

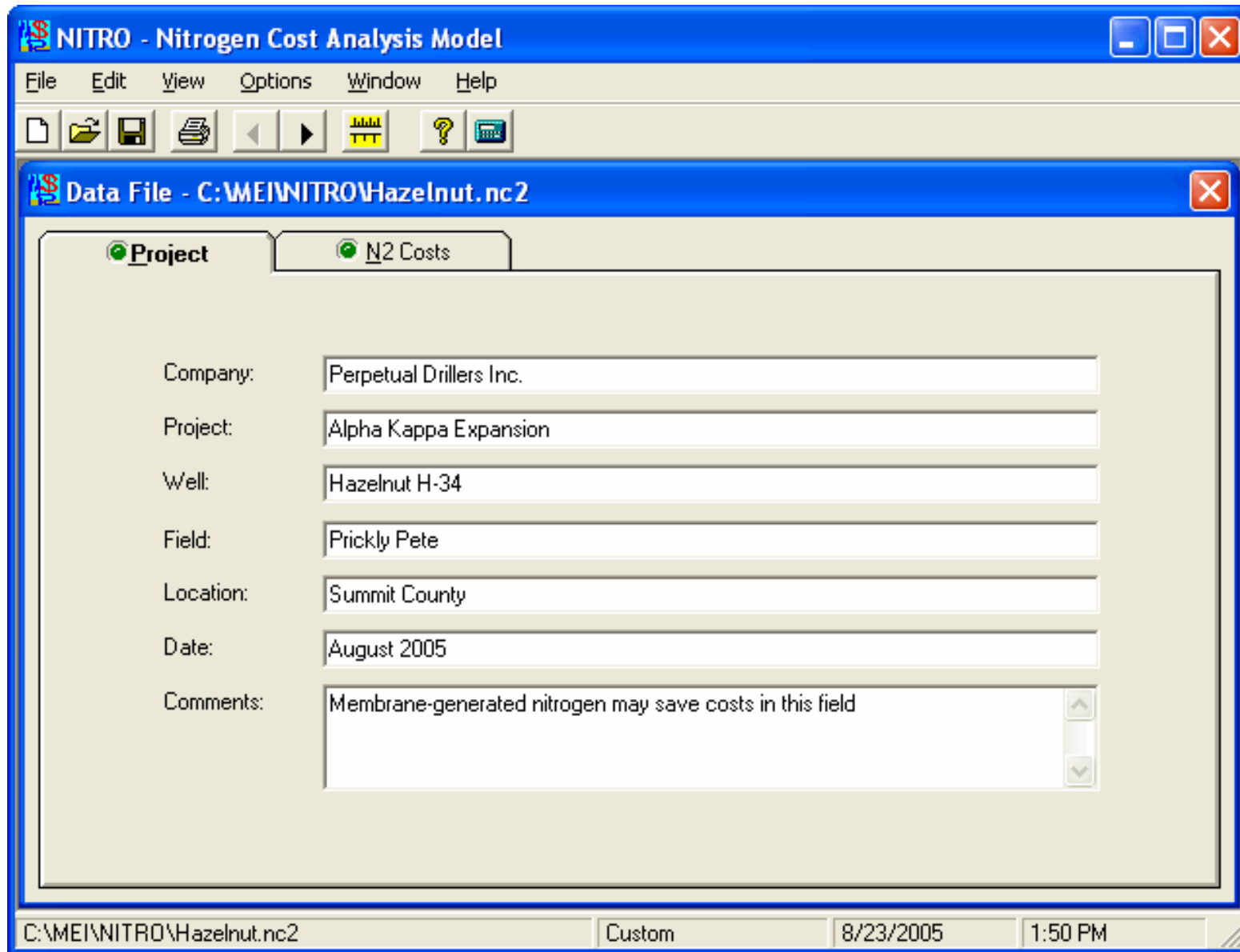
NITRO – Nitrogen Cost Analysis Program

NITRO is one of the underbalanced drilling tools developed by Maurer Technology. The primary purpose of this program is to help you with the decision-making process when selecting a nitrogen-generating method for underbalanced operations.

NITRO compares the costs of using conventional liquid nitrogen to compressor membrane equipment that produces nitrogen at the drilling site. Results from this program should be very useful for optimizing nitrogen operations.

