

SOFTWARE RELEASE NOTICE

1. SRN Number: <b>299</b>		
2. Project Title: <b>3DStress™</b>		Project No. <b>20.06002.01.062</b>
3. SRN Title: <b>3DStress™ version 3.0</b>		
4. Originator/Requestor: <b>David A. Ferrill and Nathan M. Franklin</b>		Date: <b>15 August 2003</b>
5. Summary of Actions  <input type="checkbox"/> Release of new software <input type="checkbox"/> Change of access software  <input checked="" type="checkbox"/> Release of modified software <input type="checkbox"/> Software Retirement  <input checked="" type="checkbox"/> Enhancements made  <input type="checkbox"/> Corrections made		
6. Validation Status  <input type="checkbox"/> Validated  <input type="checkbox"/> Limited Validation  <input checked="" type="checkbox"/> Not Validated                      Explain: <u>TBD</u>		
7. Persons Authorized Access		
Name	Read Only/Read-Write	Addition/Change/Delete
<b>David Ferrill</b> <b>Nathan Franklin</b>	<b>RW</b> <b>RW</b>	
8. Element Manager Approval: <b>H. Lawrence McKague</b> <i>[Signature]</i> <sup>For HCM</sup>		Date: <b>8/15/03</b>
9. Remarks:		

SOFTWARE SUMMARY FORM

01. Summary Date: <b>15 August 2003</b>		02. Summary prepared by (Name and phone) <b>Nathan Franklin, 210-522-5207</b>		03. Summary Action: <b>New</b>	
04. Software Date: <b>8/15/03</b>		05. Short Title: <b>3DStress™ version 3.0</b>			
06. Software Title: <b>3DStress™ version 3.0</b>				07. Internal Software ID: <b>None</b>	
08. Software Type:  <input type="checkbox"/> Automated Data System  <input checked="" type="checkbox"/> Computer Program  <input type="checkbox"/> Subroutine/Module		09. Processing Mode:  <input checked="" type="checkbox"/> Interactive  <input type="checkbox"/> Batch  <input type="checkbox"/> Combination		10. Application Area  a. General: <input checked="" type="checkbox"/> Scientific/Engineering <input type="checkbox"/> Auxiliary Analyses <input type="checkbox"/> Total System PA <input type="checkbox"/> Subsystem PA <input type="checkbox"/> Other  b. Specific:	
11. Submitting Organization and Address:  <b>CNWRA/SwRI 6220 Culebra Road San Antonio, TX 78228</b>			12. Technical Contact(s) and Phone:  <b>Nathan M Franklin 210-522-5207</b>		
13. Software Application: <b>3DStress™ is a stress analysis and visualization program for analysis of geological structures such as the fault and fracture in three dimensional stress fields. 3DStress™ performs calculations of slip tendency, dilation tendency, and leakage factor of faults and fractures based on resolved stresses.</b>					
14. Computer Platform <b>SGI Onyx 2 Sun Ultra 10</b>		15. Computer Operating System: <b>IRIX 6.5.14 Solaris 2.8</b>		16. Programming Language(s): <b>C++</b>	
17. Number of Source Program Statements: <b>47,462</b>		18. Computer Memory Requirements: <b>128 Mb</b>		19. Tape Drives: <b>N/A</b>	
20. Disk Units: <b>Hard Drive</b>		21. Graphics: <b>Qt 3.1.1 and OpenGL</b>		22. Other Operational Requirements <b>None</b>	
23. Software Availability: <input checked="" type="checkbox"/> Available <input type="checkbox"/> Limited <input type="checkbox"/> In-House ONLY			24. Documentation Availability: <input checked="" type="checkbox"/> Available <input type="checkbox"/> Preliminary <input type="checkbox"/> In-House ONLY		
25. Software Developer: <u></u> Date: <u>8/15/03</u>					

**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES  
QA VERIFICATION REPORT  
FOR**

**→ DEVELOPED OR ACQUIRED TO BE MODIFIED SOFTWARE ←**

Software Title/Name: 3DStress™  
 Version: 3.0  
 Demonstration workstation: PC, P562, SUN  
 Operating System: UNIX  
 Developer: Nathan Franklin

**Software Requirements Description (SRD) [TOP-018, Section 5.3]**

SRD Version: 3DStress Version 2  
 SRD Approval Date: July 2001

SRD and any changes thereto reviewed in accordance with QAP-002 requirements?  
 Yes:  No:  N/A:

Is a Software Change Report(s) (SCR) used for minor modifications (i.e., acquired code), problems or changes to a configured version of software?  
 Yes:  No:  N/A:

Comments: SCRs were used for all changes.

**Software Development Plan (SDP) [TOP-018, Section 5.4]**

SDP Version: 3DStress  
 SDP (EM) Approval Date: February 3, 2003

The SDP addresses applicable sections of TOP-018, Appendix B, SDP Template?  
 Yes:  No:  N/A:

Is the waiver (if used) in accordance with specified guidelines?  
 Yes:  No:  N/A:

Comments:

**Design and Development [TOP-018, Section 5.5.1 - 5.5.4]**

Is code development in accordance with the conventions (i.e., coding conventions) described in the SDP/SCR?  
 Yes:  No:  N/A:

Module(s) Reviewed: C++ , QT - User Interface

Comments: main.cpp , main window

**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES  
QA VERIFICATION REPORT  
FOR**

**→ DEVELOPED OR ACQUIRED TO BE MODIFIED SOFTWARE ←**

Is code internally documented to allow a user to understand the function(s) being performed and to follow the flow of execution of individual routines?

Yes:  *12/29/03* No:  N/A:

Module(s) Reviewed:

*main.ccf, main window*  
Comments:

Is development of the code and informal module/subroutine-level testing documented in scientific notebook and/or SCR?

Yes:  *12/29/03* No:  N/A:

*SCRs were used*  
SCR's and/or Scientific Notebook(s) Reviewed:

Comments:

Software designed so that individual runs are uniquely identified by date, time, name of software and version?

Yes:  *12/29/03* No:  N/A:

Date and Time Displayed:

Name/Version Displayed: *3DSTRLOSS - No Version Number. (will be added)*

Comments: *This version is more interesting software rather than unique runs.*

**Medium and Header Documentation [TOP-018, Section 5.5.6]**

A program title block of main program contains: Program Title, Customer Name, Customer Office/Division, Customer Contact(s), Customer Phone Number, Associated Documentation, Software Developer and Phone Number, Date, and Disclaimer Notice?

Yes:  No:  N/A:

Comments:

Source code module headers contain: Program Name, Client Name, Contract reference, Revision Number, Revision History, and Reference to SRD/SCR requirement(s)?

Yes:  No:  N/A:

*main.ccf*  
Module(s) Reviewed:

*Graphical*  
Comments: *- SCR's cross referenced*

The physical labeling of software medium (tapes, disks, etc.) contains: Program Name, Module/Name/Title, Module Revision, File type (ASCII, OBJ, EXE), Recording Date, and Operating System(s)?

Yes:  No:  N/A:

Comments: *Source & Executable CDs.*

**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES**  
**QA VERIFICATION REPORT**  
**FOR**  
**→ DEVELOPED OR ACQUIRED TO BE MODIFIED SOFTWARE ←**

**Code Reviews [TOP-018, Section 5.5.6]**

Are code reviews (if implemented) documented in a scientific notebook or in another format that allows others to understand the code review process and results?

Yes:  No:  N/A:

*None were done. Limited code changes, big library class.*  
 Documented in Scientific Notebook No.: \_\_\_\_\_

Comments:

**Acceptance and Installation Testing [TOP-018, Section 5.6]**

Does *acceptance testing* demonstrate whether or not requirements in the SRD and/or SCR(s) have been fulfilled?

*Documented in SCLs. 491-503*

Yes:  No:  N/A:

Has *acceptance testing* been conducted for each intended computer platform and operating system?

Yes:  No:  N/A:

Computer Platforms: PC, 961, SUN Operating Systems: IRIX, SOLARIS

Location of Acceptance Test Results: SCLs

Comments: *IRIX and Solaris results not recorded.  
 Tests appear to be thorough.*

Has *installation testing* been conducted for each intended computer platform and operating system?

Yes:  No:  N/A:  *with 9/16/03*

Computer Platforms: ~~IRIX~~ SGF & SON Operating Systems: IRIX, SOLARIS

Location of Acceptance Test Results: Project file with SCLs

Comments: *By Brandi Woffen 8/15/03*

**User Documentation [TOP-018, Section 5.5.7]**

Is there a Users' Manual for the software and is it up-to-date?

Yes:  No:  N/A:

User's Manual Version and Date: 3D Stress 3.0 8/15/03

Comments:

**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES**  
**QA VERIFICATION REPORT**  
**FOR**  
**→ DEVELOPED OR ACQUIRED TO BE MODIFIED SOFTWARE ←**

Are there basic instructions for the *installation* and *use* of the software?

Yes:  No:  N/A:

Location of Instructions: Readme.txt & User manual

Comments:

**Configuration Control [TOP-018, Section 5.7, 5.9.3]**

Is the Software Summary Form (Form TOP-4-1) completed and signed?

Yes:  No:  N/A:

Date of Approval: 8/15/03

Is the list of files attached to the Software Summary Form complete and accurate?

Yes:  No:  N/A:

Comments: Reviewed for code 8/15/03

Is the source code available or, is the executable code available in the case of (acquired/commercial codes)?

Yes:  No:  N/A:

Location of Source Code: CD - QA records for Archive

Comments:

Have all the script/make files and executable files been submitted to the Software Custodian?

Yes:  No:  N/A:

Location of script/make files: CDs - QA records for Archive

Comments:

**Software Release [TOP-018, Section 5.9]**

Upon acceptance of the software as verified above, has a Software Release Notice (SRN), Form TOP-6 been issued and does the version number of the software match the documentation?

Yes:  No:  N/A:

SRN Number: 299

Comments:

**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES  
QA VERIFICATION REPORT  
FOR**

**→ DEVELOPED OR ACQUIRED TO BE MODIFIED SOFTWARE ←**

**Software Validation [TOP-018, Section 5.10]**

Has a Software Validation Test Plan (SVTP) been prepared for the range of application of the software?

Yes:  No:  N/A:

Version and Date of SVTP: TBD

Date Reviewed and Approved via QAP-002: \_\_\_\_\_

Comments:

Has a Software Validation Test Report (SVTR) been prepared that documents the results of the validation cases, interpretation of the results, and determination if the software has been validated?

Yes:  No:  N/A:

Version and Date of SVTR: TBD

Date Reviewed and Approved via QAP-002: \_\_\_\_\_

Comments:

Additional Comments:

[Signature] 8/15/03  
Software Developer/Date

[Signature] 8/15/03  
Software Custodian/Date

## SOFTWARE INSTALLATION TESTING FOR 3DSTRESS VERSION 3.0

### Irix installation test:

The installation testing was performed on a SGI Onyx 2 running the Irix 6.5.14 Operating System. The software ran as expected.

### Solaris installation test:

The installation testing was performed on a Sun Ultra 10 running the Solaris 2.8 Operating System. The software ran as expected.

*Installation successful except for help pages. Help page files had truncated names - caused by CD Burning process. Otherwise, 3D Stress worked correctly.*

Performed by:

*Brandi L. Wintrey*



Date:

