

SUSTAINABILITY INITIATIVES AT HALA EPF PROJECT – CASE STUDY

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1.0 Company Profile:

Pakistan Petroleum Limited (PPL) has been pioneer in energy sector since 1950s, sustaining its position greatly due to its robust business programs and concerted efforts to optimize hydrocarbon production from existing fields and new discoveries. The Company operates six producing fields across the country at Sui, Adhi, Kandkhot, Chachar, Mazarani and Hala whereas holds working interest in nine partners operated producing fields across the country.

As a major stakeholder in securing a safe energy future for the country, PPL pursues dynamic exploration agenda aimed at enhancing hydrocarbon reserves. In Pakistan, the company's exploration portfolio comprises of 32 exploration blocks. Of these, PPL holds operatorship in 19 and has working interest as non operating partner with other E & P companies in 13 exploration blocks, including 3 off shore blocks. PPL is also among the first local E&P Company to extend its operations beyond national borders and holds interest in an exploration license in Yemen in a joint venture with OMV as operator.

Over the years, PPL has developed a reliable foundation and infrastructure for providing clean, safe energy through sustainable exploitation of indigenous natural resources while adhering to the highest standards of health and safety and reducing ecological footprint of its operations. In terms of International HSE Certifications, PPL Fields / Depts. have successfully achieved & sustained ISO 14001 (EMS) and OHSAS 18001 (OH & S) certifications through external certification agency.

PPL is signatory to the United Nations Global Compact, a voluntary charter which promotes environmental responsibility as one of its main basic principles. The Company is active corporate member of World Business Council for Sustainable Development (WBCSD) and Worldwide Fund for Nature (WWF) – Pakistan and Karachi Water Partnership (KWP), supporting environmental conservation efforts.

In recognition of its extensive efforts to promote workplace safety, environmental conservation and sustainable development, Employers' Federation of Pakistan awarded PPL for "Best Practices in Occupational Safety & Health" in years 2007 and 2010. Also, National Forum for Environment and Health awarded Environmental Excellence Award to PPL in 2006, 2008, 2009 & 2010.

PPL's pursuit of excellence is acknowledged through various national and international awards. PPL received the Management Association of Pakistan's 25th and 26th

Corporate Excellence Award in 2008 and 2009 for transparency of the company's financial and corporate regime.

PPL has played a significant role as a socially responsible corporate since the inception of its commercial activities in Sui by establishing Model School Sui in 1957 for children of workers and local communities. Over time, the outreach of PPL's Corporate Social Responsibility (CSR) portfolio has gone well beyond obligatory requirements. In 2001, PPL Welfare Trust was formed to provide geographical and thematic diversity within its CSR initiatives, which include education, healthcare, infrastructure development and socio-economic uplift of disadvantaged communities, particularly those living in and around its operating areas.

2.0 Introduction:

Industrial units established before promulgation of local environmental laws and regulations in late 90's generally face constraints in complying National Environmental Quality Standards and associated obligations mainly due to pre set design parameters not synchronised with later issued requirements. On one hand, design modifications to older plants involve capital expenditure whereas on the other hand there has been lack of technological solutions in local market.

However, opportunity lies in giving due consideration to local as well as international environmental guidelines during design stage of new industrial projects for embedding world class HSE practices right from the conception of the Project till its entire life cycle.

Hala early production facility is the latest addition to PPL assets in Jan. '10 as a model hydrocarbon processing facility, integrating features for sustainable development in line with local statutory requirements as well as international standards of Health, Safety & Environment in its design stage.

Hala facility is located in vicinity of Tando Adam in Hyderabad district of Sind province.

3.0 Sustainable Development Initiatives:

Sustainability may be defined as meeting the needs of present without compromising the need of future generations. At Hala following initiatives were taken during design phase of the project to stand firm with the commitment made through PPL HSE Policy.

3.1 CFC Free Refrigeration System

Hala EPF includes production of LPG and NGL hydrocarbons that are recovered from natural gas include ethane, propane, butane, pentane and heavier components. NGL's are generally more valuable as petrochemical feedstock and are recovered from natural gas streams as a liquid product. Refrigeration systems are commonly employed for extraction of NGL and LPG from hydrocarbon streams.

The extraction process includes chilling of natural gas stream with a conventional freon refrigeration system, separation of condensed liquids in a low temperature separator and stabilization in a deethanizer column. PPL took an initiative at Hala for designing its refrigeration systems on Propane gas instead of conventional Freon, keeping in view its environmental hazardous nature. Propane has negligible ozone depletion potential and very low global warming potential.

3.2 Zero Land Discharge

Produced water is the water trapped in underground formations that comes to the surface along with hydrocarbon stream. It is by far the largest volume byproduct or waste stream associated with oil and gas production. Management of produced water presents challenges and costs to operators.

Many chemical constituents found in produced water, when present either individually or collectively in high concentrations, can pose threat to aquatic life, crops etc. Produced water can have different potential impacts depending on receiving bodies. Federal EPA under National Environmental Quality Standards 2001 has set out monthly monitoring requirements for all effluent discharged from Oil & Gas facilities.

Going beyond the regulatory requirements PPL has constructed produced water evaporation pond in view of the production rate and evaporation rate of produced water. The pond is provided with pit liner to prevent seepages and leakages in order to prevent soil contamination. About 1200 gallon per day is contained in properly lined ponds for environmental friendly disposal through evaporation. In addition, optimum quantity of condensate is maintained in produced water due to installation of produced water tank to knock down condensate prior shifting to ponds for evaporation.

