



# Public Service Company of Colorado

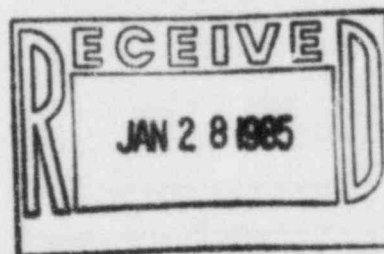
P.O. BOX 840 · DENVER, COLORADO 80201

2420 W. 26th Avenue, Suite 100D, Denver, CO 80211

January 22, 1985  
Fort St. Vrain  
Unit No. 1  
P-85021

Regional Administrator  
Region IV  
Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 1000  
Arlington, Texas 76011

Attn: Mr. E. H. Johnson



Docket No. 50-267

SUBJECT: Surveillance of Fort St. Vrain  
Seismic Accelerometer Trigger

REFERENCE: PSC Letter Brey to Johnson  
dated November 7, 1984  
(P-84478)

Dear Mr. Johnson:

In response to the commitment made in our November 7, 1984 letter to send an accelerometer from Fort St. Vrain to be completely tested by the manufacturer, the attached test report and associated certificates of calibration are submitted for your information.

Please note that the Fort St. Vrain seismic accelerometer trigger was within the specified tolerance. If the southeastern Wyoming earthquake on October 18, 1984 had produced ground accelerations at Fort St. Vrain of 0.01g or greater, the seismic event would have been recorded as designed.

8502060571 850122  
PDR ADDCK 05000267  
P PDR

H005  
RETURN ORIGINAL  
TO RIV 1/1

If you have any questions regarding this matter, please contact Mr. M. H. Holmes at (303) 571-8409.

Very truly yours,

*H. L. Brey by L. Milton McBride*

H. L. Brey  
Executive Staff Assistant  
Electric Production

HLB/MHH:pa

Attachment



SURVEILLANCE PROCEDURE / DATA SHEET

CHANNEL CALIBRATION of  
STRONG MOTION VERTICAL SEISMIC TRIGGER  
KINEMATICS INC., MODEL VS-1  
INSTALLED IN MODEL SMA-1 ACCELEROGRAPH

Customer Public Service Co of Colorado  
Location 16805<sup>1/2</sup> Wells County Road Platteville Colorado (Cal at mfg facility)  
Customer Representative Doran Meade 303-785-2223 (291)  
Kinematics' Sales Order No. C-K4351  
VS-1 S/N n/a SMA-1 S/N 323  
Customer order No. P.O. N5706

REVISION	ORIG.
DATE	02JAN85
APPROVED	<i>[Signature]</i>

Date of Test January 3 1985  
Performed by David St John  
Title SMA-1 Coordinating engineer  
E Outhay Viengkhou  
Services Engineer



## 1.0 GENERAL DESCRIPTION AND OPERATIONAL SEQUENCE OF SYSTEM

The VS-1 Seismic Trigger is an acceleration switch sensitive to vertical motion. It can be purchased alone, enclosed in a machined aluminum housing and requiring an external power supply, or it can be built into any one of several Kinematics products including the SMA-1 Strong Motion Accelerograph. When the applied acceleration reaches a preset level, a SPST switch is closed, and stays closed for a preset time.

## 2.0 PURPOSE OF PROCEDURE

The purpose of this procedure is the determination and adjustment, if required, of the trigger such that it responds to an input traceable to the National Bureau of Standards. This test will also meet the requirements for Channel Functional Test and Channel Check. Calibration may require removal of the device from its normal location.

## 3.0 FREQUENCY

It is recommended that this test be performed every 18 months or at refueling.

## 4.0 REFERENCES

American National Standards Institute: ANSI ANS-2.2-1978

American National Standards Institute: ANSI N18.5-1974

Kinematics Inc: Operating Instructions for Model VS-1  
Vertical Seismic Trigger (Switch)

## 5.0 TEST EQUIPMENT NEEDED

<u>ITEM:</u>	<u>MANUFACTURER:</u>	<u>MODEL:</u>	<u>SUBSTITUTE?</u>
Digital Voltmeter	Fluke	8050A	YES
Field Calibrator	Kinematics	FC-1	NO
Calibration Labels	Kinematics	no model	YES
Calculator	Texas Inst.	TI-55	YES
Desiccant	Kinematics	P/N 700049	YES

Stopwatch or wristwatch with sweep-second hand  
(NBS traceable calibration not necessary)





## 6.0 PERFORMANCE PRACTICES AND LIMITATIONS

This procedure will also serve as the data sheet.

Because this procedure is intended for use by a trained Kinemetrix Field Engineer, detailed step-by-step instructions will not necessarily be provided.