*8/15/2003*

src/boundingBox/src/boundingBox.cpp  
src/boundingBox/src/boundingBox.h  
src/da/src/cleanDA.cpp  
src/da/src/cleanDA.h  
src/da/src/colorDA.cpp  
src/da/src/colorDA.h  
src/da/src/da.h  
src/da/src/densityDA.cpp  
src/da/src/densityDA.h  
src/da/src/densityDepthDA.cpp  
src/da/src/densityDepthDA.h  
src/da/src/depthDA.cpp  
src/da/src/depthDA.h  
src/da/src/dilationTendencyDA.cpp  
src/da/src/dilationTendencyDA.h  
src/da/src/domainDA.cpp  
src/da/src/domainDA.h  
src/da/src/fileInfoDA.cpp  
src/da/src/fileInfoDA.h  
src/da/src/fluidPressureDA.cpp  
src/da/src/fluidPressureDA.h  
src/da/src/genericDA.h  
src/da/src/gravityDA.cpp  
src/da/src/gravityDA.h  
src/da/src/horizontalComponentDA.cpp  
src/da/src/horizontalComponentDA.h  
src/da/src/leakageFactorDA.cpp  
src/da/src/leakageFactorDA.h  
src/da/src/normalDA.cpp  
src/da/src/normalDA.h  
src/da/src/normalStressDA.cpp  
src/da/src/normalStressDA.h  
src/da/src/slipTendencyDA.cpp  
src/da/src/slipTendencyDA.h  
src/da/src/stressCalcDA.h  
src/da/src/stressTensorDA.cpp  
src/da/src/stressTensorDA.h  
src/da/src/strikeDA.cpp  
src/da/src/strikeDA.h  
src/da/src/tensileStrengthDA.cpp  
src/da/src/tensileStrengthDA.h  
src/da/src/vComponentDA.cpp  
src/da/src/vComponentDA.h  
src/da/src/verticalComponentDA.cpp  
src/da/src/verticalComponentDA.h  
src/da/src/wComponentDA.cpp  
src/da/src/wComponentDA.h  
src/graph/src/graphGL.cpp  
src/graph/src/graphGL.h  
src/graph/src/graphUI.cpp  
src/graph/src/graphUI.h  
src/help/src/back.xpm  
src/help/src/forward.xpm  
src/help/src/help.cpp  
src/help/src/help.h  
src/help/src/home.xpm  
src/help/src/old  
src/legend/src/colorLegend.cpp  
src/legend/src/colorLegend.h  
src/legend/src/colorLegendUI.cpp  
src/legend/src/colorLegendUI.h

```
src/mainWindow/src/mainWindow.cpp
src/mainWindow/src/mainWindow.h
src/mainWindow/src/mainWindowAbout.cpp
src/mainWindow/src/mainWindowAbout.h
src/mainWindow/src/splash.cpp
src/mainWindow/src/splash.h
src/mainWindow/src/test
src/math/src/tdsMath.cpp
src/math/src/tdsMath.h
src/math/src/vectorClass.cpp
src/math/src/vectorClass.h
src/mohr/src/mohrCircle.cpp
src/mohr/src/mohrCircle.h
src/mohr/src/mohrCircleIO.cpp
src/mohr/src/mohrCircleIO.h
src/mohr/src/mohrCircleItem.cpp
src/mohr/src/mohrCircleItem.h
src/mohr/src/mohrClass.cpp
src/mohr/src/mohrClass.h
src/mohr/src/mohrFailureEnvelope.cpp
src/mohr/src/mohrFailureEnvelope.h
src/mohr/src/mohrFailureEnvelopeItem.cpp
src/mohr/src/mohrFailureEnvelopeItem.h
src/mohr/src/mohrGL.cpp
src/mohr/src/mohrGL.h
src/mohr/src/mohrOptionsUI.cpp
src/mohr/src/mohrOptionsUI.h
src/mohr/src/mohrUI.cpp
src/mohr/src/mohrUI.h
src/mohr/src/optionsMohrCircle.cpp
src/mohr/src/optionsMohrCircle.h
src/mohr/src/optionsMohrFailureEnvelope.cpp
src/mohr/src/optionsMohrFailureEnvelope.h
src/mohr/src/preferencesMohrUI.cpp
src/mohr/src/preferencesMohrUI.h
src/options/src/optionsUI.cpp
src/options/src/optionsUI.h
src/plot/src/axesClass.cpp
src/plot/src/axesClass.h
src/plot/src/planeItem.cpp
src/plot/src/planeItem.h
src/plot/src/plotData.cpp
src/plot/src/plotData.cpp_backup
src/plot/src/plotData.h
src/plot/src/plotDataUI.cpp
src/plot/src/plotDataUI.h
src/plot/src/plotGL.cpp
src/plot/src/plotGL.h
src/plot/src/plotLocationUI.cpp
src/plot/src/plotLocationUI.h
src/plot/src/plotOptions.cpp
src/plot/src/plotOptions.h
src/plot/src/plotUI.cpp
src/plot/src/plotUI.h
src/plot/src/surface.cpp
src/plot/src/surface.h
src/plot/src/surfaceOptionsUI.cpp
src/plot/src/surfaceOptionsUI.h
src/plot/src/surfaceUI.cpp
src/plot/src/surfaceUI.h
src/plot/src/tensorField.cpp
```

```
src/plot/src/tensorField.h
src/plot/src/vectorItem.cpp
src/plot/src/vectorItem.h
src/rose/src/roseGL.cpp
src/rose/src/roseGL.h
src/rose/src/roseUI.cpp
src/rose/src/roseUI.h
src/stress/src/;
src/stress/src/fluidPressureUI.cpp
src/stress/src/fluidPressureUI.h
src/stress/src/singleTensorUI.cpp
src/stress/src/singleTensorUI.h
src/stress/src/stressManager.cpp
src/stress/src/stressManager.h
src/stress/src/stressTensor.cpp
src/stress/src/stressTensor.h
src/stress/src/stressTensorField.cpp
src/stress/src/stressTensorField.h
src/stress/src/stressTensorItem.h
src/stress/src/stressUI.cpp
src/stress/src/stressUI.h
src/stress/src/threeDimensionalUI.cpp
src/stress/src/threeDimensionalUI.h
src/stress/src/vComponentUI.cpp
src/stress/src/vComponentUI.h
src/stress/src/variationPlot.cpp
src/stress/src/variationPlot.h
src/stress/src/variationPlotOptions.cpp
src/stress/src/variationPlotOptions.h
src/stress/src/verticalComponentUI.cpp
src/stress/src/verticalComponentUI.h
src/stress/src/verticalVariationUI.cpp
src/stress/src/verticalVariationUI.h
src/stress/src/wComponentUI.cpp
src/stress/src/wComponentUI.h
src/tds/src/countptr.hpp
src/tds/src/ii_files
src/tds/src/linFileClass.cpp
src/tds/src/linFileClass.h
src/tds/src/linFileClass.o
src/tds/src/src
src/tds/src/tdsBase.cpp
src/tds/src/tdsBase.h
src/tds/src/tdsCoverageItem.cpp
src/tds/src/tdsCoverageItem.h
src/tds/src/tdsDocument.cpp
src/tds/src/tdsDocument.h
src/tds/src/tdsDocumentItem.cpp
src/tds/src/tdsDocumentItem.h
src/tds/src/tdsDocumentManager.cpp
src/tds/src/tdsDocumentManager.h
src/tds/src/tdsFile.cpp
src/tds/src/tdsFile.h
src/tds/src/tdsFileInputDialog.cpp
src/tds/src/tdsFileInputDialog.h
src/tds/src/tdsFileItem.cpp
src/tds/src/tdsFileItem.h
src/tds/src/tdsGraphics.cpp
src/tds/src/tdsGraphics.h
src/tds/src/tdsLine.cpp
src/tds/src/tdsLine.h
```

```
src/tds/src/tdsManager.cpp
src/tds/src/tdsManager.h
src/tds/src/tdsPoint.cpp
src/tds/src/tdsPoint.h
src/tds/src/tdsPointKDTree.cpp
src/tds/src/tdsPointKDTree.h
src/tds/src/tdsPointSet.cpp
src/tds/src/tdsPointSet.h
src/tds/src/tdsProfile.cpp
src/tds/src/tdsProfile.h
src/tds/src/tdsSegment.cpp
src/tds/src/tdsSegment.h
src/tds/src/tdsSurface.cpp
src/tds/src/tdsSurface.cpp.list
src/tds/src/tdsSurface.h
src/tds/src/tdsSurface.h.vect
src/tds/src/tdsTriangle.cpp
src/tds/src/tdsTriangle.h
src/tds/src/tdsVector.cpp
src/tds/src/tdsVector.h
src/tds/src/test
src/tds/src/test.cpp
src/tds/src/test.h
src/tds/src/vblFile.cpp
src/tds/src/vblFile.h
src/tds/src/vblFile.o
src/ui/src/axis2D.cpp
src/ui/src/axis2D.h
src/ui/src/browseDataUI.cpp
src/ui/src/browseDataUI.h
src/ui/src/choiceDialogUI.cpp
src/ui/src/choiceDialogUI.h
src/ui/src/comboboxitem.cpp
src/ui/src/comboboxitem.h
src/ui/src/dinput.cpp
src/ui/src/dinput.h
src/ui/src/dlineedit.cpp
src/ui/src/dlineedit.h
src/ui/src/imageSaveDialog.cpp
src/ui/src/imageSaveDialog.h
src/ui/src/textGL.cpp
src/ui/src/textGL.cpp.1
src/ui/src/textGL.h
src/viewer/src/view.cpp
src/viewer/src/view.h
src/viewer/src/viewer3D.cpp
src/viewer/src/viewer3D.h
src/viewer/src/viewerManager.cpp
src/viewer/src/viewerManager.h
src/viewer/src/viewerOptionsUI.cpp
src/viewer/src/viewerOptionsUI.h
src/viewer/src/viewerUI.cpp
src/viewer/src/viewerUI.h
src/viewer/src/viewerUIItem.cpp
src/viewer/src/viewerUIItem.h
src/xml/src/xml.cpp
src/xml/src/xml.h
src/mainWindow/demo/irix
src/mainWindow/demo/main.cpp
src/mainWindow/demo/solaris
src/mainWindow/demo/test
```

```
src/mainWindow/demo/windows
src/mainWindow/demo/irix/
src/mainWindow/demo/irix/Makefile
src/mainWindow/demo/irix/draft2.xml
src/mainWindow/demo/irix/error.flt
src/mainWindow/demo/irix/mainWindow
src/mainWindow/demo/irix/mainWindow.pro
src/mainWindow/demo/irix/rgb.xml
src/mainWindow/demo/irix/rgb_envelope.xml
src/mainWindow/demo/irix/small.stress
src/mainWindow/demo/irix/test
src/mainWindow/demo/irix/test.flt
src/mainWindow/demo/irix/test.lin
src/mainWindow/demo/irix/test.mag
src/mainWindow/demo/irix/test.xml
src/mainWindow/demo/irix/test2.xml
src/mainWindow/demo/irix/test3.xml
src/mainWindow/demo/irix/time.txt
src/mainWindow/demo/irix/timeMake.sh
src/mainWindow/demo/irix/wsm_stress.stress
src/mainWindow/demo/solaris/Makefile
src/mainWindow/demo/solaris/mainWindow
src/mainWindow/demo/solaris/mainWindow.pro
src/mainWindow/demo/test/1_tensors.stress
src/mainWindow/demo/test/2001repos.lin
src/mainWindow/demo/test/2_tensors.stress
src/mainWindow/demo/test/2_tensors.txt
src/mainWindow/demo/test/3_tensors.stress
src/mainWindow/demo/test/T1NOBR_Mohr.txt
src/mainWindow/demo/test/T1_ABCD.txt
src/mainWindow/demo/test/T1_Failure.txt
src/mainWindow/demo/test/T2NOBR_Mohr.txt
src/mainWindow/demo/test/T2_ABCD.txt
src/mainWindow/demo/test/T2_Failure.txt
src/mainWindow/demo/test/blks.lin
src/mainWindow/demo/test/bmfault.ovr
src/mainWindow/demo/test/bmflt.flt
src/mainWindow/demo/test/bmflt0.flt
src/mainWindow/demo/test/bmflt1.flt
src/mainWindow/demo/test/bmflt2.flt
src/mainWindow/demo/test/bmflt29.flt
src/mainWindow/demo/test/bmflt3.flt
src/mainWindow/demo/test/bmflt30.flt
src/mainWindow/demo/test/bmflt_breach.flt
src/mainWindow/demo/test/bmflt_m.flt
src/mainWindow/demo/test/bmflt_relrmp.flt
src/mainWindow/demo/test/bowridgeSmall.flt
src/mainWindow/demo/test/dir30plunge30.ovr
src/mainWindow/demo/test/dir30plunge70.ovr
src/mainWindow/demo/test/fan.flt
src/mainWindow/demo/test/flt010_bowRidge020.flt
src/mainWindow/demo/test/flt020_ghostDance020.flt
src/mainWindow/demo/test/flt030_solCanyon020.flt
src/mainWindow/demo/test/frizzell_crop.lin
src/mainWindow/demo/test/globe_surface.flt
src/mainWindow/demo/test/hemi10.flt
src/mainWindow/demo/test/hemi5.flt
src/mainWindow/demo/test/matlab.txt
src/mainWindow/demo/test/matlab2.txt
src/mainWindow/demo/test/mf2.flt
src/mainWindow/demo/test/mf3.flt
```

src/mainWindow/demo/test/mf4.flt  
src/mainWindow/demo/test/mf5.flt  
src/mainWindow/demo/test/plates.lin  
src/mainWindow/demo/test/simonds\_nobox.lin  
src/mainWindow/demo/test/site.flt  
src/mainWindow/demo/test/sliprot01.lin  
src/mainWindow/demo/test/sliprot01.nobottom.lin  
src/mainWindow/demo/test/temp.flt  
src/mainWindow/demo/test/tempsmall.flt  
src/mainWindow/demo/test/tensorField.awk  
src/mainWindow/demo/test/tensor\_1000\_bmfault\_range.txt  
src/mainWindow/demo/test/tensor\_1000\_small\_range.txt  
src/mainWindow/demo/test/tensors.txt  
src/mainWindow/demo/test/tensors2.txt  
src/mainWindow/demo/test/test.flt  
src/mainWindow/demo/test/test.lin  
src/mainWindow/demo/test/test.ova  
src/mainWindow/demo/test/test.ovr  
src/mainWindow/demo/test/test.owa  
src/mainWindow/demo/test/test.txt  
src/mainWindow/demo/test/test1.ovr  
src/mainWindow/demo/test/test2.flt  
src/mainWindow/demo/test/test2.ovr  
src/mainWindow/demo/test/test3.ovr  
src/mainWindow/demo/test/test4.ovr  
src/mainWindow/demo/test/test\_bm.ovr  
src/mainWindow/demo/test/test\_cutoff\_YM.flt  
src/mainWindow/demo/test/test\_date.ovr  
src/mainWindow/demo/test/test\_rg.ovr  
src/mainWindow/demo/test/try.flt  
src/mainWindow/demo/test/try2.flt  
src/mainWindow/demo/test/tunnel.lin  
src/mainWindow/demo/test/worldutmz11.lin  
src/mainWindow/demo/test/wsm\_stress.stress  
src/mainWindow/demo/test/wsm\_stress\_good\_subset.stress  
src/mainWindow/demo/test/ym\_cutoff\_small.flt  
src/mainWindow/demo/windows/MSVCRTD.DLL  
src/mainWindow/demo/windows/Makefile  
src/mainWindow/demo/windows/Ne04:  
src/mainWindow/demo/windows/env.xml  
src/mainWindow/demo/windows/index.html  
src/mainWindow/demo/windows/mainWindow.exe  
src/mainWindow/demo/windows/mainWindow.opt  
src/mainWindow/demo/windows/mainWindow.pro  
src/mainWindow/demo/windows/qt-mt311.dll  
src/mainWindow/demo/windows/stlport\_vc645.dll  
src/mainWindow/demo/windows/test  
src/mainWindow/demo/windows/test.mag  
src/mainWindow/demo/windows/tmp  
src/images/3DLogoA.jpg  
src/images/3ds.xpm  
src/images/axis.xpm  
src/images/box.xpm  
src/images/builder.xpm  
src/images/calculated.xpm  
src/images/camera.gif  
src/images/circle.xpm  
src/images/circleEnvelope.xpm  
src/images/circleToEnvelope.xpm  
src/images/circleToStress.xpm  
src/images/close.xpm

src/images/close\_small.xpm  
src/images/coverage.xpm  
src/images/coverage\_small.xpm  
src/images/document.xpm  
src/images/documentManager.xpm  
src/images/envelope.xpm  
src/images/exit8.xpm  
src/images/facets.xpm  
src/images/file.xpm  
src/images/file\_fault.xpm  
src/images/file\_line.xpm  
src/images/file\_points.xpm  
src/images/filenew.xpm  
src/images/fileopen.xpm  
src/images/fileprint.xpm  
src/images/graph8.xpm  
src/images/graph\_small.xpm  
src/images/help.xpm  
src/images/help8.xpm  
src/images/help\_small.xpm  
src/images/home.xpm  
src/images/legend.xpm  
src/images/legend\_mode.xpm  
src/images/legend\_small.xpm  
src/images/load.xpm  
src/images/logo\_medium.xpm  
src/images/logo\_medium.xpm.old  
src/images/logo\_small.xpm  
src/images/mag.xpm  
src/images/map.xpm  
src/images/map8.xpm  
src/images/map\_active.xpm  
src/images/mohr8.xpm  
src/images/mohrCircleTool.xpm  
src/images/mohr\_small.xpm  
src/images/open.xpm  
src/images/option8.xpm  
src/images/options\_small.xpm  
src/images/overlay.xpm  
src/images/overlay\_small.xpm  
src/images/plot8.xpm  
src/images/plot\_small.xpm  
src/images/print.xpm  
src/images/remove\_small.xpm  
src/images/reset.xpm  
src/images/rose.xpm  
src/images/rose.xpm.old  
src/images/rose8.xpm  
src/images/rotation.xpm  
src/images/save.xpm  
src/images/seye.xpm  
src/images/sliders8.xpm  
src/images/smclose.m.pm  
src/images/smdataoverlay.m.pm  
src/images/smdataoverlayc.m.pm  
src/images/snapshot.xpm  
src/images/splash.xpm  
src/images/stress.xpm  
src/images/stress\_old.xpm  
src/images/stress\_small.xpm  
src/images/surf8.xpm

src/images/surface.xpm  
src/images/surface\_gray.xpm  
src/images/surface\_small.xpm  
src/images/view.xpm  
src/images/view8.xpm  
src/images/viewer.xpm  
src/images/zoom.xpm  
help/Example.html  
help/File\_Formats.html  
help/File\_Selector.html  
help/Hot\_Keys.html  
help/Mohr\_Graph.html  
help/Options.html  
help/Rose\_Diagram.html  
help/Rose\_Options.html  
help/Stress\_Ratio.html  
help/Stress\_Tool.html  
help/Surface\_Options.html  
help/Surface\_Viewer.html  
help/TenPlotOptions.html  
help/Tendency\_Plot.html  
help/Viewer.html  
help/common\_buttons.html  
help/controller.html  
help/document\_options.html  
help/images  
help/index.html  
help/overlay\_on\_2D.html  
help/overview.html  
help/reading\_slip.html  
help/start3D.html  
help/viewer\_options.html  
help/images/3D\_StressTensor.png  
help/images/3D\_surf\_dialation\_tend.png  
help/images/3D\_surf\_leakage.png  
help/images/3D\_surf\_sliptend.png  
help/images/3dfault1a.png  
help/images/3dfault2a.png  
help/images/3dfault3a.png  
help/images/3dstress\_open.png  
help/images/3dstress\_open\_docview.png  
help/images/3dstress\_open\_session.png  
help/images/3dstress\_open\_tools.png  
help/images/3dsurf.png  
help/images/appendix10.png  
help/images/appendix10\_xv.png  
help/images/appendix11.png  
help/images/appendix11\_xv.png  
help/images/appendix12.png  
help/images/appendix12\_xv.png  
help/images/appendix13.png  
help/images/appendix13\_xv.png  
help/images/appendix2.png  
help/images/appendix3.png  
help/images/appendix4.png  
help/images/appendix5.png  
help/images/appendix6.png  
help/images/appendix7.png  
help/images/appendix7\_xv.png  
help/images/appendix8.png  
help/images/appendix8\_xv.png

