

## **Eidaad Internship Assessment Form (2021 / 2022)**

### **1. Eidaad Intern Details**

<b>Full Name:</b>	Ahmed Nasser Mohammed Al Fahdi		
<b>MU No.</b>	Mu64956	<b>Ref. Ind.</b>	UEMP2x
<b>University:</b>	German University of Technology (GuTech)		
<b>Study Major:</b>	Mechanical Engineering		
<b>Date of Joining:</b>	10/10/2021		
<b>Training Function:</b>	Engineering		
<b>Training Discipline:</b>	Pipeline Engineering		
<b>Training Location:</b>	Coastal (MAF)		
<b>Mobile Number</b>	97019529		

### **2. Assessors Details**

	Name	Ref. Ind.	Signature / Date
Supervisor/Coach/OJT	Rashid Al Adawi	UEMP2	 07.July.2022
SPM	Aflah Al Naamani	UES9	 07.07.22
CFDH / DL	Badar Al Habsi	UEMP	 7th July 2022

## **Instructions**

**\*Please read all instructions carefully before working on the report.**

Dear Eidaad Interns,

In this evaluation form, you are requested to fill all the fields describing in detail the work you have done to achieve the prescribed Competence / Job Tasks. The input of this report has to be in line with the fundamental development program framework (FDP) shared with you in the beginning of your internship.

Please follow the below table format **only**. You may add/delete tables to match your requirements.

You may enclose evidences such as reports, presentations, studies/projects, and pictures. However, all attachments **must** have an approval from the supervisor, indicating the type of the attachment in terms of confidentiality, as this report will be shared with external parties.

In case the evidence is a confidential document, kindly refer to it in general without disclosing further details.

Upon completion of all elements of this report, kindly escalate it to your direct supervisor for evaluation. Supervisors are hence requested to evaluate, approve, and comment on the intern's submissions before escalating it to the CFDH/DL for final evaluation and assessment.

Finally, supervisors/ SPMs are requested to hand over the report to the intern ensuring a copy is saved and shared with Eidaad team (EVL) for documentation purpose.

This report shall be shared by Eidaad interns to the respective academic institution instructor/ advisor, at the end of the internship period.

# 1. Fundamental Development Framework Progress Check Form

<u>Competence #1: Introduction to pipeline and Standards</u>		
<b>JT1: To understand the specification requirements in pipeline construction for at least two pipeline materials, e.g. CS, PE Lined and GRE pipelines.</b>		
<b>Eidaad Intern's Input</b>		
After meeting with my supervisor, I proceeded to gather some overview information about pipelines/flowlines from external resources. I made a presentation about the topic which illustrates my general understanding of the topic.  After that, I started reading SP-1211, which includes the overall information about on-shore pipelines and flowlines which PDO focuses on. I then presented another presentation in which I showed what I learned from the internal specification.  The following points were covered in the presentation:		
<ul style="list-style-type: none"><li>• Reasons of using pipelines to transport products instead of other methods.<ul style="list-style-type: none"><li>◦ Based on the SP-1211 definition and justifications.</li></ul></li><li>• Overview about pipeline engineering through Opportunity Realization Process (ORP).<ul style="list-style-type: none"><li>◦ Explained briefly.</li></ul></li><li>• Overview on pipeline materials, e.g., carbon steel, GRE and CS-PE lined<ul style="list-style-type: none"><li>◦ Completed an extensive course in material selection and I've written a report on the subject.</li></ul></li><li>• Overview on main pipeline engineering activities/calculations/studies through ORP process<ul style="list-style-type: none"><li>◦ Showed briefly at this stage, and extensively on JT4.</li></ul></li><li>• Overview on pipeline integrity management<ul style="list-style-type: none"><li>◦ Covered the theory as mentioned in SP-1210, and later extensively after JT2 by conducting a site visit and writing a report.</li></ul></li><li>• Overview on pipeline engineering related standards.<ul style="list-style-type: none"><li>◦ Achieved the topic by reading/skimming CMS materials, such as internal specifications, guidelines, code of practices, and policies.</li><li>◦ Achieved the topic by reading/skimming the external standards' materials like ASME 31.4B and ASME 31.8B.</li></ul></li></ul>		
<b>Attached Documents Titles</b>	<b>*Document Type (Confidential / Non-Confidential)</b>	<b>*Supervisor's approval to share document</b>
<ul style="list-style-type: none"><li>• See: Attachment ➔ stage_1</li><li>• Intro_to_pipeline_engineering_.pptx</li><li>• Metallurgy_And_Metallic_Materials_Summary.pdf</li><li>• Overveiw_Pipeline_engineirng.pptx</li></ul>	<ul style="list-style-type: none"><li>• All can be considered as Non-Confidential</li></ul>	<ul style="list-style-type: none"><li>• Approved</li></ul>
<b>Supervisor's Statement (Performance Achieved):</b>		
Ahmed has demonstrated a good understanding overview about pipeline engineering, its location among the organization and with the reference to international/PDO standards.		

