

SOFTWARE RELEASE NOTICE

1. SRN Number: 223		
2. Project Title: Yucca Mountain Repository Program		Project No. 20-01402-471
3. SRN Title: EarthVision 5.0.1		
4. Originator/Requestor: Darrell Sims		Date: August 21, 2000
5. Summary of Actions		
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Release of new software - Validation</li> <li><input type="checkbox"/> Release of modified software: <ul style="list-style-type: none"> <li><input type="checkbox"/> Enhancements made</li> <li><input type="checkbox"/> Corrections made</li> </ul> </li> <li><input type="checkbox"/> Change of access software</li> <li><input type="checkbox"/> Software Retirement</li> </ul>		
6. Persons Authorized Access		
Name	Read Only/Read-Write	Addition/Change/Delete
Brittain Hill	RO	A/C/D
David Farrell	RO	A/C/D
IMS staff	RO	A/C/D
CNWRA Staff	RO	A/C/D
7. Element Manager Approval: <i>[Signature]</i>		Date: 9/27/00
8. Remarks:  Commercial code purchased from Dynamic Graphics Inc.		



# MEMORANDUM

To: Bruce Mabrito

August 21, 2000

From: Darrell Sims



Subject: TOP-18 installation and acceptance testing of EarthVision 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), and design verification and release (TOP-18, 5.8–5.9) for commercial software not to be modified by CNWRA staff.

The EarthVision software is developed by Dynamic Graphics Inc. (DGI) for three-dimensional viewing of geologic information. EarthVision is a visualization program that is used by many government, industrial, and research agencies to display and manipulate geospatial data. Data sets are maintained in discrete files, where numerical attributes can be assigned geographic coordinates that reference common spatial coordinate systems. Data can be displayed directly as discrete points, or as interpolated surfaces or volumes.

EarthVision was installed on the Silicon Graphics ONYX II server, IRIX 6.5.8, by IMS staff. They reported a normal installation.

Functionality of EarthVision was confirmed by creating a simple data file consisting of discrete points lying on a dipping plane, interpolating a surface through the points, and displaying the plane as a 3D representation.

```
Data file: dipping_plane.dat
# Type: scattered data
# Version: 5
# Description: 45 degree dipping plane data (dsims, 21AUG2000)
# Format: free
# Field: 1 x
# Field: 2 y
# Field: 3 z meters
# Projection: Universal Transverse Mercator
# Zone: 12
# Units: meters
# Ellipsoid: GRS 1980
# End:
368000 4500000      0
369000 4500000     -1000
368000 4499000      0
369000 4499000     -1000
368000 4498000      0
369000 4498000     -1000
368000 4497000      0
369000 4497000     -1000
```

The interpolated plane with data points were plotted to the screen and the view saved to an image file. The image is shown below.

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

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

Software Title/Name: Earth Vision  
Version: 5.0.1  
Demonstration workstation: SGI Onyx II (Pluto)  
Operating System: IRIX 6.5  
Developer: Darrell Sims

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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: Not displayed  
Name and version: Earthvision 5.0.1 (on screen)

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: Earth Vision  
Module/Name/Title: ~  
Module Revision: 5.0.1  
File Type (ASCII, OBJ, EXE): EXE  
Recording Date: File Created 04/07/99  
Operating System of Supporting Hardware: IRIX 6.5

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: 9/13/00 5.0 (5 volumes + Appendix)

Notes: No disk, help files on-line

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

Yes:  No:  N/A:

Location of Instruction: User's Manual

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): Onyx II Server

Operating System(s): ILIX 6.5.8

Location of Test Results: Attached

Notes: See memo attached dated 8/21/00

**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: 08/21/00

Notes:

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

Yes:  No:  N/A:

Location Technical Description: User's Manual

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: Installation Disk

Notes:

**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: Sec CD

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): 09 101 100

Version number on SRN: 5.0.1

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: EMR Version 5.0.1 Aug. 21, 2000

