

# SOFTWARE RELEASE NOTICE

1. SRN Number: <i>224</i>		
2. Project Title: Yucca Mountain Repository Program		Project No. 20-01402-471
3. SRN Title: StereoNet for Windows Version 3.0		
4. Originator/Requestor: Deborah Waiting		Date: September 6, 2000
5. Summary of Actions  <input checked="" type="checkbox"/> Release of new software  <input type="checkbox"/> Release of modified software: <input type="checkbox"/> Enhancements made <input type="checkbox"/> Corrections made  <input type="checkbox"/> Change of access software  <input type="checkbox"/> Software Retirement		
6. Persons Authorized Access		
Name	Read Only/Read-Write	Addition/Change/Delete
Brittain Hill	RO	A/C/D
Darrell Sims	RO	A/C/D
Deborah Waiting	RO	A/C/D
CNWRA Staff	RO	A/C/D
7. Element Manager Approval: <i>[Signature]</i>		Date: <i>9/20/00</i>
8. Remarks: Commercial code purchased from Geological Software.		

# SOFTWARE SUMMARY FORM

01. Summary Date: 09-Sep-00	02. Summary prepared by (Name and phone) Deborah Waiting (210-522-5502)		03. Summary Action: NEW	
04. Software Date: 1995	05. Short Title: StereoNet			
06. Software Title: StereoNet for Windows Version 3.0			07. Internal Software ID: License: 47.1	
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: Stereographic Projection		
11. Submitting Organization and Address:  CNWRA/SwRI 6220 Culebra Road San Antonio, TX 78228		12. Technical Contact(s) and Phone:		
13. Software Application: Plotting and display of stereographic projections of fracture data.				
14. Computer Platform NT/PC	15. Computer Operating System: Windows 3.1 or higher	16. Programming Language(s): None	Number of Source Program Statements:	
18. Computer Memory Requirements: 286 or better PC	19. Tape Drives: N/A	20. Disk Units: 2 MB	21. Graphics: Windows	
22. Other Operational Requirements None				
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. Commercial code developed by Geological Software  Software Developer: <i>Deborah Waiting</i> Date: <i>9/20/00</i>				

**CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES  
DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE**

**ACQUIRED CODE - NOT TO BE MODIFIED<sup>1</sup>**

Software Title/Name: Stereo Net  
Version: 3.0  
Demonstration workstation: Shadow  
Operating System: Windows  
Developer: Microsoft

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**1. Output: TOP-018, Section 5.5.4**

Software designed so that individual runs are uniquely identified by Date, Time, Name of software and version?

Yes: ☐ No: ☐ N/A: ☒

Date and time of run: \_\_\_\_\_

Name and version: \_\_\_\_\_

Notes: Acquired code that is not to be modified is accepted as is.

**2. Medium and Header Documentation: TOP-018, Section 5.5.6**

The physical labeling of software medium (tapes, disks, etc.) contain required information?

Yes: ☒ No: ☐ N/A: ☐

Program Name: Stereo Net  
Module/Name/Title: Stereo Net for Windows  
Module Revision: 3.0  
File Type (ASCII, OBJ, EXE): Exe  
Recording Date: September 2000  
Operating System of Supporting Hardware: Windows

Notes: Acquired code that is not to be modified may not have all above elements.

<sup>1</sup> See TOP-018, Table 1 for criteria.

**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE  
ACQUIRED CODE - NOT TO BE MODIFIED**

**3. User's Manual: TOP-018, Section 5.5.5**

a) Is there a Users' Manual for the software?

Yes: ☒ No: ☐ N/A: ☐

User's Manual Version and Date: Version 3.0 1995

Notes:

b) Are there basic instructions for the use of the software?

Yes: ☒ No: ☐ N/A: ☐

Location of Instruction: Self taught - User manual kept by D. Waiting

Notes:

**4. Acceptance Testing: TOP-018, Section 5.6**

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

Yes: ☒ No: ☐ N/A: ☐

Platform(s): PC

Operating System(s): Windows

Location of Test Results: Stereo Net File

Notes:

**5. Configuration Control: TOP-018, Section 5.7**

a) Is the Software Summary Form completed and signed?

Yes: ☒ No: ☐ N/A: ☐

Software Summary Form Approval Date: \_\_\_\_\_

Notes:

b) Is a software technical description prepared, documenting the essential mathematical and numerical basis?

Yes: ☒ No: ☐ N/A: ☐

Location Technical Description: Stereo Net File

Notes:

c) 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: \_\_\_\_\_

Notes: Ex file type only

**DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE  
ACQUIRED CODE - NOT TO BE MODIFIED**

**6. Configuration Control, continued: TOP-018, Section 5.7**

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

Yes: ☒ No: ☐ N/A: ☐

Location of Script/Make Files:

*Located in this file and stored in the  
QA Records room. (me)*

Notes:

**7. Software Release: TOP-018, Section 5.9**

Upon acceptance of the software as verified above, has a Software release Notice, Form TOP-6 been issued?

