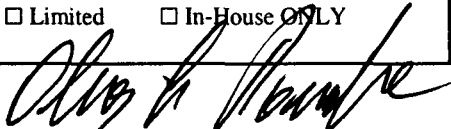



SOFTWARE RELEASE NOTICE

1. SRN Number: PA-SRN-238		
2. Project Title: General use package for high-level waste, low-level waste, and decommissioning projects		Project No. General use
3. SRN Title: STELLA, Version 6.0.1		
4. Originator/Requestor: Oleg Povetko		Date: 2/27/2001
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 checked="" type="checkbox"/> Software Retirement		
6. Persons Authorized Access		
Name	Read Only/Read-Write	Addition/Change/Delete
Oleg Povetko	Read Only	Addition
Michael Smith	Read Only	Addition
Plus other CNWRA staff	Read Only	Addition
7. Element Manager Approval: <i>[Signature]</i>		Date: 3/6/2001
8. Remarks: <i>[Signature]</i> 5/4/2001 <i>(Signature for retirement)</i> 1/21/2004		

SOFTWARE SUMMARY FORM

01. Summary Date: February 27, 2001	02. Summary prepared by (Name and phone) Oleg Povetko (210) 522-5258	03. Summary Action: Installation testing for STELLA version 6.0.1 code	
04. Software Date: 2000	05. Short Title: STELLA		
06. Software Title: STELLA version 6.0.1		07. Internal Software ID: None	
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: CNWRA/SwRI 6220 Culebra Road San Antonio, TX 78228		12. Technical Contact(s) and Phone: Oleg Povetko (CNWRA) (210) 522-5258	
13. Software Application: STELLA is a modeling environment controlled by a graphical use interface for simulating of various dynamic processes.			
14. Computer Platform : Windows-based personal computer	15. Computer Operating System: Windows NT, Windows 95 to Windows 2000.	16. Programming Language(s): N/A	17. Number of Source Program Statements: N/A
18. Computer Memory Requirements: Minimum 4 Mbytes	19. Tape Drives: N/A	20. Disk Units: Minimum 20 Mbytes	21. Graphics: Windows-based Minimum VGA graphics card
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 type="checkbox"/> Available <input type="checkbox"/> Preliminary <input type="checkbox"/> In-House ONLY	
25.  5/3/2001  Software Developer: <u>High Performance Systems</u> Date: <u>N/A</u> <u>Hamover, NH</u>			

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

ACQUIRED CODE - NOT TO BE MODIFIED¹

Software Title/Name: Stella
Version: 6.0.1
Demonstration workstation: PCs
Operating System: Windows NT, 95, 2000
Developer: High Performance Systems

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: Stella

Module/Name/Title: N/A

Module Revision: 6.0.1

File Type (ASCII, OBJ, EXE): Exe.

Recording Date: Copies made for QA Records New 2/13/2001 & 2/15/2001

Operating System of Supporting Hardware: Windows NT, 95, 2000

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

¹ 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: N/A

Notes:

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

Yes: ☒ No: ☐ N/A: ☐

Location of Instruction: Controlled By Oleg Lewetho - in Room 128,
Notes: Help Files on The CD Bldg 189 currently.

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): P.C. - "Paladin" in Room A128, Bldg 189.

Operating System(s): Windows NT and Windows 95

Location of Test Results: QA Records Room

Notes: Installation Test on diskette, 2/15/2001

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: 3 May 2001

Notes:

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

Yes: ☐ No: ☒ N/A: ☐

Location Technical Description: _____

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: QA Records Room

Notes: Executable only available.

**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: QA Records Room

Notes: Some examples have been provided in this folder

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 1st issue): 6.0.1

Version number on SRN: 238

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: _____

Notes:

Additional Remarks:

