

**CONTROLLED COPY NO.** 718

Issued to Xihua He

Xihua He	He <del>XH</del>	X.H
Brian K. Derby	B.K.D.	BKD
Greg Bird	greg Bird	gDB

Continuation of Notebook No. 308

**Initial Scientific Notebook Entry for Performance Confirmation Lab  
Notebook**

**Title:** Performance confirmation of lab equipments that are not subject to calibration

**Tests Performed by:** CNWRA/CSPE personnel, Div. 20; Brian Derby, Div. 18

**Objectives:** Determine and verify acceptable performance of various laboratory equipment that can not be calibrated, such as potentiostats, pipetter, pH probe, microscope

**Proposed approach or procedure for achieving the objectives:** TOP-022 (included in notebook) to verify the performance of potentiostats; other procedures described herein and in notebook 308

**Equipment to be Verified:** Solartron 1287 and 1480 multi-channel potentiostats, Solartron 1260 Frequency Response Analyzer, EG&G 273, 263A and versastat potentiostats, pipetter, pH probe, and Metallurgical microscope. Additional equipment to be identified prior to use.

**Equipment used to verify performance:**  
Swri Calibrated equipment: Resistor box, Caliper, pH meter (mV calibration), analytical balance.

**Additional equipment:** Solartron test modules, machined microscope test block

**Measurement Parameters:** Potential, Current, Resistance, Pipetter dispense volume, Microscope stage displacement, pH values

**Required Level of Accuracy:** Potentials  $\pm 1$  mV, Current  $\pm 0.01$  microamp, pH  $\pm 0.01$ , microscope stage displacement  $\pm 10$  percent (30 to 1000  $\mu\text{m}$ ), Dispense volume  $\pm 1$   $\mu\text{L}$

**Uncertainty and Sources of Error:** Volume and resistance measurements may vary with room temperature fluctuations

Xihua He 6/8/2005

The following procedure (TOP-022) was superseded by Rev 1 on 9/15/05

X-H 3/15/97

<b>CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES</b>		Proc. <u>TOP-022</u>							
<b>TECHNICAL OPERATING PROCEDURE</b>		Revision <u>0</u>							
Title <u>Procedure for Verification of the Performance of a Potentiostat and the Associated Data Acquisition Software</u>		Page <u>1</u> of <u>6</u>							
<p><b>EFFECTIVITY</b></p> <p>Revision <u>0</u> of this procedure became effective on <u>3/30/94</u>. This procedure consists of the pages and changes listed below.</p> <table border="1"> <thead> <tr> <th>Page No.</th> <th>Change No.</th> <th>Date Effective</th> </tr> </thead> <tbody> <tr> <td>1-6</td> <td>0</td> <td>3/30/94</td> </tr> </tbody> </table>				Page No.	Change No.	Date Effective	1-6	0	3/30/94
Page No.	Change No.	Date Effective							
1-6	0	3/30/94							
Supersedes Procedure No. <u>NONE</u>									
Approvals									
Written by <i>N. Smith</i>	Date 3/25/94	Technical Review <i>[Signature]</i>	Date 3/30/94						
Quality Assurance <i>[Signature]</i>	Date 3/30/94	Supervisor <i>[Signature]</i>	Date 3/30/94						

Superseded

Yihua He 6/8/05

<b>CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES</b>		Proc. <u>TOP-022</u>	
<b>TECHNICAL OPERATING PROCEDURE</b>		Revision <u>0</u>	
Title <u>Procedure for Verification of the Performance of a Potentiostat and the Associated Data Acquisition Software</u>		Page <u>2</u> of <u>6</u>	
<p><b>TOP-022</b></p> <p><b>PROCEDURE FOR VERIFICATION OF THE PERFORMANCE OF A POTENTIOSTAT AND THE ASSOCIATED DATA ACQUISITION SOFTWARE</b></p> <p>1. <b>PURPOSE AND APPLICABILITY</b></p> <p>Potentiostats and galvanostats are used to maintain the potential and current respectively at a given electrode at constant, predetermined values. The same instrument can be used in either mode. Hence, reference is made in this document only to potentiostats, although the same procedures are applicable to a galvanostats also. Generally, the potentiostats are not calibrated directly, but the measurements of potential and current made by a potentiostat are verified independently by calibrated voltmeters and ammeters in accordance with Center Quality Assurance Manual (CQAM), Section 12. However, for some potentiostats that are designed to operate only with automated data acquisition systems (i.e., no front panel controls), it is not always convenient to measure the potentials independently by other instruments. In such cases, the whole system of potentiostat and associated data acquisition software can be used to measure known parameters such as the resistance of a precision, pre-calibrated resistor. The purpose of the document is to provide such a procedure for the verification of the performance of a potentiostat and the associated data acquisition software. This procedure establishes controls required by CQAM, Section 12, "Control of Measuring and Test Equipment."</p> <p>This procedure applies to those cases where it is difficult to verify the performance of a potentiostat independently by calibrated voltmeter and ammeter. This procedure does not need to be followed, if provision is made to measure potential and current independently by calibrated voltmeters and ammeters. If calibrated voltmeters and ammeters are used to verify the measurements, these readings shall be recorded in the Scientific Laboratory Notebook in accordance with Quality Assurance Procedure QAP-001.</p> <p>Other procedures for verifying the performance of the potentiostat and the data acquisition system for specific electrochemical tests have been described in TOP-008 and TOP-009. These procedures may be followed in addition to the procedure outlined in the present TOP. The procedures described in TOP-008 and TOP-009 are useful to verify systems including the potentiostat, electrochemical cell, and the electrodes. However, because the electrochemical response of an alloy to a given environment is dependent on a number of factors, the results of tests described in TOP-008 and TOP-009 can only be used to verify the system performance in an approximate manner. In contrast, the current procedure enables a precise, quantitative verification of the performance of the system.</p>			

X-H 3/15/97

Superseded

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TECHNICAL OPERATING PROCEDURE

2. RESPONSIBILITY

- 2.1 The cognizant Principal Investigators are responsible for the implementation of this procedure.
- 2.2 The personnel performing the electrochemical tests are responsible for complying with the requirements of this procedure.

3. ABBREVIATIONS

The following abbreviations are used throughout this document:

I	—	Current
V	—	Potential
R	—	Resistance
A, mA, $\mu$ A	—	Amps, milliamps, microamps
V, mV	—	Volts, millivolts
$\Omega$ , k $\Omega$	—	Ohms, kilohms

4. PROCEDURE

- 4.1 A precision resistor (with a tolerance of  $\pm 1\%$ ) of appropriate resistance shall be used in the verification tests. The value of the resistance can be chosen depending on the current and voltage ranges anticipated in the actual electrochemical tests. For example, if the anticipated currents in the electrochemical experiments range from  $1\mu$ A to 1mA, then a 1k $\Omega$  can be used. The applied potentials in this case would range from 1mV to 1V which is within the capabilities of most potentiostats to apply and measure. If higher currents are anticipated, then a lower resistance must be used and vice versa.
- 4.2 It is preferred that the precision resistor be placed inside a box with appropriate three terminal connections as shown in Figure 1.
- 4.3 The resistor shall be calibrated periodically as specified in Section 12.4.1 of the CQAM and the appropriate calibration label shall be placed on the resistor box. The calibration interval will depend upon the laboratory conditions and can be determined initially by calibration in 6-month intervals. The calibration interval may be extended if the provisions of CQAM Section 12.4.1(2) are met.

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TECHNICAL OPERATING PROCEDURE

4.4 The connections to the potentiostat are shown in Figure 1. The ground connection of the potentiostat need not be connected since the working electrode provides the ground. Once the connections are made, the applied potential from the potentiostat can be either manually increased or scanned automatically and the current-potential data can be collected. Care must be exercised not to exceed the wattage of the resistor.

4.5 The current-potential data can then be exported or manually input in appropriate analysis software to calculate the resistance ( $R = V/I$ ) and various statistical measures associated with it. A sample measurement is shown in Figure 2. The measured resistance (along with its 95% confidence interval) should fall within the tolerance of the resistor, if the potentiostat and the associated data acquisition system are functioning properly. If the measured resistance is considered to be significantly different from the specified tolerance of the resistor, then the resistor must be checked independently for possible damage. If damage of the resistor is found, step 4.4 shall be repeated with another calibrated resistor. If, on the other hand, no damage to the resistor is found, the system (either the data acquisition system or the potentiostat) shall be considered to be defective, and further corrective actions shall be undertaken before using that system.

4.6 The procedure outlined in steps 4.4 and 4.5 shall be performed prior to a series of potentiostatic experiments and the results shall be recorded in the appropriate Scientific Notebook.

4.7 In the case of systems in which the potential is scanned automatically, the scan rate is a parameter that is usually specified and controlled. For the case of a pure resistor shown in Figure 1, scan rate has no effect on the measured resistance. Therefore, any convenient scan rate (typically 1 mV/sec) can be used in step 4.4 to conduct the verification test. However, it is preferable, but not necessary, to maintain this scan rate to be as close to the scan rate that will be used in subsequent electrochemical experiments. In electrochemical experiments, potential scan rate can be an important factor and hence will need an independent verification. Since the potential sweep is linear in these programs, the scan rate is calculated by dividing the total potential range by the time interval between the start and end of potential scan. The time at which the potential scan is started and the time at which the scan is stopped must be noted in the appropriate Scientific Notebook.

5. RECORDS

The files and the Scientific Notebooks containing the test data and the analyses are controlled as records in-process in accordance with CQAM Section 17.

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TECHNICAL OPERATING PROCEDURE

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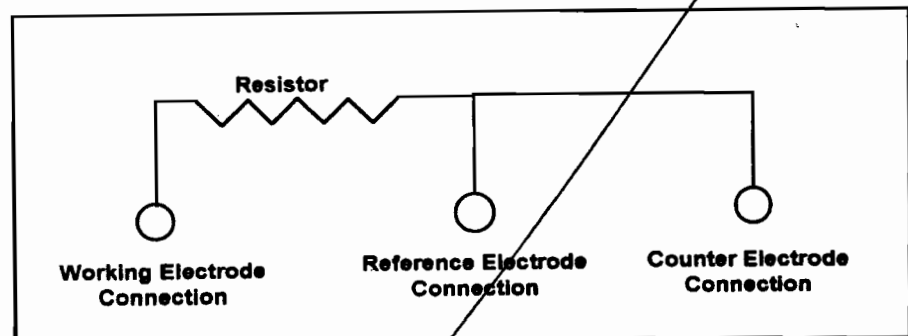


Figure 1. Schematic diagram of the resistor box with the precision resistor. The appropriate connections to the potentiostat are indicated.