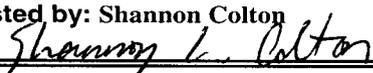
help/images/appendix9.png  
help/images/appendix9\_xv.png  
help/images/boundaryboxdimensions.png  
help/images/boundaryboxdisplay.png  
help/images/boundaryboxmenu.png  
help/images/boundaryboxspacing.png  
help/images/boundingarea.png  
help/images/boundingboxbutton.png  
help/images/boundingboxsmall.png  
help/images/boundingboxsmall2.png  
help/images/boundingnoshowgrid.png  
help/images/boundingshowbox.png  
help/images/boundingshowgrid.png  
help/images/boundingsmallspace.png  
help/images/boundingsmallspace2.png  
help/images/boxlegend.png  
help/images/browsedata.png  
help/images/browsedata2.png  
help/images/bwexample.png  
help/images/bwlegend.png  
help/images/calc\_mohr\_fail\_envelope.png  
help/images/calc\_mohr\_fail\_envelope2.png  
help/images/colorexample.png  
help/images/colorlegendbutton.png  
help/images/colorlegendf.png  
help/images/colorlegendfiledropdown.png  
help/images/colorlegendhelpdropdown.png  
help/images/colorlegendoptions.png  
help/images/configureaxisbutton.png  
help/images/continuouslengths.png  
help/images/controller.png  
help/images/coverageonfault.png  
help/images/createnewenvelopebutton.png  
help/images/createnewmohrbutton.png  
help/images/cumulativelengths.png  
help/images/dialationtend.png  
help/images/dialationtendplot.png  
help/images/document.png  
help/images/documentbrowsing.png  
help/images/dotlegend.png  
help/images/editbutton.png  
help/images/editexpandmenu.png  
help/images/editexpandmenu2.png  
help/images/editoptions.png  
help/images/eyeball.png  
help/images/faultvieweroptions.png  
help/images/faultviewertoolbar.png  
help/images/graph.png  
help/images/greatcircle.png  
help/images/helpbutton.png  
help/images/hideviewbutton.png  
help/images/keyboard.png  
help/images/leakageplot.png  
help/images/loadbutton.png  
help/images/loadfile.png  
help/images/loadfile2.png  
help/images/loadplanes.png  
help/images/loadvectors.png  
help/images/logo\_medium.png  
help/images/mapviewmodebutton.png  
help/images/mohr.png

help/images/mohr\_axis.png  
help/images/mohr\_circles.png  
help/images/mohr\_colorlegend.png  
help/images/mohr\_fail\_envelopes.png  
help/images/mohr\_fluid0.png  
help/images/mohr\_fluid54.png  
help/images/mohr\_fluid77.png  
help/images/mohr\_fluidpress0.png  
help/images/mohr\_fluidpress54.png  
help/images/mohr\_fluidpress77.png  
help/images/mohr\_preferences.png  
help/images/mohr\_sigmaU.png  
help/images/mohr\_sigmaUplot.png  
help/images/mohr\_sigmaV.png  
help/images/mohr\_sigmaVplot.png  
help/images/mohr\_sigmaW.png  
help/images/mohr\_sigmaWplot.png  
help/images/mohrfailbutton.png  
help/images/mohrgraph2.png  
help/images/mohroptsbutton.png  
help/images/mohrstressbutton.png  
help/images/newdocview.png  
help/images/newdocview2.png  
help/images/no2Dfaultstobrowse.png  
help/images/nofilesloaded.png  
help/images/openfilebutton.png  
help/images/options3.png  
help/images/optionsfileddropdown.png  
help/images/optionshelpdropdown.png  
help/images/optionsmenu.png  
help/images/overlaybutton.png  
help/images/overlaymenu.png  
help/images/overplot.png  
help/images/planeinfo.png  
help/images/planeoverlay.png  
help/images/plot.png  
help/images/plotoptionsbrowsedata.png  
help/images/plotoptionsmenu.png  
help/images/plotoptsbutton.png  
help/images/plotoverlay.png  
help/images/plotoverlay\_file\_dropdown.png  
help/images/plotoverlay\_help\_dropdown.png  
help/images/plotselected.png  
help/images/pointsexample.png  
help/images/pole.png  
help/images/ratgraph.png  
help/images/ratgraph2.png  
help/images/ratgraph3a.png  
help/images/ratgraph\_log.png  
help/images/removebutton.png  
help/images/resetmodeEW.png  
help/images/resetmodeNS.png  
help/images/resetmodeOblique.png  
help/images/resetmodemapview.png  
help/images/resetviewbutton.png  
help/images/rockquality.png  
help/images/rocktype.png  
help/images/rose3a.png  
help/images/rose4a.png  
help/images/rosebutton.png  
help/images/rosedisplaylengths.png

help/images/savefilebutton.png  
help/images/saveimage.png  
help/images/saveimgbutton.png  
help/images/segmentbrowsing.png  
help/images/shear.png  
help/images/sig14.png  
help/images/sig15.png  
help/images/singletensor\_input2.png  
help/images/sliders.png  
help/images/sliptend.png  
help/images/slipvector.png  
help/images/squarelegend.png  
help/images/strike.png  
help/images/strike2.png  
help/images/surface2.png  
help/images/surfaceoptions.png  
help/images/surfaceoptionsdilationtend.png  
help/images/surfaceoptionsleakage.png  
help/images/surfaceoptionsliptend.png  
help/images/surfacepoints.png  
help/images/surfacesolid.png  
help/images/surfacewireframe.png  
help/images/tendline.png  
help/images/tendpg10.png  
help/images/tendplot.png  
help/images/tendplotdisplaybar.png  
help/images/tendplotlines.png  
help/images/tendplotpoints.png  
help/images/tendplotsolid.png  
help/images/tendpoint.png  
help/images/tendpoint2.png  
help/images/tendpoint3.png  
help/images/tendsolid.png  
help/images/tenplotoptions.png  
help/images/tensoraxis.png  
help/images/threshold2.png  
help/images/title.png  
help/images/trianglebrowsing.png  
help/images/ucstrength.png  
help/images/verticalvariation\_input2.png  
help/images/verticalvariation\_options2.png  
help/images/viewer.png  
help/images/vieweroptions.png  
help/images/wireframe.png

# **SOFTWARE CHANGE REPORT**

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 491	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Improve the functionality of the Stress Input window: (A) Update user interface to use the QT graphical user interface library. (B) Debug the saving and loading of stress tensors when the stress field type is in the single stress tensor mode. Allow floating point values to be loaded.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 1 week, 2/7/03	
<b>12. Implemented by:</b> Nathan Franklin	<b>Date:</b> 7/3/2003 	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b> Shannon Colton 	<b>Date:</b> 7 / 3 / 2003	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A) The software was updated to use the QT graphical user interface for the Stress Input Window. The same functionality from 2.0 was included. The major files which contain these changes are located in the stress subdirectory and include stressUI.h, stressUI.cpp, singleStressTensorUI.cpp, singleStressTensorUI.h, threeDimensionalStressUI.h, and threeDimensionalStressUI.cpp.**

**(B) The saving and loading of stress tensors appears to be working correctly. Floating point values to describe a stress tensor can be saved and loaded when in the single stress tensor mode.**

## Description of Acceptance Tests

### A. Modification of a single stress field

**Summary:** Verify that user can modify the stress field by using the slider bars and by entering values. If invalid data is entered, verify that the user is warned of any problems.

**Protocol:**

1. Open the Stress display
2. Under Stress Field Type, select Single Stress Tensor
3. Enter a set of magnitudes and orientations for the three principal axes by using the slider bars and input fields. Verify your desired selections by comparing those with the ones that are displayed in the Plot window.

$\sigma_u = 95$ Mpa	$\sigma_u$ direction = 144	$\sigma_u$ plunge = 90
$\sigma_v = 35$ Mpa	$\sigma_v$ direction = 144	$\sigma_v$ plunge = 0
$\sigma_w = 83$ Mpa	$\sigma_w$ direction = 234	$\sigma_w$ plunge = 0

IRIX: The values are displayed correctly.

SOLARIS: The values are displayed correctly.

4. Under Options, select Leakage Factor to be calculated, then type in a negative value for the fluid pressure. Press enter and verify that the software reports this as an error.

IRIX: It does.

SOLARIS: It does.

### B. Input of a single stress field from file

**Summary:** Verify that data files can be loaded and saved. If incorrect data files are loaded, verify that the user is warned of any problems.

**Protocol:**

1. Open the Stress display
2. Under Stress Field Type, select Single Stress Tensor
3. Enter a set of magnitudes and orientations for the three principal axes by using the slider bars and input fields. Verify your desired selections by comparing those with the ones that are displayed in the Plot window.

$\sigma_u = 82$ Mpa	$\sigma_u$ direction = 176	$\sigma_u$ plunge = 90
$\sigma_v = 17$ Mpa	$\sigma_v$ direction = 176	$\sigma_v$ plunge = 0
$\sigma_w = 30$ Mpa	$\sigma_w$ direction = 266	$\sigma_w$ plunge = 0

IRIX: The values are displayed correctly.

SOLARIS: The values are displayed correctly.

4. Save this stress tensor to a file.
5. Alter the magnitudes and orientations of the three principal axes by using the slider bars as

input fields.

**6. Load and verify that stress tensor was correctly loaded from the file.**

IRIX: It loaded correctly.

SOLARIS: It loaded correctly.

**7. Load "IncorrectOrientations.mag" and verify that user was alerted to incorrect orientations of the principal axes.**

IRIX: A message alerted the user that there are invalid orientations for the stress axes, that the stress axes must be perpendicular, and to check lines 2, 3, and 4 where their orientations are defined.

SOLARIS: A message alerted the user that there are invalid orientations for the stress axes, that the stress axes must be perpendicular, and to check lines 2, 3, and 4 where their orientations are defined.

**8. Load "IncorrectFluidPressure.mag" and verify that user was alerted to invalid fluid pressure value.**

IRIX: A message alerted the user that there was an invalid fluid pressure or tensile strength on line 5.

SOLARIS: A message alerted the user that there was an invalid fluid pressure or tensile strength on line 5.

**9. Load "IncorrectTensileStrength.mag" and verify that user was alerted to invalid tensile strength.**

IRIX: A message alerted the user that there was an invalid fluid pressure or tensile strength on line 5.

SOLARIS: A message alerted the user that there was an invalid fluid pressure or tensile strength on line 5.

**10. Load "IncorrectValues.mag" and verify that user was alerted that all the values are invalid.**

IRIX: A message alerted the user that all values were invalid.

SOLARIS: A message alerted the user that all values were invalid.

**11. Load "NormalValues.mag" and verify that values are loaded without any problems or error messages.**

IRIX: There was no user alert, and it loaded correctly.

SOLARIS: There was no user alert, and it loaded correctly.

**“IncorrectOrientations.mag”**

100 50 5  
0 45  
0 0  
90 0  
0.01 -0.01  
0

**“IncorrectFluidPressure.mag”**

100 50 5  
0 90  
0 0  
90 0  
-90.01 -0.01  
0

**“IncorrectTensileStrength.mag”**

100 50 5  
0 90  
0 0  
90 0  
0.01 4.0  
0

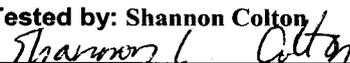
**“IncorrectValues.mag”**

1000000000000 500000000000 500000000  
-20 -90  
-20 180  
361 -1  
-0.01 0.01  
-1

**“NormalValues.mag”**

100 50 5  
0 90  
0 0  
90 0  
0.01 -0.01  
0

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 492	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Improve the functionality of the Tendency Plot window: (A) Update user interface to use the QT graphical user interface library. (B) Allow user to save a snapshot of the display.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 1 week, 2/14/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 7/5/2003	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b> Shannon Colton 	<b>Date:</b> 7 / 5 / 2003	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A) The software was updated to use the QT graphical user interface for the Stress Input Window. The same functionality from 2.0 was included. The major files which contain these changes are located in the plot subdirectory.**

**(B) The software's use of GL and QT allows it to save graphical user interface for the Graph window. The major files which contain these changes are imageSaveDialog.cpp, imageSaveDialog.h, plotGL.cpp, and plotGL.h in the ui and plot subdirectory respectfully.**

## Description of Acceptance Tests

Here is the description of the acceptance tests.

### A. Modification and display a stress tensor in single stress mode

**Summary:** Verify that user can modify the stress field by using the slider bars and by entering values. If invalid data is entered, verify that the user is warned of any problems.

#### Protocol:

1. Open the Stress display
2. Under Stress Field Type, select Single Stress Tensor
3. Enter a set of magnitudes and orientations for the three principal axes by using the slider bars and input fields. Verify your desired selections by comparing those with the ones that are displayed in the Tendency Plot window.

#### Inputs:

$\sigma_u = 42$ Mpa	$\sigma_u$ direction = 97	$\sigma_u$ plunge = 90
$\sigma_v = 66$ Mpa	$\sigma_v$ direction = 97	$\sigma_v$ plunge = 0
$\sigma_w = 64$ Mpa	$\sigma_w$ direction = 187	$\sigma_w$ plunge = 0

#### Output display verified:

IRIX: Output display is correct.

SOLARIS: Output display is correct.

4. Enter another set of magnitudes and orientations for the three principal axes by using the slider bars and input fields. Verify your desired selections by comparing those with the ones that are displayed in the Tendency Plot window.

#### Inputs:

$\sigma_u = 62$ Mpa	$\sigma_u$ direction = 171	$\sigma_u$ plunge = 90
$\sigma_v = 21$ Mpa	$\sigma_v$ direction = 171	$\sigma_v$ plunge = 0
$\sigma_w = 17$ Mpa	$\sigma_w$ direction = 261	$\sigma_w$ plunge = 0

#### Output display verified:

IRIX: Output display is correct.

SOLARIS: Output display is correct.

## **B. Input and display of fault**

**Summary:** Verify accuracy of fault orientation in the legend and the Slip Tendency Plot

### **Protocol:**

- 1. In the Slip Tendency Plot window, use left or middle mouse button to drag the normal to the fault plane (white square) to a new location.**
- 2. Does the Slip Tendency legend accurately reflect the strike and dip of the fault?**

IRIX: Yes.

SOLARIS: Yes.

### **Output Display Verified:**

#### **IRIX:**

Fault strike 51.8

Fault dip 64.8

#### **SOLARIS:**

Fault strike 200.6

Fault dip 15.3

## **D. Save a snapshot of the display**

**Summary:** Verify that a snapshot of the display can be saved.

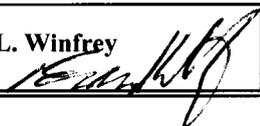
### **Protocol:**

- 1. Open the Tendency Plot display**
- 2. Save image of plot**
- 3. Verify that a snapshot of the Tendency Plot display was correctly saved to the desired file.**

IRIX: It saved the image correctly.

SOLARIS: It saved the image correctly.

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 493	<b>2. Software Title and Version:</b> 3dstress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Add new functionality and features to Mohr Circle window: (A) Update user interface to use the QT graphical user interface library. (B) Allow user to save a snapshot of the display. (C) Add the ability to load and plot multiple failure envelopes based upon rock properties. Users should have the ability to select, delete, change the appearance and change the property values of different envelope(s). Property values can be entered in or set from sample Hoek Brown values. (D) Add the ability to load and plot multiple circles. Users should have the ability to select, delete, change the appearance and property values of different circles. (E) Add the ability to color the failure envelope by the failure mode. (F) Add the ability to calculate a failure envelope from failure data. Users should be able to load failure data as mohr circles and then calculate a failure envelope from the data. (G) Add the ability to color the failure envelope by the failure angle, the angle between the failure and the largest principal stress component. A color scale should also be displayed in the window and the user should also be able to configure the failure angle color scale. (H) Add the ability to alter the viewing options of the mohr circle. Users should be able to change line widths of the circles and envelopes. Users should be able to change the background color and configure the axis.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 2 weeks, 2/28/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b>	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b> Brandi L. Winfrey 	<b>Date:</b> 8 / 13 / 2003	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A) The software was updated to use the QT graphical user interface for the Stress Input Window. The same functionality from 2.0 was included. The major files which contain these changes are located in the mohr subdirectory.**

**(B) The software's use of GL and QT allows it to save graphical user interface for the Graph window. The major files which contain these changes are imageSaveDialog.cpp, imageSaveDialog.h, mohrGL.cpp, and mohrGL.h in the ui and mohr subdirectory respectfully.**

## Description of Acceptance Tests

Here is the description of the acceptance tests.

