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OIL & GAS CONSULTING

UPSTREAM PIPELINES AND FACILITIES

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SIMOPS – an Overview

Simultaneous Operations (SIMOPS) can be defined as all concurrent activities occurring within an existing or on-going operating area that have the potential for more than general work planning and permitting interfaces that require:

- Consideration of the work interface;
- Coordnation of all groups involved with the work interfaces in planning and communication; and
- Risk assessment of the work task and the subsequent risk assessment of the interaction with other work task(s).

SIMOPS are typically controlled under the operating entities Operations Management System (OMS), involving a structured approach to all work activities which occur within the operating area and help to ensure a coordinated safe and efficient work program communicated to all personnel and organizations that are directly involved or potentially impacted.
SIMOPS and associated work programs should be identified, developed and controlled by a specific work procedure so that:

- All actions considered by the procedure to be SIMOPS and
- The generation of work programs involving SIMOPS for implementation offshore.

The work procedure should ensure the maintenance of a safe operating environment within the operating area through the application of area-wide management controls.

All activities having an impact on wells, FSO's, operations, production, drilling, maintenance or field support activities should be considered to have a potential SIMOPS impact. Similarly, drilling and production interactions are also typically considered to be SIMOPS.

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SIMOPS may involve any and all equipment working in the area, and all vessels / mobile installations directly attached to the facilities; contracted drilling rigs; contracted installation vessels; export / offloading vessels; field support and tender vessels; diving, survey and inspection vessels. No measured inclusion / exclusion zone exists to limit contractor inclusion or provide exemption from the requirements specified here.

The scope of a SIMOP work procedure normally does not cover:

- Heavy lift installation activities before Operations and Drilling personnel are living onboard drilling and production structures; or
- Drilling activities within the area before arrival of installation components or major field drilling and production structures

In conjunction with the SIMOP work procedure, a Field Control, Communication and Coordination with Third Parties Procedure should be prepared that describes how support vessels and major contractors onboard fixed facilities in the area are involved in communication and coordination with Operation's core crew to ensure the safe progression of all work.

I can assist in developing SIMOP Plans and related Scopes of Work, procedures & work packages.

Blasting Near Existing Pipelines

Prior to 1975, no universally adopted approach existed for estimating pipeline stresses caused by nearby buried explosive detonations within 100 ft of pipelines. Many states and natural gas companies used various methods to evaluate the impact of explosive detonations on buried pipelines. Some of these methods included:

- Applying parameters designed only for aboveground structures.
- Using ground motion criteria (maximum soil velocity or acceleration) which limit maximum ground particle velocity to either 1.0 or 2.0 in./sec at the surface. These criteria were originally developed to measure the effects of ground shock on aboveground buildings.
- The Battelle equations (McClure, 1964) on theoretical elasticity solutions based on the Morris' equation (1950) for ground motion. These equations have been recommended for explosive-to-pipe distances greater than 100 ft. However, they have been misapplied for the closer distances (less than 100 ft) therefore rendering its results invalid in those cases.

In 1981, the AGA commissioned a study aimed at developing criteria for the use of explosives in [proximity to pipelines. The results of the 1981 AGA study is recommended for use to properly analyze pipeline stresses caused by buried explosive detonations within 100 ft. It represents the most current data available to date for properly determining the impact of buried explosives on pipelines.

Blast prediction equations were derived using theoretical and experimental analysis from the 1981 AGA study. The basic stress prediction equation is of the form:

$$SIG = 4.44 \times E \times X^{0.77}$$

Blasting work on a pipeline in remote Bolivia

The AGA study utilized approximate analytical methods and test data to derive closed-form equations for estimating circumferential and longitudinal stresses for point and parallel-line buried explosive sources. Furthermore, the applicability of approximating more complex explosive geometries with either an equivalent point or parallel-line source was evaluated using experimental data from angled-line, parallel-grid, and angled-grid explosive sources.

In addition to the AGA research efforts covering point, line, and grid explosive sources buried to essentially the same depth as the pipe, other more limited alternative AGA studies have been conducted. The alternative limited studies included:

- The response of pipelines which are relatively near a free surface such that the blast-induced stresses would be enhanced
- A review of the literature and analysis of some data on the effects of shielding a pipeline by the use of a trench between the charge and the pipe
- An experimental and analytical effort to determine the feasibility of using concrete/soil tests to model the effects of placing the charge in a harder media (e.g., rock) than that surrounding the pipe

Project Finance – International Fiscal Contract Terms

In the international upstream oil & gas industry, there are various types of fiscal terms, which are country-specific and sometimes specific on a region or asset basis, that are utilized by host governments. Although there are many variations, in general the following fiscal agreements are used:

- Production sharing agreement (PSA)—rate-based and economic-based
- Technical service agreement (TSA) – service
- Operating service agreement (OSA) – risk service
- Concession agreements—tax and royalty, supplementary tax, and controlled margin contracts

Each type of contract brings with it certain rights and obligations as well as mechanisms for cost recovery and remuneration for both the contractor and the host government.

Production sharing agreement (PSA)—the government grants the contractor the exclusive right to explore and produce hydrocarbons within a geographical area or block. The contractor generally has discretion on conducting a work program, subject to approval of the government or state oil company, which retains control. The contractor typically owns the assets until their investment costs are recovered and then title is conveyed to the government.

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It's critical to understand the various contract types. Each contract type by virtue of its structure has various pros and cons as well as sensitivities to product prices and costs.

Contractor costs are recovered from production in the form of "cost barrels," which are based on the costs to be recovered and the sales price of the hydrocarbon production ($/bbl). The remaining production, referred to as "profit barrels," is split between the contractor and government.

Technical service agreement (TSA)—the government enters into a contract with the contractor whereby the contractor has an obligation to provide technical and consulting services for a fee (typically $/year contract) which is subject to taxation. The contractor has no equity interest in the production or the reserves. The government controls the operations and the assets and finances the work.

Operating service agreement (OSA)—the government enters into a contract with the contractor whereby the contractor has exclusive rights to conduct operations and carry out a work program for a fee (typically $/bbl) as well as the obligation and risk of financing the work. The contractor has no equity in the production and the government maintains ownership of the assets. Typically, under these types of contracts, the contractor cannot book reserves or count the production as net production for SEC reporting.

Concession agreement (tax and royalty)—the government grants the contractor (concessionaire or grantee) the exclusive right to explore and produce hydrocarbons from a geographical area or block. The contractor has total control of the operations, subject to regulations, and owns the production and assets. Under this arrangement: contractor's remuneration is from revenues generated on hydrocarbon sales; can book; government take is through bonuses, taxes, and royalties. There are two basic variations to the general concession agreements – 1) supplementary tax, and 2) controlled margin.