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## Razmahwata Mohamad Razalli

Director/Principal Process Engineer



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### EDUCATION AND QUALIFICATIONS:

- 1994 B.A. Chemical Engineering (Honours), University of Cambridge, United Kingdom.
- 1995 M.E. Chemical Engineering (Honours), University of Cambridge, United Kingdom.
- Corporate Member of the Institute of Engineers, Malaysia. Professional Engineer under the Board of Engineers Malaysia  
Corporate Member of the IChemE Chartered Engineer
- TÜV Functional Safety Engineer, Certificate Number: TÜVFSeng 2360/10
- TÜV Certified PHA-HAZOP Leader
- Honeywell Unisim Trainer (Steady State and Dynamics)

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### KEY EXPERIENCE

Wata has 17 years of experience in the oil and gas industry, in both design and operations.

Wata joined ExxonMobil Exploration and Production Malaysia Inc shortly after graduation in 1995. In 1998, he was reassigned to EMEPMI's operations department. His responsibility was to provide technical support to an offshore production facility. His tasks were varied, included troubleshooting day to day challenges, managing retrofit projects, and leading safety cases. He was made the Company's custody metering engineer in 2001, charged with leading the exercise to ensure the Company compliance with industry and company specifications was enhanced. He was involved in a number of management level committees.

Whilst in Poyry, Wata has been a Senior Process Engineer for SembCorp's Betara project. He was on secondment to Talisman Malaysia, supporting preliminary work on their Bunga Raya CO<sub>2</sub> removal system and authored a mercury management plan. He was seconded as a Senior Process Engineer at Ranhill-Worley, and subsequently provided project management support to Conocophillips Indonesia's (COPI) Singapore Onshore Facilities. He managed the preparation of an operating manual set for Shell Sarawak and lead COPI in compiling a site training program. He has also led Exxonmobil's effort in the upgrading the custody transfer management processes. He has HAZOP leadership experience on offshore facilities. He has recently worked on a secondment providing detailed design services to a tanker to FPSO conversion project in Singapore. He supported ExxonMobil in developing measurement manuals, and leading an exercise to validate 59,000 line items.

He is currently the Director of Synergy Oil & Gas Engineering Sdn. Bhd.

## **PROJECT EXPERIENCE**

**Dec 2008 – Present**

### **Synergy Oil & Gas Engineering Sdn. Bhd.**

Director

**BC Petroleum:** HAZOP and SIL classification facilitator for Early Production Vessel for Balai Cluster.

**CAFHI:** Hydraulic analysis of fuel network expansion project at Changi airport.

**ConocoPhillips:** Lead Process Engineer for Bawal Process Review. Carried out a process capacity review of the facilities on the host platform receiving the wellfluids from the new Bawal field subsea wells.

**Conocophillips:** HAZOP/HAZID/SIL facilitator for:

- HAZOP/SIL Facilitator, Sumpal Compression
- HAZOP/HAZID/SIL Facilitator, Eastern Hub Mercury Removal – Water Injection
- HAZOP Facilitator, Eastern Hub Mercury Removal – Water Injection, Startup Procedures
- HAZOP/HAZID Facilitator, West Belut FEL-2

**EMAS:** Prepare validation calibration manuals for Perisai Kamelia custody measurement systems

**ExxonMobil:** Execute gap study against Corporate Custody Measurement (LACT) requirements.

**Flowcrete:** HAZOP / HAZID Facilitator for new polymer plant.

**FPSO JV Sdn. Bhd:** HAZOP / HAZID Facilitator for Temporary Boiler Skid and Inert Gas Generator on Bunga Kertas

**Hess:** Develop hydrocarbon allocation philosophy for Hess's Belud asset. Presented Measurement and Allocation Philosophy report to PMU and PCSB for endorsement and approval. Incorporated PMU and PCSB comments into the Philosophy. Review and proposed upgrades to the Sabah Terminal Hydrocarbon allocation network and MTAB to incorporate the new asset. Performed allocation uncertainty calculations to determine the exposure of the various MTAB upgrade options.

**Hess:** Develop hydrocarbon allocation philosophy for Hess's NMB Early Production Vessel. Applied GAPA principles to incorporate new asset. Presented Measurement and Allocation Philosophy report with PMU and PCSB. Incorporated PMU and PCSB comments into the Philosophy. To review GAPA enhancements/changes due to incorporation of new asset.

**Hess:** Develop hydrocarbon allocation philosophy & metering philosophy for Hess's Bergading asset.

**Hess:** Develop hydrocarbon allocation procedures for Hess's Early Production System.

**Huntsman Tioxide:** Provide process support for conceptual engineering of additional facilities to improve fume disposal system and network.