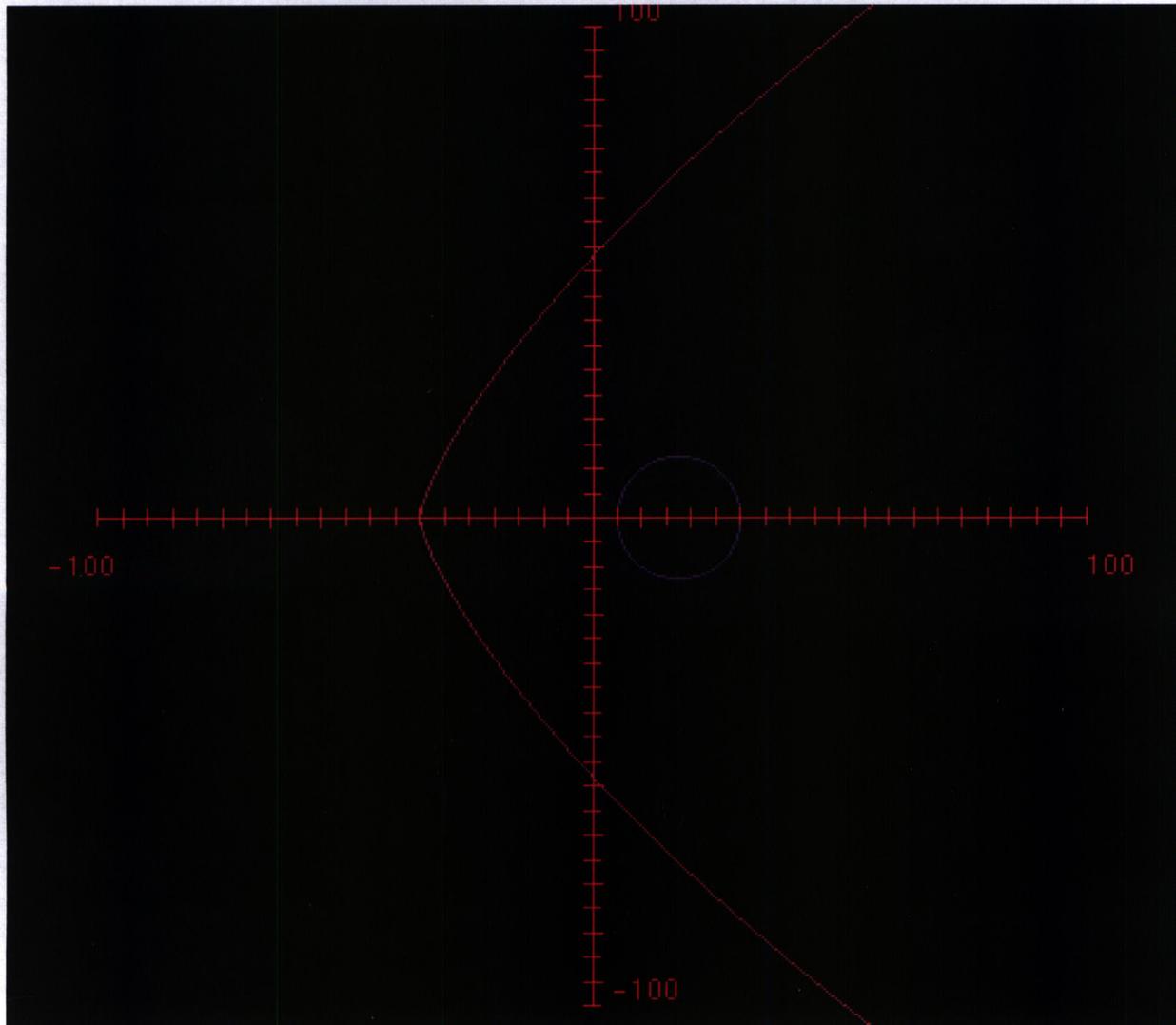
### A Save a snapshot of the display

**Summary:** Verify that a snapshot of the display can be saved.

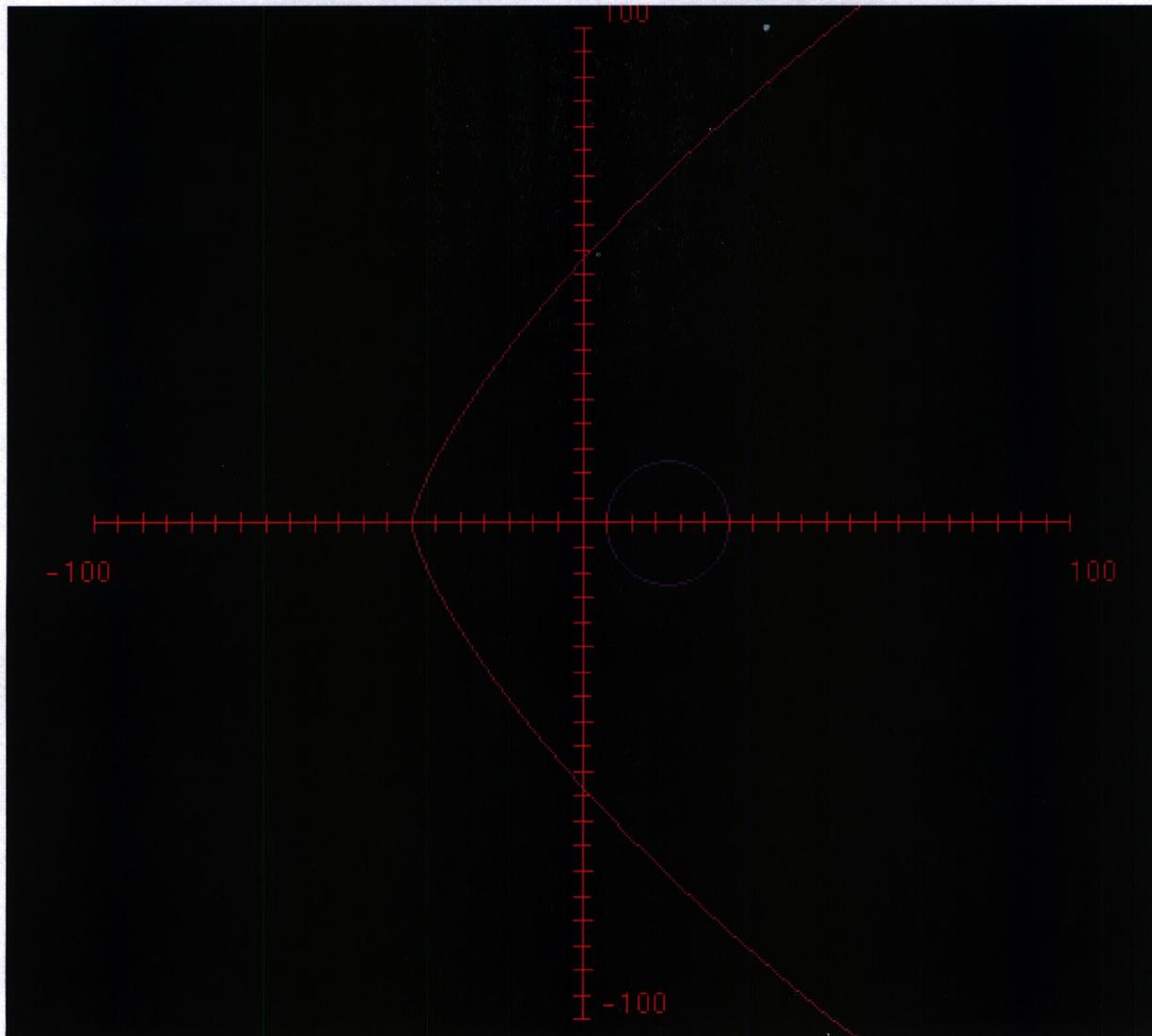
**Protocol:**

1. Open the Mohr display
2. Save image of Mohr display window
3. Verify that a snapshot of the Mohr display window was correctly saved to the desired file.

IRIX: Verified. Image shown below:



SOLARIS: Verified. Image shown below:



## B. Modification and display multiple failure envelopes

**Summary:** Verify that user can load and plot multiple failure envelopes based upon rock properties. Users should have the ability to select, delete, change the appearance and change the property values of different envelope(s). Property values can be entered in or set from sample Hoek Brown values.

### Protocol:

1. Open the Mohr display
2. Open the Mohr Options dialog and activate the Failure Envelope tab.
3. Open "rgb\_envelope.xml" in the Failure Envelope tab.
4. Select a mohr circle. Change the name, magnitudes, and color of the selected failure envelope.
5. Verify that your changes appear in the mohr plot and in the list of loaded failure envelopes in the Failure Envelope tab.

IRIX: Verified.  
SOLARIS: Verified.

**6. Select and delete multiple failure envelopes. Verify their deletion from the mohr plot and from the list of failure envelopes in the Failure Envelope tab.**

IRIX: Verified.  
SOLARIS: Verified.

### **C. Modification and display multiple mohr circles**

**Summary: Verify that user has the ability to load and plot multiple circles. Users should have the ability to select, delete, change the appearance and property values of different circles.**

#### **Protocol:**

- 1. Open the Mohr display**
- 2. Open the Mohr Options dialog and activate the Mohr Circles tab.**
- 3. Open "T1N.xml" in the Mohr Circles tab.**
- 4. Select a mohr circle. Change the name, magnitudes, and color of the selected mohr circle.**
- 5. Verify that your changes appear in the mohr plot and in the list of loaded mohr circles in the Mohr Circle tab.**

IRIX: Verified.  
SOLARIS: Verified.

**6. Select and delete multiple mohr circles. Verify their deletion from the mohr plot and from the list of mohr circles in the Mohr Circles tab.**

IRIX: Verified.  
SOLARIS: Verified.

### **D. Ability to color the failure envelope by the failure mode.**

**Summary: Verify that user has the ability to color the failure envelope by the failure mode.**

#### **Protocol:**

- 1. Open the Mohr display**
- 2. Open the Mohr Options dialog and activate the Failure Envelope tab.**
- 3. Open "rgb\_envelope.xml" and select a failure envelope.**
- 4. Click and hold the color button (located to the right of the Name input box) for that failure envelope.**
- 5. Select "Color by failure mode"**
- 6. Verify that the envelope is now colored by its failure mode.**

IRIX: Verified.  
SOLARIS: Verified.

### **E. Ability to calculate a failure envelope from failure data.**

**Summary: Verify that user has the ability to calculate a failure envelope from failure data. Users should be able to load failure data as mohr circles and then calculate a failure envelope from the data.**

**Protocol:**

- 1. Open the Mohr display.**
- 2. Open the Mohr Options dialog.**
- 3. Load "T1N.xml" in the Mohr Circle tab.**
- 4. Select all mohr circles that were loaded**
- 5. Press the "Calculate failure envelope from selected mohr circles" button**
- 6. Verify that a realistic mohr failure envelope was created in the display and that the values for the failure envelope appear in the failure envelope tab.**

IRIX: Verified.

SOLARIS: Verified.

- 7. Verify that the correct values were calculated by using the corresponding spreadsheet "failure\_envelope.xls".**

IRIX: Verified.

SOLARIS: Verified.

#### **F. Ability to color the failure envelope by the failure angle**

**Summary: Verify that user has the ability to color the failure envelope by the failure angle, the angle between the failure and the largest principal stress component. A color scale should also be displayed in the window and the user should also be able to configure the failure angle color scale.**

**Protocol:**

- 1. Open the Mohr display**
- 2. Open the Mohr Options dialog and select a failure envelope in the Failure Envelope tab.**
- 3. Click and hold the color button (located to the right of the Name input box) for that failure envelope**
- 4. Select "Color by failure angle"**
- 5. Verify that the envelope is now colored by its failure angle.**
- 6. Open the Color Legend dialog by clicking the appropriate button on the Preferences tab of the Mohr Options dialog.**
- 7. Verify that the that the failure angle color scale can be modified.**

IRIX: Verified.

SOLARIS: Verified.

#### **G. Ability to alter the viewing options of the mohr circle, failure envelope and mohr graph**

**Summary: Verify that user has the ability to alter the viewing options of the mohr circles and failure envelopes.**

**Protocol:**

- 1. Open the Mohr display**
- 2. Open the Mohr Options dialog and the dialog's Preferences tab**
- 3. Verify that the line widths of the mohr circles can be modified**

IRIX: Verified.  
SOLARIS: Verified.

**4. Verify that the line widths of the failure envelopes can be modified**

IRIX: Verified.  
SOLARIS: Verified.

**5. Verify that the background color of the mohr circle can be set**

IRIX: Verified.  
SOLARIS: Verified.

**6. Verify that anti alias can be enabled or disabled by toggling the Anti-alias check box**

IRIX: Verified  
SOLARIS: Verified.

**7. Verify that the render mode of the mohr circles can be set by toggling the mode between the line and solid render mode.**

IRIX: Verified.  
SOLARIS: Verified.

**8. Open the Mohr Axis dialog by clicking the appropriate button on the Preferences tab of the Mohr Options dialog.**

**9. Verify that the line width and line tick width can be altered**

IRIX: Verified.  
SOLARIS: Verified.

**10. Verify that the axis can be shown or hidden by toggling the Show Axis check box**

IRIX: Verified.  
SOLARIS: Verified.

**11. Verify the the color of the axis can be changed**

IRIX: Verified.  
SOLARIS: Verified.

**12. Verify that the length and tick intervals of the x and y axes can be changed.**

IRIX: Verified.  
SOLARIS: Verified.

## “rgb\_envelope.xml”

```
<?xml version="" standalone='yes'?>
<!DOCTYPE mohrFailureEnvelopes>
<mohrFailureEnvelopes>
<!-- created by 3DStress on 2003-04-15 15:12:35--> <mohrFailureEnvelope>
  <name>blue</name>
  <color>
    <red>0</red>
    <green>0</green>
    <blue>255</blue>
  </color>
  <hoekBrown>
    <m>16.54</m>
    <s>1</s>
    <sigmaC>14</sigmaC>
  </hoekBrown>
</mohrFailureEnvelope>
<mohrFailureEnvelope>
  <name>red</name>
  <color>
    <red>0</red>
    <green>170</green>
    <blue>0</blue>
  </color>
  <hoekBrown>
    <m>19.69</m>
    <s>1</s>
    <sigmaC>245</sigmaC>
  </hoekBrown>
</mohrFailureEnvelope>
<mohrFailureEnvelope>
  <name>blue</name>
  <color>
    <red>255</red>
    <green>0</green>
    <blue>0</blue>
  </color>
  <hoekBrown>
    <m>5.85</m>
    <s>1</s>
    <sigmaC>245</sigmaC>
  </hoekBrown>
</mohrFailureEnvelope>
</mohrFailureEnvelopes>
```

## “T1N.xml”

```
<!DOCTYPE mohrCircles>
<mohrCircles>
  <mohrCircle>
    <name> </name>
    <color>
      <red>160</red>
      <green>32</green>
      <blue>240</blue>
    </color>
    <stressTensor>
      <sigmaU>-7.3497</sigmaU>
      <sigmaV>0</sigmaV>
      <sigmaW>0</sigmaW>
      <fluidPressure>0</fluidPressure>
    </stressTensor>
  </mohrCircle>
  <mohrCircle>
    <name> </name>
    <color>
      <red>160</red>
      <green>32</green>
      <blue>240</blue>
    </color>
    <stressTensor>
      <sigmaU>0</sigmaU>
      <sigmaV>61.3417</sigmaV>
      <sigmaW>61.3417</sigmaW>
      <fluidPressure>0</fluidPressure>
    </stressTensor>
  </mohrCircle>
  <mohrCircle>
    <name> </name>
    <color>
      <red>160</red>
      <green>32</green>
      <blue>240</blue>
    </color>
    <stressTensor>
      <sigmaU>10.342</sigmaU>
      <sigmaV>148.924</sigmaV>
      <sigmaW>148.924</sigmaW>
      <fluidPressure>0</fluidPressure>
    </stressTensor>
  </mohrCircle>
  <mohrCircle>
    <name> </name>
    <color>
      <red>160</red>
      <green>32</green>
      <blue>240</blue>
    </color>
    <stressTensor>
      <sigmaU>13.7893</sigmaU>
      <sigmaV>124.104</sigmaV>
      <sigmaW>124.104</sigmaW>
      <fluidPressure>0</fluidPressure>
    </stressTensor>
  </mohrCircle>
  <mohrCircle>
    <name> </name>
    <color>
      <red>160</red>
      <green>32</green>
      <blue>240</blue>
    </color>
```

```
<stressTensor>
  <sigmaU>17.2366</sigmaU>
  <sigmaV>164.093</sigmaV>
  <sigmaW>164.093</sigmaW>
  <fluidPressure>0</fluidPressure>
</stressTensor>
</mohrCircle>
<mohrCircle>
  <name> </name>
  <color>
    <red>160</red>
    <green>32</green>
    <blue>240</blue>
  </color>
<stressTensor>
  <sigmaU>3.44732</sigmaU>
  <sigmaV>103.42</sigmaV>
  <sigmaW>103.42</sigmaW>
  <fluidPressure>0</fluidPressure>
</stressTensor>
</mohrCircle>
<mohrCircle>
  <name> </name>
  <color>
    <red>160</red>
    <green>32</green>
    <blue>240</blue>
  </color>
<stressTensor>
  <sigmaU>5.17099</sigmaU>
  <sigmaV>78.599</sigmaV>
  <sigmaW>78.599</sigmaW>
  <fluidPressure>0</fluidPressure>
</stressTensor>
</mohrCircle>
<mohrCircle>
  <name> </name>
  <color>
    <red>160</red>
    <green>32</green>
    <blue>240</blue>
  </color>
<stressTensor>
  <sigmaU>6.89465</sigmaU>
  <sigmaV>122.725</sigmaV>
  <sigmaW>122.725</sigmaW>
  <fluidPressure>0</fluidPressure>
</stressTensor>
</mohrCircle>
</mohrCircles>
```

end of "T1N.xml"

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 494	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Improve the functionality of the Graph window: (A) Update user interface to use the QT graphical user interface library. (B) Allow user to save a snapshot of the display.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> .25 weeks, 3/5/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 7/8/03	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b> Shannon Colton 	<b>Date:</b> 7/8/03	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A) The software was updated to use the QT graphical user interface for the Graph window. The same functionality from 2.0 was included. The major files which contain these changes are located in the graph subdirectory.**

**(B) The software's use of GL and QT allows it to save graphical user interface for the Graph window. The major files which contain these changes are imageSaveDialog.cpp, imageSaveDialog.h, graphGL.cpp, and graphGL.h in the ui and graph subdirectory respectively.**

## Description of Acceptance Tests

### A. Modification of a single stress field through graph

**Summary:** Verify that user can modify the stress field by selecting a point on the graph

**Protocol:**

1. Open the Stress display.
2. Under Stress Field Type, select Single Stress Tensor.
3. Open the Graph display.
4. Set the graph to a log scale mode.
5. Select a point on the graph:  
 $\log(\sigma_1 / \sigma_2) = \sim 1$        $\log(\sigma_2 / \sigma_3) = \sim 0.25$
6. Using the Stress display and plot display, verify that magnitudes of the principal axes have the correct ratio:

IRIX:  $\sigma_u = 100$        $\sigma_v = 9.706$        $\sigma_w = 5.56127$   
 $\log(\sigma_1 / \sigma_2) = 1.0$        $\log(\sigma_2 / \sigma_3) = 0.24$

The magnitudes of the principal axes have the correct ratio.

SOLARIS:  $\sigma_u = 100$        $\sigma_v = 9.706$        $\sigma_w = 5.64487$   
 $\log(\sigma_1 / \sigma_2) = 1.0$        $\log(\sigma_2 / \sigma_3) = 0.24$

The magnitudes of the principal axes have the correct ratio.

7. Set the graph to a ln scale mode.
8. Select a point on the graph:  
 $\ln(\sigma_1 / \sigma_2) = \sim 1.5$        $\ln(\sigma_2 / \sigma_3) = \sim 2$
9. Using the Stress display and plot display, verify that magnitudes of the principal axes have the correct ratio:

IRIX:  $\sigma_u = 100$        $\sigma_v = 21.604$        $\sigma_w = 2.9263$   
 $\ln(\sigma_1 / \sigma_2) = 1.5$        $\ln(\sigma_2 / \sigma_3) = 2.0$

The magnitudes of the principal axes have the correct ratio.