High Performance Systems
Hamden, NH

CNWRA Software Developer/Date

James Malin 5/3/2001
CNWRA Software Custodian/Date

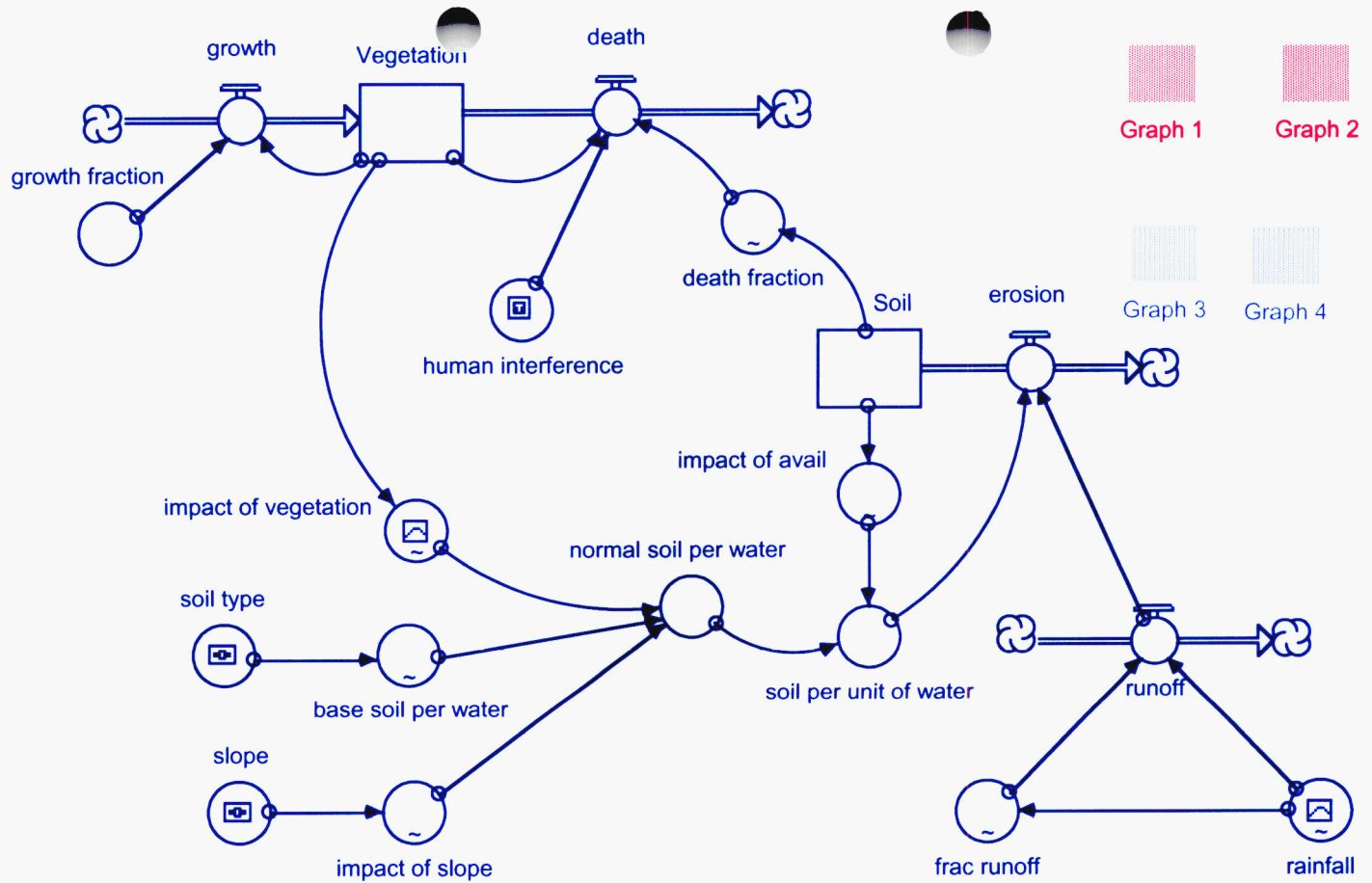
[Signature]

TO: Bruce Mabrito
FROM: Oleg Povetko
SUBJECT: TOP-018 for STELLA
DATE: February 15, 2001

STELLA version 6.0.1 code was designed for model model building and simulations with highly interactive user interface. It was acquired from High Performance Systems, Inc., 45 Lyme Road, Suite 300, Hanover, NH 03755-1221. Phones: (800) 332-1202, (603) 643-9636. Fax: (603) 643-9502. E-mails for technical and general support: support@hps-inc.com ; for workshop info: workshops@hps-inc.com .

