WellSim

OVERVIEW

WellSim is an *integrated geothermal wellbore simulator and analysis package* designed to allow 'what-if' scenarios to be performed on a geothermal well, such as: "what might be the increase in production from choosing a larger casing diameter for future wells drilled in a field?"

WellSim is written in Delphi, and uses SQL for all data queries and manipulation. Data can be stored in different databases (Access, SQLServer7, SQLServer2005) using an ADO interface for data access. **WellSim** is 'unit-aware', like all GSDS software, and can handle data in any measurement units.

WellSim Modules

Discharge Test Simulation

The steady-state discharge of a geothermal production well at one mass flow rate.

Fluid Composition and Properties Module

Assessing the consistency of measured fluid properties using an EOS model for the H_2O-CO_2-NaCl system.

Deliverability Curve Prediction (Output Test Simulation)

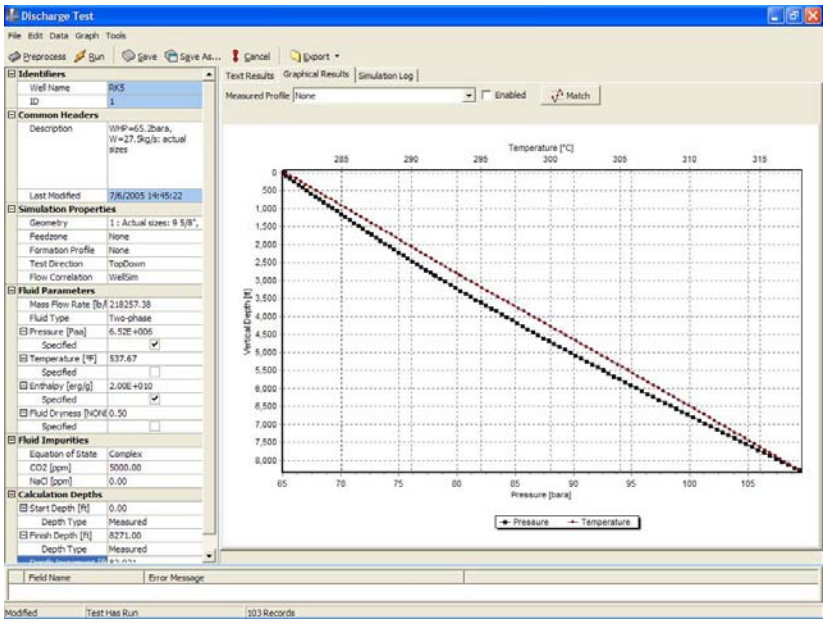
Simulation of a series of discharge tests over a range of mass flow-rates to produce a well's deliverability curve, and, prediction of a full deliverability curve and associated reservoir/feed-zone response curve on the basis of one or two measured points.

Statistical and Graphical Matching Analysis

Matching measured profiles with simulated results.

Downhole Measurement Analysis (Lower Bound)

Assessing errors and trends in down-hole measurements, identification of feed-zones and fluid composition.



GSDS
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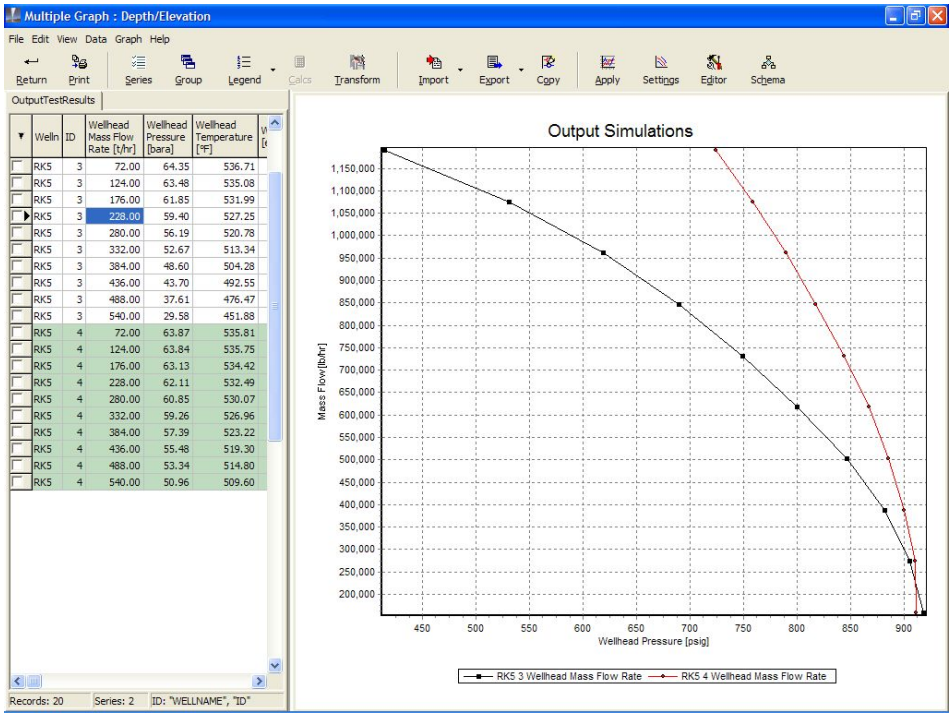
FEATURES

In the present release, the program includes the following functionality:

- Models liquid, two-phase, and superheated steam flow in geothermal wells.
- Incorporates dissolved solids content by an equivalent weight percent of NaCl.
- Incorporates non-condensable gas content by an equivalent weight percent of CO_2.
- Estimates the effect of both NaCl and CO_2 on fluid liquid phase properties (i.e. models the ternary system H_2O-NaCl-CO_2.
- Estimates the effect of CO_2 on fluid vapour phase properties (i.e. models the ternary system H_2O-NaCl-CO_2)
- Allows wellhead/down, or deepest feed/up calculation.
- Models secondary feed zones, and calculates fluid composition at secondary feeds
- Allows linear, quadratic, or superheated steam type draw-down relationships to be specified at each feed for calculating feed mass flow rate.
- Allows multiple changes of casing and liner diameter, and roughness, to be specified. Standard casing and liner sizes are included as defaults.
- Models deviated wells.
- Models heat transfer with the surrounding rock formation and well casing.
- Displays, stores and allows entry of data in either Imperial or SI units or a mixture of types of units.
- Includes the GSDS suite of standard graphing tools.
- User-specified measurement units
- Data import directly from field instruments
- Support for Access, SQLServer2005



Wellname	ID	Wellhead Mass Flow Rate [t/hr]	Wellhead Pressure [bara]	Wellhead Temperature [°F]
RK5	3	72.00	64.35	536.71
RK5	3	124.00	63.48	535.08
RK5	3	176.00	61.85	531.99
RK5	3	228.00	59.40	527.25
RK5	3	280.00	56.19	520.78
RK5	3	332.00	52.67	513.34
RK5	3	384.00	48.60	504.28
RK5	3	436.00	43.70	492.55
RK5	3	488.00	37.61	476.47
RK5	3	540.00	29.58	451.88
RK5	4	72.00	63.87	535.81
RK5	4	124.00	63.84	535.75
RK5	4	176.00	63.13	534.42
RK5	4	228.00	62.11	532.49
RK5	4	280.00	60.85	530.07
RK5	4	332.00	59.26	526.96
RK5	4	384.00	57.39	523.22
RK5	4	436.00	55.48	519.30
RK5	4	488.00	53.34	514.80
RK5	4	540.00	50.96	509.60

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