SOLARIS:  $\sigma_u = 100$        $\sigma_v = 21.6245$        $\sigma_w = 2.93276$   
 $\ln(\sigma_1 / \sigma_2) = 1.5$        $\ln(\sigma_2 / \sigma_3) = 2.0$

The magnitudes of the principal axes have the correct ratio.

### B. Display of stress field by the graph

**Summary:** Verify that user can modify the stress field and the graph will display the ratio of the stress axes magnitudes.

**Protocol:**

1. Open the Stress display.
2. Under Stress Field Type, select Single Stress Tensor.
3. Set the magnitudes of the axes.  
 $\sigma_u = 76$        $\sigma_v = 59$        $\sigma_w = 20$
4. Calculate outside of 3DStress the log and ln ratios of the magnitudes:  
 $\log(\sigma_1 / \sigma_2) = 0.11$        $\log(\sigma_2 / \sigma_3) = 0.47$   
 $\ln(\sigma_1 / \sigma_2) = 0.25$        $\ln(\sigma_2 / \sigma_3) = 1.1$
5. Open the Graph display and verify that values have the correct ratio:

IRIX:  $\log(\sigma_1 / \sigma_2) = \sim 0.12$        $\log(\sigma_2 / \sigma_3) = \sim 0.49$   
 $\ln(\sigma_1 / \sigma_2) = \sim 0.25$        $\ln(\sigma_2 / \sigma_3) = \sim 1.1$

These are the correct ratios.

SOLARIS:  $\log(\sigma_1 / \sigma_2) = \sim 0.1$        $\log(\sigma_2 / \sigma_3) = \sim 0.47$   
 $\ln(\sigma_1 / \sigma_2) = \sim 0.25$        $\ln(\sigma_2 / \sigma_3) = \sim 1.1$

These are the correct ratios.

**6. Under Stress Field Type, select Vertical Variation.**

**7. Note the magnitudes of the stress tensor that is now displayed in the Plot display:**

IRIX:  $\sigma_u = 77.91$        $\sigma_v = 46.746$        $\sigma_w = 38.955$

SOLARIS:  $\sigma_u = 77.91$        $\sigma_v = 46.746$        $\sigma_w = 38.955$

**4. Calculate outside of 3DStress the log and ln ratios of the magnitudes:**

$\log(\sigma_1 / \sigma_2) = 0.22$        $\log(\sigma_2 / \sigma_3) = 0.079$

$\ln(\sigma_1 / \sigma_2) = 0.51$        $\ln(\sigma_2 / \sigma_3) = 0.18$

**5. Open the Graph display and verify that values have the correct ratio:**

IRIX:  $\log(\sigma_1 / \sigma_2) = \sim 0.2$        $\log(\sigma_2 / \sigma_3) = \sim 0.1$

$\ln(\sigma_1 / \sigma_2) = \sim 0.5$        $\ln(\sigma_2 / \sigma_3) = \sim 0.2$

These are the correct ratios.

SOLARIS:  $\log(\sigma_1 / \sigma_2) = \sim 0.2$        $\log(\sigma_2 / \sigma_3) = \sim 0.07$

$\ln(\sigma_1 / \sigma_2) = \sim 0.5$        $\ln(\sigma_2 / \sigma_3) = \sim 0.2$

These are the correct ratios.

**C. Save a snapshot of the display**

**Summary: Verify that a snapshot of the display can be saved.**

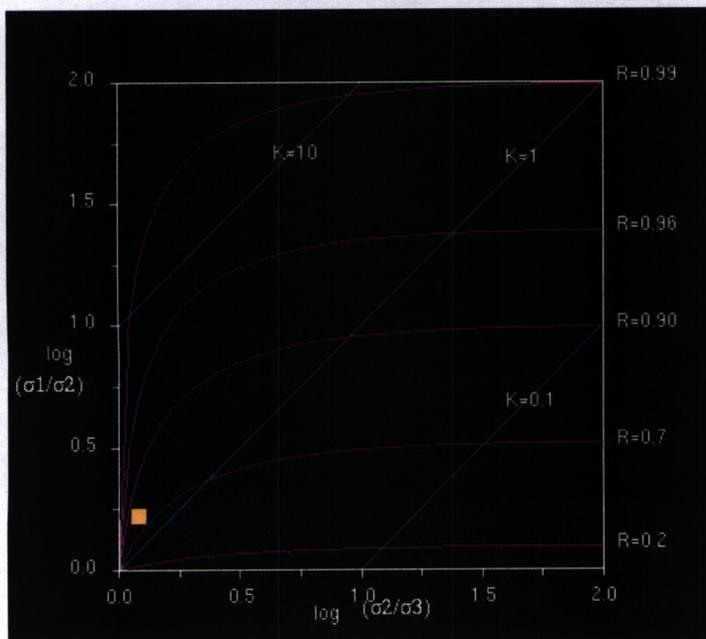
**Protocol:**

**1. Open the Graph display**

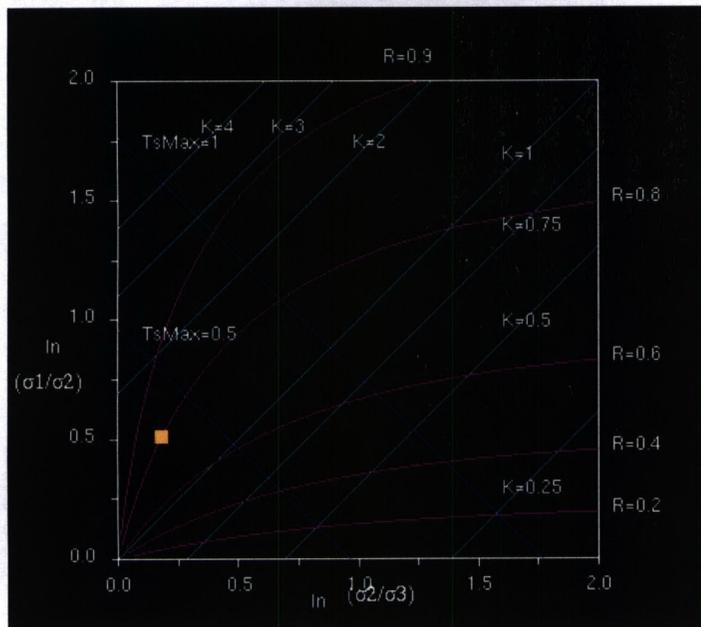
**2. Save image of plot**

**3. Verify that a snapshot was correctly saved to the desired file.**

IRIX: The snapshot was correctly saved. It is shown below.



SOLARIS: The snapshot was correctly saved. It is shown below.



**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 495	<b>2. Software Title and Version:</b> 3dstress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Improve the functionality of the Surface Viewer window: (A) Update user interface to use the QT graphical user interface library. (B) Allow users to save a snapshot of the module display.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> .25 weeks, 3/6/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 7/8/03	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b> Shannon Colton 	<b>Date:</b> 7/8/03	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A) The software was updated to use the QT graphical user interface for the Surface Viewer window. The same functionality from 2.0 was included. The major files which contain these changes are located in the plot subdirectory.**

**(B) The software's use of GL and QT allows it to save graphical user interface for the 3D Surface window. The major files which contain these changes are imageSaveDialog.cpp, imageSaveDialog.h, viewer3D.cpp, and viewer3D.h in the ui and viewer subdirectory respectfully.**

## Description of Acceptance Tests

### A. Display of stress field in Surface Viewer

**Summary:** Verify that user can modify the stress field by selecting a point on the graph

**Protocol:**

1. **Open the Stress display.**
2. **Select Single for the stress tensor.**
3. **Open the Surface Viewer and Tendency Plot.**
4. **Verify that Surface Viewer correctly displays the magnitudes of the Tendency Plot.**  
IRIX: Verified.  
SOLARIS: Verified.
5. **Change stress magnitudes and orientations.**
6. **Verify that Surface Viewer correctly displays the magnitudes of the Tendency Plot.**  
IRIX: Verified. Surface Viewer correctly shows magnitudes of the Tendency Plot.  
SOLARIS: Verified. Surface Viewer correctly shows magnitudes of the Tendency Plot.

### B. Modify display in Surface Viewer

**Summary:** Verify that user can modify display in the Surface Viewer window

**Protocol:**

1. **Open the Surface Viewer.**
2. **Verify that the user can use the mouse to translate (left button), zoom (middle button) and rotate (right button) the viewer..**  
IRIX: Verified.  
SOLARIS: Verified.
3. **Open the Surface Viewer options menu.**
4. **Verify that the user can change the draw mode between solid, wireframe, or points.**  
IRIX: Verified.  
SOLARIS: Verified.
5. **Select solid for the draw mode.**
6. **Verify that the user can toggle the display of the bounding box, base, axis, and points.**  
IRIX: Verified.  
SOLARIS: Verified.
7. **Verify that the user can change the vertical exaggeration of the 3D surface.**  
IRIX: Verified.  
SOLARIS: Verified.
8. **Verify that the user can change the background color of the display.**  
IRIX: Verified.  
SOLARIS: Verified.

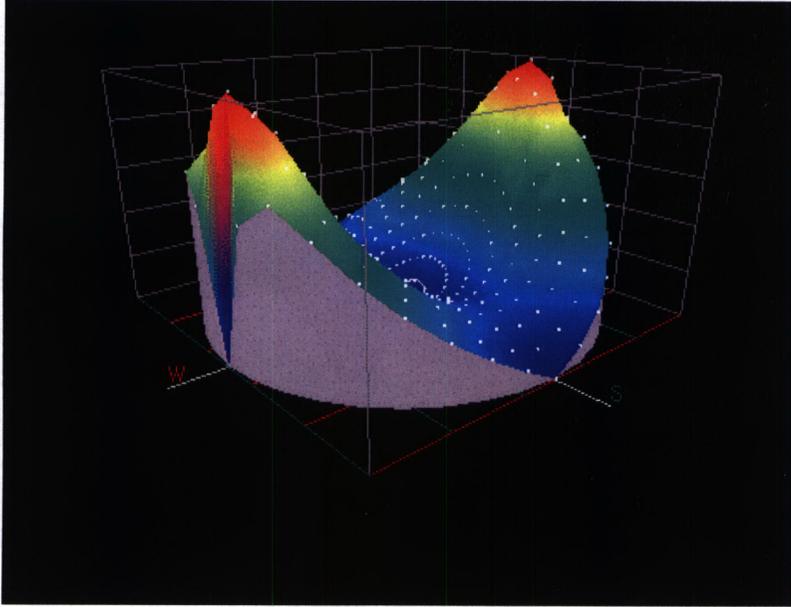
### C. Save a snapshot of the display

**Summary:** Verify that a snapshot of the display can be saved.

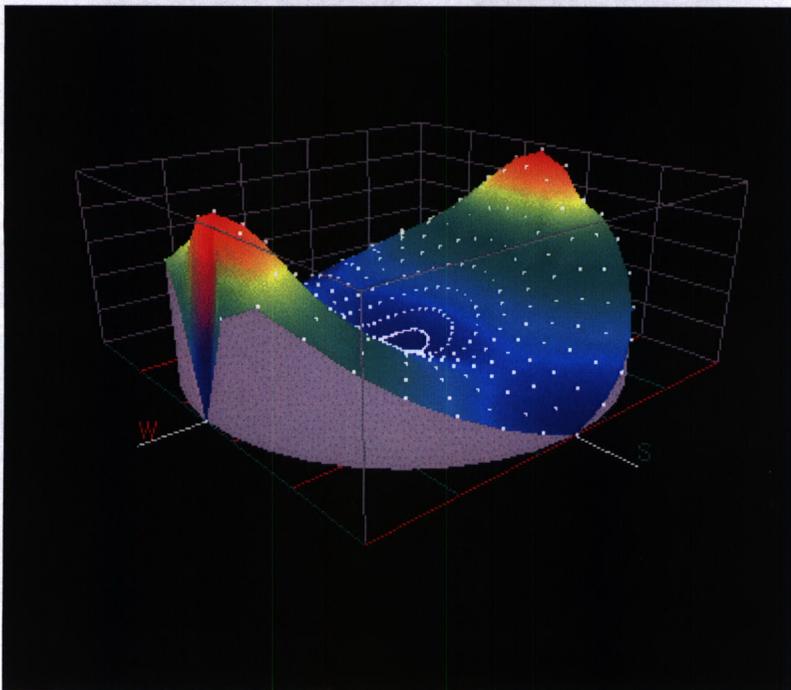
**Protocol:**

- 1. Open the Surface Viewer display**
- 2. Save image of plot**
- 3. Verify that a snapshot was correctly saved to the desired file.**

IRIX: Verified. Image is shown below.



SOLARIS: Verified. Image is shown below.



**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 496	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Add functionality to improve the 3D Fault Viewer (3DView) in 3DStress: (A) Update the user interface to use the QT graphical user interface library. (B) Allow the users to save a snapshot of the display. (C) Add ability for the users to use light/shading on faults and coverages. (D) Add ability for the users to set viewing settings so user can have a "map view" of the data. This improvement will make the map viewer obsolete.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 1 week, 3/13/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 8/08/03	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b>  Brandi L. Winfrey	<b>Date:</b> 8 / 08 / 03	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A), (C), (D) The software was updated to use the QT graphical user interface for the Viewer Window. The same functionality from 2.0 was included besides the changes outlined in this SCR. The major files which contain these changes are located in the viewer subdirectory and include viewer3D.h, viewerUI.cpp, viewerManager.cpp, viewerUI.h, view.cpp, viewerManager.h, view.h, viewerOptionsUI.cpp, viewerUIItem.cpp, viewer3D.cpp, viewerOptionsUI.h, and viewerUIItem.h. These files contain functionality to allow for light/shading on faults and coverages and for “map view” of the data.**

**(B) The software’s use of GL and QT allows it to save graphical user interface for the Viewer window. The major files which contain these changes are imageSaveDialog.cpp, imageSaveDialog.h, viewer3D.h, and viewer3D.cpp in the ui and viewer subdirectory respectively.**

## Description of Acceptance Tests

Here is the description of the acceptance tests.

### A. Update the user interface to use the QT graphical user interface library

**Summary:** Verify that the QT graphical user interface libraries are included in the source code by a visual inspection of the files.

**Protocol:**

1. Open the file mainWindow.cpp. Verify that the following QT includes are defined:

```
#include <qworkspace.h>
#include <qsplitter.h>
#include <qapplication.h>
#include <qtable.h>
#include <qmenubar.h>
#include <qimage.h>
#include <qpixmap.h>
#include <qpopupmenu.h>
#include <qstringlist.h>
#include <qsettings.h>
#include <qmessagebox.h>
#include <qvbox.h>
#include <qfont.h>
```

2. Open the file mainWindow.h. Verify the following QT includes are defined:

```
#define QT_CLEAN_NAMESPACE
#include <qmainwindow.h>
```

3. Open the file Makefile and verify that the QT library is included:

```
Makefile: ... libqt-mt.prl ...
LIBS = ... -lqt-mt ...
```

4. Status: Pass/Fail:

```
IRIX: PASSED TEST
SOLARIS: PASSED TEST
```

### B. Allow the users to save a snapshot of the display

**Summary:** Verify that the user is able to save a snapshot of the display for the Stereonet Plot, Mohr Graph, Stress I 3D Fault Viewer, Surface Viewer, and Rose Diagram. Verify that the snapshot can be saved in all selectable format qualities for each display listed here.

**Protocol:**

1. Open two new documents in the 3D Fault Viewer. Load a .lin fault file (frizzell.lin) to Document 1 and a .flt fault file (flt020\_ghostdance020.flt) to Document 2.

2. Verify that the save image dialog window operates correctly (the program GIMP can be used to view saved images).
  - 2.1 Take a snapshot of the Document 2 and save it as 3DFaultviewDoc2.bmp. Verify that the file was saved and can be opened and viewed. Save this view in the formats jpeg, pbm, pgm, png, ppm, xbm, and xpm and verify that all files are saved correctly.

- 2.1 Save the Document 1 view as a jpeg in each of the available qualities: Best, Good, Fair, and Poor. Verify that each snapshot saved correctly and that the quality of the snapshot corresponds to the quality selected. This can be verified by the difference in file size when browsing the directory the files are saved in.

3. Verify that the snapshot button works for each display from which it can be invoked

#### 3.1 Stereonet Plot

- 3.1.1 Select all Vectors on Document 2 and click on the Plot selected button on the edit document menu. This will plot the vectors on the Stereonet Plot window. Open a Stereonet Plot window and verify that the vectors are plotted.

plotted. Now click on the save image button (small camera) and save the image using the default quality and bmp. Verify that the file saves correctly, can be opened and viewed and that the image matches exactly the one in the St window.

### 3.2 Mohr Graph

3.2.1 Open a Mohr Circle display window. Click on the save image button and save the image using default values. Verify that the file saves to the specified directory, can be opened and viewed, and that the image matches exactly the image in the Mohr Circle window.