NOTE: Computer screens within this PDF document may appear slightly distorted. This is due to limitations in the Adobe Acrobat Viewer when displaying graphics. To clearly view details in the graphics, zoom in or print the document.





NITRO

Input data are entered on two input pages, each accessed by clicking its tab. The first input page (**Project**) includes basic project information/documentation. This information is shown on printouts.

Slide
2 of 10

NITRO - Nitrogen Cost Analysis Model

File Edit View Options Window Help

Data File - C:\MEI\NITRO\Hazelnut.nc2

Project N2 Costs

| | | | | | |
|---------------------|-------|----------------------------------|-------|------------|---------------|
| Drilling Time (day) | 20. | Stand By (SB) Time (day) | 2. | N2 Cost: | 4800. (\$/d) |
| N2 Flow Rate (scfm) | 2000. | N2 daily Circulation Time (hour) | 20. | N2 Trans.: | 2400. (\$/d) |
| N2 Cost (\$/MMscf) | 2000. | N2 Transportation (\$/MMscf) | 1000. | Fuel Cost: | 785.86 (\$/d) |

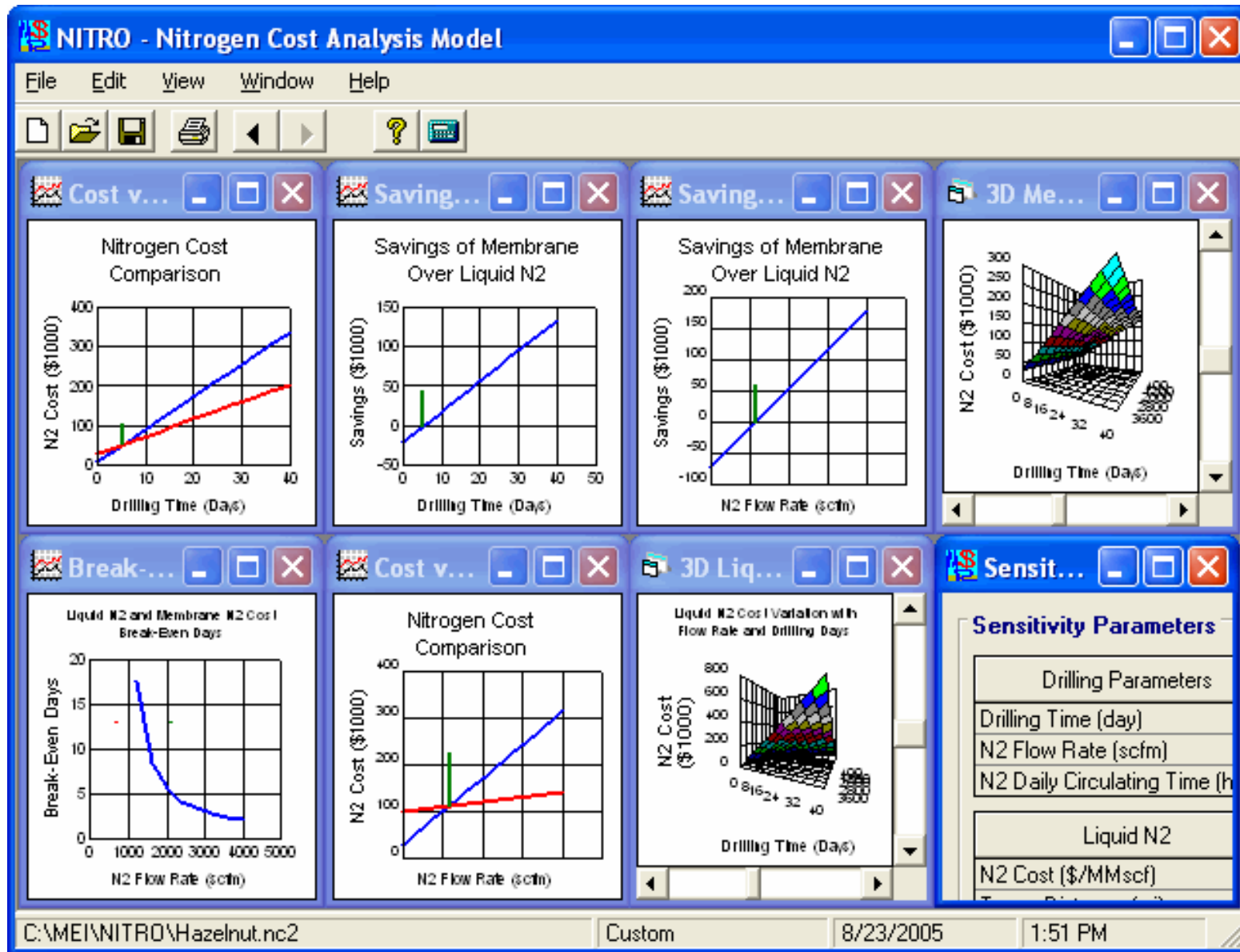
| Item | Stand By | Liquid N2 | | | Membrane | | | |
|-------------------|-------------------------------------|-----------|--------|---------------------|----------|---------------------|---------|--------|
| | | (day) | (\$/d) | (\$) | (day) | (\$/d) | (\$) | |
| Compressor | | | | | | | | |
| 2 Primary | <input type="checkbox"/> | 20. | | | 20. | 900. | 18000. | |
| 3 Primary | <input checked="" type="checkbox"/> | 2. | | | 2. | 450. | 900. | |
| 4 Booster | <input type="checkbox"/> | 20. | | | 20. | 400. | 8000. | |
| 5 Booster | <input checked="" type="checkbox"/> | 2. | | | 2. | 200. | 400. | |
| 6 Operator | <input type="checkbox"/> | 20. | | | 20. | 350. | 7000. | |
| 7 Fuel Cost | <input type="checkbox"/> | 20. | | | 20. | 786.36 | 15727.2 | |
| Liquid N2 | | | | | | | | |
| 9 N2 Cost | <input type="checkbox"/> | 20. | 4800. | 96000. | | | | |
| | | | | Total Cost (\$1000) | 173.15 | Total Cost (\$1000) | | 116.68 |