**Husky CNOOC Madura Ltd:**

- HAZID HAZOP Facilitator, Gas Metering Station and Wellhead Platform Madura Straits.

**KLIA Aviation Fuel System Sdn Bhd (KAFS):** Direct process support for new KLIA2 fuel hydrant system.

**MISC:** Facilitate HAZOP and HAZIDs for Cendor Phase 2 FPSO

**Murphy:** HAZOP/HAZID facilitator for a number of modification packages at Murphy Gas Plant BORF:

- HAZOP Facilitator, Gas Chillers Temperature Control Line Modification.
- HAZOP Facilitator, Plant Turbo Generators (Base)
- HAZOP Facilitator, Plant Turbo Generators (Incremental)
- HAZOP Facilitator, Rental Turbine Generators.
- HAZOP/HAZID Facilitator Fuel Gas Line for early TG Commissioning
- HAZOP/HAZID Facilitator Gas Chillers Bypass
- HAZOP/HAZID Facilitator, Turbo Generator fuel gas system
- HAZOP Facilitator, new GTG, GTC skids
- HAZOP/IPF Facilitator, Gas lift compressor, Permas
- HAZOP/IPF Facilitator, Fuel Gas Skid, Permas

**Murphy:** QRA

- Belum and Permas pipelines

**NOEX:** Project Manager for Water Treatment Facilities Debottlenecking Project. Provide process and operational input to the design.

**NOEX:** Project Manager and Facilities engineer for alternative evacuation route of SK10 condensate/crude.

**NSERC:** Project Manager and Principal Process engineer for Gasifier Steam Boiler Renewable Energy Plant at Kerteh Polymer Plastic Park, Kerteh.

**ONGC:** Act as independent 3<sup>rd</sup> party observer/inspector, B-193A Process Gas Compressor HAZOP.

**Optimal:** Facilitate HAZOP:

- Distillation tower reboiler process modification.
- New ethane line installation

**Pars Oil & Gas Company:**

- Update of existing Operation Manual to include new assets SP 22 23 24

**Pearl Energy:** HAZOP Facilitator

- Ruby Tie In Project - EPSC2

**Pertamina:** SIL Facilitator

- Uniform Flow Station SIL Classification Exercise (existing asset)
- Grissik Feed Gas Metering Skid
- PHE-44 PHE-48 CPP2

**Pertamina:** HAZOP Facilitator:

- JJA Reactivation project (existing asset)
- Perform revalidation HAZOPs for ANOA, West Lobe, POI and associated FPSO.
- PHE-44 PHE-48 CPP2

**Pertamina:** HAZID Facilitator:

- UL Development (conceptual)
- APN Field modifications
- PHE-44 PHE-48 CPP2

**PetroChina:** HAZOP Facilitator:

- Modification of Fuel Gas System at SWB
- APN Field modifications

**Petron:** Facilitate HAZOP for new tanks.

**Petrofac:** Provide Facilities Engineering support to Cendor MOPU.

**PETRONAS Carigali:** Lead process work to provide process support for BCOT New Condensate Tank.

**PETRONAS Carigali:** Lead process to install new instrument air accumulator at Angsi inlet SDV.

**PETRONAS Carigali:** HAZOP / HAZID Facilitator:

- HAZOP Facilitator, OPE RO#8, RO#9 modifications
- HAZOP Facilitator, OPE RO#13 modifications
- HAZID Facilitator, Samarang IO modifications
- HAZOP Facilitator, Yetagun-C
- HAZOP/HAZID Facilitator, Angsi D AEMP 2.1 Flowline installation
- HAZOP/HAZID Facilitator, Bekok-A Revisit
- HAZID Facilitator SOGT – locating laboratory inside admin building
- HAZOP/HAZID SKO Compact LPS and Water Injection Module (WIM)
- HAZID Facilitator, Angsi CEOR
- HAZOP Facilitator, TTJT-A, E11R-C
- HAZOP Facilitator, BODP-A Workover modifications
- HAZOP Facilitator, Zero flaring modifications, TCOT.
- HAZOP Facilitator, D18MP-A CTD modifications
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**PETRONAS Dagangan:** HAZOP Facilitator, new Biodiesel Facilities at Melaka Terminal.

**PETRONAS Dagangan:** Lead process engineering to install new pumps and associated equipment at Asia Supply Base AGO Bunkering Facilities.

**PETRONAS Penapisan (T) Sdn Bhd:** Lead Process Engineer, reviewed basic engineering package for the Light Diesel Oil (LDO) Condensate Fractionation Unit (CFU).