The sample problem included the following:

Input file:	Description:
Soilloss1.stm	<p>Model of an upper soil loss due to erosion. Parameters included soil type, slope type, rainfall, runoff, amount of soil per unit of water volume, vegetation growth and death fractions, human interference in vegetation growth and others. Parameters were entered as constants, as analytical expressions or in graphical form, all in arbitrary units. Based on visual inspection of output plots and tables, variation of input parameters produced reasonable changes in output. The file Soilloss1.stm contains input and output data, some input and output data were stored as separate image and text files on the attached diskette: Diagram_soilloss1.pct, Interface_soilloss1.pct, Graph_1.pct, Graph_2.pct, Equations_soilloss1.txt.</p> <p>Attached: 1 cdrom, STELLA version 6.0.1 Research software 1 diskette, installation test results</p>



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From test run:

STELLA 6.0.1 IN: SOILLOSS1.STM
 STELLA 6.0.1 OUT: DIAGRAM_SOILLOSS1.PCT
 OR
 SOILLOSS1.STM

☐ $\text{Soil}(t) = \text{Soil}(t - dt) + (- \text{erosion}) \cdot dt$

INIT Soil = 300

OUTFLOWS:

☒ $\text{erosion} = \text{runoff} \cdot \text{soil_per_unit_of_water}$

☐ $\text{Vegetation}(t) = \text{Vegetation}(t - dt) + (\text{growth} - \text{death}) \cdot dt$

INIT Vegetation = 250

INFLOWS:

☒ $\text{growth} = \text{Vegetation} \cdot \text{growth_fraction}$

OUTFLOWS:

☒ $\text{death} = \text{Vegetation} \cdot \text{death_fraction} + \text{PULSE}(\text{Vegetation} \cdot .3, 6, 1000) \cdot \text{human_interference}$

UNATTACHED:

☒ $\text{runoff} = \text{rainfall} \cdot \text{frac_runoff}$

☐ $\text{growth_fraction} = .3$

☐ $\text{human_interference} = 1$

☐ $\text{normal_soil_per_water} = \text{base_soil_per_water} \cdot \text{impact_of_slope} \cdot \text{impact_of_vegetation}$

☐ $\text{slope} = 20$

☐ $\text{soil_per_unit_of_water} = \text{impact_of_avail} \cdot \text{normal_soil_per_water}$

☐ $\text{soil_type} = 5$

☒ $\text{base_soil_per_water} = \text{GRAPH}(\text{soil_type})$

(1.00, 0.0546), (2.00, 0.262), (3.00, 0.42), (4.00, 0.588), (5.00, 1.00), (6.00, 1.28), (7.00, 1.50), (8.00, 1.60), (9.00, 1.73), (10.0, 1.90)

☒ $\text{death_fraction} = \text{GRAPH}(\text{Soil})$

(0.00, 1.11), (30.0, 1.06), (60.0, 1.03), (90.0, 0.98), (120, 0.93), (150, 0.83), (180, 0.75), (210, 0.67), (240, 0.58), (270, 0.45), (300, 0.3)

☒ $\text{frac_runoff} = \text{GRAPH}(\text{rainfall})$

(0.00, 0.00), (1.00, 0.08), (2.00, 0.14), (3.00, 0.235), (4.00, 0.345), (5.00, 0.45), (6.00, 0.575), (7.00, 0.72), (8.00, 0.78), (9.00, 0.8), (10.0, 0.795)

☒ $\text{impact_of_avail} = \text{GRAPH}(\text{Soil}/\text{INIT}(\text{Soil}))$

(0.00, 0.09), (0.1, 0.65), (0.2, 0.795), (0.3, 0.885), (0.4, 0.955), (0.5, 1.00), (0.6, 1.00), (0.7, 1.00), (0.8, 1.00), (0.9, 1.00), (1, 1.00)

☒ $\text{impact_of_slope} = \text{GRAPH}(\text{slope})$

(0.00, 0.025), (4.00, 0.26), (8.00, 0.41), (12.0, 0.62), (16.0, 0.76), (20.0, 1.00), (24.0, 1.15), (28.0, 1.35), (32.0, 1.53), (36.0, 1.78), (40.0, 2.00)