### 3.3 Stress Ratio Graph

3.3.1 Open a Stress Ratio Graph display window. Click on the save image button and save the image using the default values. Verify that the file saves to the specified directory, can be opened and viewed, and that it matches exactly the image in the Stress Ratio Graph window.

### 3.4 Surface Viewer

3.4.1 Open a Surface Viewer display window. Click on the save image button and save the image using the default values. Verify that the file saves to the specified directory, can be opened and viewed, and that the image matches exactly the image in the Surface Viewer window.

### 3.5 Rose Diagram

3.5.1 On the edit document menu of Document 1, click on the Rose Diagram button to create a Rose diagram for the .lin file. On the Rose Diagram window, click on the save image button to save the image to a file. Use default quality and image format to save the file. Verify that the file was saved to the specified directory, can be opened and viewed, and that the image matches exactly the image in the Rose Diagram window.

## 4. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

## C. Add ability for the users to use light/shading on faults and coverages

**Summary:** Verify that the user is able to select between highlighting either faults or coverages or both using the checkbox on the Viewer Options menu for the 3D Fault Viewer.

### Protocol:

1. Create a new document using the Document/Views drop down menu.
2. Load the file bmflt.flt as a Fault file and the files bmflt\_breach.flt and bmflt\_relrmf.flt as Coverages.
3. On the Viewer Options menu, obtained by clicking on the Options button located on the 3D Fault Viewer window, click on the Lighting/Shading section of the menu.
4. Click on the checkbox for Faults. Verify that the area of the image representing the data for the file bmflt.flt, and the area representing the data for the files bmflt\_breach.flt and bmflt\_relrmf.flt, is shaded to show the faults. Click on the Faults check box to unselect the data.
5. Click on the Coverages check box on the Viewer Options menu to highlight the data from the coverages files bmflt\_breach.flt and bmflt\_relrmf.flt. Verify that the data from only those two files is shaded.
6. Click on the Fault check box so that both Faults and Coverages are selected. Verify that all data is shaded on the 3D Fault Viewer window.
7. Click on the Fault check box and the Coverages box so that neither is selected. Verify that none of the data is shaded on the 3D Fault Viewer window.

## 8. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

## D. Add ability for the users to set viewing settings so user can have a "map view" of the data. This improvement will make the map viewer obsolete

**Summary:** Verify that in the 3D Fault Viewer window, the user can create a map view of the data by clicking on the Map View button or by selecting Map View in the Viewer Options menu under the View Reset Mode section.

### Protocol:

1. Create a new document using the Document/Views drop down menu and load the file frizzell.lin as a Fault file.

2. On the toolbar of the document's 3D Fault Viewer window, click on the Map View Mode button. Verify that the ir to a map view of the data. Click on the Map View Mode button again to undo this selection. Verify that the map ret original view.

3. Open the Viewer Options menu for this document by clicking on the Options button on the 3D Fault Viewer wind the View Reset Mode section of the Viewer Options menu, select Map View and verify that the view of the data retu map view when the Reset View button is clicked

4. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 497	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Improve the functionality of 3DStress: (A) Set all the windows to minimize when the main control bar is minimized.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 1 week, 3/20/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 8/8/2003	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b>  Brandi L. Winfrey	<b>Date:</b> 8 / 8 / 2003	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A) To allow the user to minimize all the windows when the control bar is minimized, 3DStress software was altered so that it had a “workspace” design. The software has one main window with a menu bar. The tools (Tendency Plot, Viewer, etc.) of 3DStress then reside in this one window. The controller is the tool bar of this workspace and when the main window is minimized, all of the windows are minimized as well. The major files which contain these changes are located in the main window subdirectory and include mainWindow.h and mainWindow.cpp.**

## **Description of Acceptance Tests**

**Here is the description of the acceptance tests.**

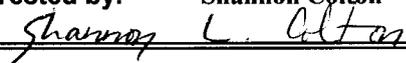
**A. Set all the windows to minimize when the main control bar is minimized.**

**Summary: Verify that all the windows minimize when the main control bar is minimized.**

### **Protocol:**

- 1. Maximize the 3D Stress window.**
  - 2. Open all windows on the Controller: Stress, Plot, Viewer, Mohr, Graph, 3D Surf, and Options.**
  - 3. Open all Options, Edit Document, Overlay, Rose Diagram, Color Legend windows on all Displays.**
  - 4. Click on the Minimize button on the main control bar. Verify that all windows generated by 3D Stress are minimized.**
- 4. Status: Pass/Fail:**
- IRIX: PASSED TEST**
  - SOLARIS: PASSED TEST**

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 498	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Add increase the overlay information and data selection ability of the Tendency Plot window: (A) Add ability to load, save, delete, display information and change appearance of overlay vectors on the Tendency Plot. (B) Add ability to load, save, delete, display information and change appearance of overlay planes on the Tendency Plot.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 1 week, 3/27/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 7/14/2003	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b> Shannon Colton 	<b>Date:</b> 7 / 14 / 2003	

## **Description of Change(s) or Problem Resolution**

**Here is the description of the changes or problem resolution.**

**(A), (B) The software was updated to use the QT graphical user interface for the Plot Overlay Window. Functionality to allow the user to load, save, delete, display information and change appearance of overlay vectors and overlay planes on the Tendency Plot was added. The major files which contain these changes are located in the plot subdirectory and include plotDataUI.h, plotDataUI.cpp, plotData.cpp, plotData.h, plotGL.h, and plotGL.cpp.**

## Description of Acceptance Tests

### A. Plane overlays

**Summary:** Verify that the user can load, save, delete, display information and change appearance of overlay planes on the Tendency Plot and Plot Overlay window.

**Protocol:**

1. Open the Tendency Plot
2. Open the Plot Overlay window
3. Load "5\_Vector\_Or\_Planes.ovr" as a plane overlay.
4. Verify that plane orientations listed in the "5\_Vector\_Or\_Planes.ovr" file match those reported in the Plane list view of the Plot Overlay window.

IRIX: The values are correct.

SOLARIS: The values are correct.

5. Verify that plane orientations in the Tendency Plot match those listed in the "5\_Vector\_Or\_Planes.ovr" file.

IRIX: Verified.

SOLARIS: Verified.

6. Select one plane.

Selected point: 270, 80.

7. Verify that the plane's color can be changed by clicking on the color button and changing the selected plane's color. Verify that the changes appear in the plane list view and in the Tendency Plot.

IRIX: Verified for navy blue and red.

SOLARIS: Verified for a few colors (e.g. cyan, purple).

8. Verify that the plane's symbol can be changed by changing the selected planes symbol with the pull down symbol menu. Verify that the changes appear in the plane list view and in the Tendency Plot.

IRIX: Verified for circle, square, diamond, triangle, and pentagon.

SOLARIS: Verified for circle, square, diamond, triangle, and pentagon.

9. Verify that a plane can be deleted. Push the delete button and verify that the selected plane is deleted from the plane list view and in the Tendency Plot.

IRIX: Verified.

SOLARIS: Verified.

10. Select a multiple number of planes.

Selected points: 180, 80 and 90, 80.

**11. Verify that the color of all the selected planes can be changed. Click on the color button and choose a new color for the selected planes. Verify that the changes appear in the plane list view and in the Tendency Plot.**

IRIX: Verified for navy blue and red.

SOLARIS: Verified for several colors (e.g. yellow, red).

**12. Verify that the symbol of all the selected planes can be changed. Click on the symbol button and choose a new symbol for the selected planes. Verify that the changes appear in the plane list view and in the Tendency Plot.**

IRIX: Verified for circle, square, diamond, triangle, and pentagon.

SOLARIS: Verified for circle, square, diamond, triangle, and pentagon.

**13. Verify that planes can be deleted. Push the delete button and verify that the selected planes are deleted from the plane list view and in the Tendency Plot.**

IRIX: Verified.

SOLARIS: Verified.

**14. Delete the remaining overlay planes.**

**15. Load "10\_Vector\_Or\_Planes.ovr" as a plane overlay.**

**16. Verify that plane orientations listed in the "10\_Vector\_Or\_Planes.ovr" file match those reported in the Plane list view of the Plot Overlay window.**

IRIX: The values are correct.

SOLARIS: The values are correct.

**17. Verify that plane orientations in the Tendency Plot match those listed in the "10\_Vector\_Or\_Planes.ovr" file.**

IRIX: Verified.

SOLARIS: Verified.

**B. Loading incorrect overlay planes.**

**Summary: Verify that user is alerted when attempting to load incorrect plane overlay files.**

**Protocol:**

**1. Open the Tendency Plot**

**2. Open the Plot Overlay**

**3. Load "Plot\_Bad\_Color.ovr" as a plane overlay and verify that user was alerted that the color value is invalid.**

IRIX: Verified.

SOLARIS: Verified.

**4. Load “Plot\_Bad\_Color\_2.ovr” and verify that user was alerted that the color value is invalid.**

IRIX: Verified.  
SOLARIS: Verified.

**5. Load “Plot\_Bad\_DipPlunge.ovr” as a plane overlay and verify that user was alerted that the strike or dip value is invalid.**

IRIX: Verified.  
SOLARIS: Verified.

**6. Load “Plot\_Bad\_DipPlunge2.ovr” as a plane overlay and verify that user was alerted that the strike or dip value is invalid.**

IRIX: Verified.  
SOLARIS: Verified.

**7. Load “Plot\_Bad\_StrikeBearing.ovr” as a plane overlay and verify that user was alerted that the strike or dip value is invalid.**

IRIX: Verified.  
SOLARIS: Verified.

**8. Load “Plot\_Bad\_Symbol.ovr” as a plane overlay and verify that user was alerted that the symbol value is invalid.**

IRIX: Verified.  
SOLARIS: Verified.

#### **C. Display options of overlay planes.**

**Summary: Verify that user can alter display of overlay planes in the Tendency Plot.**

##### **Protocol:**

- 1. Open the Tendency Plot**
- 2. Open the Plot Overlay**
- 3. Load “5\_Vector\_Or\_Planes.ovr” as a plane overlay.**
- 4. Verify that “Great Circle”, “Strike”, “Pole”, and “Slip Vector” display options can be changed by toggling the appropriate display check boxes and verify the changes in the Tendency Plot display.**

IRIX: Verified.  
SOLARIS: Verified.

#### **D. Vector overlays**

**Summary: Verify that the user can load, save, delete, display information and change appearance of overlay vectors on the Tendency Plot and Plot Overlay window.**

**Protocol:**

- 1. Open the Tendency Plot**
- 2. Open the Plot Overlay window**
- 3. Load "5\_Vector\_Or\_Planes.ovr" as a vector overlay.**
- 4. Verify that vector orientations listed in the "5\_Vector\_Or\_Planes.ovr" file match those reported in the Vector list view of the Plot Overlay window.**

IRIX: Verified.

SOLARIS: Verified.

- 5. Verify that vector orientations in the Tendency Plot match those listed in the "5\_Vector\_Or\_Planes.ovr" file.**

IRIX: Verified.

SOLARIS: Verified.

- 6. Select one vector.**

Selected point: 270, 90.

- 7. Verify that the vector's color can be changed by clicking on the color button and changing the selected vector's color. Verify that the changes appear in the vector list view and in the Tendency Plot.**

IRIX: Verified for several colors (e.g. cyan, red).

SOLARIS: Verified for several colors (e.g. cyan, red).

- 8. Verify that the vector's symbol can be changed by changing the selected vectors symbol with the pull down symbol menu. Verify that the changes appear in the vector list view and in the Tendency Plot.**

IRIX: Verified for circle, square, diamond, triangle, and pentagon.

SOLARIS: Verified for circle, square, diamond, triangle, and pentagon.

- 9. Verify that a vector can be deleted. Push the delete button and verify that the selected vector is deleted from the vector list view and in the Tendency Plot.**

IRIX: Verified.

SOLARIS: Verified.

- 10. Select a multiple number of vectors.**

Selected points: 180, 80 and 90, 80.

- 11. Verify that the color of all the selected vectors can be changed. Click on the color button and choose a new color for the selected vectors. Verify that the changes appear in the vector list view and in the Tendency Plot.**

IRIX: Verified.  
SOLARIS: Verified.

**12. Verify that the symbol of all the selected vectors can be changed. Click on the symbol button and choose a new symbol for the selected vectors. Verify that the changes appear in the vector list view and in the Tendency Plot.**

IRIX: Verified.  
SOLARIS: Verified.

**13. Verify that vectors can be deleted. Push the delete button and verify that the selected vectors are deleted from the vector list view and in the Tendency Plot.**

IRIX: Verified.  
SOLARIS: Verified.

**14. Delete the remaining overlay vectors.**

**15. Load "10\_Vector\_Or\_Planes.ovr" as a vector overlay.**

**16. Verify that vector orientations listed in the "10\_Vector\_Or\_Planes.ovr" file match those reported in the Vector list view of the Plot Overlay window.**

IRIX: The values are correct.  
SOLARIS: Verified.

**17. Verify that vector orientations in the Tendency Plot match those listed in the "10\_Vector\_Or\_Planes.ovr" file.**

IRIX: Vectors are plotted correctly.  
SOLARIS: Verified.

**E. Loading incorrect overlay vectors.**

**Summary: Verify that user is alerted when attempting to load incorrect vector overlay files.**

**Protocol:**

**1. Open the Tendency Plot**

**2. Open the Plot Overlay**

**3. Load "Plot\_Bad\_Color.ovr" as a vector overlay and verify that user was alerted that the color value is invalid.**

IRIX: The values are correct.  
SOLARIS: Verified.

**4. Load "Plot\_Bad\_Color\_2.ovr" and verify that user was alerted that the color value is invalid.**

IRIX: The values are correct.  
SOLARIS: Verified.

**5. Load “Plot\_Bad\_DipPlunge.ovr” as a vector overlay and verify that user was alerted that the trend or plunge value is invalid.**

IRIX: The values are correct.

SOLARIS: Verified.

**6. Load “Plot\_Bad\_DipPlunge2.ovr” as a vector overlay and verify that user was alerted that the trend or plunge value is invalid.**

IRIX: The values are correct.

SOLARIS: Verified.

**7. Load “Plot\_Bad\_StrikeBearing.ovr” as a vector overlay and verify that user was alerted that the trend or plunge value is invalid.**

IRIX: The values are correct.

SOLARIS: Verified.

**8. Load “Plot\_Bad\_Symbol.ovr” as a vector overlay and verify that user was alerted that the symbol value is invalid.**

IRIX: Verified.

SOLARIS: Verified.

#### **G. Display options of overlay vectors.**

**Summary: Verify that user can alter display of overlay vectors in the Tendency Plot.**

#### **Protocol:**

**1. Open the Tendency Plot**

**2. Open the Plot Overlay**

**3. Load “5\_Vector\_Or\_Planes.ovr” as a vector overlay.**

**4. Verify that “Vector” display options can be changed by toggling the “Vector” display check boxes and verify the change is made in the Tendency Plot display.**

IRIX: Verified.

SOLARIS: Verified.

```
#10_Vector_Or_Planes.ovr
#Made by Nathan Franklin for testing purposes
180 20 3 1 0.666667 0
180 40 2 1 0.333333 0
180 60 1 1 0 0
180 80 0 0.666667 0 0
270 45 4 0 0 0
360 20 3 0.666667 1 1
360 40 2 0 0.666667 1
360 60 1 0.054902 0.384314 1
360 80 0 0.168627 0 1
90 45 1 1 1 1
```

```
#5_Vector_Or_Planes.ovr
#Made by Nathan Franklin for testing purposes
0.000000 80.000000
90.000000 80.000000
180.000000 80.000000
270.000000 80.000000
360.000000 80.000000
```

```
#Plot_Bad_Color.ovr
#Made by Nathan Franklin for testing purposes
1.000000 0.000000 1 1.01 0 0
```

```
#Plot_Bad_Color_2.ovr
#Made by Nathan Franklin for testing purposes
1.000000 0.000000 1 .1 0 -.01
```

```
#Plot_Bad_DipPlunge.ovr
#Made by Nathan Franklin for testing purposes
30.000000 -1.000000
```

```
#Plot_Bad_DipPlunge2.ovr
#Made by Nathan Franklin for testing purposes
30.000000 90.000001
```

```
#Plot_Bad_StrikeBearing.ovr
#Made by Nathan Franklin for testing purposes
360.100000 0.000000
```

```
#Plot_Bad_Symbol.ovr
#Made by Nathan Franklin for testing purposes
1.000000 0.000000 5 0 0 0
```

### SOFTWARE CHANGE REPORT (SCR)

<b>1. SCR No.:</b> 499	<b>2. Software Title and Version:</b> 3dstress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Add functionality to allow the user to input a stress field that varies in three dimensions. Currently, the stress field is set and used in calculations in two different ways in 3DStress: (1) a single stress tensor for the entire domain or (2) a stress field that varies vertically. The users should now be able to set a three dimensional stress field by loading a input file that contains a stress tensor field defined by a set of tensors (six unique components of a stress tensor matrix) and their locations. To calculate stress-based values in this scenario, the stress tensor at a location (whether it be a midpoint of a line or center of a triangle patch of a fault surface) is determined by finding the nearest known tensor in the loaded file. Add the ability to display the tensors in the viewer and allow the users to set the plot location to one of the tensors in the loaded stress field.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 2 weeks, 4/10/03	
<b>12. Implemented by:</b> <u>Nathan Franklin</u> 	<b>Date:</b> 8/8/03	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b>  Brandi L. Winfrey	<b>Date:</b> 8 / 13 / 2003	

### **Description of Change(s) or Problem Resolution**

**The major files containing these changes are located in the stress subdirectory and include threeDimensionalUI.cpp, threeDimensionalUI.h, and stressTensorField.h.**

## Description of Acceptance Tests

Here is the description of the acceptance tests.

