#### CENTER FOR LUCLEAR WASTE REGULAL DRY ANALYSES NONCONFORMANCE REPORT 1 of 18

**Project No.** 20.01402.562

NCR No. 2000-10

#### PART 1: DESCRIPTION OF NONCONFORMANCE

MULTIFLO acceptance testing (i.e., benchmark method) of release 1.2 was performed as documented in multiple scientific notebooks over a period of approximately 2 years. Testing just prior to release was performed and witnessed by QA; however, no evidence (e.g., notes in scientific notebooks, annotations on Design Verification Report) was Initiated by: Donald W. Dunavant **Date:** 07/10/2000

Action Required by: Gordon Wittmeyer

Response by: 7/24/2000 PART 2: PROPOSED DISPOSITION AND CORRECTIVE ACTION

Disposition: Accept MULTIFLO Version 1.2 as is. Re-work the Design Verification Report for the release fo MULTIFLO Version 1.2.

Basis of Disposition: The acceptance tests were conducted and the files for the acceptance test are recorded on the CD-ROM included with the MULTIFLO Version 1.2 QA record. Review of the test results indicate that the MULTIFLO Version 1.2 code functions properly. The Design Verification Report can be re-worked because the results of acceptance testing exist.

Action to Correct Nonconformance: References will be added to the Design Verification Report indicating the physical location of the acceptance test results. In addition, a "README" file and a memorandum will be prepared that describe the input and output files comprising the acceptance test. To prevent recurrence, the template used by the software custodian for design verification will be revised to require reference to the location of the acceptance test results.  $\lesssim ?$ 

Gordon Wittmeyez Proposed by:

Target date for completion: 08/21/2000

PART 3: APPROVAL

Element Manager:

07/18/2000

Director of OA:

Date:

Comments/Instructions:

**PART 4: CLOSE OUT** 

Comments: DVR form has been changed

to identify location of acceptance test usults "Readme" liles and memorandum how leen generated that describe input and output

Verified by:✓

Distribution:

Original-CENTER QA DIRECTOR QA Records ORIGINATOR

PRINCIPAL INVESTIGATORS

**ELEMENT MANAGERS** 

B. Sagar, H. Garcia

\* available to support successful test results or QA observations. NoTE: Major Revision To The Design Verification Report form was mode following Andit 2000-01. The DVR form has been used several times since and it appears conver form QAP 9-1 The revised form is superior in several ways to the earlier form.

See Mahillo QA 2/9/2001.

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#### CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

#### CORRECTIVE ACTION REQUEST

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CAR No: 2000-04		Associated AR, SR, NCR No: Audit 2000-1
PART A: DESCRIPTION	ON OF CONDITION ADVERSE TO QUALITY: Soft	ware Control
Not all requirements of Topara 5.5.5, the requirement formally documented.	OP-018 are being complied with, such as: para 5.5.2, chat for code review is not being determined by the Eleme	nanges/modifications to MULTIFLO are not being updated to be compliant; not Manager; para 5.6.2, acceptance testing for MULTIFLO/TPA has not been
Initiated by: D.W. Dunay	vant DWP	Date: 06/30/00
PART B: PROPOSED A	ACTION	Responsible Individual: Response Due:
1) Extent of Condition:	UPOH FURTHER INTERVIEWS	S WITH EM JPI 15 WAS
2) Root Cause:	BEING COMPLUED WITH TI	TWO DEFICIENCIES CITED WERE  HIS CAR IS RESCINDED AND  HG DOCUMENTED ON CHURA  INDUST  THAN LLOCK
3) Remedial Action:	7/10/00	Proposed Completion Date:
4) Corrective Action to I		Proposed Completion Date:
Element Manager:	1	Date:
PART C: APPROVAL Comments/Instructions		
Director of QA:		Date:
PART D: VERIFICATION	ON OF CORRECTIVE ACTION IMPLEMENTATION	ON Distribution: Original-CNWRA/QA DIRECTOR QA Records ORIGINATOR PRINCIPAL INVESTIGATORS ELEMENT MANAGERS TECHNICAL DIRECTOR CNWRA PRESIDENT
Verified by:	Date:	

Verified by:

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## CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES 3 66 18

MEMORANDUM

July 20, 2000

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TO:

Bruce Mabrito

FROM:

Scott Painter Scotle

SUBJECT: NCR 2000-10: Acceptance testing for MULTIFLO V1.2

This memo addresses the NCR 2000-10: Acceptance testing for Multiflo V1.2. Please note that

- 1. acceptance testing was performed at the time of release for both Versions 1.2 and 1.2.1,
- 2. input and output files for these tests were submitted to QA records with the source code,
- 3. the final acceptance testing was witnessed by QA personnel when the Design Verification Reports were completed,
- 4. and the simulation used for the acceptance test is described in scientific notebook 282, Vol 3 (Pg 13 in the entry dated 2.23.99).