Insert Delete

C:\MEI\NITRO\Hazelnut.nc2 Custom 8/23/2005 1:50 PM

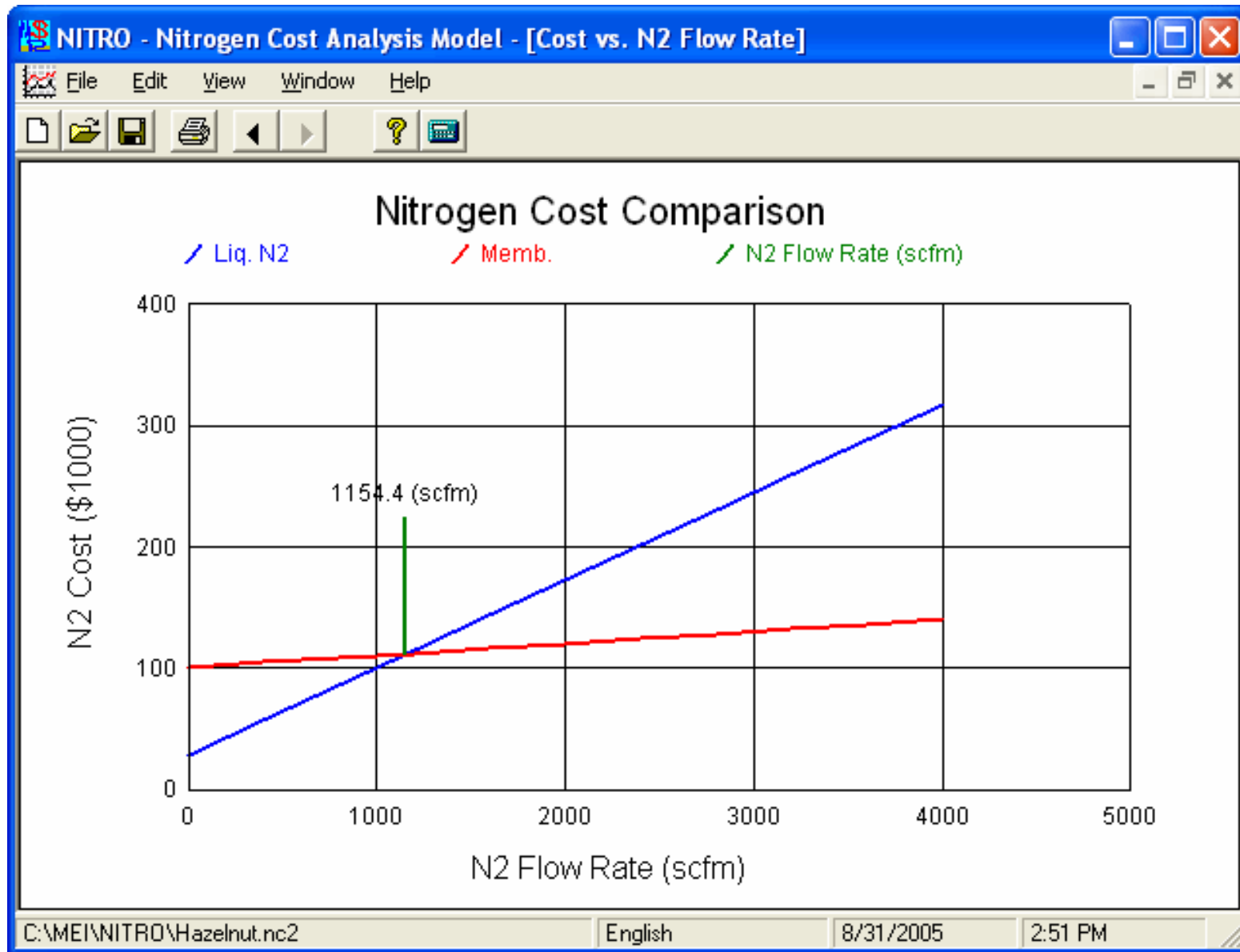
NITRO

All cost data for a comparing the two nitrogen-generating methods are entered on the **N2 Costs** page. Individual cost parameters can be added or deleted as required. Total costs for each system are updated automatically as data are entered.



