VMGFIELD IS A FULLY INTEGRATED RESERVOIR/MULTI-PHASE GATHERING SYSTEM SIMULATOR, BUILT TO ALLOW YOU TO QUICKLY OPTIMIZE YOUR TOTAL FIELD, NO MATTER WHAT THE SIZE.

In one stand-alone model, it is possible to simulate complex gathering systems (including items such as flow splitting and line looping) with or without liquids, vertical/horizontal wells, 3D gridded reservoirs, tanks, or surface networks only.

Features like drag-and-drop pipeline design and the on-screen UTM coordinate system speed model creation and allow the user to focus their time evaluating development options rather than model building.

Key model applications include:
- Network only or when linked to VMGField Multi-phase Reservoir module:
  - Pipeline Integrity Management System (PIMS)
  - Gas condensate, volatile oil, black oil
  - Coal bed methane
- Built in dry gas reservoir simulator (with assigned WGR per well):
  - Pipeline Integrity Management System (PIMS)
  - Gas exploitation (shale, tight, shallow, conventional)
  - Lean gas condensates
  - Gas storage (cyclic injection and production)
  - Combination exploitation with gas storage
INTEGRATED RESERVOIR, WELLBORE AND SURFACE NETWORK MODELS

Reservoir Model
- Built-in dry gas (pseudo pressure formulation) with multi-phase module available
- Gridded or tank reservoirs (1D, 2D, or 3D)
- Fully defined reservoir properties
- Multi-layer/multi-zone/multi-reservoir
- Multiple completions
- Dual porosity, local grid refinement capability

Wellbore Model
- Multi-phase flow
- Commingling, turbulent inflow
- Vertical/horizontal wells
- Gas lift

Surface Network Model
- Multi-phase, multi-component pipeline flow
- Multiple delivery points
- Compression (parallel and booster configurations)
- Chokes, valves regulators, separators, line heaters
- In-line separators with products remaining in network
- Corrosion based pipeline risk of failure assessment
- Energy balance for flowing temperature calculation
- Hydrate calculation

OVERVIEW
- Quickly build fully integrated gridded 3D reservoir, complex gathering system, and facility models in one package
- Predict nodal pressures, temperatures, fluid compositions and water born species concentrations in the network
- User friendly input/output interface
- Computationally very efficient – built for large fields with high well counts
- More than 30 years of successful usage
- Currently features VMGThermo, Shale Utility, Pipeline Integrity Management System, Shapefile Import, Network Connection Tool, hydrate calculations with many more developments planned

MULTI-PHASE RESERVOIR MODULE (MRM)

The multi-phase reservoir module provides robust and flexible phase behaviour treatment along with component and species tracking capabilities. It is computationally fast, stable and memory efficient. It uses a user interface and database structure that is analogous to VMGField, significantly reducing training times and software maintenance efforts.

Four simulators in one: Black Oil, Fully Compositional, Pseudo Miscible, and Chemical Flood.

MRM can run stand-alone or be linked with VMGField gathering system simulations whenever multi-phase, multi-component reservoir simulations are needed.
CALIBRATION SYSTEM

- Rigorous calibration of the reservoir and gathering system is achieved by reservoir history match and surface network tuning until the calculated simulator performance agrees with observed performance.
- Each update of calibration improves the reliability of the model to accurately forecast the performance of alternative exploitation.
- Time saving calibration features such as automatic inflow coefficient calculation, ability to select multiple pipe segments and modify parameters en masse.

RESULTS ANALYSIS

- Easy to objectively quantify the benefits of changes to the exploitation plan such as infill drilling, addition of compression (field or plant) and de-bottlenecking of the gathering system.
- Compare results (graphically or tabular) on a well, group, and segment basis (i.e. pipe, compressor).
- View results directly on the network system display at any point in time.
- Export performance data in Excel® compatible format for further analysis and post processing (i.e. economic analysis).
- Export reservoir results such as grid block pressure and hydrocarbon-in-place for further analysis and post processing to third party software including Petrel®.

USER FRIENDLY INTERFACE

Reservoir Model

- Reservoir properties from spreadsheet arrays or shapefiles.
- Evaluate grid properties from shapefiles.
- Import GRDECL files.
- Access commercial databases.
- Cut, paste, and scale properties.
- View well locations and transmissibility restrictions on screen and spreadsheet arrays.
- Cross-sectional displays of reservoir data.

Gathering System

- UTM coordinate system.
- DEM topographic data import.
- Large gathering system display.
- Drag and drop gathering system creation.
- On screen well and gathering system component additions.
- Pipeline path cross-section display.
- Daisy chain pipe segments together to evaluate pipe path from well to plant in one plot.
- Pipeline color coding.
- Create as built network systems.

Exploitation Plan

- Add and connect infill wells.
- Re-direct and loop pipelines.
- Insert/modify compression.
- Calculate pipeline lengths on the screen.
- Automatically calculate inflow coefficients.
- Time stepping (input and output).
ENHANCED CAPABILITIES

Pipeline Integrity Management System (PIMS)
- PIMS has been added as an integral component of VMGField to allow the user to perform pipeline integrity calculations. Such calculations include corrosion rate and likelihood of failure. These calculations can be coupled with the users’ corporate Risk Matrix which can be viewed directly within VMGField or exported as a pdf report for regulatory submission. This streamlines the evaluation process and ensures a consistent method of satisfying internal and regulatory requirements.

Heat Transfer and Hydrates
- Integration with VMGThermo, our world class thermodynamic engine, allows for heat transfer, temperature, and hydrate calculations to be performed when required. Such capabilities further enhance VMGField’s accuracy and power for performing network modeling and evaluating critically important flow assurance issues.

Shapefile Import and Data Field Assignment
- Generic Pipeline Network Shapefiles can be imported from private or public databases and pipeline attributes can be filtered and mapped to respective data fields. This expedites the model creation process saving the user from having to manually enter data such as pipe length, internal/external diameters, wall thickness, etc.

Network Connection Tool (NCT)
- Shapefiles are rarely complete or properly connected. The Network Connection Tool locates and lists unconnected Shapefile segments automatically and allows the user to make connections in batch or individually. This further accelerates the model building process allowing the user to spend more time evaluating scenarios instead of model building.

Export Network to Symmetry
- The VMGField network can easily be exported to Symmetry to perform high fidelity studies such as dynamic evaluations like slugging and pigging, furthering VMG’s integrated offering. This leverages VMGField’s GIS based interface as a front end to Symmetry.