**PETRONAS Methanol Labuan:** HAZOP Facilitator, new potable water facilities.

**PETRONAS:** HAZOP facilitator:

- D35 complex. This complex consist of 6 platforms including wellhead, oil separation, gas compression and dehydration

**Poyry Energy (Kuala Lumpur) Sdn Bhd:** Facilitated HAZOP, Low Pressure System (LPS), Pulau-B.

**Premier Oil:** Facilitated SIL, West Lobe.

**PUSB, Brunei:** Training Instructor, Unisim software suite.

**PETRONAS Gas Berhad:** Managed and provided process and operational support to the detailed design of a new high pressure steam (HPS) network.

**Santos:** Facilitated HAZOP of new reject oil tank at OPF Grati

**Talisman:** Facilitated HAZOP and HAZID, new receiving facilities at Jambi, Sumatra plant.

**Talisman:** Provide measurement and allocation consulting services to upgrade Talisman measurement and allocation methodologies and procedures. Among the activities performed was modelling the PM3 system using HYSYS to determine shrinkage and theoretical yield factors.

**Talisman:** Provide specialist measurement and allocation support for Kinabalu Transition Team. Involves providing input into regulatory allocation methodologies, technical and commercial agreements, documentation requirements for internal reporting, and related process support. Presented and collaborated with PMU / PCSB with regards to upgrading the existing MTAB to incorporate Kinabalu Transition. Reviewed current terminal hydrocarbon allocation network and its application to Kinabalu Transition.

**Talisman:** Preparation of upgrade validation calibration manuals for Kinabalu DP-A

**Talisman:** Analysis of sampling location points for custody transfer purposes.

**Talisman:** HAZID facilitation of produced water upgrades at Kinabalu DP-A.

**Talisman Jambi:** Commissioning of new condensate sphere and pumps at JOB, Jambi.

**Technip:** Facilitated HAZOP for new LNG at Tongkai.

**Technip:** Facilitated SIL classification workshop and perform SIL verification for Nam Con Son 2 Gas Pipeline Project.

**TLO:** Facilitated construction HAZID for installation of new subsea facilities at Berantai.

**Salamander:** Prepared startup and operating procedures for a new Onshore gas Receiving Facility.

**UZMA Engineering:** Prepared HAZOP Report, Low Pressure System (LPS).

**Weida:** HAZOP for Biogas Plant.

**Wilmar:**

- HAZOP Facilitator for Modification of new 1-Butene Facilities.

- HAZOP Facilitator, New Hot Oil Distribution Network

April 2007 – Dec 2008

**Poyry Energy (Kuala Lumpur) Sdn Bhd**



Senior - Principal Process Engineer / Operations Manager

Additional responsibilities:

- The Operations Manager is a member of the KL Leadership Team (KLTT) and provides technical and commercial management of IGL's business in Malaysia.



**Nippon Oil:** Interface for QRA safety study by third-party contractor.

**Dialog Plant Services:** Project Lead Process Engineer. Responsible in providing technical and administrative leadership for a process verification exercise.

**ExxonMobil Exploration and Production Malaysia Inc.** Provide process support in Company's efforts to improve the reliability of EMEPMI's gas production and onshore receiving assets.

**WorleyParsons KL:** Facilitate 2 week HAZOP for Dulang new offshore installation comprising of a central processing facility and drilling platforms.

**Tanker Pacific Offshore Terminals:** Provide process support via secondment for a tanker to FPSO conversion project. Perform sensitivity calculations, and review process and equipment documents from detailed design consultant.

**ExxonMobil Exploration and Production Malaysia Inc:** Lead team to update EMEPMI's measurement validation and operating manuals. Lead a team to validate EMEPMI's critical parameters database, which consists of 59000 line items.

**Uzma Engineering Sdn Bhd:** Facilitate HAZOP of Uzma's Low Pressure System (LPS) which is to be installed on PCSB's Pulau-B platform.

Jan 2004 – April 2007

**IGL Oil and Gas Consultants Sdn Bhd, Kuala Lumpur**

Senior - Principal Process Engineer / General Manager

Key responsibilities:

- Provides value adding process services to the Oil & Gas Industry operating companies within the Malaysian and SE Asian region.

- Business Management.

**ConocoPhillips Indonesia:** Project Engineer, Onshore Receiving Facilities, Sakra Island, Singapore. Responsible for management of various critical projects generated from past initiatives. 6 month assignment reporting to Indonesia Pipeline Operations Manager and Site Operations Manager. Point contact with Relevant Singapore authorities and JV partners.