**Assessor's Statement (Competence Developed):****Proficiency Level: Awareness**

**CFDH Comment:** Ahmed demonstrated good understanding of the requirement of pipelines in the oil and gas business. He was exposed to the main PDO pipeline specification such as SP-1211 and SP1210.

**Competence #2: Pipeline Construction****JT2: To understand the specification requirements in pipeline construction for at least two pipeline materials, e.g. CS, PE Lined and GRE pipelines.****Eidaad Intern's Input**

After attaining a solid overview in the pipeline engineering topic, I started to cover the theory of pipeline construction, specifically SP-1208 for construction and SP-1212 for hydrostatic testing. After that, I went for a site visit to *Mabrouk Project* in Northeast for 14 days to witness the construction process.

- Required documents to be able to start pipeline construction activities (HSE plan, QAQC, ITP, method statements, AFC drawings, ...)
  - In the construction site, the pipeline construction engineer (DNNS5) showed me the relevant documents of the mentioned activities and explained to me their importance and how they are related to each other.
- Site key personals and roles/responsibilities from PDO side and contractor side.
  - Met and discussed with multiple contractor personal, in this case it was L&T (Larsen & Toubro Ltd), and spent some time with them explaining to me the workflow and their responsibilities. I spent a lot of this time with QAQC.
  - Discussed with DNNS5 the roles/responsibilities from PDO side.
- ROW and working strip layout
  - During the visit, I witnessed different stages of ROW construction.
- Survey
  - Spent some time with the civil team which explained to me the survey process from civil engineers' point of view, as I come from mechanical engineering background.
- Pipe stacking
  - Visited the contractor's warehouse and yard in which they store pipelines, instruments, fittings, and other equipment under PDO's specifications and manufacturer recommendations.
- Materials handling, i.e. line pipe (lifting and stacking) and others
  - The contractors showed me the equipment that are used for material handling and how they stack, store, and move pipelines as per PDO's specifications and manufacturer recommendations.
- Clearing and grading
  - Witnessed the activity of clearing, grading, and the aftermath of blasting that was used a rocky location.
- Pipeline trenching: types, equipment, depth, width, rock definition, crossings, etc.
  - Witnessed trenchers at work with verity of widths and depths at Wadies, road crossings, blasted areas (not the process itself; just the aftermath of the activity).
  - Got some theoretical exposure to the *Trenchless Technology*.
- Stringing
  - Witnessed the activity.

- Bending: equipment, bending calculation, etc.
  - I didn't witness the activity; I just looked at the equipment and performed the calculations, and a PDO's engineer (DEL14) gave me a presentation about the activity.
- Pipeline welding
  - Made a welding engineer of L&T explains to me the process both theoretical and practical, and then witnessed practically most kinds of NDTs that I mentioned in the presentation with QAQC contractor.
- Field joint coating
  - Witnessed the HSS application and the peel test verification.
- Lowering and post padding
  - Witnessed the activity and reviewed with contractor's engineers the requirements.
- Permanent markers
  - Witnessed the mentioned topic.
- Station work, i.e., Launcher, Receiver, BVS, etc.
  - Visited multiple RMSs and a CEMS and witnessed temporary launchers and receivers that were set-up for the hydrotesting activity. I didn't witness BVS at this stage; however, I witnessed them later in my second visit to *Fahud*.
- Pipeline hydrotest details, i.e., test pressure, safety requirements, equipment, procedures, testing sequence, testing reports, etc.
  - Performed multiple visits to a hydrotesting activity at different stages and accompanied the contract's hydrotesting engineer during those visits. He explained to me the standards that he's supposed to follow, the equipment and their certifications, the calculations he performed, and the safety precautions. By far, most of my time (on this site visit) was spent in this activity, and I performed a case study for PL-05 to cover this activity in some depth.

Attached Documents Titles	Attached Documents Titles	Attached Documents Titles
<ul style="list-style-type: none"> <li>• See: Attachment ➔ stage_2</li> <li>• Hydrotest_Calcs           <ul style="list-style-type: none"> <li>○ Air.pdf</li> <li>○ Gauge.pdf</li> <li>○ Pressure – Temperature Effect Calculations.pdf</li> <li>○ TP.pdf</li> </ul> </li> <li>• Cold_Bending.pdf</li> <li>• construction_Pipeline_engineering.pptx</li> <li>• Pipeline Maintenance.pdf</li> </ul>	<ul style="list-style-type: none"> <li>• All can be considered as Non-Confidential</li> </ul>	<ul style="list-style-type: none"> <li>• Approved</li> </ul>

#### Supervisor's Statement (Performance Achieved):

During his visit to site to Mubrouk & Fahud area, Ahmed has familiarized himself with Pipeline construction activities and demonstrated a good understanding of the specification requirements in pipeline construction for CS and CS+PE line. In addition, he had visited multiple hydrotesting activities and then he demonstrated his learnings on how to carry out pipeline hydrotest based on PDO specifications taking in account safety and quality requirements

**Assessor's Statement (Competence Developed):**

**Proficiency Level:** Awareness

**CFDH Comment:** Ahmed presentation on pipeline construction was very detailed. He presented the construction sequence in compliance to PDO pipeline construction specification and standards.