The users should now be able to set a three dimensional stress field by loading a input file that contains a stress tensor field defined by a set of tensors (six unique components of a stress tensor matrix) and their locations. To calculate stress-based values in this scenario, the stress tensor at a location (whether it be a midpoint of a line or center of a triangle patch of a fault surface) is determined by finding the nearest known tensor in the loaded file. Add the ability to display the tensors in the viewer and allow the users to set the plot location to one of the tensors in the loaded stress field.

### A. Loading of a three dimensional varying stress field

Protocol:

1. Open the Stress Tool display
2. Under Stress Field Type, select 3D.
3. Load file "3dStressField\_Vertical.txt"
4. Select "Move Plot Location To Selected Tensor" and select a tensor
5. Verify that the magnitudes of the selected tensor match the magnitudes displayed in the Tendency Plot window.

IRIX: Verified.

SOLARIS: Verified.

6. Arbitrary select a plane in the Tendency Plot with your mouse and complete the following steps (or use the excel spreadsheet "3DStressAcceptance.xls"):

6a. Compute direction cosines (with respect to +X = east, +Y = north, +Z = up) for each of the three principal stresses:

Corrected Azimuth = Azimuth - 90

If Corrected Azimuth < 0 then Corrected Azimuth = 360 + Azimuth - 90

a = cos(angle between principal stress direction and east)  
= cos(Plunge) x cos(Corrected Azimuth)

b = cos(angle between principal stress direction and north)  
= cos(Plunge) x cos(Corrected Azimuth - 270)

c = cos(angle between principal stress direction and up)  
= cos(90 + Plunge)

$\sigma_1$	$\sigma_2$	$\sigma_3$
a = -0.17101	a = 0.469846	a = 0.866025
b = -0.2962	b = 0.813798	b = -0.5
c = -0.93969	c = -0.34202	c = 0

IRIX:

$\sigma_1$	$\sigma_2$	$\sigma_3$
a = -0.9894	a = -0.14522	a = 6.06E-17

b = -0.14522  
c = 6.13E-17

b = 0.989399  
c = 6.13E-17

b = 8.9E-18  
c = -1

**SOLARIS:**

**$\sigma_1$**   
a = 0.145213  
b = 0.9894  
c = 6.13E-17

**$\sigma_2$**   
a = -0.9894  
b = 0.14522  
c = 6.13E-17

**$\sigma_3$**   
a = 6.06E-17  
b = -8.9E-18  
c = -1

**6b. For the arbitrary plane and using the right hand rule, determine the pole to this plane.  
e.g., Strike = 168; Dip = 38**

**The pole to this plane has the orientation:**

**Azimuth = Strike - 90**

**If Azimuth < 0 then Azimuth = 360 + Strike - 90**

**Plunge = 90 - Dip**

**For the example in (6b):**

**Azimuth = 78**

**Plunge = 52**

**IRIX:** Strike = 307.1  
Dip = 42.8  
Azimuth = (307.1 - 90) = 217.1  
Plunge = (90 - 42.8) = 47.2

**SOLARIS:** Strike = 139.2  
Dip = 42.0  
Azimuth = (139.2 - 90) = 49.2  
Plunge = (90 - 42.0) = 48

**6c. Compute direction cosines (with respect to +X = east, +Y = north, +Z = up) of pole to arbitrary plane. The procedure is similar to that in (6a) above:**

**a = cos(angle between pole to arbitrary plane and east)**

**a = cos(Plunge) x cos(Azimuth)**

**b = cos(angle between principal stress direction and north)**

**b = cos(Plunge) x cos(Azimuth - 270)**

**c = cos(angle between principal stress direction and up)**

**c = cos(90 + Plunge)**

**For the example in (6b):**

**a = 0.602208**

**b = 0.128003**

**c = -0.78801**

**IRIX:**

a = -0.40984

b = -0.54191

c = -0.73373

**SOLARIS:**

a = 0.506529

b = 0.437224

c = -0.74314

**6d. Compute direction cosines of pole to arbitrary plane with respect to principal stresses. The angle,  $\theta$ , between vector A (with direction cosines  $a_A, b_A, c_A$ ) and vector B (with direction cosines  $a_B, b_B, c_B$ ) is given by:**

$$\theta = 2 \times \sin^{-1} \frac{\sqrt{(a_A - a_B)^2 + (b_A - b_B)^2 + (c_A - c_B)^2}}{2} \quad \text{(Pythagoras)}$$

**For the example in (6c) above:**

a (direction cosine of pole to arbitrary plane with respect to  $\sigma_1$ ) = 0.59959

b (direction cosine of pole to arbitrary plane with respect to  $\sigma_2$ ) = 0.656629

c (direction cosine of pole to arbitrary plane with respect to  $\sigma_3$ ) = 0.457526

**IRIX:**

a = 0.484196045

b = -0.476649427

c = 0.733729865

**SOLARIS:**

a = 0.506143915

b = -0.437665588

c = 0.743144825

**(6e) Substitute values of principal stresses and direction cosines into equations for normal ( $\sigma$ ) and shear ( $\tau$ ) stress on an arbitrarily oriented surface within a stress tensor (e.g., Ramsay, J. G., 1967. *Folding and Fracturing of Rocks*, McGraw-Hill, pages 35 and 36).**

$$\sigma = \sigma_1 a^2 + \sigma_2 b^2 + \sigma_3 c^2$$

$$\tau = \sqrt{(\sigma_1 - \sigma_2)^2 a^2 b^2 + (\sigma_2 - \sigma_3)^2 b^2 c^2 + (\sigma_3 - \sigma_1)^2 c^2 a^2}$$

**7. Verify that the values for shear and normal stress calculated here (following the steps in 6 or using the excel spreadsheet "3DStressAcceptance.xls") match those given by 3DStress and**

displayed in the Tendency Plot Window.

**Stress Tensor:**

$\sigma_u = 40.4403$  Mpa     $\sigma_u$  direction = 261.65     $\sigma_u$  plunge = 0  
 $\sigma_v = 10.5597$  M pa     $\sigma_v$  direction = 351.65     $\sigma_v$  plunge = 0  
 $\sigma_w = 5$  Mpa     $\sigma_w$  direction = 81.6504     $\sigma_w$  plunge = 90

$\sigma_u = 19.5597$  Mpa     $\sigma_u$  direction = 278.35     $\sigma_u$  plunge = 0  
 $\sigma_v = 40.4403$  M pa     $\sigma_v$  direction = 8.34962     $\sigma_v$  plunge = 0  
 $\sigma_w = 5$  Mpa     $\sigma_w$  direction = 98.3496     $\sigma_w$  plunge = 90

**Strike, Dip and Pole to arbitrary plane:**

Pole:  
Strike = 307.1    Azimuth = 217.1  
Dip = 42.8    Plunge = 47.2

Pole:  
Strike = 139.2    Azimuth = 49.2  
Dip = 42.0    Plunge = 48

**Values calculated here:**

$\sigma_N$  (Normal Stress) = 16.61672 Mpa  
 $\tau$  (Shear Stress) = 14.41115 Mpa

$\sigma_N$  (Normal Stress) = 18.86807 Mpa  
 $\tau$  (Shear Stress) = 14.8836 M pa

**Values calculated and displayed in Tendency Plot window:**

$\sigma_N$  (Normal Stress) = 16.589 Mpa  
 $\tau$  (Shear Stress) = 14.400 Mpa

$\sigma_N$  (Normal Stress) = 16.877 Mpa  
 $\tau$  (Shear Stress) = 14.884 Mpa

**B. Ability to display the tensors**

**Protocol:**

1. Load "3dStressField\_Vertical.flt" in a document and view the fault.
2. Open the Stress display
3. Under Stress Field Type, select 3D.
4. Load file "3dStressField\_Vertical.txt".
5. Select "Show Tensors" and verify that the tensors can be displayed.

**IRIX: Verified.**  
**SOLARIS: Verified.**

**6. Verify that the color of the tensors can be changed.**

**IRIX: Verified.**  
**SOLARIS: Verified.**

**7. Verify that the color of any selected tensor can be changed.**

**IRIX: Verified.**  
**SOLARIS: Verified.**

**8. Verify that the tensors can be displayed as points or as crosses.**

**IRIX: Verified.**  
**SOLARIS: Verified.**

**9. Verify that the point size of tensors displayed as points can be changed .**

**IRIX: Verified.**  
**SOLARIS: Verified.**

**10. Verify that the length and width of tensors displayed as crosses can be changed.**

**IRIX: Verified.**  
**SOLARIS: Verified.**

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 500	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Add functionality to allow the software to have one color scale which appears in the Tendency Plot window, the Surface Viewer (3DSurf) window, and the Viewer window. The user should be able to set the range of the color scale by selecting a max and min, using the range of loaded data, or by using the max, min of the tensor being displayed by the Tendency Plot.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> .5 week, 4/17/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 8/8/2003	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b>  Brandi L. Winfrey	<b>Date:</b> 8 / 8 / 2003	

### **Description of Change(s) or Problem Resolution**

**The software was updated to to have one color scale which appears in the Tendency Plot window, the Surface Viewer (3DSurf ) window, and the Viewer window by having a single instance of a legend class and its user interface from which the different tools (Tendency Plot window, the Surface Viewer (3DSurf ) window, and the Viewer window) could use. The major files which contain these changes are located in the legend subdirectory and include colorLegend.h, colorLegend.cpp, colorLegendUI.h, and colorLegendUI.cpp.**

## Description of Acceptance Tests

Here is the description of the acceptance tests.

**A. Test that the software has one color scale which appears in the Tendency Plot window, the Surface Viewer (3DSurf) window, and the Viewer window. Test that the user can set the range of the color scale by selecting a max and min, using the range of loaded data, or by using the max, min of the tensor being displayed by the Tendency Plot.**

**Summary: Verify that the user can use one color scale, found on the Tendency Plot window, to control the Tendency Plot, Surface Viewer, and Viewer windows. Test that the min and max range of the color scale can be selected by two range sliders in the Data range section, checkbox to select the range of the current plot.**

**Protocol:**

- 1. Open the Tendency Plot window, the Surface Viewer window, and the 3D Fault Viewer window.**
- 2. Click on the Color legend button on the toolbar of the Tendency Plot window to open the Stress Color Legend menu.**
- 3. Verify that selections made in the Stress Color Legend menu affect all three Displays: Tendency Plot, Surface Viewer, and 3D Fault Viewer.**
  - 3.1 Load a Fault file (bmfilt.flt) into the 3D Fault Viewer so that the color changes can be seen on data as well as the color legend.**
  - 3.2 Change from Color scale to Black/White scale**
  - 3.3 Change Legend type from Square to Box to Dot**
  - 3.4 Display the Legend and Hide the Legend by checking or un-checking the check box.**
  - 3.5 Threshold. Checking the Threshold box causes an upper and lower threshold slider to appear. Moving the sliders causes the appropriate threshold (upper/lower) to change on all three Displays.**
  - 3.6 Checking the "Use range of current plot" check box disables the Data range sliders and all three windows utilize the data range of the current plot.**
  - 3.7 Data Range. With the "Use range of current plot" check box un-checked, moving the minimum data range slider causes the minimum data range to change for all three displays. Moving the maximum data range slider causes the maximum data range to change for all three displays.**
- 4. Status: Pass/Fail:**
  - IRIX: PASSED TEST**
  - SOLARIS: PASSED TEST**

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 501	<b>2. Software Title and Version:</b> 3dstress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Add functionality to the software to allow the user to handle negative normal stresses.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> .5 week, 4/22/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b>	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b>  Brandi L. Winfrey	<b>Date:</b> 8 / 14 / 2003	

### **Description of Change(s) or Problem Resolution**

**The major files which contain these changes are located in the stress subdirectory and include singleStressTensorUI.cpp, singleStressTensorUI.h, threeDimensionalStressUI.h, threeDimensionalStressUI.cpp, stressManager.h, and stressManager.cpp. Also, colorLegend.cpp and colorLegend.h were modified for this SCR.**

## Description of Acceptance Tests

Here is the description of the acceptance tests.

### A. Modification of a single stress field

**Summary:** Verify that user can modify the stress field by using the slider bars and by entering values. If invalid data is entered, verify that the user is warned of any problems.

**Protocol:**

1. Open the Stress display
2. Under Stress Field Type, select Single Stress Tensor
3. Enter a set of magnitudes and orientations for the three principal axes by using the slider bars and input fields. Enter a negative magnitude value for one of the three principal axes. Verify your desired selections by comparing those with the ones that are displayed in the Plot window.

$\sigma_u = 95$ Mpa	$\sigma_u$ direction = 144	$\sigma_u$ plunge = 90
$\sigma_v = 35$ Mpa	$\sigma_v$ direction = 144	$\sigma_v$ plunge = 0
$\sigma_w = 83$ Mpa	$\sigma_w$ direction = 234	$\sigma_w$ plunge = 0

IRIX: Verified. The values match.

SOLARIS: Verified. The values match.

4. Under Options, select Slip Tendency to be calculated, verify that with a negative stress, the slip tendency plot is colored by Potential Slip Mode (Shear, Hybrid, and Tensile).

IRIX: Verified.

SOLARIS: Verified.

5. Save this stress tensor to a file.

6. Alter the magnitudes and orientations of the three principal axes by using the slider bars as input fields.

7. Load and verify that stress tensor was correctly loaded from the file.

IRIX: Verified. It loaded correctly.

SOLARIS: It loaded correctly.

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 502	<b>2. Software Title and Version:</b> 3DStress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Add functionality to 3DStress™ to allow for a multiple document and viewer system. Currently, 3DStress™ has a single 2D viewer (Map Viewer) and 3D viewer (3DView). Each of the current two viewers allow the user to load data files. 3DStress™ should be improved to allow for multiple documents in which data can be loaded. For any document, multiple viewers would be able to view the document's data (faults, coverages, etc). The following improvements should be made: (A) Add ability for users to have different documents of data (B) Add ability for users to load data in different documents. User should also be able to manipulate the files in the manner in which they can currently manipulate them with the current 2D viewer and 3D viewer (querying the data with the Rose Diagram tool, etc). (C) Add ability for users to load and remove multiple files. (D) Add ability for users to create an output file containing triangular elements of faults and fractures with each element "attributed" stress-based parameters (e.g., resolved normal and shear stress, etc). (E) Add ability for users to create an output file containing line segment elements of two dimensional fault and fracture traces with each element's "attributed" stress-based parameters (e.g., resolved normal and shear stress, etc).		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 1.5 weeks, 5/2/03	
<b>12. Implemented by:</b> <u>Nathan Franklin</u> 	<b>Date:</b> 8/7/03	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b> Brandi L. Winfrey 	<b>Date:</b> 8 / 7 / 2003	

## Description of Change(s) or Problem Resolution

(A), (B). To allow users to have different documents of data and be able to manipulate the files in the manner in which they can in 3DStress Version 2, the following files (located primarily in the viewer and tds subdirectories) were either created or changed: viewerManger.h, viewerManger.cpp, tdsFileItem.cpp, tdsProfile.h, linFileClass.cpp, tdsFileItem.h, tdsSegment.cpp linFileClass.h, tdsSegment.h, tdsSurface.cpp, tdsGraphics.cpp, tdsBase.cpp, tdsGraphics.h, tdsBase.h, tdsCoverageItem.cpp, tdsCoverageItem.h, tdsLine.cpp, tdsSurface.h, tdsDocument.cpp , tdsLine.h, tdsTriangle.cpp, tdsDocument.h, tdsManager.cpp, tdsTriangle.h, tdsDocumentItem.cpp, tdsManager.h, tdsDocumentItem.h, tdsPoint.cpp, tdsDocumentManager.cpp, tdsPoint.h, tdsDocumentManager.h, tdsFile.cpp, tdsFile.h, tdsFileInputDialog.cpp, and tdsPointSet.h. A singleton class manages a set of documents (tdsDocumentManger.h,.cpp) and another singleton class manages the views and their relation to documents (viewerManger.h,.cpp).

(C) (D) (E) A file input dialog (tdsFileInputDialog.cpp and tdsFileInputDialog.h) was created for user to load multiple files. The document dialog (tdsDocument.h and tdsDocument.cpp) allows the user to remove multiple files from the list of files. The options of the document dialog also contains new functionality to allow the user to create an output file containing “attributed” stress-based parameters (e.g., resolved normal and shear stress, etc) for two dimensional faults or three dimensional faults. The major files containing these changes are tdsDocument.h, tdsDocument.cpp.

## Description of Acceptance Tests

Here is the description of the acceptance tests.