If a deficiency is observed, the Field Engineer may undertake additional testing and install factory-authorized and/or calibrated replacement parts as necessary to restore proper operation of the sensors and systems.

Any situation which is not covered in the body of this procedure will be explained under "COMMENTS".

All equipment deficiencies and corrective actions will be reported under "COMMENTS".

Any item which cannot be brought into compliance with the requirements of this test will have a red REJECT tag affixed in a clearly visible location. The tag will identify the item, show the nature of the deficiency, and recommend a course of action.

Unless otherwise noted, limits will be based upon Kinemetrix Inc. in-house acceptance tests and on recommendations found in ANSI N18.5-1974. If an item is found to be outside those limits and cannot be adjusted sufficiently to satisfy this procedure, the Kinemetrix Field Engineer will recommend an appropriate course of action but it will be the responsibility of the customer to act in accordance with plant policy and technical specifications.

It is assumed that the system under test is functioning properly. If neither a Channel Functional Test nor a Channel Check has been run within 45 days prior to this test, a preliminary Channel Check will be performed before beginning the Calibration.



## 7.0 PRETEST PREPARATION

7.1 If the VS-1 trigger is mounted in another Kinematics product, note the model and serial number of the product below.

Model SMA-1 S/N 323

## 8.0 CALIBRATION

8.1 Measure supply voltage. SPECIFIED AS FOUND AS LEFT

11.5-13VDC +/- 54V +/- 54V

8.2 Using a calibrated FC-1 Field Calibrator, check the acceleration set points, both + and -, of the sensor. Each should match the specified value  $\pm 20\%$ . Adjust if needed.

<u>Specified</u>		<u>As Found</u>	<u>As Left</u>
+ <u>.01</u>	g	+ <u>.0086</u>	<u>.0086</u>
		- <u>.0086</u>	<u>.0084</u>

8.3 Gently blow on the mass of the vertical sensor. The output relay should close and remain closed for  $11 \pm 4$  seconds. Adjust if necessary.

<u>Specified</u>	<u>As Found</u>	<u>As Left</u>
<u>11 sec. <math>\pm</math> 4 sec.</u>	<u>10 sec</u>	<u>10 sec</u>

8.4 Confirm visually that the mass of the vertical sensor is in the center third of its available travel.

(initials) O.S

8.5 In the chart below, record the test equipment used in the performance of this calibration.

Equipment	Manufacturer	Model No.	Range	Owner & ID No.	Calibration Last / Due
Digital Multimeter	Fluke	8065A	0-20V	#0586	9/6/84 / 3/6/85
Field Calibrator	Kinematics	FC-1	.001-.1G	#0398	10/22/84 / 10/22/85
Stopwatch	Micronta		0-60 sec	#0024	11/1/84 / 11/1/85



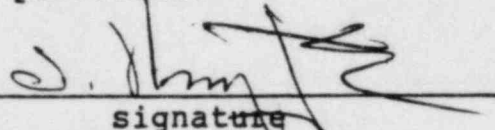
8.6 Attach certifications for test equipment to the back of this procedure.

9.0 SUMMARY (Comments, parts replaced, deficiencies, etc)

vertical starter is functioning  
properly

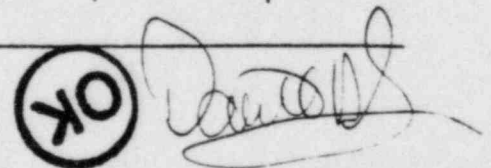
9.1 CERTIFICATION

All items included in this procedure have been performed unless noted above and were found or have been adjusted to be within the range required by this procedure.

  
signature

9.2 ACTION REQUIRED (if any)

None  
This starter and inst are being recalibrated completely and refurbished to factory specifications prior to immediate return to customers  
Plant - Fort St. Vrain nuclear power plant

  
OK



# CERTIFICATE OF CALIBRATION

ITEM Field Calibrator  
MFG. KINEMATICS SYSTEMS MODEL FC-1  
SERIAL NUMBER 0398 PROP.# 0398  
CALIBRATION DATE 22 Oct. 84 RECAL DUE 22 Oct. 85

Kinematics Systems certifies that the above listed instrument meets or exceeds all published manufacturer's specifications and has been calibrated using standards whose accuracies are traceable to the National Bureau of Standards or have been derived from accepted values of natural physical constants.