**Competence #3 and #4: Pipeline Concept Studies and Pipeline Design**

**JT3: Understand the Basic Requirements to Generate Pipeline Concept Study**

**JT4: Understand the Main Tasks and Deliverables in Pipeline Design**

**Eidaad Intern's Input**

Prior to entering the design stage, I went to a site visit to *Fahud* to cover pipeline integrity management. Also, I covered important topics that I will cover in depth in the design stage like pig trap configurations and pig traps design. Moreover, I covered some other topics outside the FDP; however, they were beneficial for my understanding regarding pipeline integrity management. It's worth noting that there is a designated in-house course for pipeline integrity management; however, I believe my training period will be over before I can get the chance to take the mentioned course. Hence, the site visit to *Fahud* substituted the in-house course.

**Brief Description for Pipeline Concept Studies**

To understand the process and tools required to select the optimum solution for pipeline system issues and how to generate a pipeline Concept Selection Report.

- Describe why pipeline concept study is required, i.e., capacity constraint, new development, integrity,
  - I had multiple sessions with UEFL2, where he explained to me why concept study is important, and how it's done in different circumstances i.e., green field Vs. brown field, CAPEX Vs. OPEX, urban planning, etc.
- Describe the general process of generating pipeline concept study
  - Same as above.
- Describe the main contents of Concept Selection Report and how to generate each part, i.e., background, issue description, options, selection criteria, selected option, execution plan, cost estimate and budget plan, ...
  - I have had exposure to two CSR cases, and I included one case study in the presentation. The case that I included was the replacement of MOL-06 Rima – Hubara pipeline, in which I went through each part mentioned above.
- To analyse the generated options, you need to understand the following:  
Pipeline hydraulics, i.e., fluid properties, hydraulic equations in fluid and gas and to be aware about hydraulic programs like: PIPESIM and Pipeline Studio.
  - I have included the necessary calculations that are needed to understand the behaviour of fluids (both liquids and gases) in the pipelines/flowlines. Also, I had a session with process engineer who showed me how they use PIPESIM and OLGA for steady state and transient state simulations.

- Gathering the information about pipeline route and generate routes options in addition of considering the environmental impact assessment.
  - Covered the basics and recommended practises of route selection with UEFL2, where I learned for example how to use PDO's earth effectively along with relevant drawings. I included a case study in the presentation.
- Basic understanding of pipeline materials options
  - I have had covered this topic before multiple times in the previous stages, but here I presented a coherent pipeline selection case study including Hydrocor case study which I conducted with help of Material & Corrosion Engineer, UEFM14.
- Basics of pipeline wall thickness calculations and selecting suitable CS grade
  - Preformed full manual calculations for CS and DSS as well, along with vacuum calculations utilizing the relevant SOPs.
- Understand the basics of pump/compressor sizing
  - Requested relevant documents and information from process team and I presented a summary in the presentation.

### **Brief Description for Pipeline Design**

To understand the main deliverables and tasks in pipeline design (FEED&DD), i.e., the purpose of each document, input information and desired outcome.

- Read and understand pipeline design data summary sheet.
  - Covered the data summery sheets in construction stage as I needed to extract information from them to preform hydrotest test related calculations.
  - Covered the topic here again, where I participated with UEFL team in HABUR FEED+DD.
- Do pipeline calculations, i.e., wall thickness, buoyancy, bend thinning and full vacuum for Carbon Steel pipeline.
  - Preformed fully manual calculations utilizing relevant SOPs for wall thickness, full vacuum, and buoyancy.
  - Both cold bending and bend thinning calculations were covered previously in the construction stage.
  - As a bonus, I covered up upheaval buckling and preformed a validation for the excel calculation sheet, and found a unit error/inconsistency, in which I notified DEL23. After discussing with him, he concluded that he will make the necessary corrections. Refer to *Upheaval\_Buckling\_Correction* folder to inspect the relevant files.
- Understand pipeline route selection requirements including selection process, survey techniques and route selection report.
  - Covered in in-house Pipeline Engineering Course
  - Preformed a case study: 10" GRE buried condensate pipeline approximately 44 km from MBR to SRCPP.
- Understand how to do pipeline criticality classification
  - Covered in in-house Pipeline Engineering Course
  - Covered this topic in the construction stage in *Mabrouk Project*.
- Understand how to identify pipeline location class.
  - Covered this topic in the construction stage in *Mabrouk Project*.
- Understand how to classify Wadi crossing and identify the required protection design for each

class.