The basis for the NCR is that the final acceptance testing was not noted in scientific notebook 282.

To address this NCR, I have made the following entry into scientific notebook 282, Vol 7, pg 6:

#### 7.20.00 Acceptance Testing for V1.2. and V1.2.1

Final acceptance testing performed was performed at the time of release of Versions 1.2 and 1.2.1. The simulation is a one-dimensional version of the one described in Scientific Notebook 282 Vol 3, Pg 13, entry dated 2.23.99. This simulation is of a dual-permeability, non-isothermal, fully coupled, thermal-hydrological-chemical system. It tests all major new capabilities added in Version 1.2. Both Versions of the code ran this simulation to completion. The input and output files are in QA records with the source code in the directory "mflo1.2/runs/". To execute the test problem, one would type at the command line multiflo VAld dcml as described in the MULTIFLO User's Guide.

cc: W. Patrick

- B. Sagar
- E. Pearcy
- G. Wittmeyer

# CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES DESIGN VERIFICATION REPORT FOR CNUMBA SOCIETY

#### ACQUIRED CODE - NOT TO BE MODIFIED $^1$

Software Title/Name:				
Version:				
Demonstration workstation:				
Operating System:				
Developer:				
1. Output: TOP-018, Section 5.5.4 Software designed so that individua	l runs are uni	guely i	dentified by D	ate, Time,
Name of software and version?				_
Date and time of run:				
Name and version:				
Notes: Acquired co				
2. Medium an'd Header Documenta	ation: TOP-01	.8, Sect	tion 5.5.6	
The physical labeling of software med	lium (tapes, dis	sks, etc	.) contain requir	red
information?	Yes:		No:	N/A:
Program Name:				
Module/Name/Title:				
Module Revision:				
File Type (ASCII, OBJ, EXE):				
Recording Date:				
Operating System of Supporting Hardware:				
Notes: Acquired code that is elements.	not to be modi	fied ma	ny not have all a	bove

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

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## 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:						
	Notes:						
b)	Are there basic instructions for the use of t	he soft Yes:		No:		N/A:	
	Location of Instruction:						
	Notes:						
4. a)	Acceptance Testing: TOP-018, Section 5 Has installation testing been conducted operating system?		ch inter	nded c	omputer	platform	and
	Platform(s):						
	Operating System(s):						
L	ocation of Test Results:						
	Notes:						
5.	Configuration Control: TOP-018, Section	on 5.7					
a)	Is the Software Summary Form completed		gned?	No:		N/A:	
	Software Summary Form Approval Date: _					·	
	Notes:						
b)	Is a software technical description prepare and numerical basis?	ed, doc	umentii	ng the	essentia	l mathem	atical
	and numerious outsis.	Yes:		No:		<b>N/A</b> :	
	Location Technical Description:						
	Notes:					v	
c)	Is the source code available (or, is the (acquired/commercial codes)?	execut	table co	ode av	ailable	in the ca	se of
		Yes:		No:		N/A:	
	Location of Source Code:						
	Notes:						•

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

6.	Configuration Control, continued: TO	P-018,	Section	5.7	
	we all the script/make files and execut stodian?	able fil	es been	n submitted	to the Software
		Yes:		No:	N/A:
	Location of Script/Make Files:				
	Notes:				
7.	Software Release: TOP-018, Section 5.	9			
	on acceptance of the software as verified OP-6 been issued?	above,	has a S	Software rele	ease Notice, Form
			_	No:	<del></del>
	Version number on software (1.0 for 1st i	ssue): _			
	Version number on	SRN: _			
	Notes:				
8.	Software Validation: TOP-018, Section	n 5.10			
a)	Has a Software Validation Test Plan application of the software?	(SVTF	P) been	prepared	for the range of
				No:	
	Version/Date of SV				
	Date reviewed and approved via QAP-0	02:			
	Notes:				<b>ĕ</b>
b)	Has a Software Validation Test Report results of the validation cases, interpreta software has been validated?	•	•		
		Yes:		No:	N/A:
	Version/Date of SVT	TR:			
	Date reviewed and approved via QAP-0	02:		1	`
	Notes:				
Ad	ditional Remarks:				į
CN	WRA Software Developer/Date	CNW	RA Sof	tware Custo	odian/Date