CNWRA Form TOP-2

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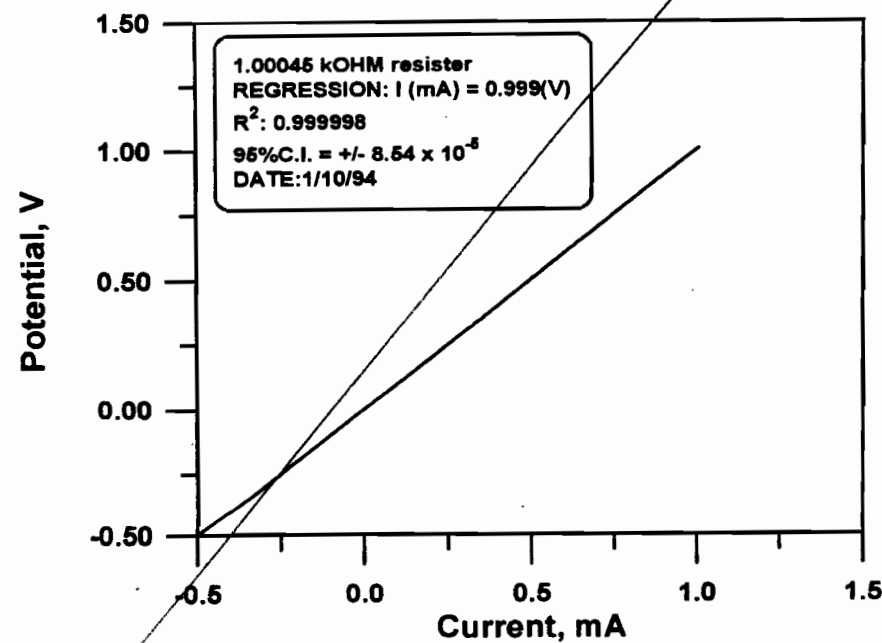
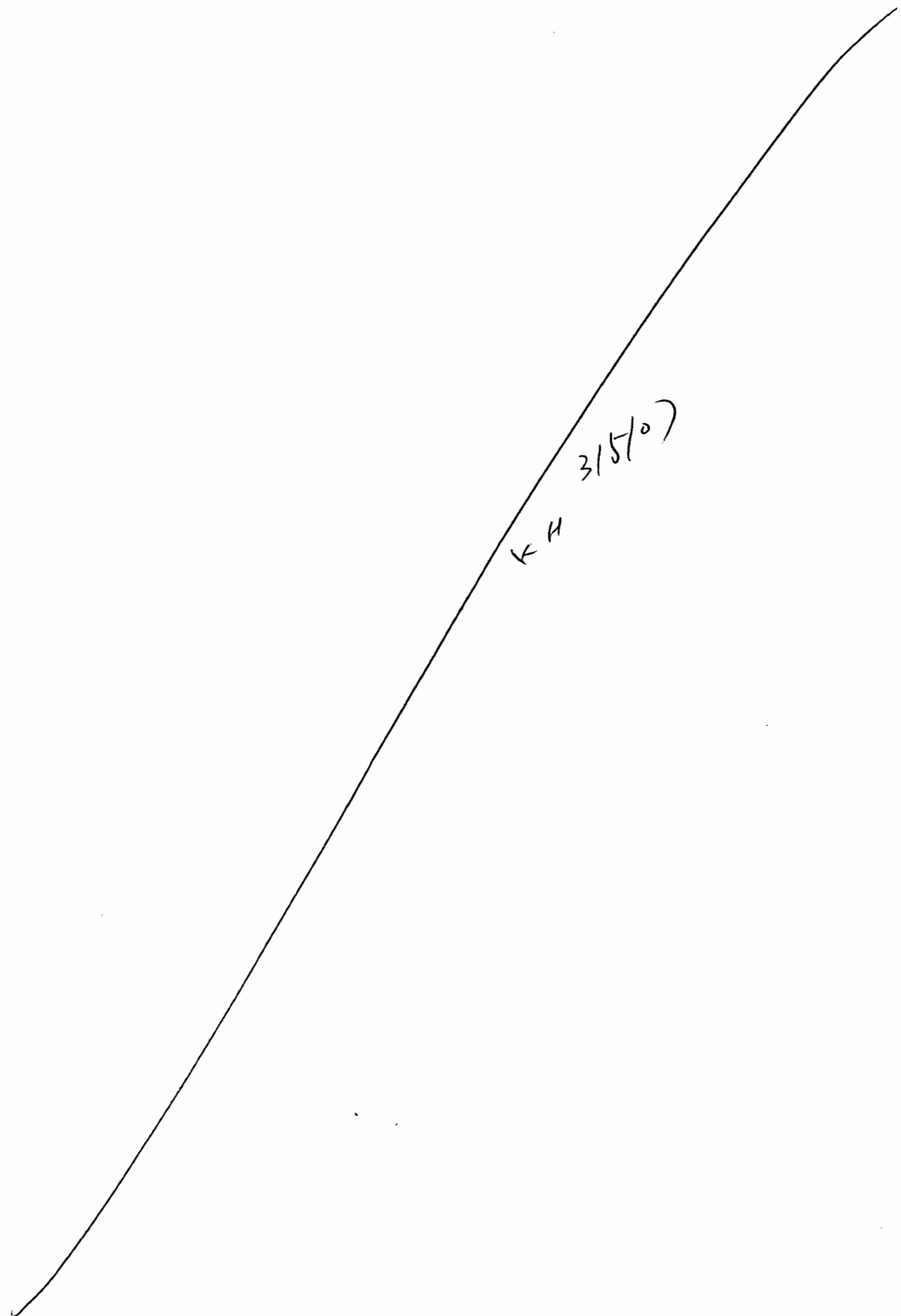
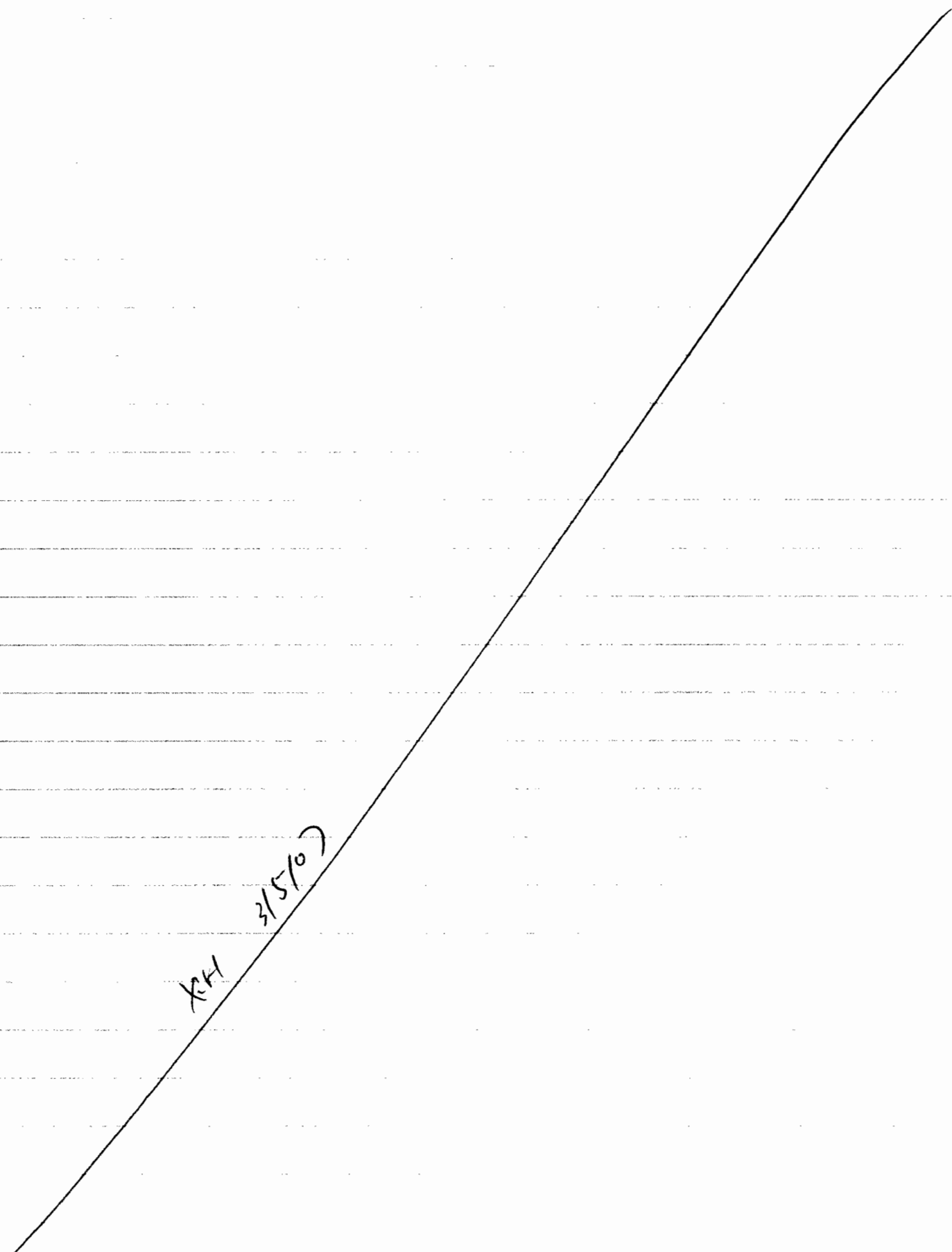


Figure 2. A sample potential-current plot for a 1.0044 KΩ resistor using the EG&G model VersaStat Potentiostat and the EG&G model M352 data acquisition software

CNWRA Form TOP-2

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Weekly pH Cal of Orion EA920A SN#5001A  
 Cal 2/10/05 Due 2/10/06

pH probe Fisher 13-620-296 SN 4079147P

T: 25°C room temperature

Date	Buffer used	Int.
6/6/05	4-7-10	X.H
6/13/05	4-7-10	K.H
6/20/05	4-7-10	BK
6/27/05	4-7-10	BK
7/7/05	4-7-10	OK
7/11/05	4-7-10	BK
7/18/05	4-7-10	BK
7/25/05	4-7-10	BK
8/5/05	4-7-10	BK
8/15/05	4-7-10	OK
8/22/05	4-7-10	BK
9/6/05	4-7-10	BK
9/13/05	4-7-10	OK
9/19/05	4-7-10	BK
9/26/05	4-7-10	OK
10/4/05	4-7-10	BK
10/10/05	4-7-10	OK
10/17/05	4-7-10	BK
10/25/05	4-7-10	BK

*[Signature]* 6/20/05

Weekly pH calibration of ORION EA920A SN# 5001A  
 Cal 2/10/05 Due 2/10/06

Accumet® glass pH indicating electrode 13-620-284 SN 5017043P

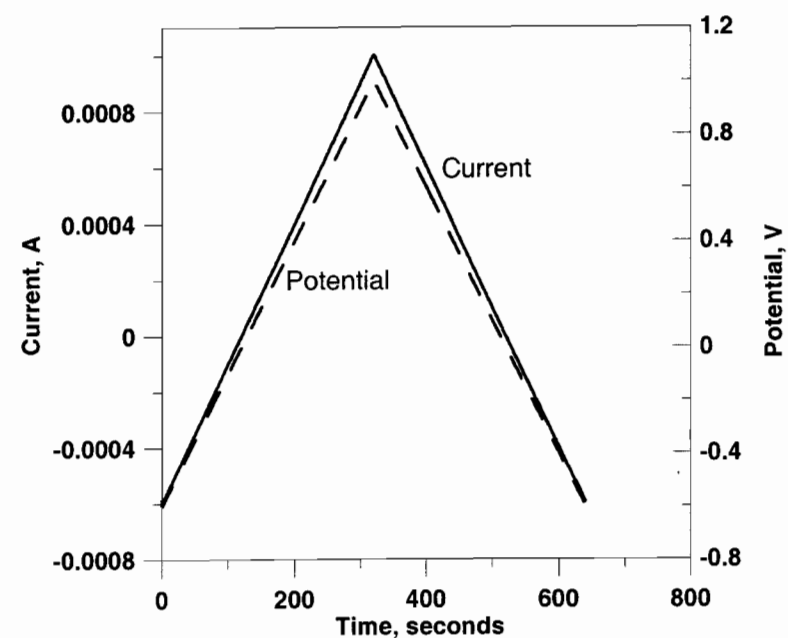
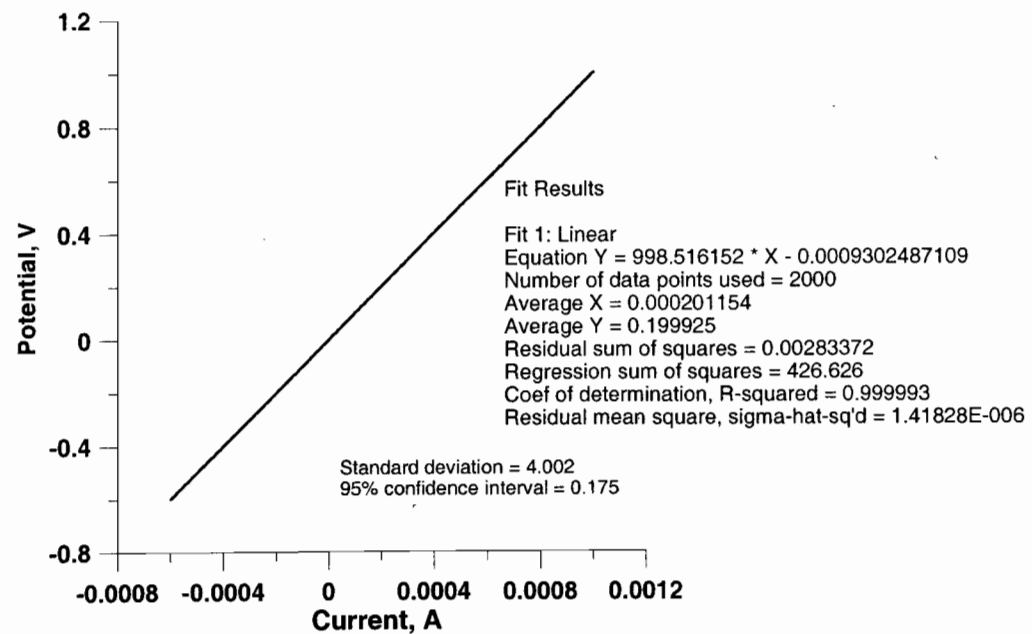
High temperature Ag/AgCl reference electrode 13-620-53 SN 5062017P

T: 25°C room temperature - ~~\* Note Ch #2 No Operational Make note of ch problem - Tagged and labeled this instrument~~ *[Signature]* 7/13/05

Date	Buffer used	Int.
6/6/05	4-7-10	X.H
6/13/05	4-7-10	X.H
6/20/05	4-7-10	BK
6/27/05	4-7-10	OK
7/7/05	4-7-10	BK
7/11/05	4-7-10	BK
7/18/05	Not In Use with High Temp Probes	
7/19/05	ch1 Only 4-7-10	BK
9/17/05		BK
9/14/05	4-7-10	BK