Preparation of training program for Singapore site staff. Includes compilation of competency matrixes and training schedules for site staff. Work with Company wide training effort to ensure standards compatibility between JV and Company staff.

**Ranhill-Worley.** Senior Process Engineer, Tapti, India FEED design. 4 month client office assignment. Responsible for preparation, technical content and issue of process drawings, from IFR to IFH.

**Talisman Malaysia.** Preparation of a mercury management plan. Reviewed existing standards and legislation. Suggested maximum exposure levels. Prepare Risk Management Plan. Presented findings to TML Management.

**PETRONAS Research and Scientific Services.** Write startup and operating procedures for a pipeline than may potentially gel. IGL services were provided to compliment PRSS's laboratory expertise.

**Shell Sarawak.** Manage preparation of startup and operating manuals for a gas CPP and WH platform.

**ExxonMobil Exploration and Production Malaysia Inc.** Led enhancement of EMEPMI's custody measurement program to meet new corporate requirements. Wrote new metering manual as part of enhancement. Reviewed the terminal hydrocarbon allocation network with respect to ExxonMobil's interests, i.e. TCOT allocation philosophy, methodology and procedures.

**HAZOP facilitation:** various.

Feb 2003 – Jan 2004

**IGL Process Solutions Sdn Bhd, Kuala Lumpur**

Senior Process Engineer

Key responsibilities:

- Provides value adding process services to the Oil & Gas Industry operating companies within the Malaysian and SE Asian region.

Senior Process Engineer, Bunga Raya E CO<sub>2</sub> Removal Platform. Client: Talisman Malaysia Limited. 3 month secondment at client location providing engineering support for basic engineering. Includes preparation preliminary relief safety cases and sizing, review of basic engineering P&IDs.



Senior Process Engineer, North Geragai Fractionation. Client: SembCorp. Work activities include:

- Sizing of equipment and instrumentation.
- Developing Process deliverables, ex. PFD/P&ID, Process Datasheets.
- Directing and reviewing work prepared by junior process team members.
- Providing input for project management deliverables, ex. Equipment lists, deliverables list.

Oct. 2001 – January 2003

**ExxonMobil Exploration and Production Malaysia Inc.**



Metering Engineer, Production Operations Department, Kertih, Terengganu

Provide leadership and technical support to increase compliance to custody metering expectations and requirements.

- Metering and allocation team leader.
- Provide input and signoff of the GAPA manual. Involves reviewing and proposing allocation measurement systems, including terminal hydrocarbon allocation network at TCOT/OSC/OGT/RGT.
- ExxonMobil technical representative to the GAPA Joint Working Group, providing technical support of Peninsular Malaysia allocation activities, and prepare allocation management systems.
- Exxon technical representative to the GAPA Joint Working Group (JWG). Involves collaboration, discussion and presentation with other JWG members, including PMU, PCSB, and Gas Malaysia
- Local technical focal point in worldwide Company metering custody network.
- Lead effort to improve sampling compliance.
- Prepared scope of work for maintenance contracts.
- Created documentation and processes to better track metering performance and compliance (Key Performance Indices, status of autosampler equipment, monthly status update to Operations Management).
- Presented status of metering to In County Manager.
- Justified metering exceptions taken to Company control processes.
- Upgraded communication with Operating partners to better address common concerns (point of sales meter, quality of lab analysis, availability of autosamplers, suggested changes in operating procedures).

March 1998 – Sept. 2001

**Esso Production Malaysia Inc**



Lead Facilities Engineer, Guntong Complex, Production Operations Department, Kertih, Terengganu



Provide direct technical and engineering support to operations personnel such that production capability and facilities are maintained at optimum levels.

- Facilitate Risk Assessment Studies for Brownfield Projects, and Baseline Risk Assessment Reviews. Reviews consist of HAZOP facilitation, risk ranking workshops, and technical justification of safety recommendations. Facilities covered include wellhead platforms, CPP and new equipment skids. Team comprises of operations and technical support personnel.
- Examples of facilities surveillance issues: Resolved and eliminated water slugs in the main oil line to shore. Wrote and reviewed startup and operating procedures, ex. hot oil systems, system commissioning. Technical contact for retrofit projects, ex. installing a new produced water system upgrade, installing a new dehydration module. Technical evaluation of platform-bought materials.
- Conversion of a CPI into a dissolved gas floatation (DGF) device: Led project implementation team. Improved process by 450%. The idea has been adopted and implemented by operating partner.
- Hotwash project: Mix Guntong A's hot produced water with satellite full well streams to & obtain a high enough temperature at which de-emulsifiers will work. Played role as project engineer and EPMI technical support. Increased production by 300 kl/d.
- Oilwash project: Applied hotwash concept to use hot Guntong-A crude to heat up cold satellite full well streams. Played roles as the project engineer and EPMI technical support for this project.
- Reuse of idle compressor: Use idle compressor to increase gaslift and gas injection capacity. RM 500k project successfully increased production by an additional 500-800 kl/d crude, in addition to having a backup gas compression system.

