





# APEC ENGINEER REGISTER ENGINEERING PRACTICE REPORT

Name of Candidate:

Date of Application:

Professional Discipline: **Civil Engineering**

<p><b>Career Episode Title:</b> <i>Replace High Voltage Cables at Abqaiq Plants.</i></p> <p><b>Dates of Career Episode:</b> January 2014 – July 2017</p>	<p><b>Competency Elements Claimed</b></p>
<p><i>CE 1.1 Introduction</i></p>  <p>I joined Al Jehat Company for Trading and Contracting (JATCO) in January 2013 as Contractual Planning and Scheduling Engineer under SMP program, Supplied Manpower Personnel for Saudi Aramco. I've been connected in Saudi Aramco for almost five years and still counting under Southern Area Oil Facilities projects Division. I handled various projects and I involved ever since the projects was started from business case, Table Top review, Design Basis Scoping Paper (DBSP), Project Proposal, Detailed Design and up to Construction. I was totally part of the team to <b>define research deliverables in terms of specific measurable results by stage of the research.</b> I was also in charge to <b>communicate and monitors research and development progress.</b> Saudi Aramco are on their program for rehabilitation projects in order to upgrade the capacity of the Refinery plant/Gas and Oil Separation Plants including the Upgrade of Transmission lines at Southern Area. The management were closely monitored these projects due to the power lines and equipment are partially deteriorated due to it exceeded the life span requirement. I always <b>identify the extent and combination of fundamental or applied research.</b> Enhancements of production were relied on this rehabilitation/ upgrade and expansion projects. Saudi Aramco were advised by the Saudi Government to boost the supply to meet the global demand of the Oil and Gas market. I identify applications for possible commercial opportunities for <b>Research and Development application</b> in order to enhance the processes and goals for a better outcome which our administration assigned me to <b>manage project throughout life cycle</b> in project planning that gives me confident and dedication for project implementations. Being a good team player and hard worker was one factor also to <b>contribute professional and services for the civic good.</b> At the same time, I <b>manages remedial action and reporting when accident occur</b> which part of my responsibility as planning In-charge.</p>	 <p><b>PE1B.2c</b> <b>PE1B.5d</b></p> <p><b>PE1B.3c</b></p> <p><b>PE1B.4b</b></p> <p><b>PC2.1c</b></p> <p><b>PC1.1e</b> <b>PC2.2e</b></p>

### CE 1.2 Background

Saudi Aramco was a prestigious Oil and Gas Company in Saudi Arabia. This company were founded by an American Company in 1939 called an Aramco or Arab American Company. Lately, the Saudi Government buy all of the shares of this company and named as Saudi Aramco. The market value has been estimated at between \$14 trillion and \$21 trillion, making it the most valuable company in the world. Saudi Aramco has both the world's second-largest proven crude oil reserves, at more than 270 billion barrels (4.3×10<sup>10</sup> m<sup>3</sup>), and second-largest daily oil production.

The country has proven reserves of 266 billion barrels, according to government estimates submitted to OPEC. If these numbers are correct, Saudi Arabia's reserves will last for 70 years at the average production rate of 10.2 million barrels per day reported on Jul 7, 2016.

As a specialist assigned to our team under Project Management Team was very challenging and required to set my attention in every decision that I made to **advocates innovative engineering solutions**. Cheerfully to **identify opportunities to effect decisions that have engineering implications and leads the integration of Research & development outcomes**.



PC3.3c  
PC3.3a  
PE1A.3f

### CE 1.3 Identifying the Cause of the Problem

As I remembered, I was involved to an interesting project of Saudi Aramco that located inside Abqaiq Plant, Eastern Province of Saudi Arabia. It is required to **identify potential benefits and tangible outcomes of the research and development opportunity** in every project. In year 2013, Abqaiq plants process approximately 6.5 MMBD of oil and is projected remain in operation for the next fifteen years. The high voltage paper Insulated Lead Covered Armored (PILCA) cables, which supply power to most of the facilities at Abqaiq Plants, are over 45 years old, experiencing high insulation deterioration and are subject to failures. The cables have experienced a number of failures over the years due to insulation degradation and contractor excavation, which required splices. The further increases the vulnerability of the cables to failures and reduces their reliability. The condition of the cables was recently verified in a study through nondestructive low frequency testing, which found them to be at high risk to failure. It was planned to replace 15,500 meters of 13.8 kV PILCA cables supplying power to 12 Substations. Replacement of PILCA cables is required to support continued crude stabilization and avoid unplanned outages. I **prepared demonstrations (model or prototypes) of the research and development outcome** can help to establish better planning on site including safety. **Strategic goals interpretation are necessary with engineering business planning** to avoid deficiency of deliverables needed in the project.

PE1B.1e



PE1B.5i  
PE1A.1b

*CE 1.4 Analysis of Possible Solutions*

The actions made in order to solve the problems occurred that we conduct a joint meeting to all stakeholders for the identification of the problems and solutions. We always need to identify research focus, conducts test and identifies information for general application and ensures documentation of outcomes are integrated across professions. All areas were classified properly and organized per phases to avoid any shutdown occurrence during the tie ins/ cut overs and installation of the cables. Safety and proper procedures, best practices and stakeholder constant communications are implemented to help to finish the project ahead of schedule and within the budget. I ensure that regulatory and legal requirements are addressed during the implementation. All tasks were planned and my colleagues was consulted on the development of projects that are implementing Research and development outcomes to avoid deficiencies during the implementations. All stakeholders involved must refines the research process required through collaborative process to ensure that all parties that could have a potential interest have an opportunity to express their interest.