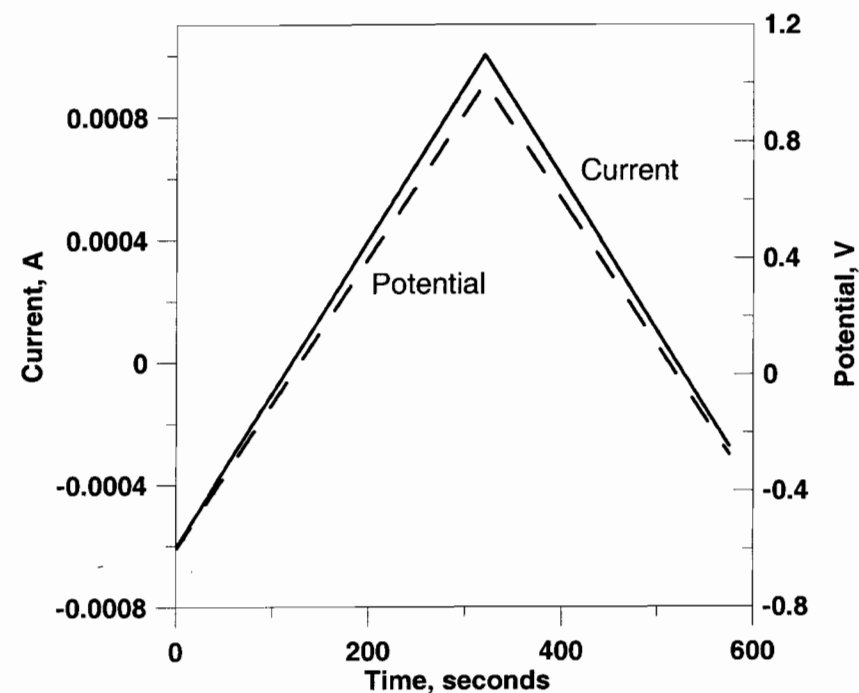
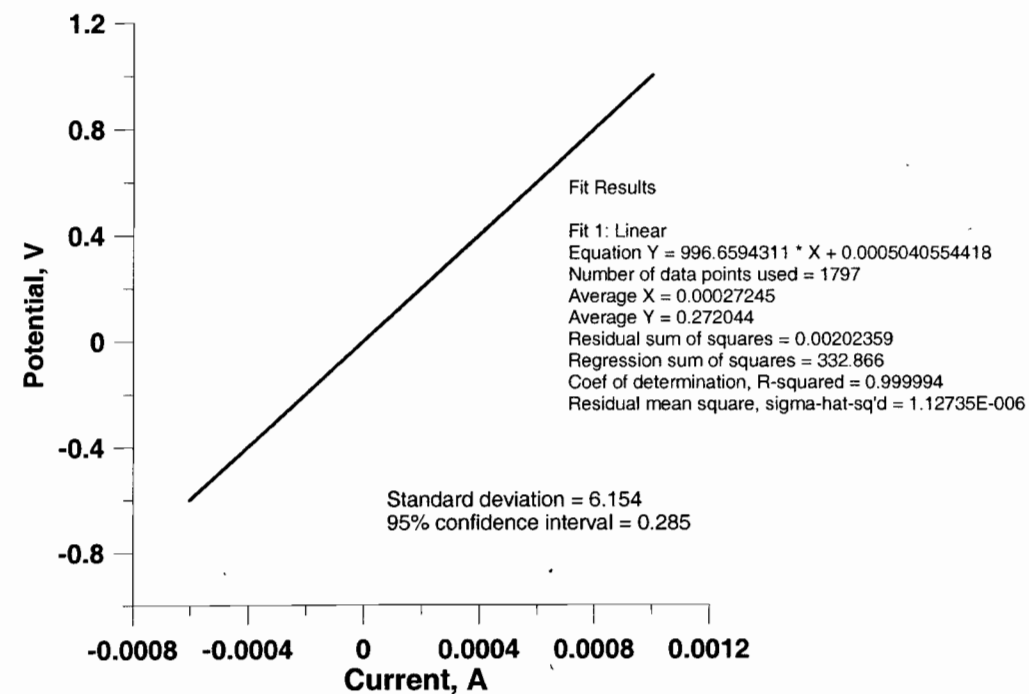
X.H. 3/23/09

*[Signature]* 6/20/05



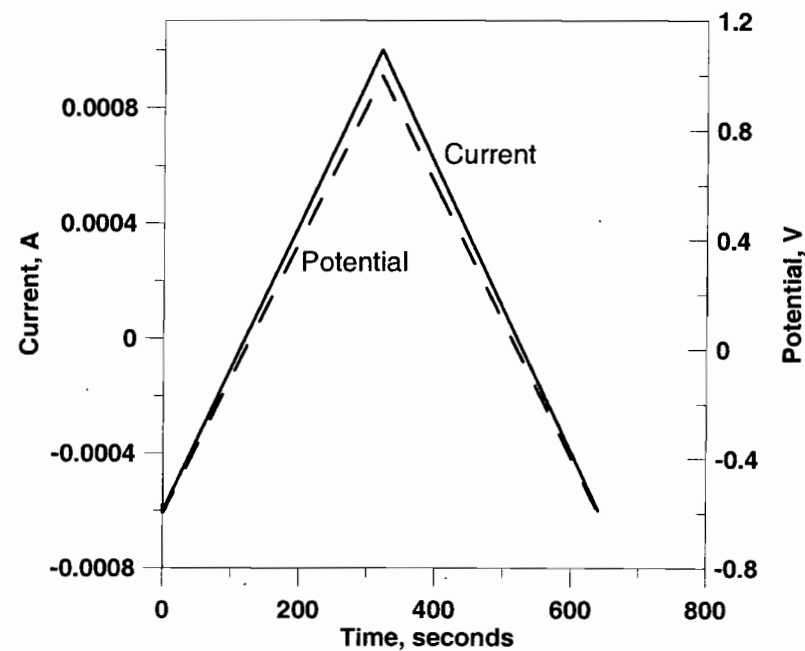
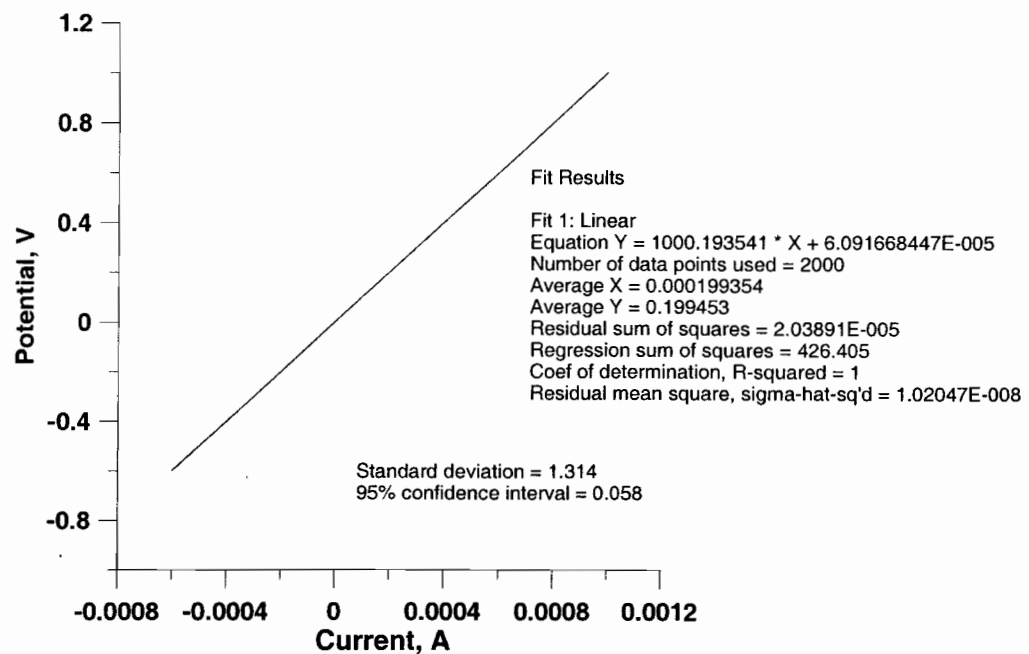
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 Solartron 1480 Ch1  
 SN 00186634 238265 x.r1 12/16/05  
 6/1/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

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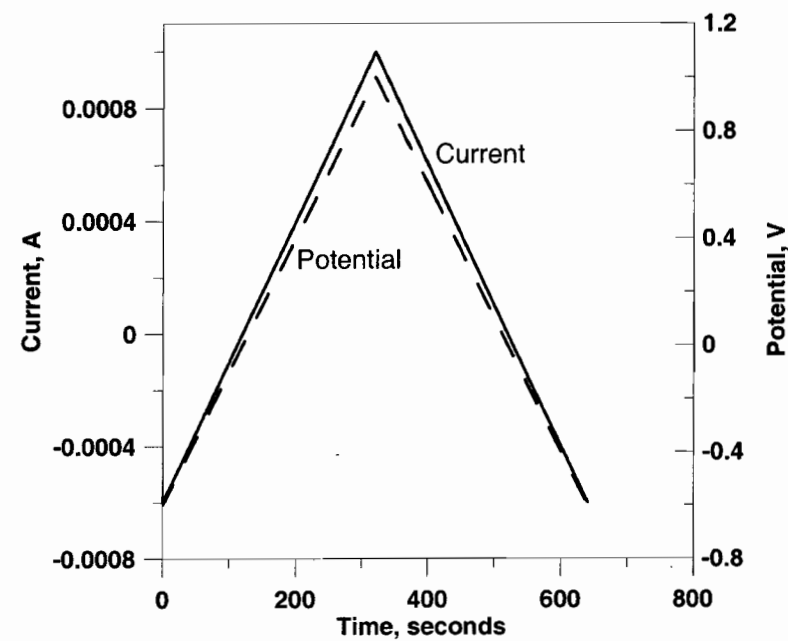
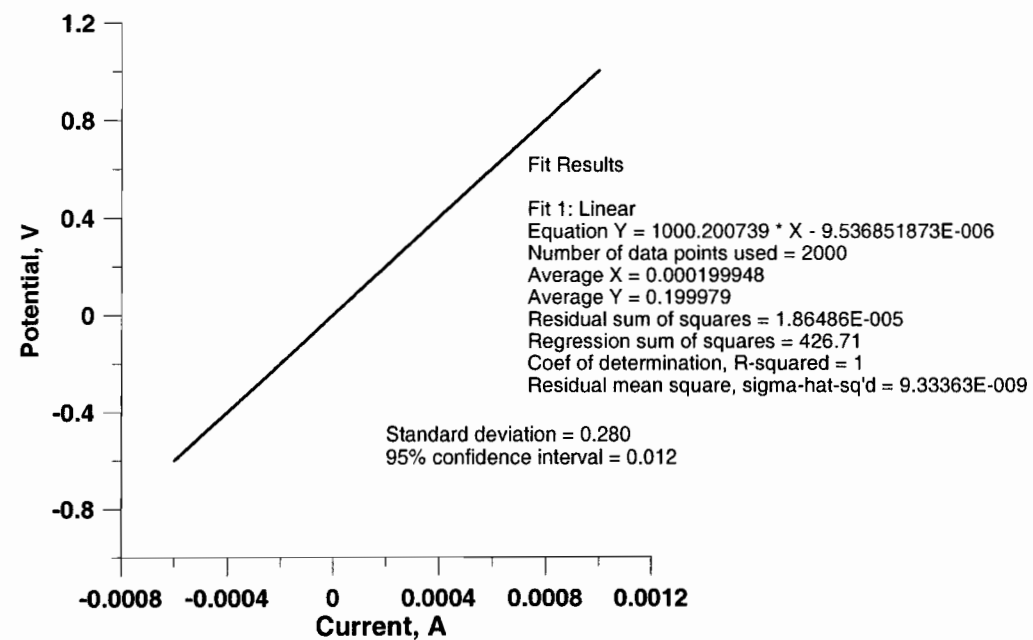
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 Solartron 1480 Ch2  
 SN 00186634 238265 x.r1 12/16/05  
 6/1/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -275 mV  
 Scan rate: 5 mV/s

Xihua He 6/3/05



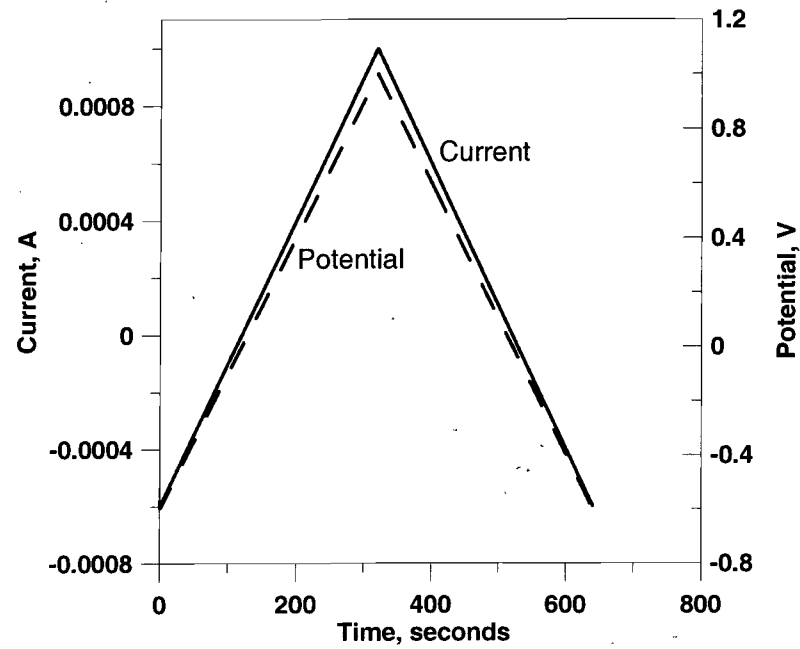
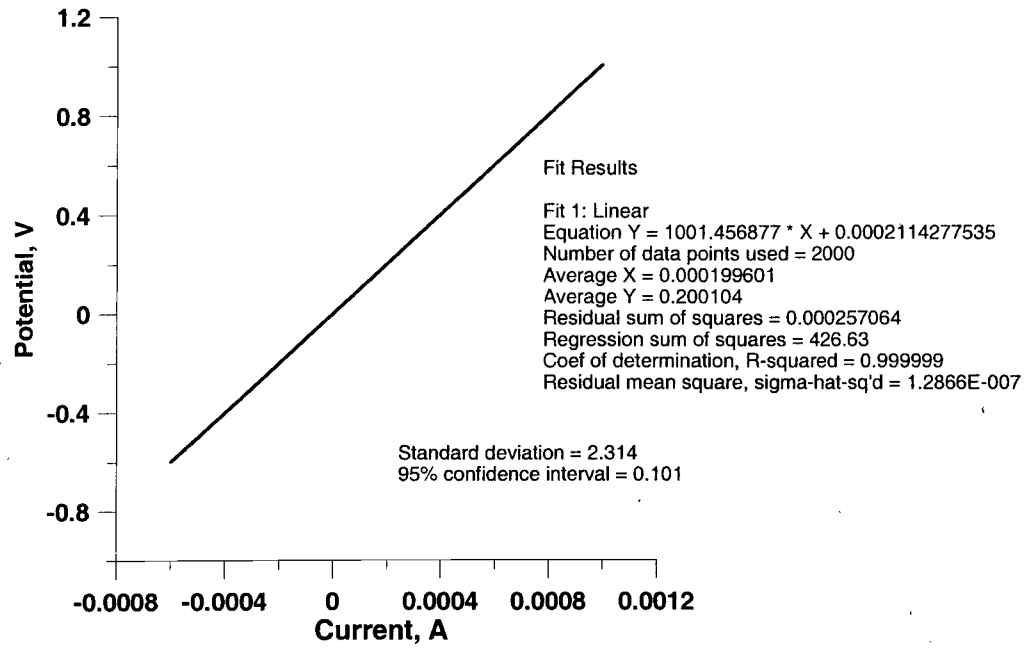
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 Solartron 1480 Ch3  
 SN 00186634 238265 X.H 12/16/05  
 6/1/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