## CONDITION RECEIVED

- ☒ WITHIN TOLERANCE  
☐ OUT OF TOLERANCE  
☐ OPERATIONAL FAILURE  
☐ PHYSICAL DAMAGE

## CONDITION RETURNED

- ☒ WITHIN TOLERANCE  
☐ LIMITED  
\_\_\_\_\_  
\_\_\_\_\_

## CALIBRATION EQUIPMENT

MANUFACTURER	MODEL	SERIAL	TEST DATE	RECALL DATE
Fluke	8050A	2504256	7 June 84	7 Dec. 84

## QA REVIEWED

By GWS  
Date 29 Oct 84

Certified by

John G. Diehl  
Manager of Services



# RD TECHNOLOGY, INC.

KINEMATRICS  
CUSTOMER

## Certificate of Calibration

MFG. Fluke MODEL 8060A DESCRIPTION DMM/Counter  
SERIAL NUMBER 3190456 ASSET # 0586 TEST # 15918  
CALIBRATION DATE 6 SEP 84 TEMPERATURE        °F  
RECALIBRATION DATE 6 MAR 85 HUMIDITY        %RH

RD TECHNOLOGY, INC. CERTIFIES THAT THE ABOVE LISTED INSTRUMENT MEETS OR EXCEEDS ALL PUBLISHED SPECIFICATIONS AND HAS BEEN CALIBRATED USING STANDARDS WHOSE ACCURACIES ARE TRACEABLE TO THE NATIONAL BUREAU OF STANDARDS WITHIN THE LIMITATIONS OF THE BUREAU'S CALIBRATION SERVICES, OR HAVE BEEN DERIVED FROM ACCEPTED VALUES OF NATURAL PHYSICAL CONSTANTS, OR HAVE BEEN DERIVED BY THE RATIO TYPE OF SELF-CALIBRATION TECHNIQUES. OUR "CALIBRATION SYSTEM REQUIREMENTS" IS IN COMPLIANCE WITH MIL STD 45662.

### CONDITION RECEIVED

- ☒ WITHIN TOLERANCE  
☐ OUT OF TOLERANCE  
☐ REFER TO OUT OF  
TOLERANCE REPORT  
☐ OPERATIONAL FAILURE

### CONDITION RETURNED

- ☒ WITHIN TOLERANCE  
☐ LIMITED CAL

INSTRUMENT ACCURACY MFG SPEC

### APPLICABLE NBS TEST REPORT NUMBERS:

DC VOLTAGE 5046/231966

AC VOLTAGE 807676

RESISTANCE 5142/231966

INDUCTANCE 5117/231966

CAPACITANCE 5054/231966

TEMPERATURE F160013

FREQUENCY WWVL Boulder Col

PRESSURE MS5049

### QA REVIEWED

By GWS  
Date 27 SEP 84

William Taylor

CERTIFIED BY

*Robert E. Menth*

CHIEF OF METROLOGY

mm

# RD TECHNOLOGY, INC.

Kinemetrics  
CUSTOMER

## Certificate of Calibration

MFG. Micronta MODEL \_\_\_\_\_ DESCRIPTION Stop Watch  
SERIAL NUMBER \_\_\_\_\_ ASSET # 0024 TEST # 17303  
CALIBRATION DATE 01 Nov 84 TEMPERATURE \_\_\_\_\_ °F  
RECALIBRATION DATE 01 Nov 85 HUMIDITY \_\_\_\_\_ %RH

RD TECHNOLOGY, INC. CERTIFIES THAT THE ABOVE LISTED INSTRUMENT MEETS OR EXCEEDS ALL PUBLISHED SPECIFICATIONS AND HAS BEEN CALIBRATED USING STANDARD WHOSE ACCURACIES ARE TRACEABLE TO THE NATIONAL BUREAU OF STANDARDS WITHIN THE LIMITATIONS OF THE BUREAU'S CALIBRATION SERVICES, OR HAVE BEEN DERIVED FROM ACCEPTED VALUES OF NATURAL PHYSICAL CONSTANTS, OR HAVE BEEN DERIVED BY THE RATIO TYPE OF SELF CALIBRATION TECHNIQUES. OUR "CALIBRATION SYSTEM REQUIREMENTS" IS IN COMPLIANCE WITH MIL STD 45662.

### CONDITION RECEIVED

- ☒ WITHIN TOLERANCE  
☐ OUT OF TOLERANCE  
☐ REFER TO OUT OF TOLERANCE REPORT  
☐ OPERATIONAL FAILURE

### CONDITION RETURNED

- ☒ WITHIN TOLERANCE  
☐ LIMITED CAL \_\_\_\_\_

INSTRUMENT ACCURACY MFG Spec

### APPLICABLE NBS TEST REPORT NUMBERS:

DC VOLTAGE 5046/231966  
AC VOLTAGE 807676  
RESISTANCE 5142/231966  
INDUCTANCE 5117/231966  
CAPACITANCE 5054/231966  
TEMPERATURE F160013  
FREQUENCY WWVL Boulder Col  
PRESSURE MS5049

### QA REVIEWED

By GWS  
Date 5 NOV 84

Bob Sneddon

CERTIFIED BY

*Robert E. Mendt*

CHIEF OF METROLOGY