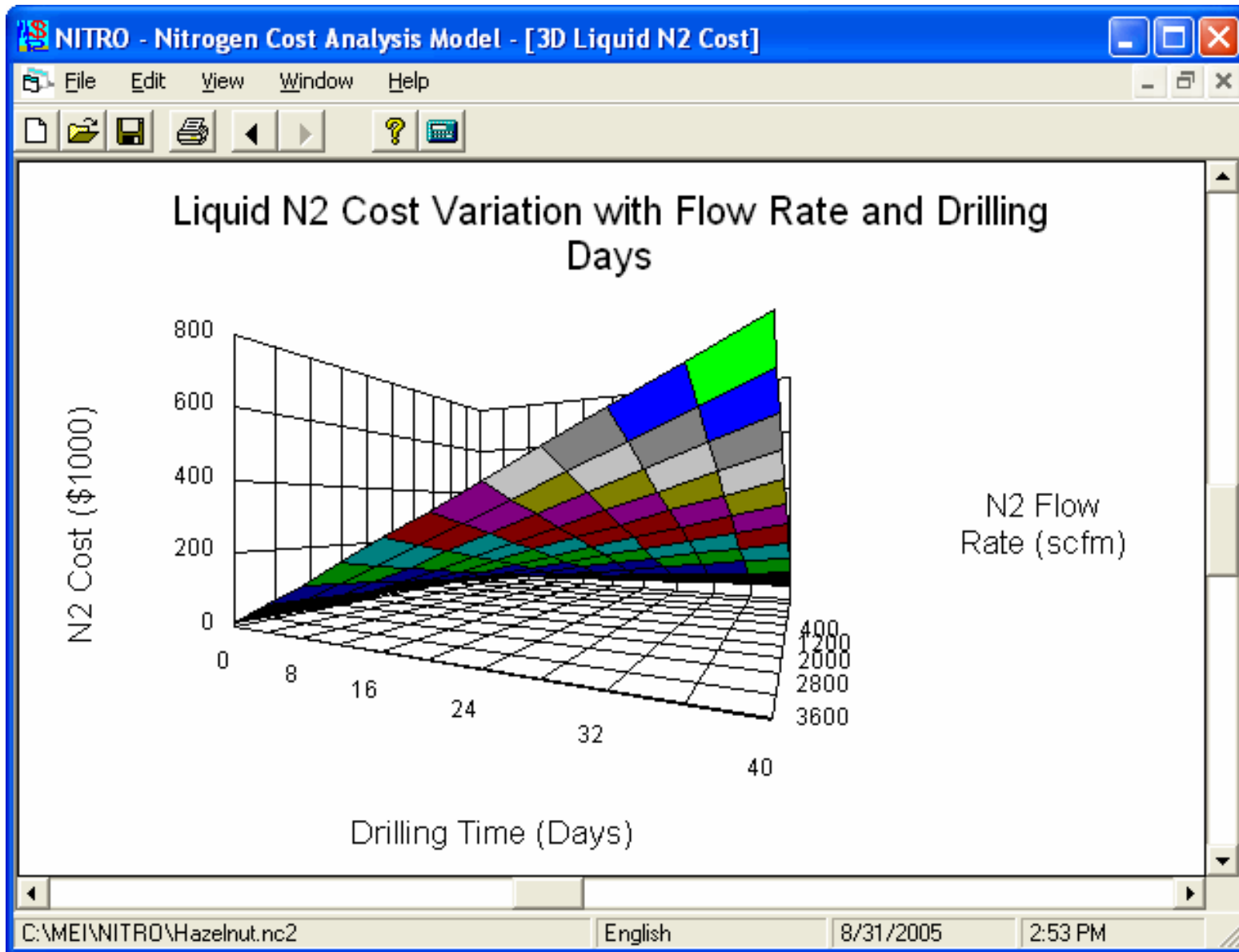
NITRO

After all required input data are input, you can immediately view the results. A variety of output types and formats are available for review and comparison in the main output window.