☒ $\text{impact_of_vegetation} = \text{GRAPH}(\text{Vegetation})$

(0.00, 2.63), (50.0, 2.38), (100, 1.95), (150, 1.65), (200, 1.38), (250, 1.20), (300, 0.9), (350, 0.6), (400, 0.3), (450, 0.00), (500, 0.00)

☒ $\text{rainfall} = \text{GRAPH}(\text{COUNTER}(1, 12))$

(1.00, 7.85), (1.92, 6.95), (2.83, 6.30), (3.75, 5.25), (4.67, 4.00), (5.58, 4.05), (6.50, 4.65), (7.42, 4.25), (8.33, 1.30), (9.25, 2.05), (10.2, 0.85), (11.1, 1.90), (12.0, 1.90)

From test run:

STELLA 6.0.1 IN: SOILLOSS1.STM

STELLA 6.0.1 OUT: EQUATIONS_SOILLOSS1.TXT
SOILLOSS4.STM

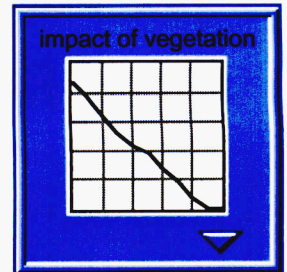
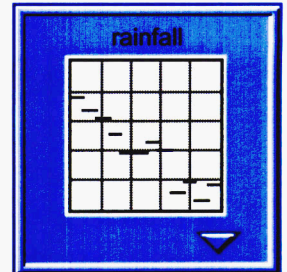
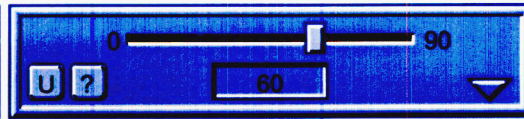
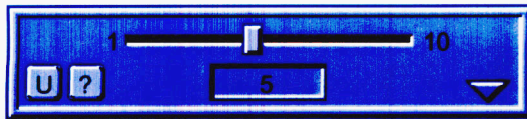


By clicking on this switch, you can see the result of a one-time 30% decrease in the stock of Vegetation in month 6.

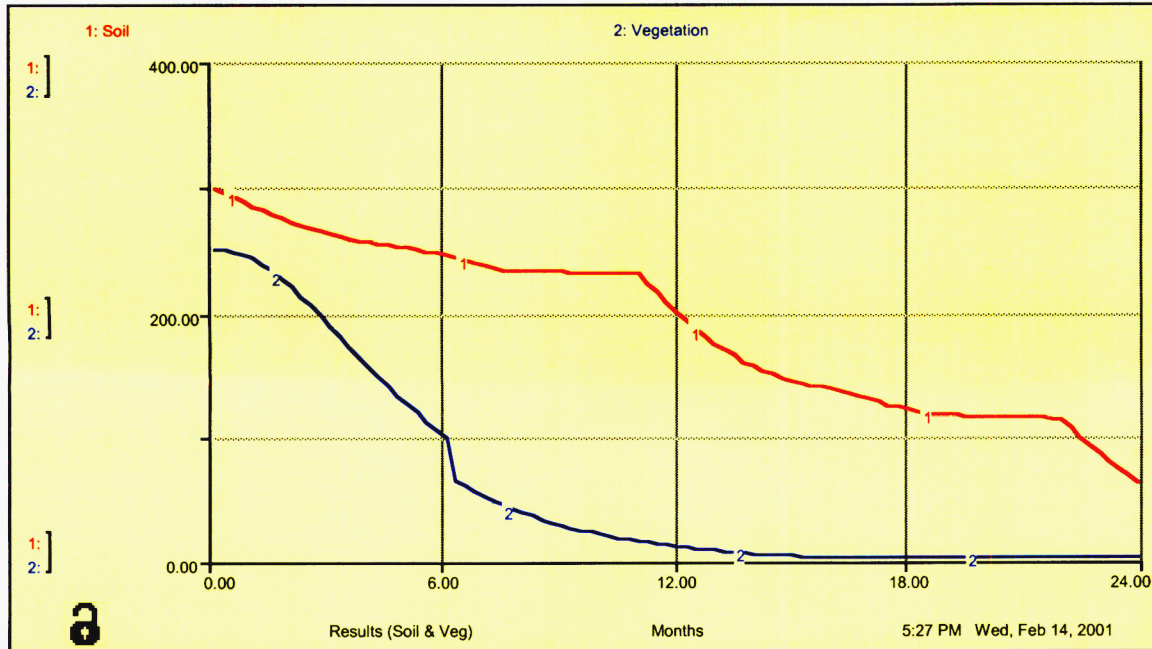
Here you have the opportunity to experiment with soil type, slope of the land and human interference by changing the values of the sliders to the left. Simply move the sliders to change the values. You can also modify rainfall trends and impact of vegetation which are represented by graphical input

