

Chapter 11

Gathering Systems and Processing Facilities Risk Analysis

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ABSTRACT

Gathering system is defined as one or more segments of pipeline, usually interconnected to form a network that transports oil and natural gas from the production wells to one or more production facilities, gas processing plant, storage facility, or a shipping point. There are two types of pipeline networks: radial and trunk system. Produced well fluids are often complex mixtures of the liquid hydrocarbons, gas, and some impurities that can have detrimental effects on the integrity of the gathering pipelines. It is necessary to eliminate most of the impurities before oil and natural gas can be stored and sold. Complexity of the processing facility depends on the treated fluid composition. Environmental impacts during the oil and gas transportation and processing phase will cause long-term habitat changes. To minimize that, it is very important to implement appropriate activities across the designing, construction, operational, and decommissioning phases.

INTRODUCTION

The evolution of today's gathering systems and surface facilities actually began several thousand years ago. Seepages of asphaltic bitumen in Mesopotamia around 3000 B.C.

were the raw material for the "petroleum" industry that flourished for about three thousand years. It primarily produced mastic and caulk used in construction. The production system was crude and involved merely the recovery of hydrocarbon in jars and casks. Surface facilities for the production at the time involved a crude type of distillation (JPT, 1999).

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Today, dramatic changes in the range of new technologies available ensure a new environmental and safety approach. Awareness of the importance of environmental issues has become increasingly vital to our society. Designer's understanding of all processes, safety and environmental tasks of newly developed technologies is essential. Now, as well as in the future, the process and equipment choices will have to be made before all aspects are definitely known. Depending on the specific application, it may make more sense to use an older, proven technology instead of a newer one because the application does not require a cutting-edge solution.

A prescriptive approach to safety and environmental management of gathering system and surface facilities relies on a selection of specific regulatory and technical requirements developed for all of the phases from design to decommissioning. The owners must follow existing standards, practices, guidelines, and procedures. The owner of installations must be completely knowledgeable in the regulations of each country in which it operates and is responsible only for complying with individual regulatory requirements. Complex working situations occur on offshore installations, possibly creating dangerous conditions that must be examined carefully and organized in the best way possible.

This Chapter provides basic information regarding the gathering and processing systems and potential environmental impacts of these systems. To avoid or minimize environmental impact of the gathering systems and surface facilities it is very important to implement appropriate activities from designing phase, construction, operational and decommissioning phase which will be also described in this Chapter.

BACKGROUND

Created in 1972, the United Nations Environment Programme (UNEP) addresses environmental issues at the global and regional level. UNEP provides leadership and encourages partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising the quality of lives for the future generations.

The E&P Forum is the international association of oil companies and petroleum industry organizations formed in 1974. It was established to represent its members' interests at the specialist agencies of the United Nations, governmental and other international bodies concerned with regulating the exploration and production of oil and gas. While maintaining this activity, the Forum now concerns itself with all aspects of E&P operations, with particular emphasis on safety of personnel and protection of the environment, and seeks to establish industry positions with regard to such matters. At present the Forum has almost 60 members worldwide, the majority being oil and gas companies operating in 60 different countries, but with a number of national oil industry associations/institutes.

Environmental Management in Oil and Gas Exploration and Production, developed by Oil Industry International Exploration and Production Forum and UNEP, provide an overview of environmental issues in the oil and gas exploration and production industry, and of the best approaches to achieving high environmental performance in all parts of the world. Their Technical Report Environmental management in oil and gas exploration and production provides an overview of the environmental issues and the technical and management approaches to achieving high environmental performance in the activities

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