process Control and Functional Safety for the energy industry. Mr. Merriam’s communication and leadership skills, combined with his understanding of Process Safety make him an effective and competent facilitator and educator. Mr. Merriam is a professional engineer and TÜV Functional Safety Engineer.

Past Projects: Terra Nova FPSO, Edm. Refinery Upgrade, Fort Hills, MR2 (Petro Canada), Firebag 3, Tailings Reduction Operations, Coker Upgrade (Suncor)



Richard Carter

B.Sc. Chem. Eng., P.Eng., TÜV (Rheinland) F.S.Eng. PH & RA, PHA Facilitator / Project Manager / Instructor

Mr. Richard Carter is a Professional Engineer, and is qualified as a Functional Safety Engineer (F.S. Eng.) in Process Hazards and Risk Analysis through the TÜV (Rheinland) Functional Safety Program.

Richard is an experienced facilitator of Process Hazards Analysis (PHA) studies, such as Hazard and Operability (HAZOP), Layer of Protection Analysis (LOPA), Hazard Identification (HAZID) and What-If Analysis. He has facilitated more than 120 PHA studies for some

of the largest operating and engineering organizations in Canada and the United States, and has field experience in oilsands and petrochemicals facilities.

Richard is a training instructor, and teaches the 2-day P&ID/Engineering Drawings Interpretation course, the 1-day Introduction to Process Hazards Analysis course, and the 3-day PHA/HAZOP Facilitation course at ACM Facility Safety. He has also managed ACM's education and training program for public and private offerings, and developed customized PHA procedures and education materials to meet the specific needs of clients.

[View instructor profiles online.](#)

CONTACT FOR FURTHER INFORMATION: info@acm.ca

CALL TOLL FREE AT 1-877-264-9637

PRIVATE IN HOUSE TRAINING COURSES:

<http://www.acm.ca/institute-of-hazard-prevention/private-courses>