Date reviewed and approved via QAP-002: Through QAP-002 9/19/2000

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: Sept. 19, 2000

Date reviewed and approved via QAP-002: Sept. 26, 2000

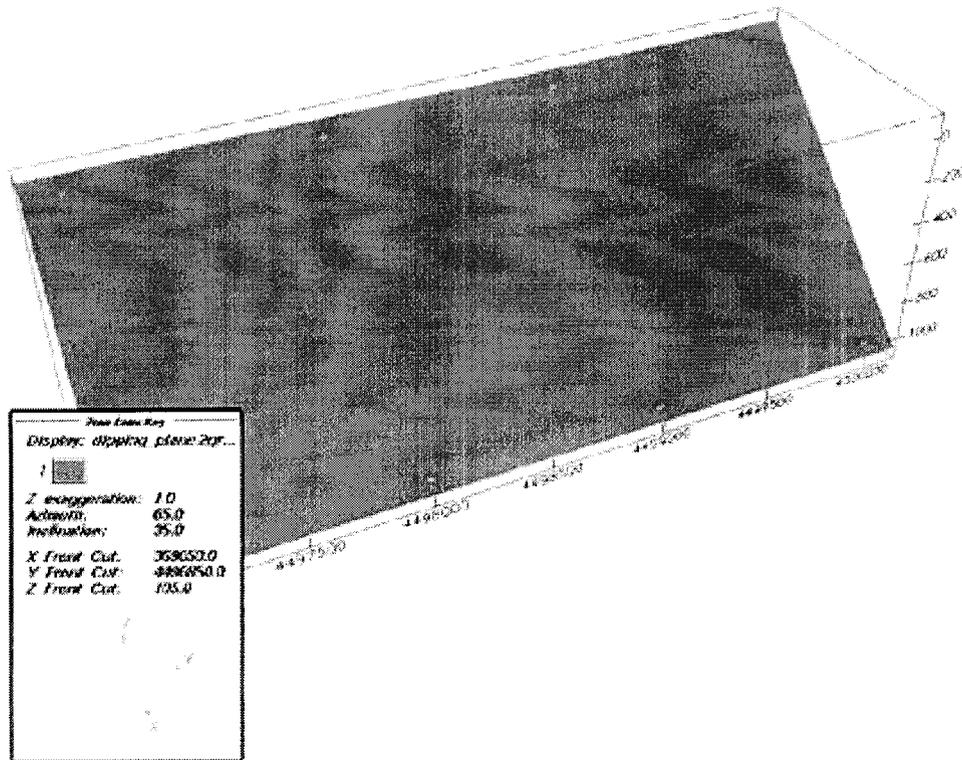
Notes:

Additional Remarks:

D. S. [Signature] 27 Sep 00  
CNWRA Software Developer/Date

[Signature] 9/27/2000  
CNWRA Software Custodian/Date

[Signature]  
9/27/2000



In addition to these tests, routine use of EarthVision by myself and Ron Martin throughout the past month has confirmed that the program is installed and operating correctly. Attached are completed forms TOP-4-1 (software summary form) and TOP-6 (software release notice). Included also are copies of the EarthVision installation and program CDs for UNIX, thus meeting all requirements of TOP-18 5.6-5.9.

**Software Validation Test Plan for EarthVision Version 5.0.1**  
**Darrell Sims, August 21, 2000**

This report documents methods used to demonstrate compliance with TOP-18 requirements for a software validation test plan (TOP-18, rev 7), for commercial software not to be modified by CNWRA staff.

The EarthVision software is developed by Dynamic Graphics Inc. (DGI) for three-dimensional viewing and modeling of geologic information. EarthVision is a visualization program that is used by many government, industrial, and research agencies to display and manipulate geospatial data. Data sets are maintained in discrete files, where numerical attributes can be assigned geographic coordinates that reference common spatial coordinate systems. Data can be displayed directly as discrete points, or as interpolated surfaces.

**Software Validation Test Plan** (TOP-18, rev 7). To ensure that the EarthVision program is correctly displaying geospatial relationships for digital geologic data, which is the primary function of the software, we propose the following validation test:

- a) Create a data file of discrete points with known coordinates (universal transverse mercator), representing a dipping plane that is analogous to a dipping fault plane.
- b) Use EarthVision to interpolate a planar surface through the points.
- c) Use EarthVision to display a three-dimensional representation of the plane.
- d) Use EarthVision to overlay the original point file with the newly calculated dipping plane in the three-dimensional representation, and compare the location of the point data with the interpolated plane. The point data should appear on or very near the plane if the plane orientation, location and attitude are a geologically-reasonable interpolation.
- e) Document the results of these tests, including copies of relevant input and output files. If the EarthVision software passes these tests, provide copies of data used for the tests to QA records and make positive finding in test report.