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

#### DEVELOPED SOFTWARE<sup>1</sup>

S	Software Title/Name:						
	Version:						
	Demonstration						
	Operating System:						
	Developer:						
					<del>-</del>	e Wind School Control Control	
1.	Software Requirement	nts Description	: TOP-018	, Sectio	on 5.3		
	ftware Requirements D cordance with QAP-002		) and any o			ved in N/A:	П
	SRD Version:		103.	<u> </u>	110.	14/11.	ш
	SRD Approval Date:						
	Notes:						
2.	Software Developme	nt Plan (SDP):	TOP-018,	Section	ı 5.4	ŧ	
a)	The Element Manager	has approved th	ne SDP and Yes:	l any ch	anges?	N/A:	
b)	The SDP addresses ap Development Plan Ter		of TOP-01	8, App	endix B, Softw	vare	
	Development Flan Tel	inprate:	Yes:		No:	N/A:	
	SDP Version:					4	
	SDP Approval Date:						
	Notes:						

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

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3.	Design and Developm	ent: TOP-018	8, Section 5	.5.1, 5.5	5.2	
a)	Is development and mo notebooks and/or in So			SCR)?	umented either	r in scientific
	Scientific Notebook(s	):				
	SCR Number(s					
	Note					
b)	Is development and mo an informed reviewer c		testing proc			nented so that
	Notes:					
c)	Is development in according convention?  Notes:	ordance with	the convent Yes:		No:	SDP/SCR, i.e.
So	Internal Documentation of the Internal	ented to allow	a user to ur	nderstar liv <u>id</u> ual		(s) Being
Ţ	Module(s) Reviewed:				_	10/11.
	Notes:				1	4
5.	Output: TOP-018, Sec	ction 5.5.4				
	ftware designed so that iftware and version?	ndividual run	s are unique	ly ident	rified by Date,	Time, Name of
			Yes:		No:	N/A:
	Date and time of run:	<u>.</u>			· · · · · · · · · · · · · · · · · · ·	ţ.
	Name and version:					
	Notes:					

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6.	Code Reviews: TOP-	018, Section 5.5.5
		emented) documented in a scientific notebook or in another to understand the code review process and results?
		Yes: No: No: N/A:
	Scientific Notebook: _	
		Acquired code that is not to be modified is accepted as is. No code reviews required.
7.	Medium and Header	Documentation: TOP-018, Section 5.5.6
a)	Program title block of	main program contains required information?  Yes: No: N/A:
	Program	Title:
		Jame:
		ision:
		ect(s):
	Customer Phone Nur	mber:
		ation:
	Disclaimer No	otice:
	Notes:	
b)		eader contains required information provides Program Name, Reference, Revision Number, and Revision History? Yes: No: No: N/A:
	Module Reviewed:	
	Notes:	4

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7. Medium and Header Documentation,	continue	d: TO	P-018,	Section	5.5.6	
c) The physical labeling of software medius information?	ım (tapes,	disks,	etc.) co	ontain rec	quired	
	Yes:		No:		N/A:	
Program Name:	· • • • • • • • • • • • • • • • • • • •					
Module/Name/Title:						
Module Revision:						
File Type (ASCII, OBJ, EXE):						
Recording Date:						
Operating System of Supporting Hardware:						
Notes:						
8. User's Manual: TOP-018, Section 5.5.	.5					
a) Is there a Users' Manual for the software		$\Box$	<b>3</b> .T	<del></del> 1	<b>3</b> .T/A.	
77 1 37 1 17 1 17 1	Yes:		No:		N/A:	
User's Manual Version and Date:						
Notes:						
b) Are there basic instructions for the use of	of the soft Yes:		No:		N/A:	
Location of Instruction:						
Notes:						
9. Acceptance Testing: TOP-018, Section	n 5.6					
a) Does the acceptance testing demonstra		er or n	ot req	uirement	s in the	SRD
and/or SCR have been fulfilled?	Yes:	П	No:		N/A:	
Location of Test Results:					- 11	
Notes:						