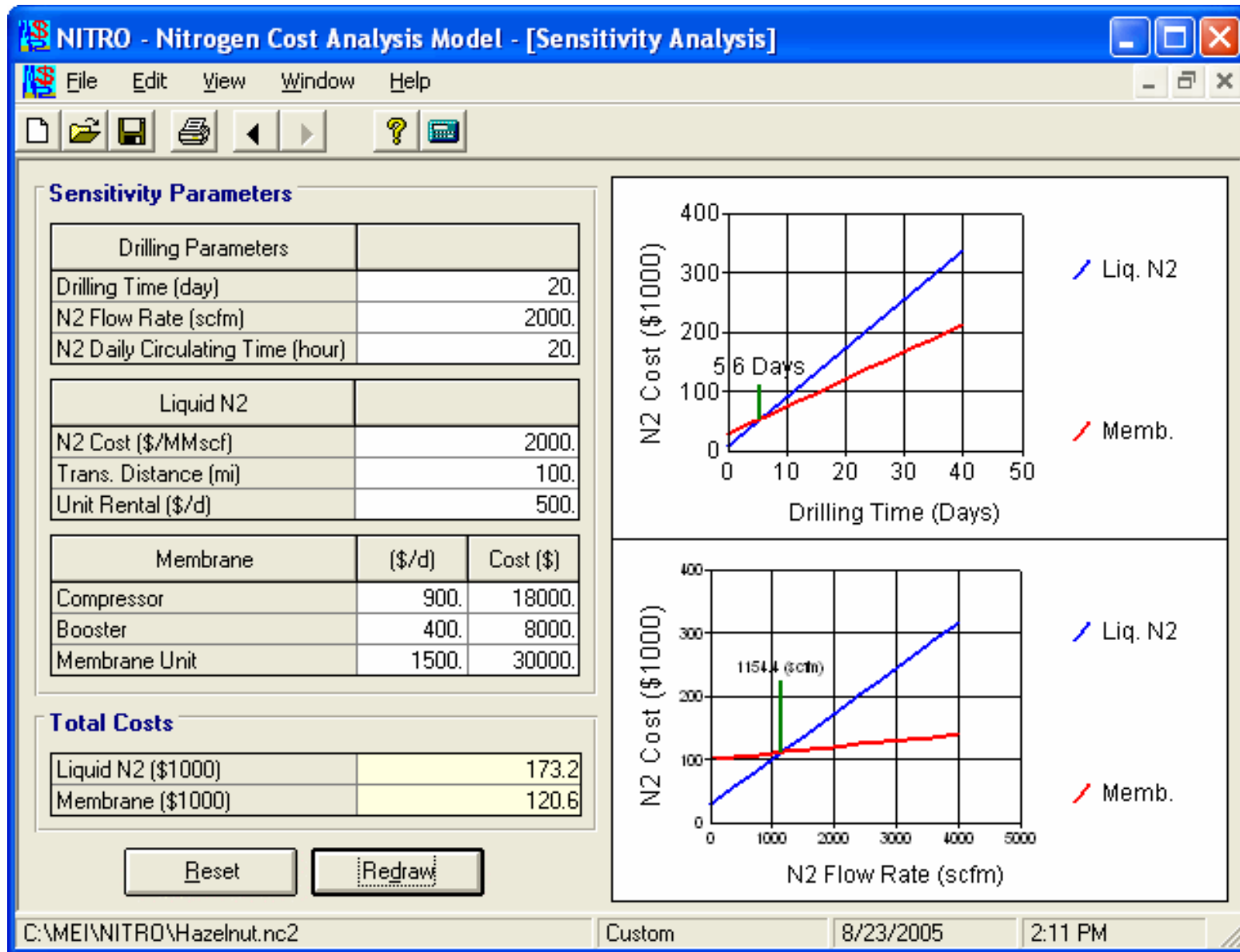
NITRO

For example, the **Nitrogen Cost Comparison** graph shows how nitrogen flow rates impact the economics of each system. The point where the two approaches are equivalent (i.e., the break-even point) is highlighted.