3.3 Green Procurement

Green procurement is the organization's practice in meeting their needs for goods, services, utilities and works not on a private cost benefit analysis, but with a view to maximize net benefits for themselves and the contribution towards reduced carbon footprint. It is as a tool to address climate change, but it offers the broader capacity to mitigate over exploitation of any and all scarce resources.

In adopting green procurement strategy, PPL promoted green practices throughout the life cycle of project including planning, design, selection of equipment, procurement, plant erection & commissioning phase. Green procurement at Hala project included procurement of NEQS compliant gensets & heaters, energy saving light bulbs, use of rock wool, glass wool and foam glass instead of asbestos (a known carcinogen). Green procurement has enabled PPL to comply with NEQS and reduced GHG emissions thus minimizing ecological footprint while supporting Kyoto Protocol declaration.

The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC), aimed at fighting global warming. The UNFCCC

is an international environmental treaty with the goal of achieving stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

3.4 Process Safety Equipment

State of the art process safety equipments are installed at the Hala production facility. A few of them are listed below:

3.4.1 Deluge System on LPG Storage Tanks

Water deluge system is installed at LPG storage tank at Hala to combat LPG fires. Deluge systems prove effective as compared to ordinary sprinkler systems in areas where flammable liquids are stored. In deluge system, all sprinklers connected to the piping network are open and the water supply is controlled by a deluge valve. The valve remains closed until a fire is detected by a heat actuated device that in turn causes the valve to open.

3.4.2 Pressure Relief Valves

PRVs also called PSVs are installed on process pipelines at Hala. PRVs are spring operated safety valves which activate in case of emergency. It is primarily used to control or limit the pressure in a system or vessel which can build up by a process upset, instrument or equipment failure, or fire.

3.4.3 Down Hole Safety Systems

Down hole safety valves are installed at Hala well, which acts as a failsafe to prevent the uncontrolled release of reservoir fluids in the event of a worst case scenario surface disaster. Down hole safety valves are controlled hydraulically from surface through a control panel.

3.4.4 Gas Flaring

Gas flare is an elevated vertical conveyance at Hala which acts as safety systems for non waste gas and is released via pressure relief valve when needed to ease the strain on equipment. They protect gas processing equipment from over pressuring due to unplanned upsets. Also in case of an emergency situation, the flare system helps burn out the total reserve gas. In order to keep the flare system functional, a small amount of gas is continuously burned, like a pilot light, so that the system is always ready for its primary purpose as an over-pressure safety system.

3.5 Venting & Flaring

PPL endeavored design & installation of a stable processing plant with zero flaring. The design of Hala facility is based on “No Flaring Concept”, whereas negligible quantity of

gas about 0.1 MMSCFD flared in contrary to normal flaring of up to 1 MMSCFD. Flaring of gas was also substantially avoided during commissioning phase through application of heat tracing at Plant's vessels and daily adjustments to cater for temperature control of raw gas which saved flaring of around 150 – 170 MMSCF gas.

Burning of liquid hydrocarbons in conventional burn pits during well testing and maintenance activities was also avoided in the Hala Project.

Concept of pigging and inertization of sales gas line from plant to tie in was introduced at Hala which resulted in the acceptance of sales gas by customers without venting.

3.6 Fire & Gas Detections and Fire Fighting Systems

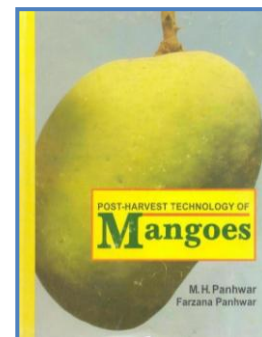
In addition to process safety and control equipment, Hala project is also equipped with state of the art fire & gas detection and fire fighting systems to cater for incidental fires. Dedicated fire water pumps are employed for pressurizing the distribution network while a water reservoir is present at the facility to meet the fire water. Further, Fire Hydrants, Foam Monitors, Mobile Foam Trolleys, DCP & CO₂ Fire Extinguishers etc are available to combat emergencies.

3.7 ISO & OHSAS Certified Project

HSE Management System at PPL devised inline with ISO 14001 (Environmental Management System) and OHSAS 18001 (Health and Safety Management System) is successfully implemented at Hala. These standards are internationally renowned for providing quality based management system supporting continual improvement in organization's environmental performance and reduction of occupational risks. The management system was implemented at Hala project right from the initiation of seismic activities followed by drilling operations and field development activities. Various HSE inspections, audits were conducted during the project cycle to ensure compliance of company's management and international standards. At last, Certifications audit was conducted by external certification agency which resulted in grant of certification based on detail assessment of entire project cycle.

3.8 Support to Agricultural Sector

To support sustainable agricultural development in the country, PPL sponsored the publication of Post Harvest Technology of Mangoes authored by Hala based agriculturist Mr. Hussain Panhwar (Sitara-e-Imtiaz). The book is an excellent contribution in the field of agricultural research making useful recommendations on increasing mango yield in the area.



3.9 Environmental Friendly Practices

PPL adopts environmental friendly practices for all its operations, appended below are few practices undertaken at PPL:

- Tree cutting is totally avoided during seismic activities, and site restoration is simultaneously carried out for even minor removal of flora / vegetation through green team.
- Tree plantation campaigns are undertaken at operated Fields & Exploration Blocks as a measure to enhance ambient environmental quality in surrounding of Projects.
- Water based mud was used in Drilling Operations which is known for compatibility with natural soil in comparison to oil based mud which requires special treatment for disposal.
- Reduction in paper use by promoting electronic resource for exchange of corporate communications.



PPL's Hala Early Production Facility