- Covered this topic in the construction stage and covered here once again due to an update in the methodology, where go/no-go PDO's earth is implemented.
- Understand how to perform road crossing calculations
  - Preformed fully manual calculations utilizing the relevant SOP and other relevant documents.
- Understand design of launcher/Receiver and BVS's
  - Covered the Launcher/Receiver design in the report of the second site visit (*Fahud*).
  - Regarding BVSs, I covered the SP-1032, and included a summary in the presentation. Also, BVSs were covered in the in-house course.
- Read and understand MTO's
  - UFEL2 explained to me the general process and included it in the presentation.
- Read and review scope of work
  - Same as above.
- Understand the process of ordering the materials including technical bid evaluation and vendor drawings review.
  - Covered MESC, AFT, AVME CODE, and PO Number.
- Understand pipeline alignment sheets
  - Covered this topic in the construction stage and went more in depth in this stage as I spent some time with the contractors/designers in the FEED office, where I watched them how they draw the alignment sheets and the relevant criteria.
  - Spent some time with the contractors/designers in the FEED office where they explained to me thoroughly the process in which how the alignment sheets, and overall route map are created.
- Understand station approach drawings
  - Preformed a showcase of station approach drawing in the presentation for 10" GRE buried condensate pipeline from MBR to SRCPP.
- Understand urban plan drawing and report
  - Read and discussed a report with UELF2 for *Lekhweer*.
- Understand hydrotest calculations and hydrotest diagram
  - Preformed the relevant calculations and covered this topic in the construction stage.
- Read and review pipeline drawings, i.e. PEFS, pipeline schematics plot plans, piping plans, isometric, ...
  - Had exposure to the mentioned topics above with both UEFL team and contractor's designer.
- Understand design code breaks
  - Covered this topic in alignment sheets at multiple stages.

Attached Documents Titles	*Document Type (Confidential / Non-Confidential)	*Supervisor's approval to share document
<ul style="list-style-type: none"> <li>● See: Attachment ➔ stage_3&amp;4</li> <li>● WT+V.pdf</li> <li>● RC.pdf</li> <li>● Buoyancy.pdf</li> <li>● Upheaval_Buckling_Correction           <ul style="list-style-type: none"> <li>○ Dimensional_analyses.pdf</li> <li>○ Upheaval_Calc_FIXED.pdf</li> <li>○ Upheaval_Buckling_Calculatio_n_Spreadsheet_ver_1.0.pdf</li> </ul> </li> <li>● Concept_Studies_and_Design.pptx</li> </ul>	<ul style="list-style-type: none"> <li>● All can be considered as Non-Confidential</li> </ul>	<ul style="list-style-type: none"> <li>● Approved</li> </ul>

**Supervisor's Statement (Performance Achieved):**

After Ahmed has completed his learnings and task at site for (where he witnessed construction & maintenance activities), he was then transferred to Coastal Office working closely with Feed Office to get insight with respect to Pipeline design calculations. During his stay at FEED Office, he has demonstrated a good understanding of the main deliverables and tasks in pipeline design (FEED&DD) such as Wall Thickness Calculation, buoyancy calculation, vacuum check, and cold bending check. He has done the calculations with his own developed spread sheet.

**Assessor's Statement (Competence Developed):**

**Proficiency Level:** Knowledge.

**CFDH Comment:** Ahmed did the manually verification of most of the design Excel sheet used in PDO design office. This includes wall thickness calculation for CS, PE liner and DSS material. This has clearly demonstrated his pipeline design capabilities.

## 2. Learning Needs

Courses Attended	Supervisor's Statement
Fundamentals of Metallurgy and Metallic Materials (31-10-2021 to 4-11-2021)	Attended
Introduction to Exploration and Production training (8-11-2021) ( <u>partially attended due to scheduling conflicts</u> )	Attended
Mechanical Static & Piping Awareness session (16-01-2022)	Attended
Materials Selection - Surface Facilities (21-02-2022 to 22-02-2022)	Attended
TSE for non-TSE Awareness Session (16-03-2022 to 17-03-2022)	Attended
Go-No-Go Tool awareness session (24-03-2022)	Attended
In house-Pipeline Engineering Course (15th - 24th of May 2022)	Attended
Lonestar Laboratory Visit (01-06-2022)	Attended
Basics of Process Control Course (12-06-2022)	Attended

**\* To be filled by the CFDH / DL:**

Final Assessment		
Student Internship Result	PASS	FAIL
	YES	
CFDH / DL Signature		 7th July 2022