Xihua He 6/3/05



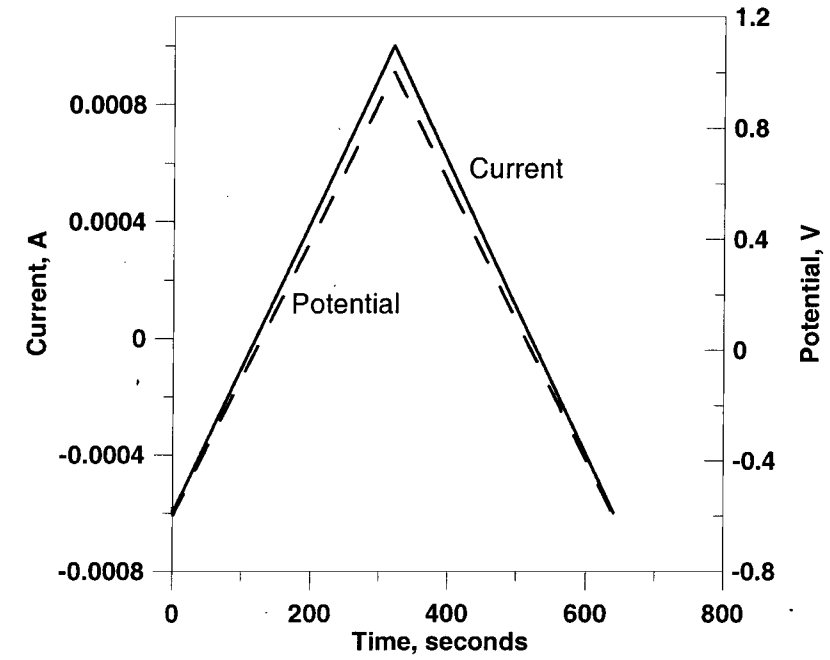
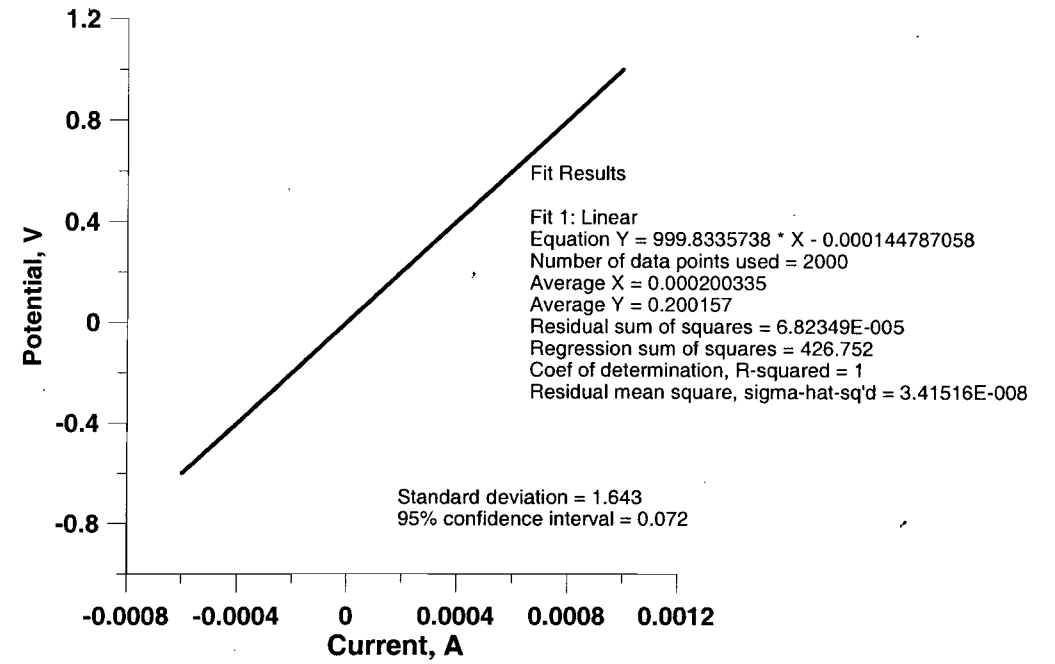
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 SN 00186634 238265 X.H 12/16/05  
 6/1/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

Xihua He 6/3/05



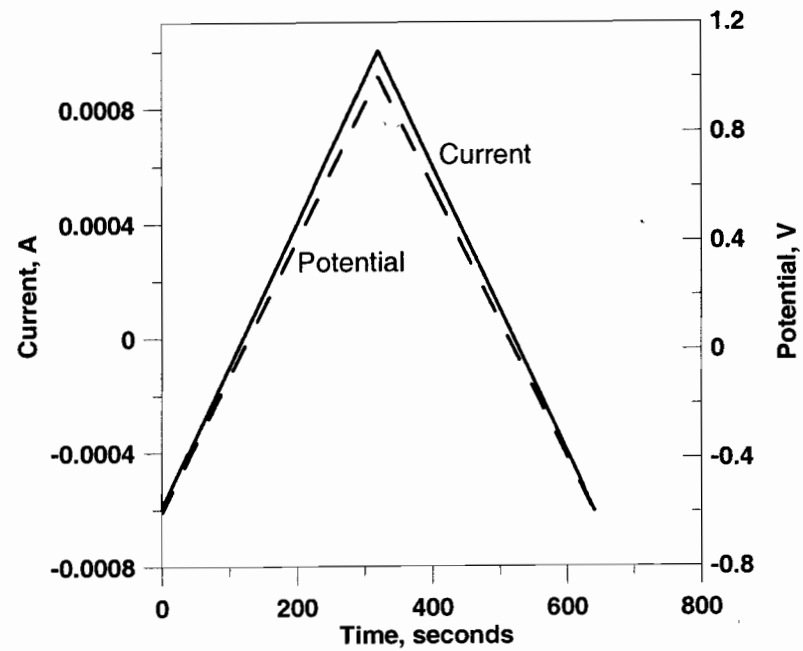
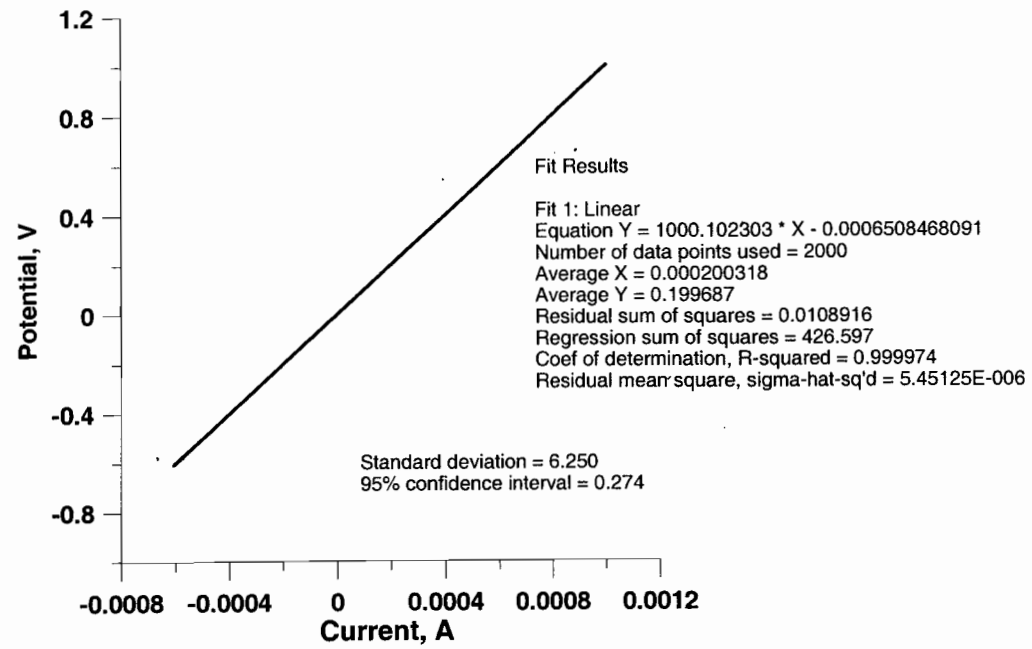
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 Solartron 1480 Ch5  
 SN 00186634 238265 X.H 12/16/05  
 6/1/05  
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 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 6/3/05*



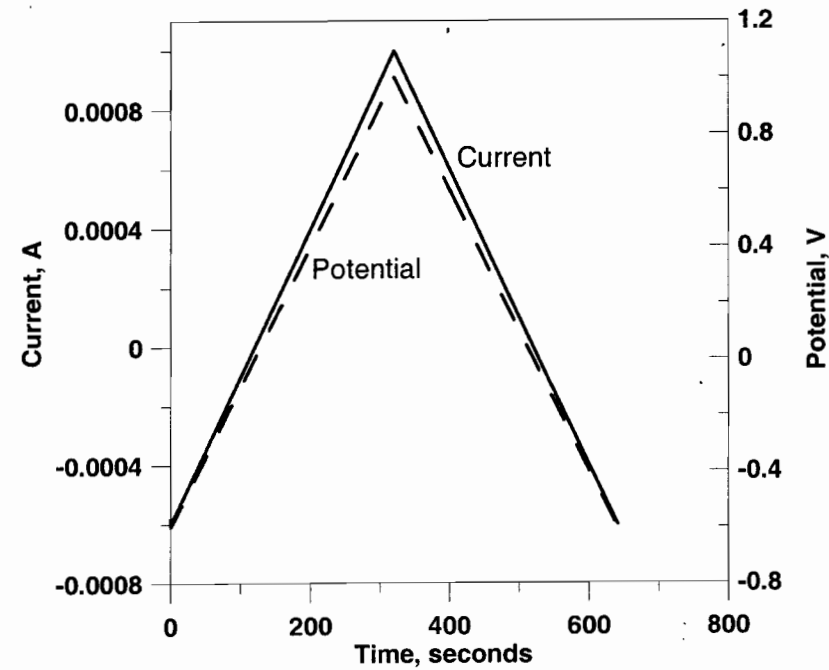
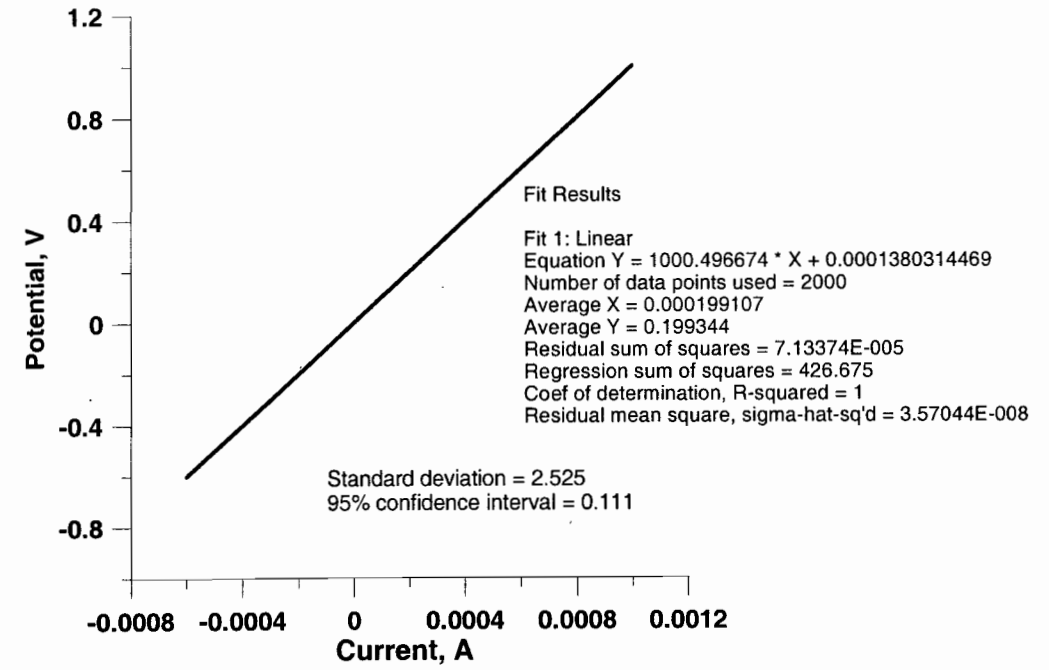
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 Solartron 1480 Ch6  
 SN 00186634 238265 X.H 12/16/05  
 6/1/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 6/3/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch7  
 SN 00186634 238265 x.rl 12/16/05  
 6/1/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 6/3/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch8  
 SN 00186634 238265 x.rl 12/16/05  
 6/1/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 6/3/05*