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<ul><li>9. Acceptance Testing, continued: TOP-018, Section 5.6</li><li>b) Has acceptance testing been conducted for each intended computer platform and</li></ul>								and
- ,	operating system?						-	
			Yes:		No:		<b>N/A</b> :	
	Platform(s):							
	Operating System(s):							
L	ocation of Test Results:							
	Notes:							
c)	Has installation testing operating system?	been conducted		ch inter		_	platform N/A:	
	Platform(s):							
	Operating System(s):							
L	ocation of Test Results:							
	Notes:							
10.	. Configuration Control	: TOP-018, Secti	on 5.7					
a)	Is the Software Summar	y Form completed		gned?	No:		N/A:	
	Software Summary Form	Approval Date:					}	
	Notes:							•
b)	Is a software technical of and numerical basis?	lescription prepar	ed, doc	umentir	ng the	essential	mathem	atical
			Yes:		No:		N/A:	
	Location Technica	l Description:						
	Notes:						4	
c)	Is the source code ava (acquired/commercial co							se of
	I anation of	Sauras Cada:					N/A:	
		Source Code:						
	Notes:							t

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11. Configuration Control, continued: TOP-018	, S	Section	<b>5.</b> 7			
d) Have all the script/make files and executable Custodian?	fi	les bee	n subr	nitted to	o the Sof	tware
	<b>S</b> :		No:		N/A:	
Location of Script/Make Files:						
Notes:						
12. Software Release: TOP-018, Section 5.9						
Upon acceptance of the software as verified above TOP-6 been issued?	e, 1	has a S	oftwar	e releas	e Notice,	Form
	3:		No:		N/A:	
Version number on software (1.0 for 1st issue):	_					
Version number on SRN:						
Notes:						
12 Saftware Validations TOD 019 Section 5 10						
13. Software Validation: TOP-018, Section 5.10	- ·			1.0	. •	c
a) Has a Software Validation Test Plan (SVI application of the software?	. <b>P</b>	) been	prepa	red for	the rang	ge of
	<b>S</b> :		No:		N/A:	
Version/Date of SVTP:						
Date reviewed and approved via QAP-002:						
Notes:					ğ	
b) Has a Software Validation Test Report (SVT results of the validation cases, interpretation configurate has been validated?	-					
Yes	<b>S</b> :		No:		N/A:	
Version/Date of SVTR:						
Date reviewed and approved via QAP-002:						
Notes:						
Additional Remarks:						
						t
CNWRA Software Developer/Date CNV	VF	RA Soft	ware (	Custodi	an/Date	-

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

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#### **ACQUIRED CODE - TO BE MODIFIED<sup>1</sup>**

Software Title/Name:							
Version:							
Demonstration workstation:							
Operating System:			····				
Developer:							
1. Software Requirements Description: TOP-018, Section 5.3							
Software Requirements I		d any changes	thereto reviewe	ed in			
accordance with QAP-00	2 requirements?	Yes:	No:	N/A:	$\boxtimes$		
SRD Version:	N/A						
SRD Approval Date:	N/A						
Notes:	Acquired code that i	s to be modifi	ed may use an	SCR.			
2. Software Developme	ent Plan (SDP): TOF	P-018, Section	5.4				
a) The Element Manage	r has approved the SI	OP and any char	anges? No: 🗌	N/A:			
b) The SDP addresses ap Development Plan Te	• •	OP-018, Appe	endix B, Softwa	are			
_ • • • • • • • • • • • • • • • • • • •	<b></b>	Yes:	No:	N/A:			
SDP Version:							
SDP Approval Date:				4			
Notes:	Acquired code that i	s to be modifi	ed may use an	SCR.			

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

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#### DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE ACQUIRED CODE - TO BE MODIFIED

3.	Design and Development	t: TOP-0	18, Sect	ion 5.	5.1, 5.	5.2			
a)	Is development and modul notebooks and/or in Softw				C <u>R)</u> ?	eumente No:	d either	r in scienti N/A:	fic
	Scientific Notebook(s):								
	SCR Number(s):								
	Notes:								
b)	Is development and modulan informed reviewer can			g proc		and log	ic?	nented so	that
	Notes:								
c)	Is development in accord coding convention?  Notes:	ance with	the co	Yes:	_	escribed No:		SDP/SCE N/A:	R, i.e.
So	Internal Documentations ftware internally document rformed and to follow the fl	ed to allo	w a use	r to un	derstar			(s) being	
•				Yes:		No:		N/A:	
]	Module(s) Reviewed:								
	Notes:			, ,		s		· · · · · ·	
5.	Output: TOP-018, Section	on 5.5.4							
	ftware designed so that inditional ftware and version?	ividual ru	ns are u	nique	ly iden	tified by	y Date,	Time, Na	me of
				Yes:		No:		N/A:	
	Date and time of run:								t
	Name and version:								
	Notes:								

#### DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE **ACQUIRED CODE - TO BE MODIFIED**

о.	Code Reviews: 10P-018, 8	section 5.5.5			
	e code reviews (if implement rmat that allows others to und	lerstand the code review r	process and results	s?	r
		Yes:	No: [	N/A:	Ш
	Scientific Notebook:				
		ired code that is not to be reviews required.	modified is accep	oted as is.	No
7.	Medium and Header Docu	mentation: TOP-018, S	ection 5.5.6		
a)	Program title block of main	program contains require Yes:	_	N/A:	
	Program Title:				
	Customer Office/Division:				
	Customer Phone Number:				
	Associated Documentation:				
	Disclaimer Notice:				
	Notes:				
b)	Source code module header Client Name, Contract Refe	•	and Revision Hist	- 1	ne,
	Module Reviewed:				
	Module Reviewed:				
	3 C 1 1 D ' 1				
	Notes:			4	

## DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE ACQUIRED CODE - TO BE MODIFIED

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7.	Medium and Header Documentation,	continue	ed: TO	P-018,	Section	on 5.5.6
c) The physical labeling of software medium (tapes, disks, etc.) contain requirinformation?					required	
	intornation.	Yes:		No:		N/A:
	Program Name:	· · · · · · · · · · · · · · · · · · ·				
	Module/Name/Title:					
	Module Revision:					
	File Type (ASCII, OBJ, EXE):					·
	Recording Date:					
(	Operating System of Supporting Hardware:					
	Notes:					
8.	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:					
	Notes:					
b)	Are there basic instructions for the use o	f the soft Yes:		No:		N/A:
	Location of Instruction:					
	Notes:					
9. a)	Acceptance Testing: TOP-018, Section Does the acceptance testing demonstra and/or SCR have been fulfilled?			not req No:	_	ents in the SRD
L	ocation of Test Results:					
	Notes:					

## DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE ACQUIRED CODE - TO BE MODIFIED

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<ul><li>9. Acceptance Testing, continued: TOP-018, Section 5.</li><li>b) Has acceptance testing been conducted for each interest.</li></ul>								
υ)	operating system?	occii conducted	101 04					
			Yes:		No:		N/A:	
	Platform(s):				<del></del>			
	Operating System(s):							
L	Location of Test Results:							
	Notes:							
c)	Has installation testing operating system?	been conducted				_	-	and
			Yes:	_	No:		<b>N/A</b> :	
	Operating System(s):							
L	ocation of Test Results:	·						
	Notes:							
10	. Configuration Control	: TOP-018, Sect	ion 5.7					
a)	Is the Software Summar	y Form complete		gned?	No:		N/A:	
	Software Summary Form	Approval Date:	- · · · · · · · · · · · · · · · · · · ·					
b)	Is a software technical cand numerical basis?	lescription prepa	red, doc	umenti	ng the	essentia	al mathema	tical
	<b></b>		Yes:		No:		N/A:	
	Location Technica	l Description:			· · · · · · · · · · · · · · · · · · ·	:		
	Notes:						4	
c)	Is the source code ava (acquired/commercial co		e execut	able c	ode av	ailable	in the cas	e of
			Yes:		No:		<b>N/A</b> :	
	Location of	Source Code:						
	Notes:						,	

## DESIGN VERIFICATION REPORT FOR CNWRA SOFTWARE ACQUIRED CODE - TO BE MODIFIED

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11.	Configuration Control, continued: TOP-018, Section 5.7					
d)	Have all the script/make files and executable files been submitted to the Softv Custodian?					
	Yes: No: No: N/A:					
	Location of Script/Make Files:					
	Notes:					
12.	Software Release: TOP-018, Section 5.9					
	on acceptance of the software as verified above, has a Software release Notice, Form PP-6 been issued?					
	Yes: No: No: N/A:					
	Version number on software (1.0 for 1 <sup>st</sup> issue):					
	Version number on SRN:					
	Notes:					
13.	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: 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: No: N/A:					
	Version/Date of SVTR:					
	Date reviewed and approved via QAP-002:					
	Notes:					
Ado	ditional Remarks:					
CN	WRA Software Developer/Date CNWRA Software Custodian/Date					