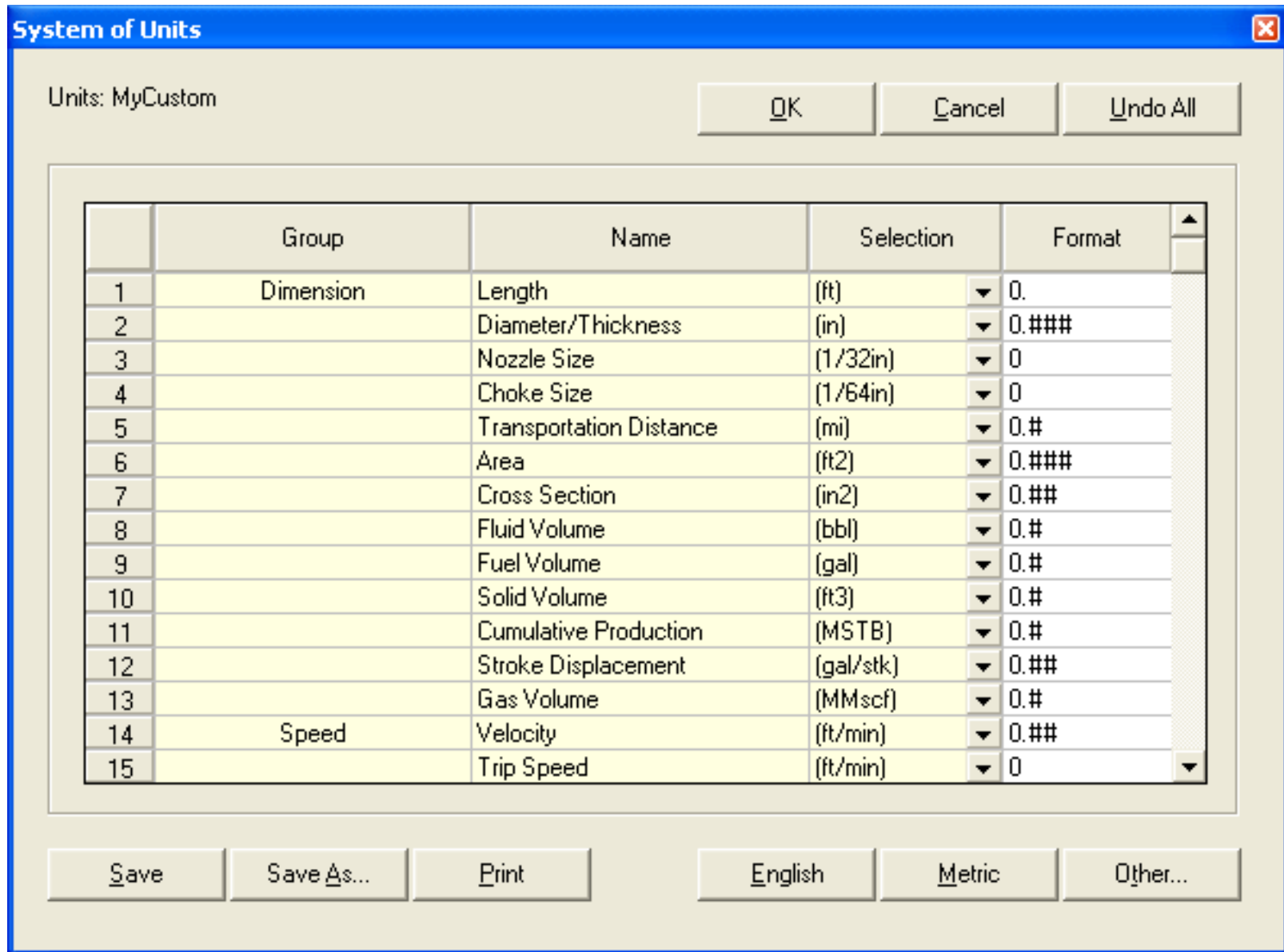
NITRO

The 3D **Cost Variation with Flow Rate and Drilling Days** graphs show how costs accumulate for each nitrogen flow rate.



NITRO

The **Sensitivity Analysis** window allows you to make changes in several critical parameters to see the impact on overall costs.



Units for input and output displays are easy to select and customize. Choose between the default metric or English systems, or a custom combination of units (for example, depth in meters, hole size in inches). Custom systems are saved and automatically recalled in future sessions.

Help for NITRO

File Edit Bookmark Options Help

Back Print

Contents Index Search

- Introduction
 - Background
 - Features
 - Quick Tour
 - Removing the Program
- Input
- Output
 - Main Output Window
 - Output Graphs
 - Sensitivity Analysis Window
- MTI Software

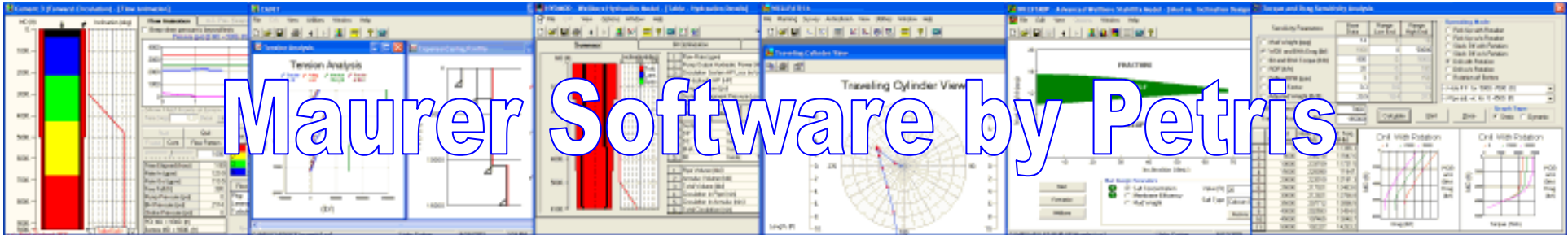
Background

NITRO, the Nitrogen Cost Analysis program, is one of the underbalanced drilling tools developed by Maurer Technology. The primary purpose of this program is to help you in the decision-making process for selecting a nitrogen-generating method for an underbalanced drilling operation.

As field results have demonstrated, using nitrogen instead of air can effectively prevent corrosion as well as downhole fires and explosions. However, nitrogen can add significant additional costs to a UB drilling operation. NITRO analyzes the costs related to the use of nitrogen as the circulating fluid. It compares the costs of using conventional liquid nitrogen to compressor/membrane equipment that produces nitrogen on demand at the drilling site. Results from this program should be very useful in optimizing

NITRO

A comprehensive **On-Line Help System** is also provided. Tips on program operation and program structure are immediately available at the click of a button.



Thanks for your interest in **NITRO**

For more information on Maurer Software by Petris,

email:

sales@petris.com

or visit us on the web at

www.petris.com

PETRIS