Continued from NB# 308

weekly pH calibrations of Orion EA 940 SN# 2330

cal 7/21/04 due 7/21/05 \* cal 7/25/05 due 7/25/06

pH probe 13-620-296 SN# 4065196

Date	Buffers Used	Ind
6/10/05	4-7-10	OK
6/20/05	4-7-10	BK
6/27/05	4-7-10	BK
7/7/05	4-7-10	SM
7/11/05	4-7-10	SM
7/18/05	4-7-10	OK
7/26/05	4-7-10 Took To Re Cal · New Cal = 7/25/05 Due 7/25/06	
8/1/05	4-7-10	BK
8/8/05	4-7-10	BK
8/15/05	4-7-10	OK
8/22/05	4-7-10	BK
9/6/05	4-7-10	BK
9/13/05	4-7-10	BK
9/19/05	4-7-10	SM
9/26/05	4-7-10	BK
10/3/05	4-7-10	BK
10/10/05	4-7-10	BK
10/17/05	4-7-10	OK
10/24/05	4-7-10	BK
11/1/05	4-7-10	OK
11/8/05	4-7-10	BK
11/14/05	4-7-10	SM

B.K.D. 6/9/05

Continued from NB# 308

weekly pH calibrations of Orion EA 920 SN# 7064-TV64A

cal 8/11/04 due 8/11/05

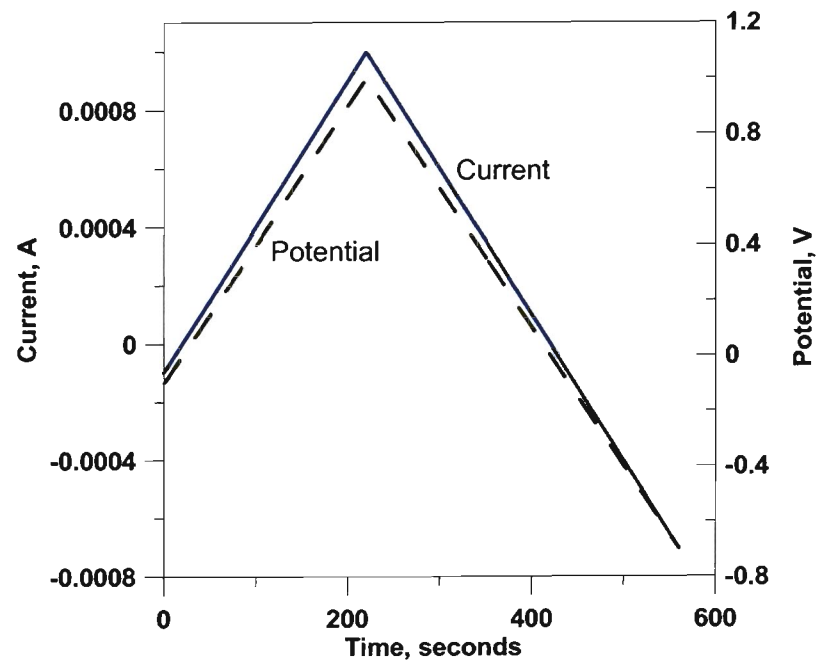
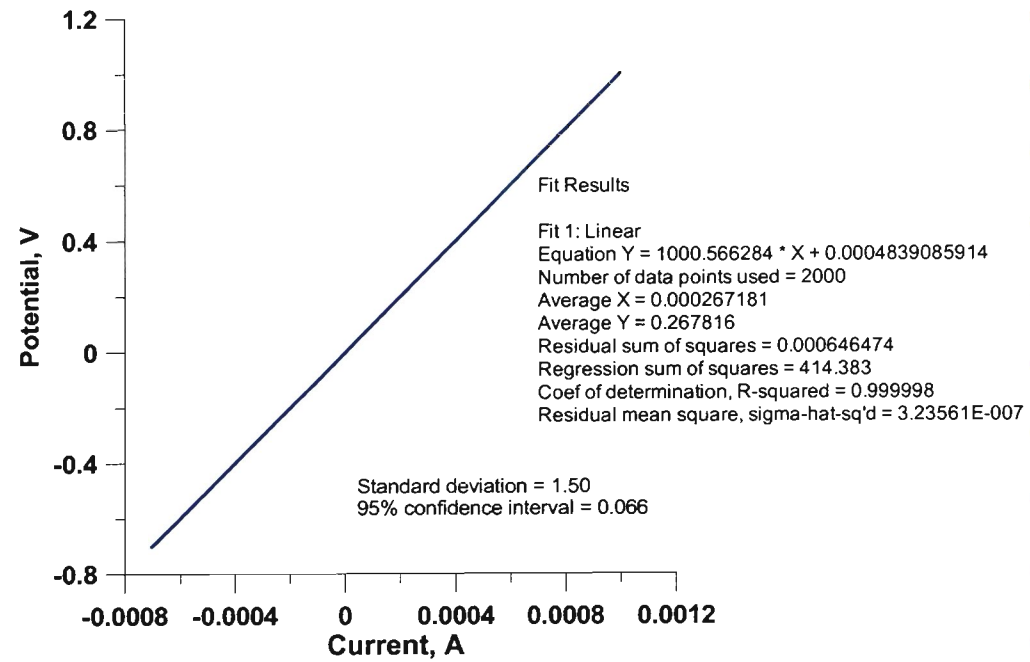
pH probe 13-620-296 SN# 5146019

\* Note pH Meter Makes ch#1 only ch#2 out of cal B.K.D. 9/12/05 \*

Date	Buffers Used	Ind.
6/13/05	4-7-10	OK
6/20/05	4-7-10	BK
6/27/05	4-7-10	BK
7/7/05	4-7-10	BK
7/11/05	4-7-10	BK
7/18/05	4-7-10	BK
7/25/05	4-7-10	BK
8/1/05	4-7-10	BK
	cal lab	BK
9/6/05	still @ cal lab	BK
9/13/05	ch #1 only 4-7-10	BK
9/19/05	4-7-10	BK
9/26/05	4-7-10	BK
	Removed from Service and taken out of Cal log B.K.D. 9/28/05	
	New Meter EA940 SN# 4274 cal 10/17/05 due 3/17/06	
	pH Probe 13-620-296 SN# 5146019	
11/1/05	4-7-10	BK
11/8/05	4-7-10	BK
11/14/05	4-7-10	BK

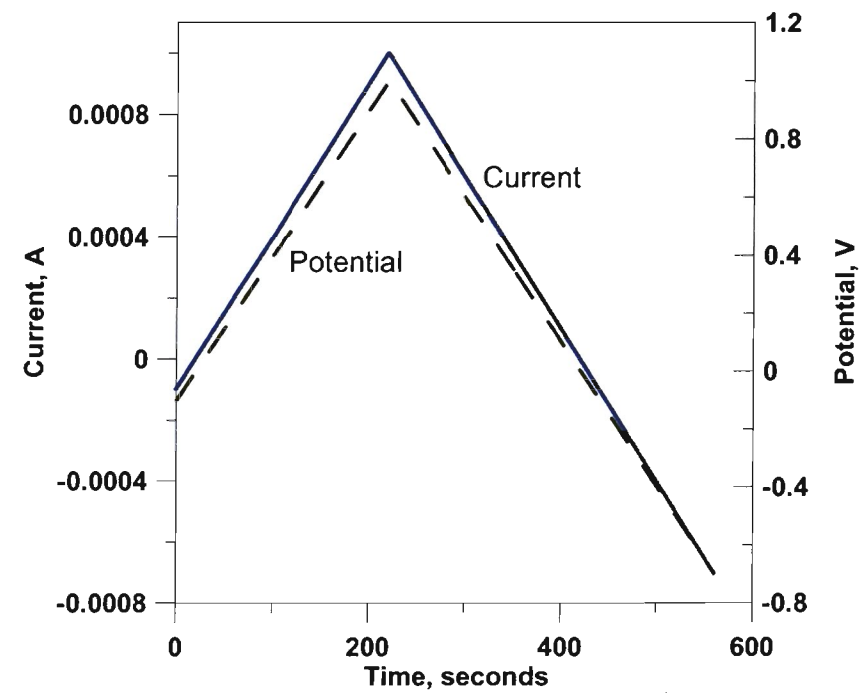
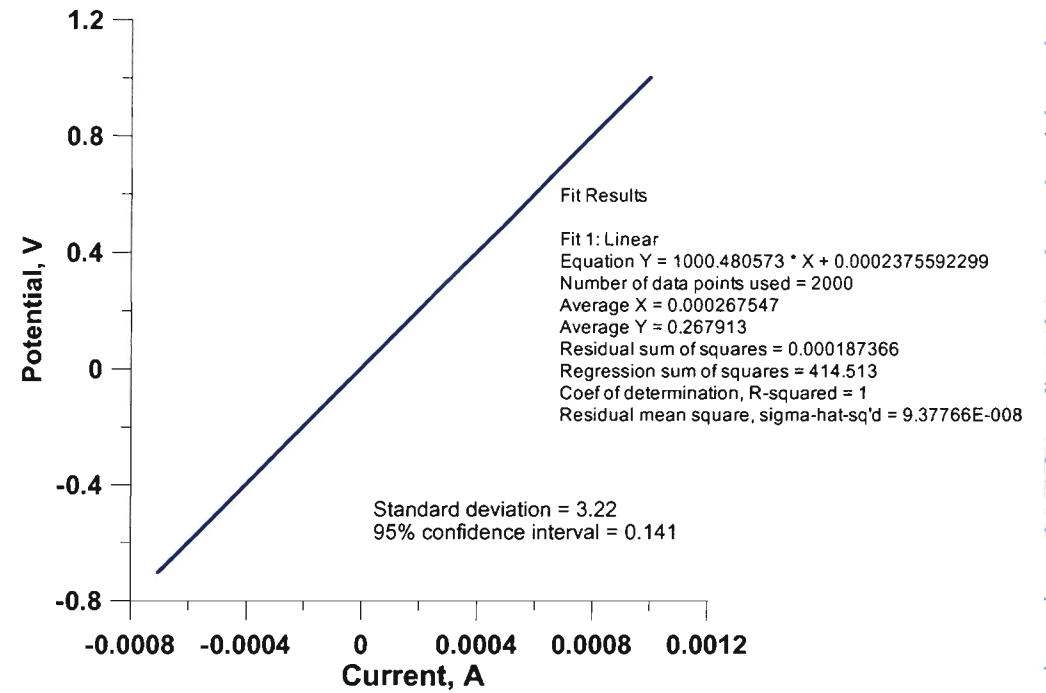
B.K.D. 6/9/05





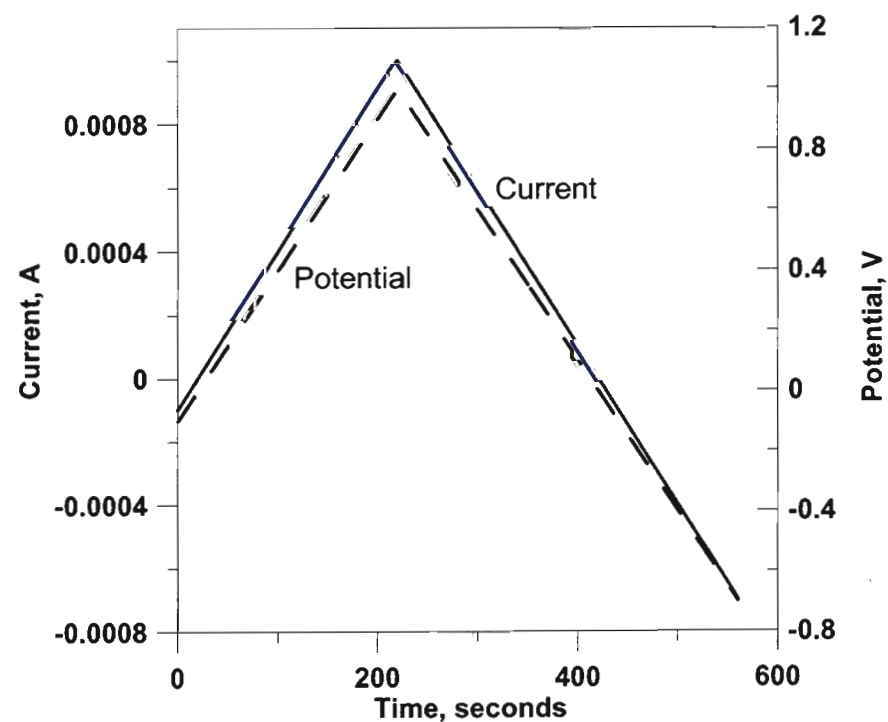
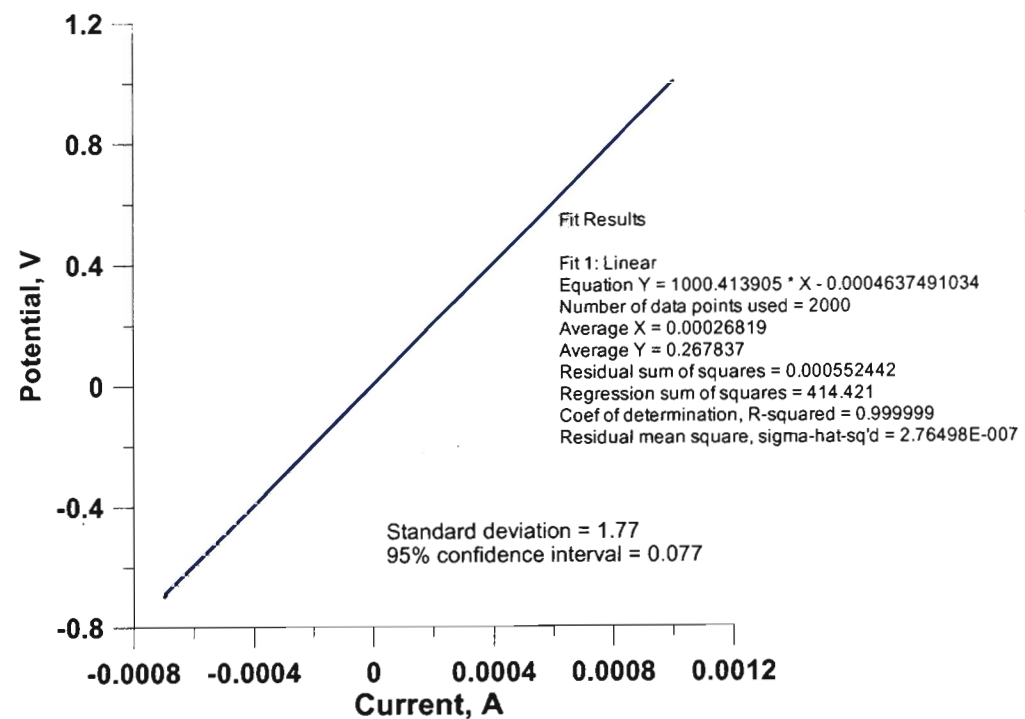
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 Solartron 1480 Ch1  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/26/05*