*PE1B.5b*  
*PE1A.2c*

*PE1B.5f*

*PE1B.6c*

*PE1B.3b*

*CE 1.5 Project Planning and Implementation*

The judgement that we made was in pattern of standards and promoting the essence of engineering profession importance. I developed and checks the design solution using engineering specifications. Engineering knowledge and judgement was giving high priority for solving problems and implementation of best practices. We need to ensure proper communications & promotes engineering outcomes. I collaborates with others to review the cost and benefits of research and development. This project was executed to replace old cables which the new line were installed parallel to the existing cables. Shutdown of substation were not implemented due to simultaneous transfer of old line to new line. It was done phase by phase, line by line and area by area to avoid interference of the productions. Analyses recorded results and develops conclusion was essentially documented as well for future use and reference. Planning and implementation must be aligned to develop the concept in relation to the imperatives of environmental and social sustainability.



ارامكو السعودية  
Saudi Aramco



*PC2.3c*

*PE1B.6a*

*PE1B.5g*

*PE1B.3f*

*CE1.6 Summary*



Replacement of High Voltage Cables at Abqaiq Plants was completed on year 2016 ahead of schedule by more than 6 months. Contractor dedications, close monitoring of PMT and participation and support of proponent and operations contribute a big impact for the speedy completion of this project and sound safe. Providing recommendation for the implementation of research and development based on commercial

analysis for the proposed or upcoming projects in the future and it can be used as reference. It is overwhelming and gives more impact to my career as Project Management specialist for achieving the goals and objectives of the company. It helps to shape me for an analyses situations or required outcomes, in consultation with potential clients and other stakeholders, to determine justification for research. Lesson learned were applied to the future projects that have the same scope. This time, this high voltage cables were totally used by Saudi Aramco in order to support 12 Substations in order to boost production to support their economy for a better future. Always ensure Research and Development continues to provide innovative engineering application/systems/processes for entire project development.

*PE1B.6b*

*PE1B.1b*

*PE1B.5e*

Signature of Candidate:

Candidate's Verifier: Name :

Contact Nos.

Name

Contact Nos.

Engineering Qualifications:

Signature:

Signature:



**APEC ENGINEER REGISTER PROJECT  
ENGINEERING PRACTICE REPORT  
SELF ASSESSMENT**

<b>UNIT PC1</b>	<b>CONTRIBUTES TO THE DEVELOPMENT OF ENGINEERING PRACTICE</b>	<b>Self-Assessment</b>	
ELEMENTS: (ALL THESE ELEMENTS <u>MUST</u> BE ADDRESSED)			
PC1.1	Provides significant contributions to science and practice of engineering	<input checked="" type="checkbox"/> <b>YES</b>	<input type="checkbox"/> NO
PC1.2	Leads engineering practice in area of specialization	<input type="checkbox"/> YES	<input type="checkbox"/> NO
<b>UNIT PC2</b>	<b>LEADS/MANAGES SIGNIFICANT PROJECTS</b>	<b>Self-Assessment</b>	
ELEMENTS: (ALL THESE ELEMENTS <u>MUST</u> BE ADDRESSED)			
PC2.1	Interpret project scope	<input checked="" type="checkbox"/> <b>YES</b>	<input type="checkbox"/> NO
PC2.2	Manage project quality, safety and risk	<input checked="" type="checkbox"/> <b>YES</b>	<input type="checkbox"/> NO
PC2.3	Implement planning and design process	<input checked="" type="checkbox"/> <b>YES</b>	<input type="checkbox"/> NO
PC2.4	Review the design outcomes in operation	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC2.5	Prepares and maintain documentation during the design process	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC2.6	Manages time and progress	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC2.7	Review the design to achieve acceptance	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC2.8	Manages work priorities and resources	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC2.9	Manages the assets within the operation/system	<input type="checkbox"/> YES	<input type="checkbox"/> NO
<b>UNIT PC3</b>	<b>DEMONSTRATES ENGINEERING LEADERSHIP</b>	<b>Self-Assessment</b>	
ELEMENTS: (ALL THESE ELEMENTS <u>MUST</u> BE ADDRESSED)			
PC3.1	Facilitates innovation	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC3.2	Promotes the engineering profession	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC3.3	Provides significant engineering contributions to community	<input checked="" type="checkbox"/> <b>YES</b>	<input type="checkbox"/> NO
PC3.4	Encourages and manages workplace change	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PC3.5	Motivates and mentors other	<input type="checkbox"/> YES	<input type="checkbox"/> NO

UNIT PE1A	MANAGES ENGINEERING BUSINESS/ORGANIZATIONAL OUTCOME	Self-Assessment	
AT LEAST TWO ELEMENTS MUST BE ADDRESSED FROM THE FOLLOWING:			
PE1A.1	Establishes engineering business/organization direction	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PE1A.2	Manages a multi-disciplined team	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PE1A.3	Leads and manages the engineering business/organization	<input type="checkbox"/> YES	<input type="checkbox"/> NO

UNIT PE1B	RESEARCH AND DEVELOPMENT	Self-Assessment	
AT LEAST TWO ELEMENTS MUST BE ADDRESSED FROM THE FOLLOWING:			
PE1B.1	Identifies opportunities for new or improved processes and / or products/materials	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PE1B.2	Identifies the resources required for R & D	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PE1B.3	Initiates concept developments	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PE1B.4	Gains commitments to the R&D proposal	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PE1B.5	Ensures research is undertaken	<input type="checkbox"/> YES	<input type="checkbox"/> NO
PE1B.6	Collaborates in the application or potential commercialization of research outcome	<input type="checkbox"/> YES	<input type="checkbox"/> NO