Sept. 1995 – Feb. 1998

**Esso Production Malaysia Inc**



Process Engineer, Design Engineering Section, KL

Provide process support for the design, installation and troubleshooting of onshore and offshore facilities.

- EPMI process engineer for Lawit topsides and Lawit compression design. Basic design, analysis and review of the consultant's and contractor's design. Included design troubleshooting.
- Process design checks: Checked separation vessel sizing and control settings are suitable for the anticipated flowrates. Determined that the gas and liquid disposal systems are adequately sized for the largest conceivable gas or liquid emergency release. Determined piping is adequately sized so that critical path pressure drops are within limits.
- Safety checks: Participated in HAZID and HAZOP reviews of Lawit's compression system. Performed vent dispersion calculations using commercial software.

- Technical site support: Lead a team and walk through the platform modules to verify that the P&IDs were correct. Performed a pressure relieving valve verification exercise.
- Process Design Engineer for Seligi-A cooler replacement: This required performing process simulations using HYSYS to determine gas compositions and required cooler duties required. Used propriety software (ACE) to confirm that the coolers proposed were adequately sized for the process conditions. Troubleshot deviation of cooler from design.
- Prepared draft specification for instrument air dryers

1993

**Shell Refining Company (FOM), Malaysia**



Summer industrial placement. Compared simulation packages used to actual plant throughput. Suggested and implemented methods to cut LPG plant costs. Also presented a projection report that is accurate to 10% of actual results. Providing operational and project management expertise to IGL's clients in upstream and downstream oil and gas industry.

**Training Courses (attended)**

- Design, operation and troubleshooting of oil and gas surface facilities.
- Oil & Gas Custody Metering & Measurement.
- Surface production safety systems (API RP 14C, RP 500)
- Crane Gas Processing School.
- Fisher control valve school
- Specification writing course.
- Fundamentals of Management.
- Hydrocarbon Flow Measurement Workshop
- HAZOP leadership.
- Functional Safety Engineer, TUV

**Training Courses (delivered)**

- HAZOP – A practical approach for team members

**Papers and Presentations**

- Emulsion handling via Hot Water Wash: SPE ATW Workshop, Langkawi, Malaysia, March 2001.
- SPE 77848: Emulsion Treatment Utilizing Hot Produced Water. Presented at SPE APOGCE, Melbourne Oct 2002.
- SPE 77835: Guntong – Key Challenges and Issues in the Management of a Large Complex Oil Field. Co-author. Presented at SPE APOGCE, Melbourne Oct 2002.
- Industrial lecture on Safety, Universiti Malaya, September 2003.
- Chairman, 2 day "Oil and Gas Symposium", Institution of Engineers Malaysia, July 2004.
- Authored "Oil and Gas in Malaysia – an Overview", Bulletin, January 2005.

- Authored "Report on Technical Presentation, 'Sustainable Oil and Gas production Operations through Effective Application of Oilfield Chemicals'", Bulletin, November 2005.
- Co-authored "The Economics of Natural Gas", Bulletin, June 2007
- Authored "Conceptual Design of Natural Gas Facilities", June 2007
- Authored "Report on Technical Presentation, 'Commercial Aspects of Malaysia's Gas Sales Agreement'", Bulletin, August 2007.
- Authored "An Introduction to Risk Management", Bulletin, June 2011.
- Editorial, Bulletin, June 2012.

### **Outside Representation**

- Institution of Engineers, Malaysia, Council Member (2009-2012)
- IEM, Secretary, Standing Committee on Activities (2009-2012)
- IEM, Member, Standing Committee on Finance (2009-2011)
- Institution of Engineers, Malaysia, Oil Gas and Mining Technical Division, Committee Member (2003-2005), Treasurer / Secretary (2005-2009). Deputy Chairman (2009-2011), Chairman (2011- present)
- Institution of Engineers, Malaysia, Chemical Engineering Division, Committee Member (2008-2012)
- Board of Engineers, Malaysia, Application Committee member, 2010-2012
- Association of Malaysian Oil & Gas Engineering Consultants, Secretary, 2011 to 2013.
- Adjunct Teaching staff, University Putra Malaysia, 2012 to 2013