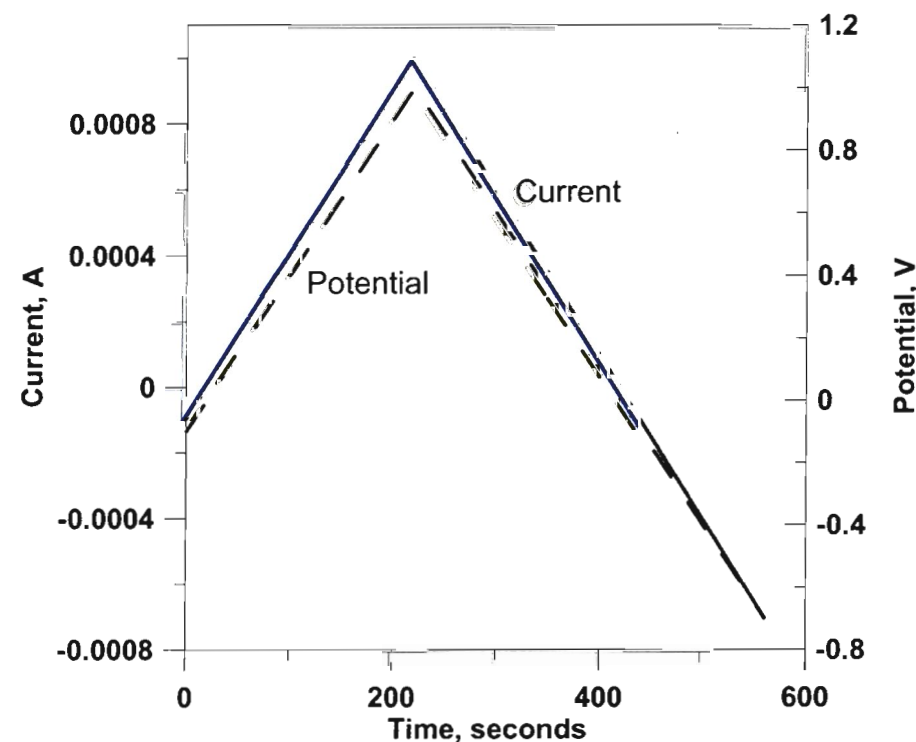
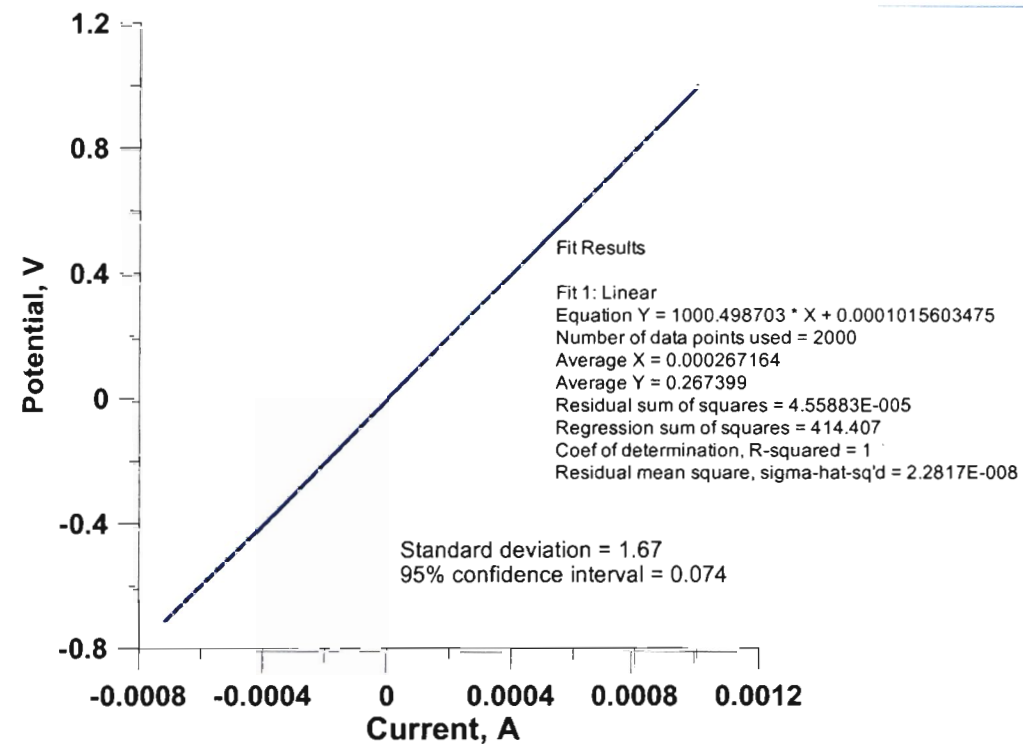
1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch2  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/26/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch3  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

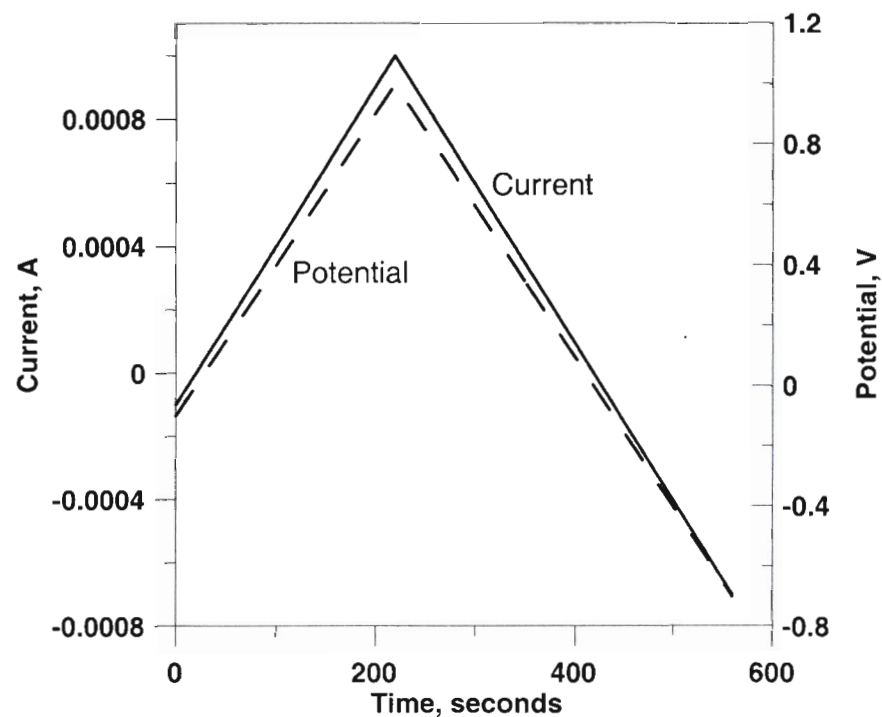
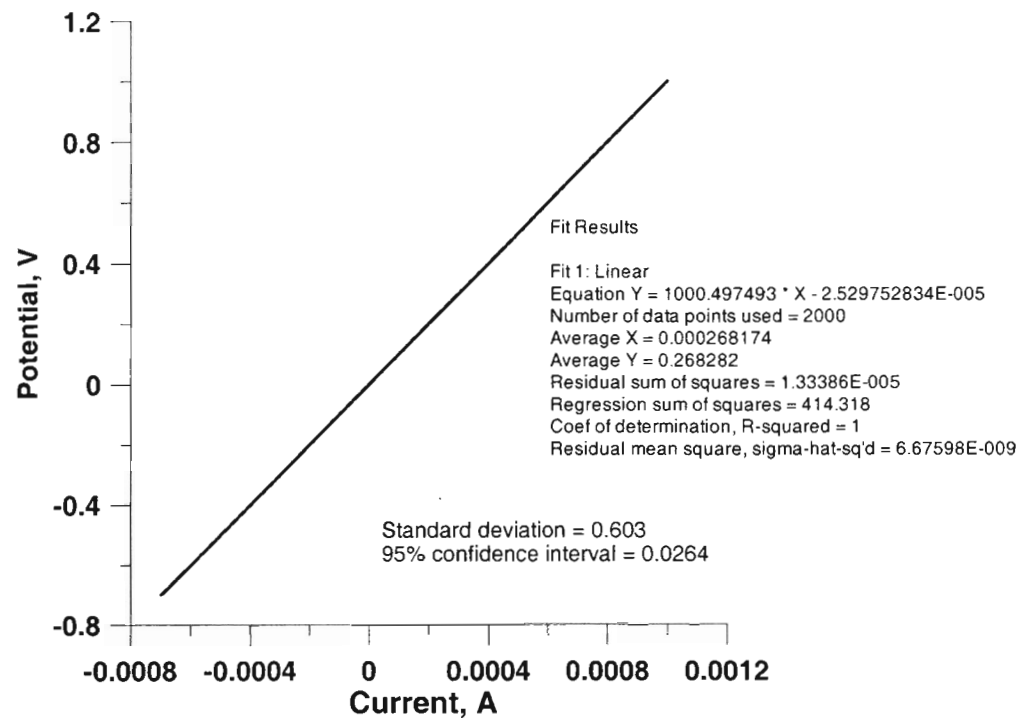
*X. Hua HQ 8/26/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch4  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

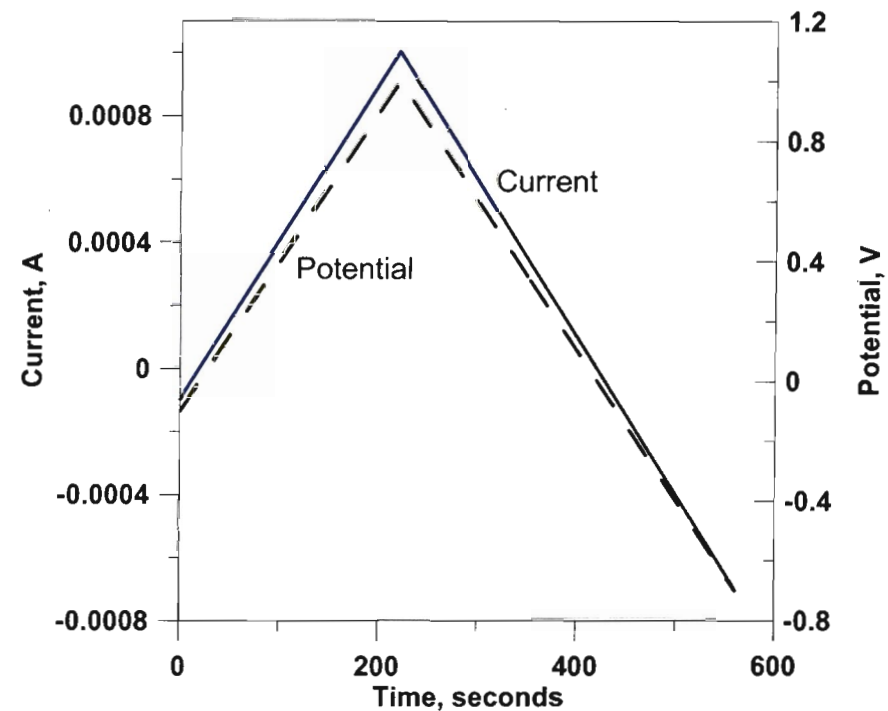
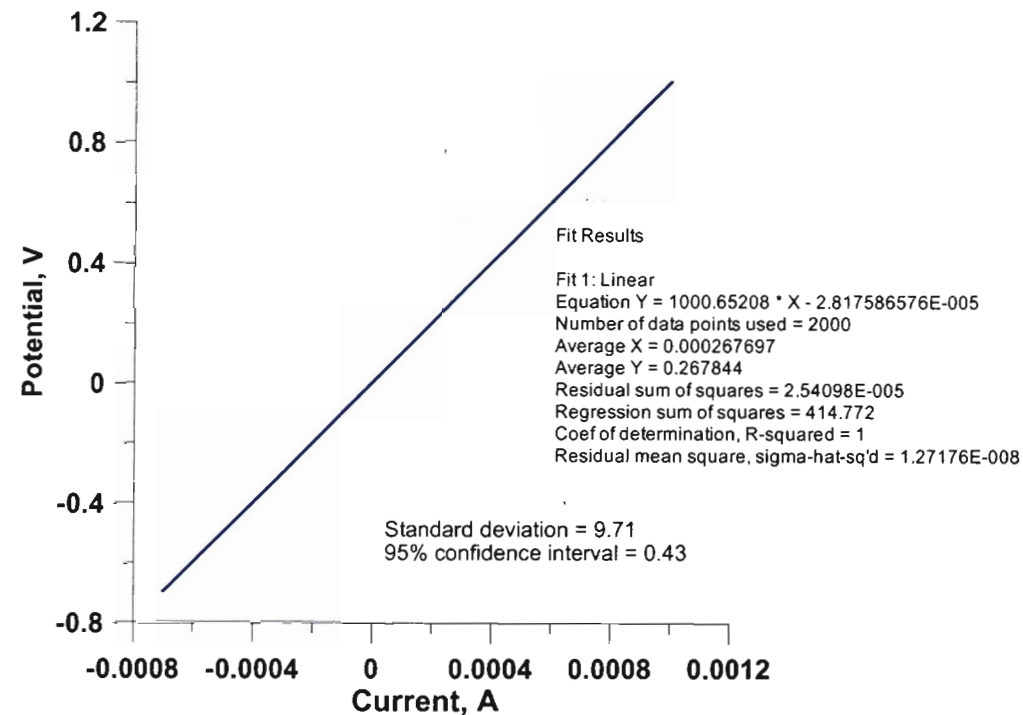
*X. Hua HQ 8/26/05*