Yes: ☒ No: ☐ N/A: ☐

Version number on software (1.0 for 1<sup>st</sup> issue):

*3.0*

Version number on SRN:

*3.0*

Notes:

**8. Software Validation: TOP-018, Section 5.10**

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

Yes: ☐ No: ☐ N/A: ☒

Version/Date of SVTP: \_\_\_\_\_

Date reviewed and approved via QAP-002: \_\_\_\_\_

Notes:

b) 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/Date of SVTR: \_\_\_\_\_

Date reviewed and approved via QAP-002: \_\_\_\_\_

*Not Required*

Notes:

Additional Remarks:

*Daleenah Waitley 9/20/00*  
CNWRA Software Developer/Date

*Nash R. Ehnstern 9/20/2000*  
CNWRA Software Custodian/Date

# MEMORANDUM

DATE: November 26, 2001

TO: Bruce Mabrito

FROM: Deborah Waiting

*Deborah Waiting*  
11/26/01

SUBJECT: Acceptance testing of StereoNet software

This memo documents methods used to demonstrate compliance with TOP-18 requirements for acceptance testing (TOP-18, 5.6), configuration control (TOP-18, 5.7), design verification and release (TOP-18, 5.8-5.9), and validation (TOP-18, 5.10) for commercial software not to be modified by CNWRA staff. The software is currently installed on the NT "Shadow".

StereoNet for Windows, Version 3.0, a commercially available software, was developed by Geological Software, Varden 94, N-9018 Tromsø, Norway. A copy of the License Agreement and Form TOP 4-1 is attached. The program is used for analyses of orientation data by plotting planes, points, contours, poles-to-planes, linear slip, rose diagrams, or statistics on a stereonet. The program uses fault data in text file format. The software was validated for the plotting of poles-to-planes and rose diagrams, these being the primary calculations used by CNWRA staff.

A test of the software was conducted to insure the accuracy of a plotted stereonet and rose diagram. File Pole\_plane.txt (attached as Pole\_p~1.txt) consists of five (5) strike and dip measurements. These measurements were manually plotted using conventional methods as fault planes and then poles of the planes. The same data was then re-plotted using StereoNet. The four (4) plots are attached. The StereoNet plots correlate with the manual plots.

A second data file was created (attached as Rosedi~1.txt) consisting of 14 strike and dip measurements. Rose diagrams represent the percent of faults in a strike azimuth. The file has nine (9) measurements in 50-60/230-240 azimuth or 64% of the total, and five (5) measurements in 150-160/330-340 azimuth or 36% of the total. The StereoNet Rose Diagram was set up so that each ring represents 10 %, the radius then equals 40%, the diameter 80%. The data percents and azimuths plotted as expected.

StereoNet Version 3.0 operated correctly after installation and the data was plotted correctly, thus this software has been verified and validated for use as a stereonet plotting program for analyzing orientation data.

Attachments: 9 pages

**Maria Padilla**

**From:** Renee I Folck [renee426@juno.com]  
**Sent:** Wednesday, November 28, 2001 1:49 AM  
**To:** mjpadilla@cnwra.swri.edu  
**Subject:** Waiting memo

Hi Maria,

The memo sound fine. What TOP-018 requires is that we develop a Validation Test Plan and after execution of the plan a Validation Test Report is issued with the results of the test. Both are to be QAP-002 reviewed.

*Arc Info 769 12/19/01*

If my memory serves me correctly ~~StereoNet and ArcView~~ were validated without issuing a validation plan and we received only a validation report. This may have been "before" we clearly identified or understood all the requirements. ~~The validation report was QAP-002 reviewed and accepted by all.~~

In the future we need both validation plan and validation report.

Have a great day,

Randy

reply to: rfolck@satx.rr.com

*Randy Folck  
12/19/01  
Actually  
Arc Info.*

# **Software Validation Test Plan**



# **SOFTWARE VALIDATION TEST PLAN FOR STEREONET FOR WINDOWS, VERSION 3.0**

*Prepared for*

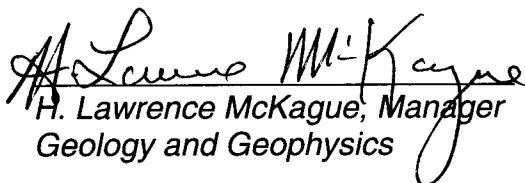
**U.S. Nuclear Regulatory Commission  
Contract NRC-02-97-009**

*Prepared by*

**Danielle Wyrick**

**Center for Nuclear Waster Regulatory Analyses  
San Antonio, Texas**

**Approved by:**

  
H. Lawrence McKague, Manager  
Geology and Geophysics

09/23/02  
Date

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## **1 SCOPE OF THE VALIDATION**

This document establishes the Software Validation Test Plan for validating the functionality of the code StereoNet, Version 3.0. StereoNet, Version 3.0, is designed for plotting and display of stereographic projections of fracture data. The program uses fault data in a text file format.