  
H. Lawrence McKague

09/15/00  
Date

**Software Validation Test Report for EarthVision Version 5.0.1**  
**Darrell Sims, September 19, 2000**

This report documents methods used to demonstrate compliance with TOP-18 requirements for software validation (TOP-18, rev 7), for commercial software not to be modified by CNWRA staff.

The EarthVision software is developed by Dynamic Graphics Inc. (DGI) for three-dimensional viewing and modeling of geologic information. EarthVision is a visualization program that is used by many government, industrial, and research agencies to display and manipulate geospatial data in three dimensions. Data sets are maintained in discrete files, where numerical attributes can be assigned geographic coordinates that reference common spatial coordinate systems. Data can be displayed directly as discrete points, or as interpolated surfaces.

**Software Validation Test** (TOP-18, rev 7). To ensure that the EarthVision program is correctly displaying geospatial relationships for digital geologic data, which is the primary function of the software, we conducted the following validation test:

- a) Create a data file of discrete points with known coordinates (universal transverse mercator), representing a dipping plane that is analogous to a dipping fault plane.

Results: The following data file describes a plane striking north-south and dipping 45° to the east:

```
Data file: dipping_plane.dat
# Type: scattered data
# Version: 5
# Description: 45 degree dipping plane data (dsims, 19SEP2000)
# Format: free
# Field: 1 x
# Field: 2 y
# Field: 3 z meters
# Projection: Universal Transverse Mercator
# Zone: 12
# Units: meters
# Ellipsoid: GRS 1980
# End:
368000 4500000      0
369000 4500000    -1000
368000 4499000      0
369000 4499000    -1000
368000 4498000      0
369000 4498000    -1000
368000 4497000      0
369000 4497000    -1000
```

b) Use EarthVision to interpolate a planar surface through the points.

Results: Execution of the following command created dipping\_plane.2grd for viewing:

```
#!/bin/sh -e
```

```
FEATURE=ev-gmx/svp
```

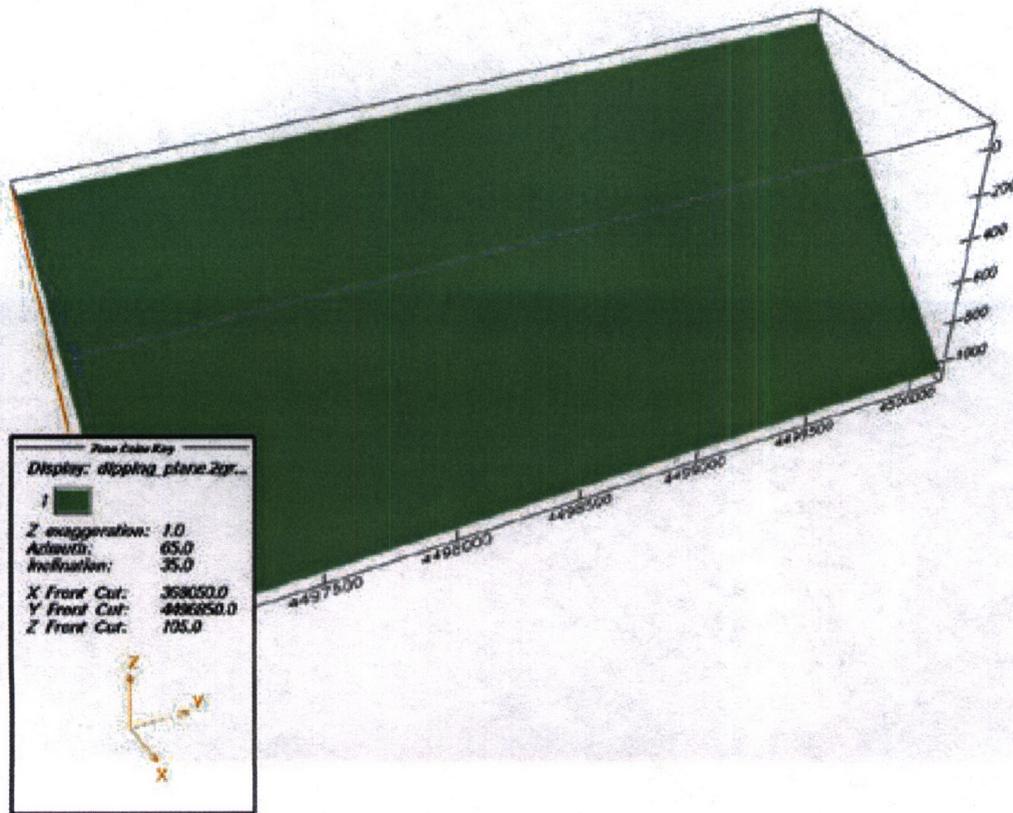
```
ev_2trend -o dipping_plane.2grd -F $FEATURE -r
```

```
'367950.000000,369050.000000,4496850.000000,4500150.000000' -s 22,22 -d dipping_plane.dat -f 'z' -e
```

```
1 -G dipping_plane.2grpt -z -1000.000000,0.000000
```