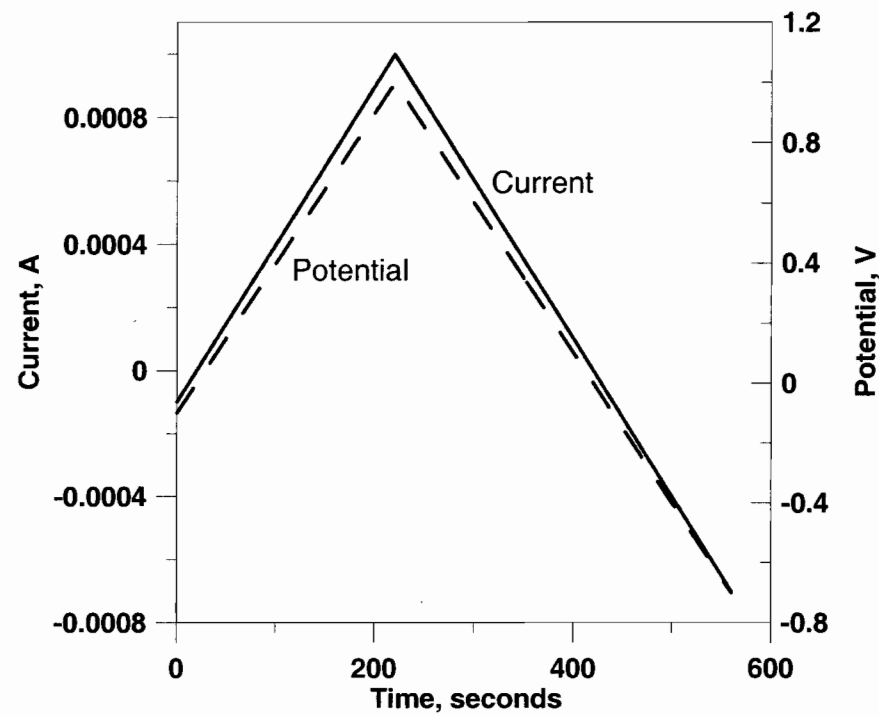
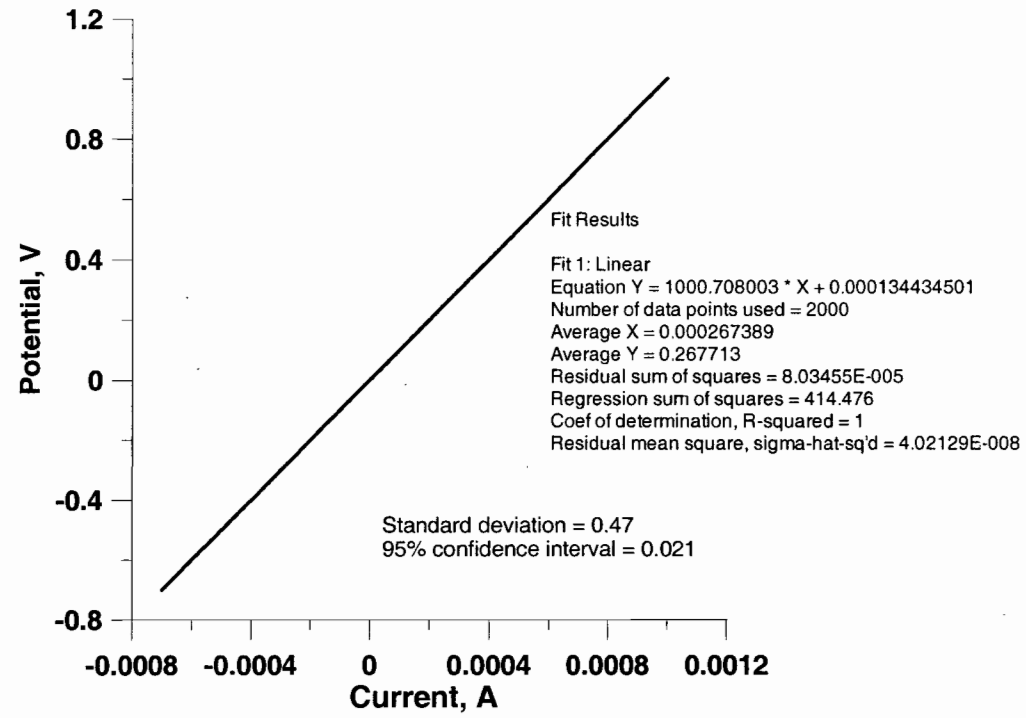
1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch5  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

*X-axis file 8/26/05*



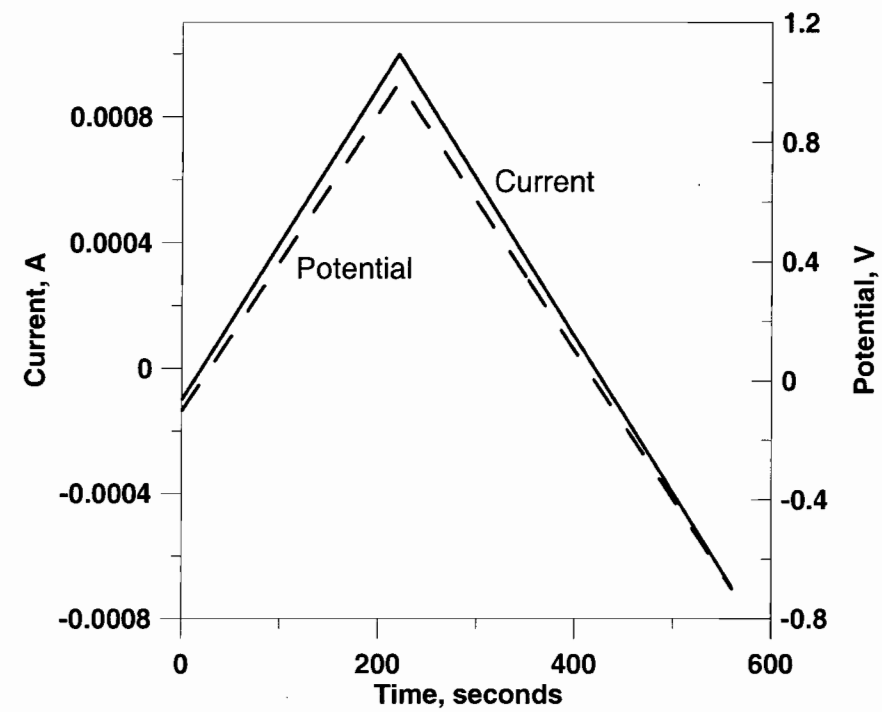
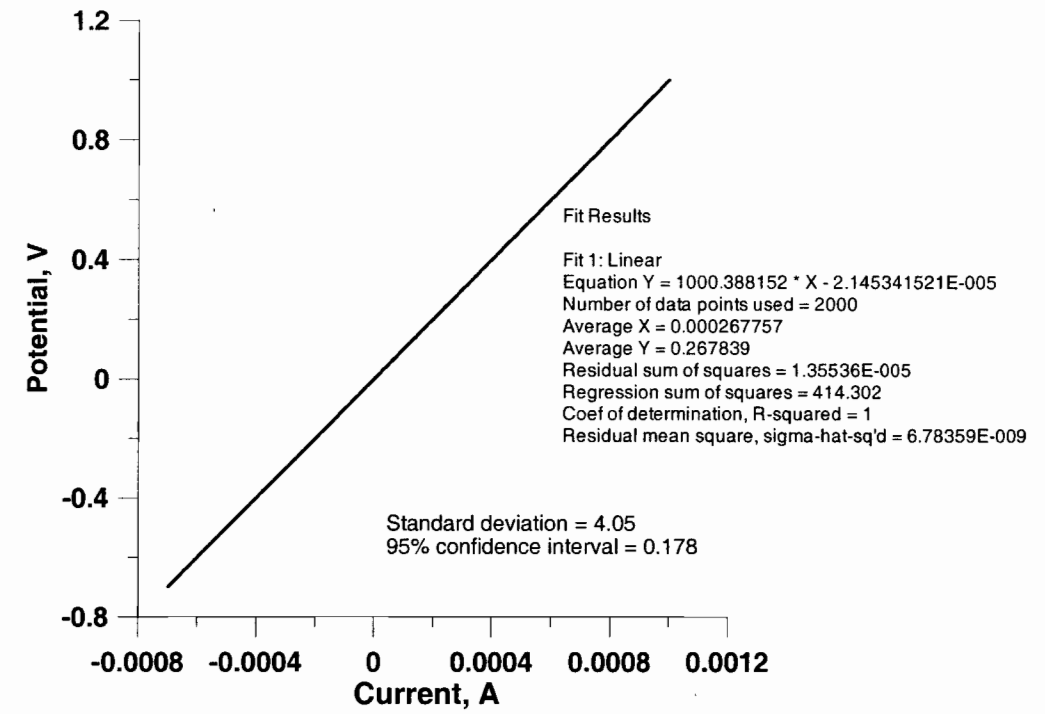
1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch6  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

*6 x-vt 11/21/05*  
*file X10 8/26/05*



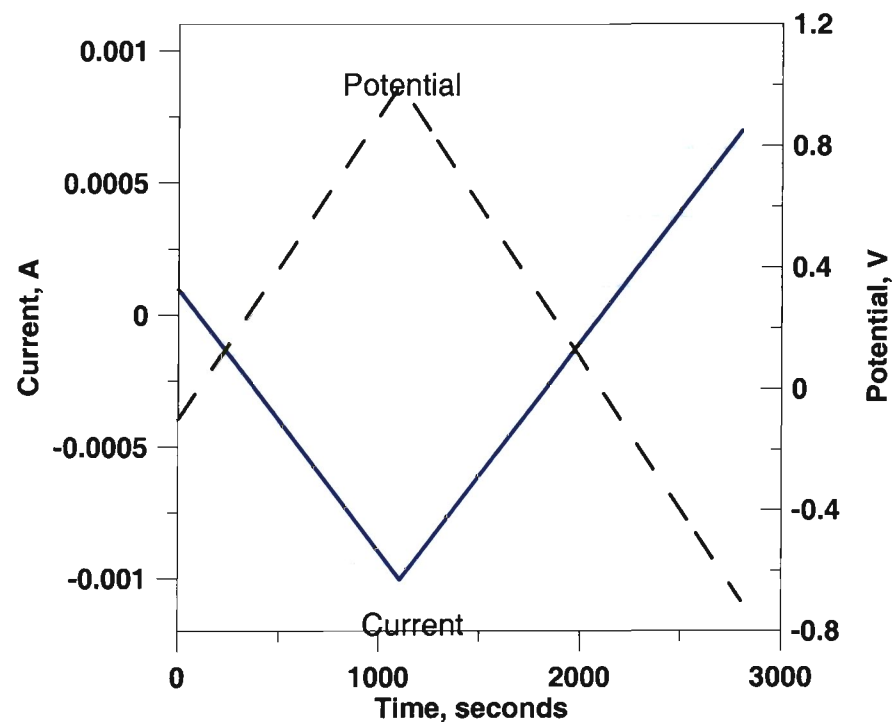
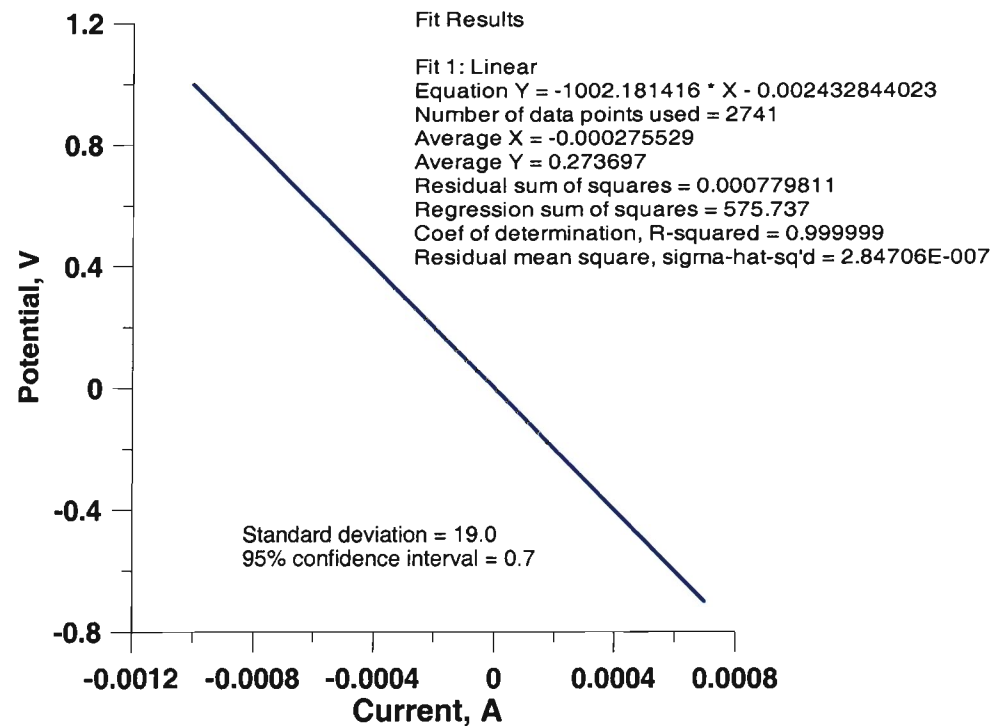
1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch7  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