## **2 REFERENCES**

Steinsund, P.I. "StereoNet Version 3.0 for Windows User's Guide." Tromsø, Norway: Geological Software. 1995.

## **3 ENVIRONMENT**

### **3.1 Software**

StereoNet, Version 3.0, is commercially available software developed by Geological Software, Varden 94, N-9018 Tromsø, Norway. Version 3.0 runs in Windows 3.1 or higher operating system. The following software items are required to perform the testing activities:

- (i) StereoNet, Version 3.0 software
- (ii) Windows 3.1 or higher operating system

### **3.2 Hardware Requirements**

StereoNet, Version 3.0, runs on a 286 or higher microprocessor PC. The program requires a minimum of 2Mb of computer memory. Input information is in text file formats (see Appendices A and B) and output information is saved on the computer hard drive. The only peripheral device needed is a printing and/or plotting device, configured as per normal settings in the Windows control panel, used to help validate results.

## **4 PREREQUISITES**

Running StereoNet, Version 3.0, requires installation of the commercially available software, per the developers' user's manual.

## **5 ASSUMPTIONS AND CONSTRAINTS**

The user of StereoNet, Version 3.0, is assumed to be familiar with fault data as displayed in rose diagrams and stereonet and with the construction of rose diagrams and stereonet.

## **6 TEST CASES**

The test cases described in this section involve comparisons of plots, such as fault planes and poles of the planes, created from StereoNet, Version 3.0, to measurements manually plotted using conventional methods.

### **6.1 Test Case 1 – Verifying accuracy of plotted stereonet**

The accuracy of plotted stereonet, such as fault planes and poles of the planes, will be checked by comparing to measurements manually plotted using conventional methods.

#### **6.1.1 Test Input**

The StereoNet file Pole\_plane.txt (See Appendix A: Pole\_p~1.txt) consists of five (5) strike and dip measurements.

#### **6.1.2 Test Procedure**

After opening StereoNet, the user should open the file Pole\_plane.txt. Using the Graphics menus, the user should choose the option for Plane.

#### **6.1.3 Test Results**

Once StereoNet has plotted the strike and dip measurements, they should be visually compared to measurements that have been manually plotted using conventional methods. No visually apparent discrepancies should be noted.

### **6.2 Test Case 2 – Verifying Rose Diagrams**

Rose diagrams represent the percent of faults in a strike azimuth or in a range of strike azimuths. Comparison of plots created by StereoNet to manually plotted diagrams using conventional methods will be used to determine the accuracy.

#### **6.2.1 Test Input**

The StereoNet file Rosedi~1.txt (attached) consists of 14 strike and dip measurements.

#### **6.2.2 Test Procedure**

After opening StereoNet, the user should open the file Rosedi~1.txt (see Appendix B). Using the Graphics menus, the user should choose the option for Rose Diagram. The file has 14 measurements within three percentage

categories. The StereoNet Rose Diagram should be set up so that each ring represents 10%: the radius then equals 40% and the diameter 80%.

### **6.2.3 Test Results**

Once StereoNet has plotted the rose diagram, it should be visually compared to measurements that have been plotted manually using conventional methods. No visually apparent discrepancies should be noted.

## APPENDIX A

Pole\_p~1.txt

STRIKE	DIP
152	20
332	40
154	60
334	80
156	90

The file format for data is a tab delimited Text file. The first line is the title of the data set. The rest of the lines are data. These include two columns with strike and dip separated by one or more blank spaces or a tabulator. When StereoNet saves data to files, it uses a tabulator as a delimiter. The user can use an editor such as Windows Notepad or Microsoft Excel for creating text files to make the data files. It is recommended that the data files have the filename extension txt.

## APPENDIX B

Rosedi~1.txt

STRIKE	DIP
230	20
55	40
235	40
52	60
232	60
58	80
238	80
55	50
235	50
152	20
332	40
154	60
334	80
156	90

The file format for data is a tab delimited Text file. The first line is the title of the data set. The rest of the lines are data. These include two columns with strike and dip separated by one or more blank spaces or a tabulator. When StereoNet saves data to files, it uses a tabulator as a delimiter. The user can use an editor such as Windows Notepad or Microsoft Excel for creating text files to make the data files. It is recommended that the data files have the filename extension txt.