**A. 3D Stress should allow users to have different documents of data.**

**Summary:** Verify that more than one document can be created and deleted.

**Protocol:**

1. **Add a first document.** On the Document/Views drop down menu on the main 3D Stress window, there should be three choices, Edit views and New Document/View. Select new document view. A new window should appear with an empty boundary box and a color legend. Click on the Document/Views drop down menu again. There should now be four choices, Edit views, New Document/View, Document 1, and View 1 of Document 1.

2. **Add a second Document.** On the Document/Views drop down menu, select New Document/View. A new window should appear with an empty boundary box and a color legend. Click on the Document/Views drop down menu again. It should now have six choices, Edit views, New Document/View, Document 1, Document 2, View 1 of Document 1 and View 1 of Document 2.

3. **Delete both documents.**

3.1 On the Document/Views drop down menu on the main 3D Stress window, click on the Edit views option. A window should appear listing all of the open documents and views. Click on Document1 to highlight it. Then click on the Edit selected document/view button (represented by a large X) to delete the document. Repeat this process for Document 2. All windows and menus for both documents should disappear when the X button is clicked. Click on the Document/Views drop down menu. Both documents should also be gone from this list.

4. **Status: Pass/Fail:**

**IRIX: PASSED TEST**

**SOLARIS: PASSED TEST**

**B. The user should be allowed to load data in different documents. User should also be able to manipulate the files in the manner in which they can currently manipulate them with the current 2D viewer and 3D viewer (querying the data with the Rose Diagram tool, etc,... NOTE: The Rose Diagram tool can only be used with .lin files).**

**Summary:** Verify that data can be loaded in each document that is created and that the data can be manipulated.

**Protocol:**

1. **Create two document views following protocol steps 1 and 2 of step A of this Acceptance Test.**

2. **Open the edit document menu on the toolbar of the Document 1 window. Click on the Load files button on the edit document toolbar. This will open a dialog window that prompts the user to select a Render Mode, File Type, and File name to open. The default Render Mode is "Fault", the default File Type is "flt". Select lin (2D) for the File Type and open the file "frizzel.lin". An image of the fault should appear in the Document 1 window.**

3. **Open the edit document menu on the toolbar of the Document 2 window. Click on the Load files button on the edit document toolbar. Select lin (2D) for the File Type and open the file "nakata.lin". An image of the fault should appear in the Document 2 window.**

4. **On the edit document toolbar for Document 1, click on the Rose Diagram button. A rose diagram window should appear displaying the data for Document 1. Click on the Rose Diagram button on the edit document toolbar for Document 2. A rose diagram window should appear displaying the data for Document 2.**

5. **Since line data cannot be transferred to the Stereonet Plot, load a .flt data file to a third document to verify that it can be transferred to the Stereonet Plot.**

5.1 On the Document/Views drop down menu on the main 3D Stress window, select new document view. C document menu for this third document, using the default settings "Fault" for Render Mode and "flt" for File Type, "flt010\_bowridge020.flt". This image should appear in the Document 3 window. Now open the Stereonet Plot window the date from Document 3.

5.1.1 On the toolbar of the Document 3 edit document menu, click on the options button to open the window. Click on the Select All button to select all vectors in the Document 3 data. Verify that all vectors on Document 3 are selected. Now click on the "Plot selected" button on the options menu of the edit document menu. The data should show white points on the Stereonet Plot window.

6. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

C. The user should be able to load and remove multiple files.

Summary: Verify that the user can load multiple files, in the same document, and also remove those files.

Protocol:

1. Create a document using protocol steps 1 and 2 from step A of this Acceptance Test.
2. Click on the edit documents button on the document window to view the edit documents menu.
3. Click on the Load files button on the edit documents tool bar. This will open a dialog window that prompts the user to select a Render Mode, File Type, and File name to open. The default Render Mode is "Fault", the default File Type is "flt". Using the default options, open the Fault file "bmflt.flt". An image of the fault should appear in the Document window.
4. Add multiple files to the same document.

4.1 Using the default options on the Load files dialog, load the following files. They can be loaded individually or they can all be selected at the same time by holding the shift key down to highlight them all and clicking on the open button.

Verify that all files appear in the document window as they are loaded.

flt010\_bowridge020.flt

flt020\_ghostdance010.flt

flt030\_solcanyon020.flt

4.2 On the Load files dialog window, select the Coverage render mode and load the following files. They can be loaded individually, or as a group. Verify that all files appear in the document window as they are loaded.

bmflt\_breach.flt

bmflt\_relrmp.flt

5. Remove multiple files from a document.

5.1 Using the left mouse button, select the coverage file bmflt\_breach.flt. Click on the Remove Selected File button on the edit document toolbar (represented by a large X). The file should disappear from both the document window and the list of open files on the edit document window.

5.2 Repeat the procedure in step 5.1 for the remaining files. To remove multiple files at the same time, hold the shift key when selecting the files in the edit document window. When complete, there should be no faults or coverages in the document window or in the edit documents window.

6. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

D. The user should be able to create an output file containing triangular elements of faults and fractures with each "attributed" stress-based parameters (e.g., resolved normal and shear stress, etc)

Summary: Verify that when a fault file is loaded as a Fault render mode, the 3D triangular elements of the data can be saved to a file. That data will include resolved normal and shear stresses, along with other data.

Protocol:

1. Create a document using protocol steps 1 and 2 from step A of this Acceptance Test.
2. Click on the edit documents button on the document window to view the edit documents menu.

3. Click on the Load files button on the edit documents tool bar. This will open a dialog window that prompts the user to select a Render Mode, File Type, and File name to open. The default Render Mode is "Fault", the default File Type is "flt". Using the default options, open the Fault file "bmflt.flt". An image of the fault should appear in the Document window.
4. Click on the Options button on the edit document toolbar to expand the menu. Click on the Browse data button of the edit document options window. This will cause a dialog window to appear with a selection between Map faults. Choose 3D faults. Another dialog window will appear prompting the user to choose between Center points and Triangles. Choose Triangles. A window containing 3D Fault data will appear. Verify that resolved normal and stress are part of the data shown.
5. Click on the save text file button at the bottom of the 3D Fault data window. A dialog window will appear prompt to select a location and file name for the data file. Enter the required information and click on the Save button. The data file is saved to the location specified.
6. Close the 3D Fault data window and repeat protocol steps 4 and 5 above with the exception that Center points should be selected instead of Triangles.

6. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

E. The user should be able to create an output file containing line segment elements of two dimensional fault and traces with each element's "attributed" stress-based parameters (e.g., resolved normal and shear stress, etc)

Summary: Verify that when a lin (2D) File Type is loaded as a Fault render mode, the Map fault segments of the data output to a file. That data will include resolved normal and shear stress, along with other data.

Protocol:

1. Create a document using protocol steps 1 and 2 from step A of this Acceptance Test.
2. Click on the edit documents button on the document window to view the edit documents menu.
3. Click on the Load files button on the edit documents tool bar. This will open a dialog window that prompts the user to select a Render Mode, File Type, and File name to open. Select lin (2D) as the File Type and open the Fault file "landers.lin". An image of the fault should appear in the Document window.
4. Click on the Browse data button at the bottom of the edit document window. This will cause a dialog window to appear with a selection between Map faults and 3D faults. Choose Map faults. Another dialog window will appear prompting the user to choose between Center points of segments and Segments. Choose Segments. A window containing Map faults data will appear. Verify that resolved, normal, and shear stress are part of the data shown.
5. Click on the save text file button at the bottom of the Map faults data window. A dialog window will appear prompting the user to select a location and file name for the data file. Enter the required information and click on the Save button. The data file is saved to the location specified.
6. Close the Map Faults data window and repeat protocol steps 4 and 5 above with the exception that Center points of segments should be selected instead of Segments.

6. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

**SOFTWARE CHANGE REPORT (SCR)**

<b>1. SCR No.:</b> 503	<b>2. Software Title and Version:</b> 3dstress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  Update the help pages for 3DStress to address the software improvements in version 3.0.		
<b>7. Change Requested by:</b> David A Ferrill and Nathan Franklin Date: 1 / 22 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 1 / 22 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> 1 week, 5/9/03	
<b>12. Implemented by:</b> Nathan Franklin 	<b>Date:</b> 8/11/2003	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b>  Brandi L. Winfrey	<b>Date:</b> 8 / 11 / 2003	

### **Description of Change(s) or Problem Resolution**

**The software's help system was updated for the software improvements contained in Version 3.0. These help pages in html format are located in the help pages directory. The files in the software to facilitate the help manual during the execution of the program are help.h and help.cpp (located in the help directory). These files provide a html viewer so the files can be loaded by 3DStress instead using the netscape browser.**

## Description of Acceptance Tests

Here is the description of the acceptance tests.

A. Test that the help pages for 3DStress address the software improvements in version 3.0.

**Summary:** Verify that features added to 3DStress version 3.0 have been added to the help pages and those that were also removed from the help pages. Verify that all help page links go to the correct page.

**Protocol:**

1. Verify that all help buttons go to the correct help pages.

1.1 Open the Stress Input window by clicking on the Stress button on the Controller or by clicking on the Stress option in the Tools drop down menu of the 3D Stress main window. Click on the Help drop down menu on the Stress Input window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Stress Input Tool. Close the help window and click on the help button on the Stress Input toolbar. Verify that this action opens the same help page as the drop down menu.

1.2 Open the Tendency Plot window by clicking on the Plot button on the Controller or by clicking on the Plot option in the Tools drop down menu of the 3D Stress main window. Click on the Help drop down menu on the Tendency Plot window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Tendency Plot. Close the help window and click on the help button on the Plot toolbar. Verify that this action opens the same help page as the drop down menu.

1.2.1 Open the Plot Overlay menu by clicking on the Overlay button on the Tendency Plot toolbar. Click on the Help drop down menu on the Plot Overlay window and click on the Help option. Verify that a help window appears and that it is showing the help page for Overlaying Planes and Vectors on the Tendency Plot. Close the help window and click on the help button on the Plot Overlay toolbar. Verify that this action opens the same help page as the drop down menu.

1.2.2 Open the Stress Color Legend menu by clicking on the Color Legend button on the Tendency Plot toolbar. Click on the Help drop down menu on the Stress Color Legend window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Tendency Plot Options (which contains help on the Color Legend). Close the help window and click on the help button on the Stress Color Legend toolbar. Verify that this action opens the same help page as the drop down menu.

1.2.3 Open the Plot Options menu by clicking on the Options button on the Tendency Plot toolbar. Click on the Help drop down menu on the Plot Options window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Tendency Plot Options. Close the help window and click on the help button on the Plot Options toolbar. Verify that this action opens the same help page as the drop down menu.

1.3 Open the 3D Fault Viewer window by clicking on the Viewer button on the Controller or by clicking on the Viewer option in the Tools drop down menu of the 3D Stress main window. Click on the Help drop down menu on the 3D Fault Viewer window and click on the Help option. Verify that a help window appears and that it is showing the help page for the 3D Fault Viewer and Viewer. Close the help window and click on the help button on the Viewer toolbar. Verify that this action opens the same help page as the drop down menu.

1.3.1 Open the edit document menu by clicking on the edit document button on the Viewer toolbar. Click on the Help drop down menu on the edit document window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Document and Viewer. Close the help window and click on the help button on the edit document toolbar. Verify that this action opens the same help page as the drop down menu.

1.3.2 Open the Rose Diagram menu by clicking on the Rose diagram button on the Viewer toolbar. Click on the Help drop down menu on the Rose Diagram window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Rose Diagram. Close the help window and click on the help button on the Rose Diagram toolbar. Verify that this action opens the same help page as the drop down menu.

1.3.3 Open the Viewer Options menu by clicking on the Options button on the Viewer toolbar. Click on the Help drop down menu on the Viewer Options window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Document and Viewer Options. Close the help window and click on the help button on the Viewer Options toolbar. Verify that this action opens the same help page as the drop down menu.

1.3.4 Open the Boundary Box menu by clicking on the Boundary box button on the Viewer Options toolbar. Click on the Help drop down menu on the Boundary Box window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Document Viewer Options. Close the help window and click on the help button on the Boundary Box toolbar. Verify that this action opens the same help page as the drop down menu.

1.4 Open the Mohr window by clicking on the Mohr button on the Controller or by clicking on the Mohr option in the Tools drop down menu of the 3D Stress main window. Click on the Help drop down menu on the Mohr window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Mohr Graph. Close the help window and click on the help button on the Mohr toolbar. Verify that this action opens the same help page as the drop down menu.

1.4.1 Open the Mohr Options menu by clicking on the Options button on the Mohr toolbar. Click on the Help drop down menu on the Mohr Options window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Mohr Graph. Close the help window and click on the help button on the Mohr Options toolbar. Verify that this action opens the same help page as the drop down menu.

1.5 Open the Stress Ratio Graph window by clicking on the Graph button on the Controller or by clicking on the Stress Ratio Graph option in the Tools drop down menu of the 3D Stress main window. Click on the Help drop down menu on the Stress Ratio Graph window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Stress Ratio Graph. Close the help window and click on the help button on the Stress Ratio Graph toolbar. Verify that this action opens the same help page as the drop down menu.

1.6 Open the 3D Surface Viewer by clicking on the 3Dsurf button on the Controller or by clicking on the Surface Viewer option in the Tools drop down menu of the 3D Stress main window. Click on the Help drop down menu on the Surface Viewer window and click on the Help option. Verify that a help window appears and that it is showing the help page for the Surface Viewer. Close the help window and click on the help button on the Surface Viewer toolbar. Verify that this action opens the same help page as the drop down menu.

1.6.1 Open the Surface Viewer Options menu by clicking on the Options button on the Surface Viewer toolbar. Click on the Help drop down menu on the Surface Viewer Options window and click on the Help option. Verify that a help window appears and that it is showing the help page for Surface Viewer Options.

1.7 Open the Options window by clicking on the Options button on the Controller or by clicking on the Options option in the Tools drop down menu of the 3D Stress main window. Click on the Help drop down menu on the Options window and click on the Help option. Verify that a help window appears and that it is showing the help page for Options. Close the help window and click on the help button on the Options toolbar. Verify that this action opens the same help page as the drop down menu.

2. All images were updated to reflect version 3.0 User Interface cosmetic changes (i.e., new icons, buttons, color changes, drop down menus, toolbars).

3. Help pages were updated to reflect new functionality added to version 3.0.

3.1 3D Option added to Stress Tool help page.

3.2 Map View button removed from Controller and added to the 3D Fault Viewer and Viewer Options window.

3.3 Browse Data options added to 3D Fault Viewer to differentiate between Map Faults and 3D Faults each with their own subcategories to select (i.e., Center point of segments vs Segments for Map Faults and Center point of triangles vs Segments for 3D Faults).

3.4 Creating and editing multiple documents with multiple views through a new drop down menu Documents in the main 3D Stress window.

3.5 Improvements to the Mohr Tool that allow user to load multiple mohr circles and mohr envelopes.

4. Status: Pass/Fail:

IRIX: PASSED TEST

SOLARIS: PASSED TEST

### SOFTWARE CHANGE REPORT (SCR)

<b>1. SCR No.:</b> 504	<b>2. Software Title and Version:</b> 3dstress 3.0	<b>3. Project No:</b> 20.06002.01.062
<b>4. Affected Software Module(s), Description of Problem(s):</b>  When accessing Version 3.0 compact disks (CD) on a Sun Ultra 10 running the Solaris 2.8 Operating System, some file names are incorrect. These file names have been truncated and have lower case letters instead of the intended upper case letters.		
<b>7. Change Requested by:</b> Nathan Franklin Date: 10 / 02 / 2003	<b>8. Change Authorized by (Software Developer):</b> Nathan Franklin Date: 10 / 02 / 2003	
<b>9. Description of Change(s) or Problem Resolution:</b>  Please see attachment, "Description of Change(s) or Problem Resolution"		
<b>10. Priority:</b> N.A.	<b>11. Approximate Level of Effort and Scheduled Completion Date:</b> N.A.	
<b>12. Implemented by:</b> Nathan Franklin	<b>Date:</b> 10/08/2003	
<b>13. Description of Acceptance Tests:</b>  Please see attachment, "Description of Acceptance Tests"		
<b>14. Tested by:</b>  Brandi L. Winfrey	<b>Date:</b> 8 / 09 / 2003	

### **Description of Change(s) or Problem Resolution**

**The CD creation process is altered so that CDs are created for use on Solaris. To create a CD for use on a Unix machine, create a CD image on Solaris by using the *mkisofs* utility. Then use CD burning software and hardware on a Windows machines to burn the CD image to a CD.**

## **Description of Acceptance Tests**

**Here is the description of the acceptance tests.**

**A. Test that the help pages for 3DStress address the software improvements in version 3.0.**

**Summary: Verify that CD was correctly made for use on Solaris/Sun machines.**

**Protocol:**

- 1. Insert CD into Sun and copy contents to the hard disk.**
- 2. Access contents of CD and verify that help page files have names longer than 8 characters and that some names contain upper case characters.**
- 3. Follow install procedures (located in the README.txt file)**
- 4. Start 3DStress and view help manual.**
- 5. Verify that different sections of the help manual can be viewed by clicking on different links.**
- 6. Status: Pass/Fail: PASSED TEST**