April, 1999 Update – Version 2.70/3.10

StimPlan

- Added the capability to simulate pressure dependent (i.e., natural fracture) fluid loss. For the physics simulated, fluid loss will begin to increase once net pressure in the fracture exceeds a critical (input) value. While this has been extensively tested, it is expected that solution stability problems still exist and we ask that any solution problems be reported promptly so this can be improved to the general stability level of StimPlan itself.
- Significantly expanded and improved "Help" system. The goal is for this "Help" system to completely displace the StimPlan manual by the next release and any/all comments and ideas are solicited in order to make this possible.
- Added a "Data Graph" for displaying the input data for in situ stress, modulus, and fluid loss as log style "tracks". In addition, added a capability to import one "log data" variable such as Gamma Ray, Porosity, etc. to plot along side the fracturing input data. Also allowed a capability to "shade" this log data to highlight clean sand intervals, etc.
- Significantly improved the input dialog for layer data allowing color (and name) coding of layers, and including a "ditto" (or "Fill Down") capability to duplicate input across several layers.
- Fixed the "weakness" where successive saving/opening of FRK and STP files could cause a loss of fluid rheology and/or proppant conductivity data. As an example, consider the following case. StimPlan data is saved in two types of disk files: a) FRK files contain all the 3-D model input data such as stresses, modulus, etc., but a FRK file only contains ONE pump schedule, that being the "active" schedule at the time the FRK file was saved, and b) STP files which contain all the FRK data, plus all defined pump schedules (& also any data used in the Analysis Module). HOWEVER, the defined fluid rheology data is saved in both FRK & STP files, and this created potential problems. Assume you define a pump schedule which uses a 100 cp fluid defined as "Fluid Type 1", and a 200 cp fluid defined as "Fluid Type 2", and this is saved in MYFILE-1.FRK. Now assume we define a second pump schedule, and as part of this definition, we alter the definition of "Fluid Type 1" to be a 1,000 cp fluid, and this is saved as MYFILE-2.STP. If we later open the MYFILE-1.FRK file, our redefined "Fluid Type 1" is returned to its 100 cp values ! This weakness has been addressed and all input fluid/proppant descriptions are always retained.
- Fixed minor display problems where "tabs" did not appear for certain 640X480 displays.
- Altered Proppant Schedule dialog to allow "copying" an existing schedule when creating a new pump schedule.

E-StimPlan

- Developed the implicit solution for 2-D Flow/Width/Height. In this solution, the 2-D flow pressure distribution and the resulting width distribution are calculated simultaneously. In addition, this is formulated in a manner, which can use numerically derived width/pressure relations in the future. This will allow the use of a 2-D finite element calculation to define the width/pressure relations, and thus allow a rigorous solution for layered modulus cases. This would then be the ONLY hydraulic fracture simulator rigorously including the effects of layered modulus on fracture width. This is also formulated in terms of a "stiffness matrix", thus allowing more rigorous solution for fracture height recession and fracture closure on proppant. This should also provide a much more robust, stable solution than previous versions of E-StimPlan.
- Added capability to simulate "0" rate (i.e., shut-in periods) stages. This allows the simulation of cases where a preceding mini-frac may affect the spurt loss or fluid loss during a subsequent propped fracture treatment.

Analysis Module (Version 3.10 only)

- Added a capability to calculate a bottomhole pressure using a measured gauge pressure from any position in the wellbore and correcting for hydrostatic head changes (and pipe friction) from the gauge to the perforations.
- Added a "Volumes Plot" to the Frac Job Analysis. This allows a comparison of "Actual" versus "Design" Proppant Volume versus Fluid Volume for QA/QC analyses.
- Added capability for the individual defined tests to be "named" and reordered for user convenience.
- Improved scaling of Analysis Plots such that "zoomed" or user set scales are not lost while switching from plot-to-plot