soil type

slope



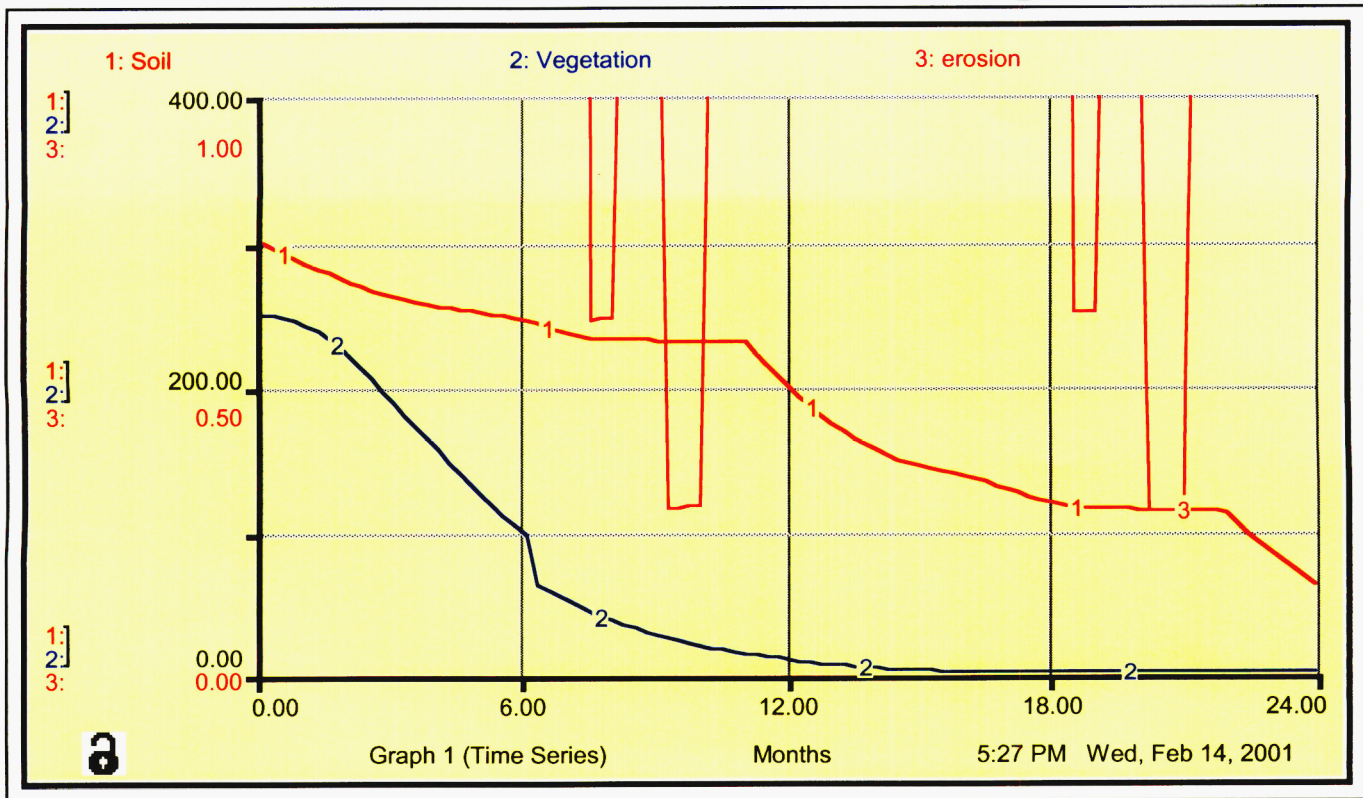
Trace Loops



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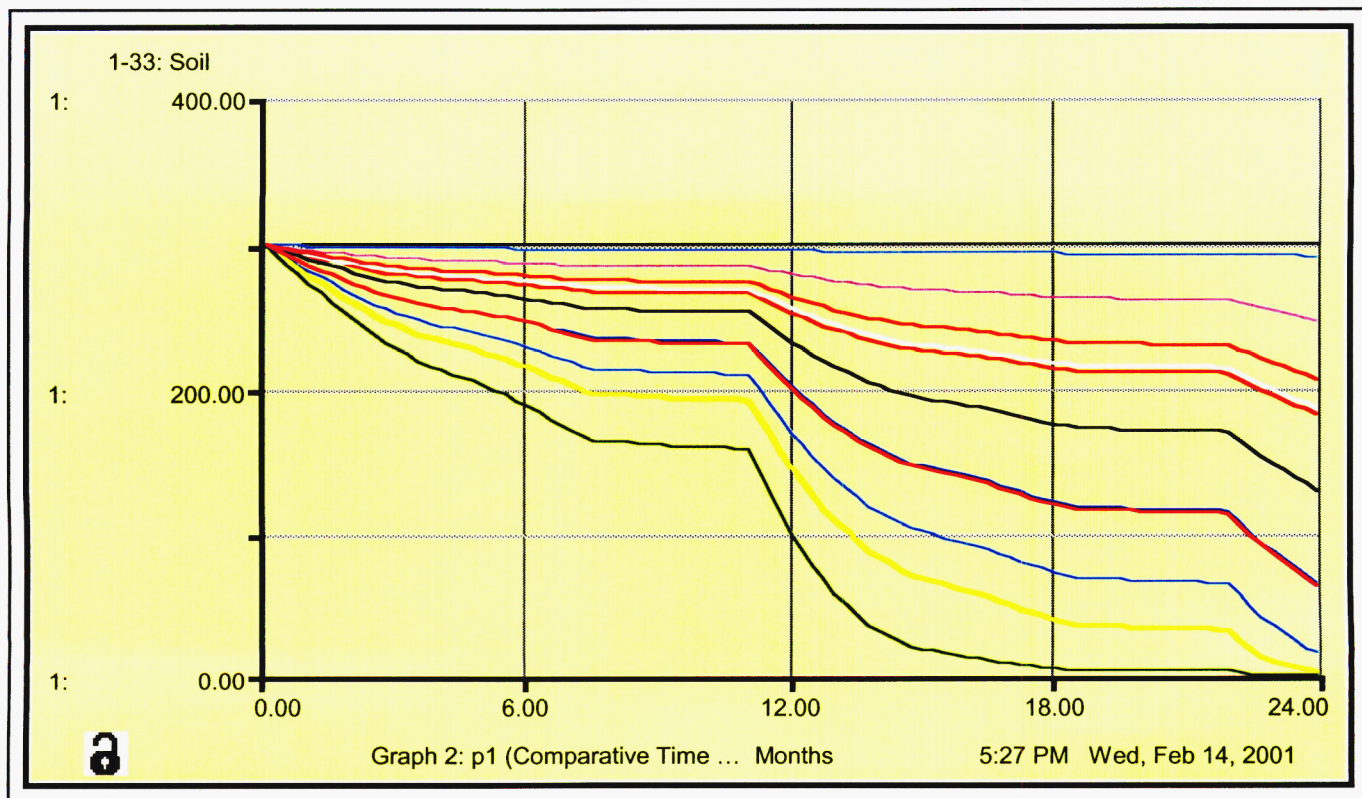
From test run:

STELLA 6.0.1. IN: SOILLOSS1.STM
STELLA 6.0.1 OUT: ~~THE~~ INTERFACE-SOILLOSS1.PCT
02
SOILLOSS1.STM



From test run:

STELLA G.D.1 IN: SOILLOSS1.STM
 STELLA G.D.1 OUT: GRAPH1.PCT
 02
 SOILLOSS1.STM



From test run:

STELLA G.O. 1 IN: SOILLOSS1.STM
 STELLA G.O. 1 OUT: GRAPH2.PCT
 02
 SOILLOSS1.STM