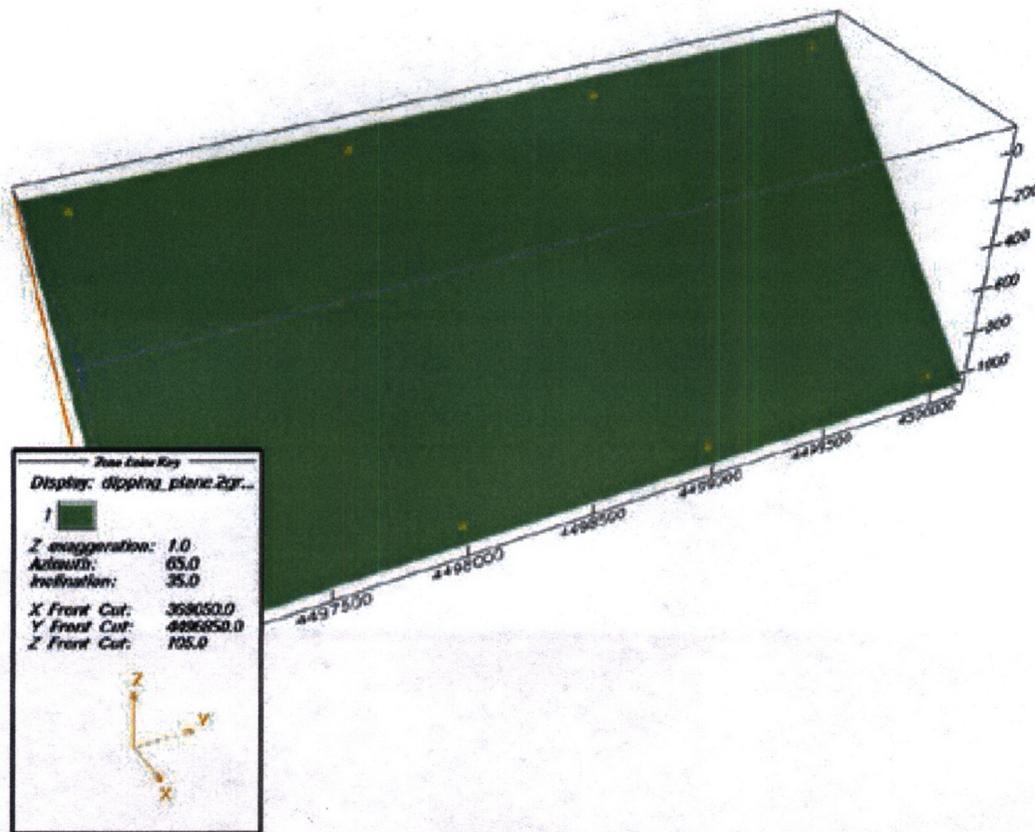
c) Use EarthVision to display a three-dimensional representation of the plane.

Result: The plane is displayed using the EarthVision viewer: A screen capture is displayed below:



The axes represent north (Y), east (X), and elevation (Z).

- d) Use EarthVision to overlay the original point file with the newly calculated dipping plane in the three-dimensional representation, and compare the location of the point data with the interpolated plane. The point data should appear on or very near the plane if the plane orientation, location, and attitude are a geologically-reasonable interpolation.



Each step in the Software Validation Test Plan as described for EarthVision 5.0.1 was successfully completed. EarthVision 5.01 is validated under the requirements of TOP-18, rev 7.