*Xehan He 8/26/05*



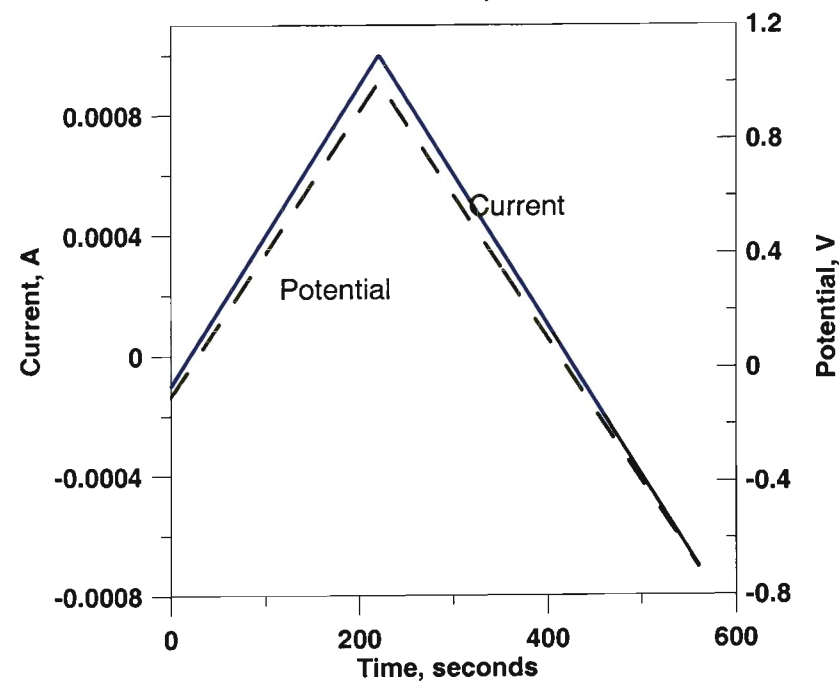
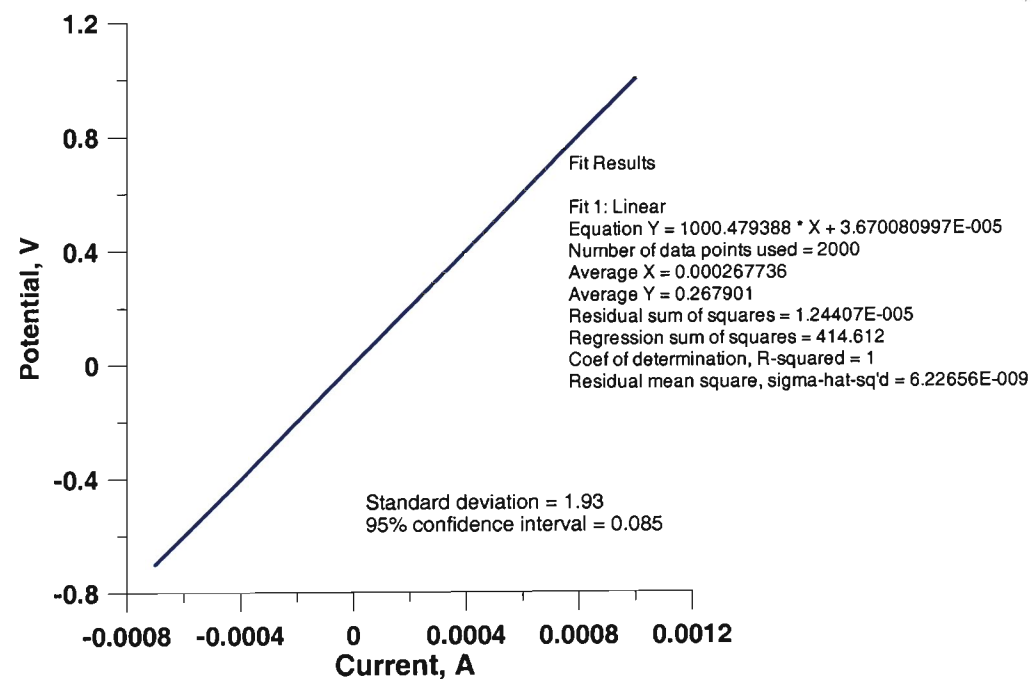
1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch8  
 SN 00240053  
 8/23/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

*He Xehan 8/26/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 EG&G Versat, SN 20104, 10/05/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 1 mV/s  
 Calculated time to finish scan: 2800 seconds; Actual time to finish scan: 2800 seconds

*Xi Hua He 10/6/05*

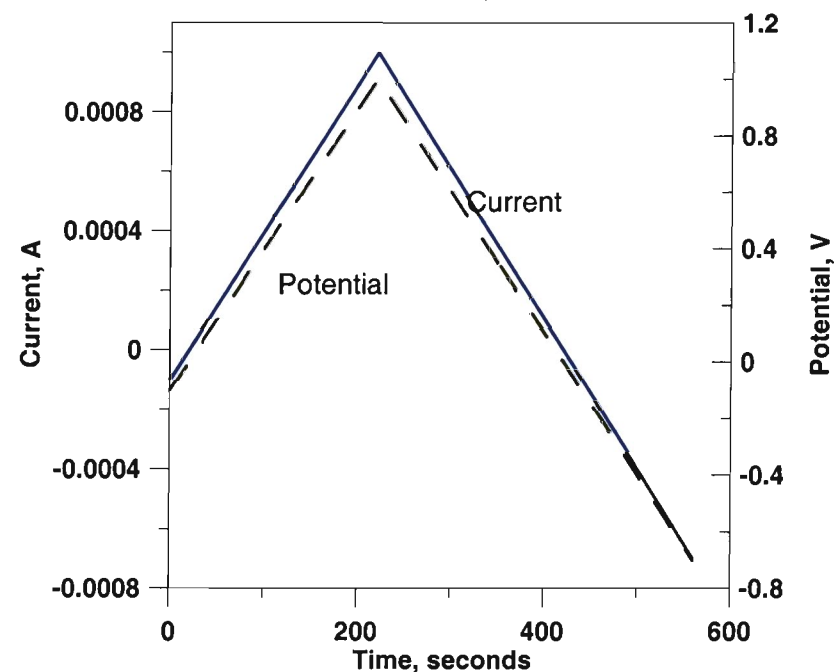
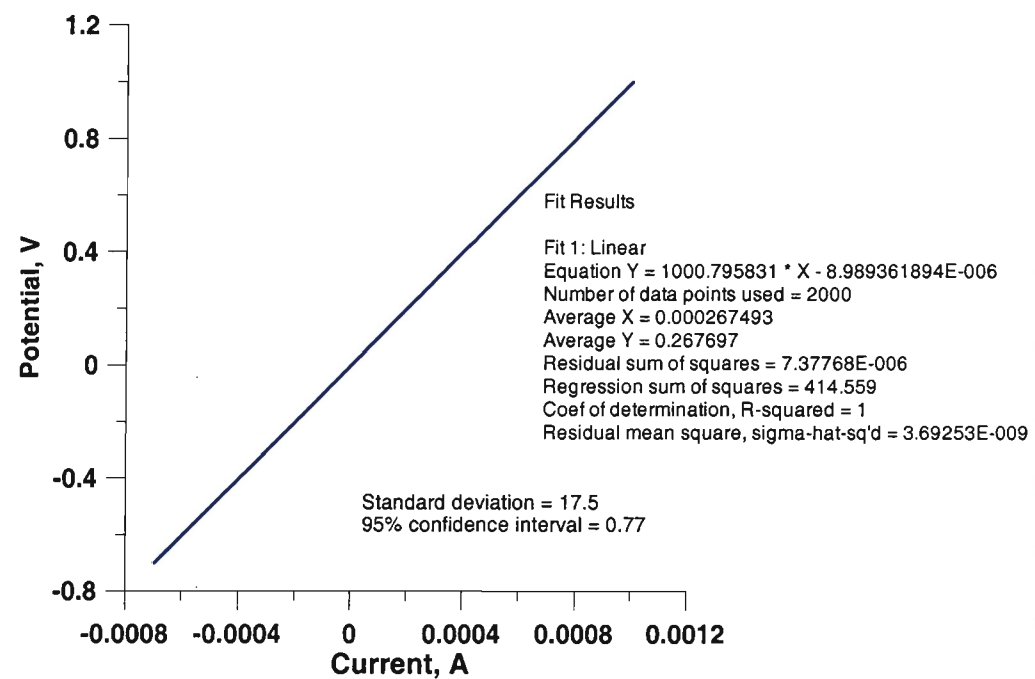


1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch1, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: ~~540 seconds~~ 560 seconds  
 Actual time to finish scan: 560 seconds

*He Xi 10/25/05*

*11/21/05*

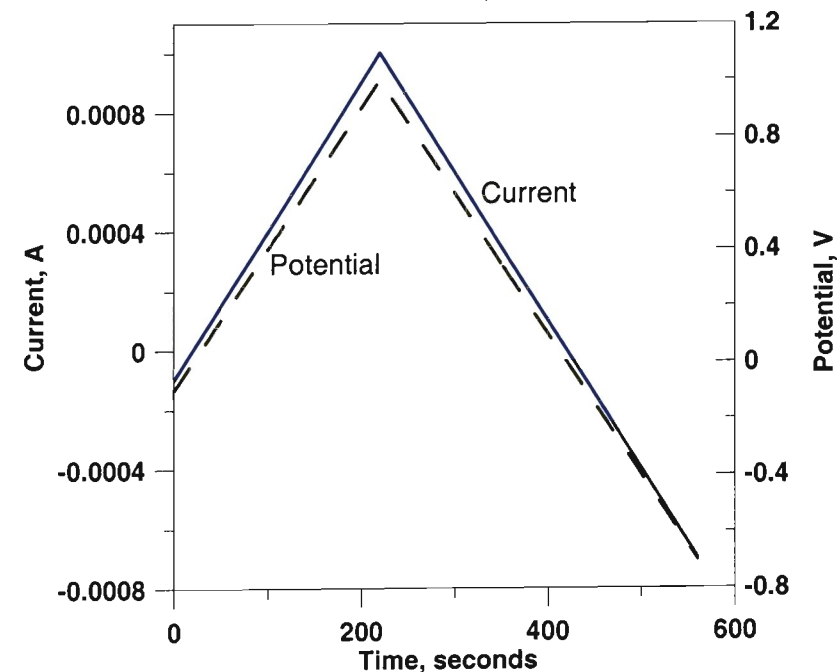
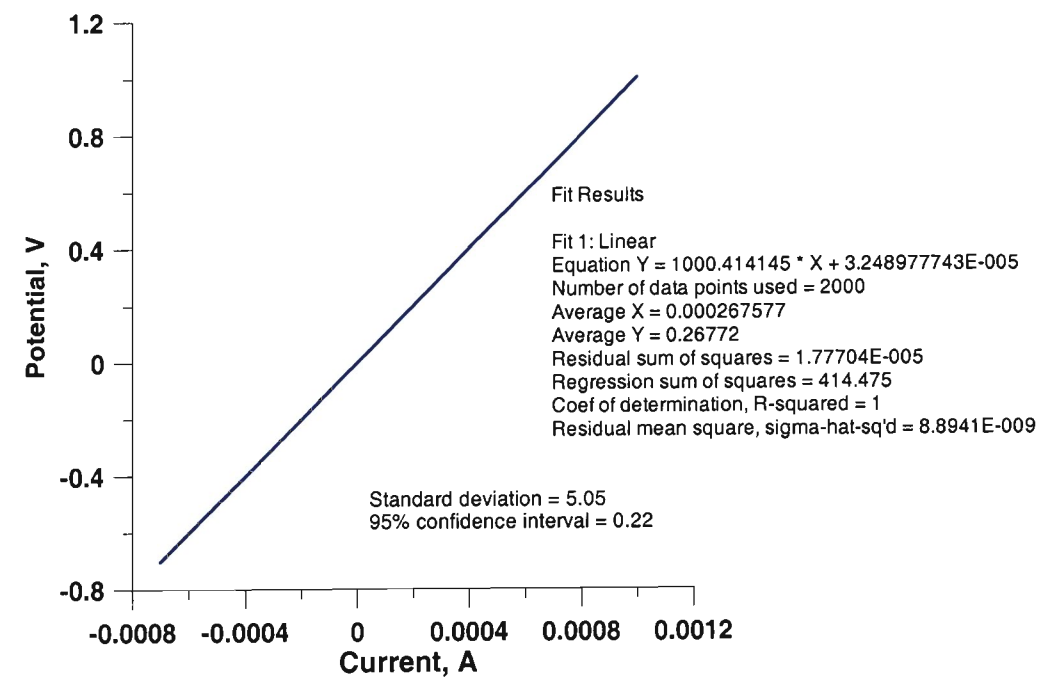




1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch2, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: ~~540 seconds~~ 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 10/25/05*

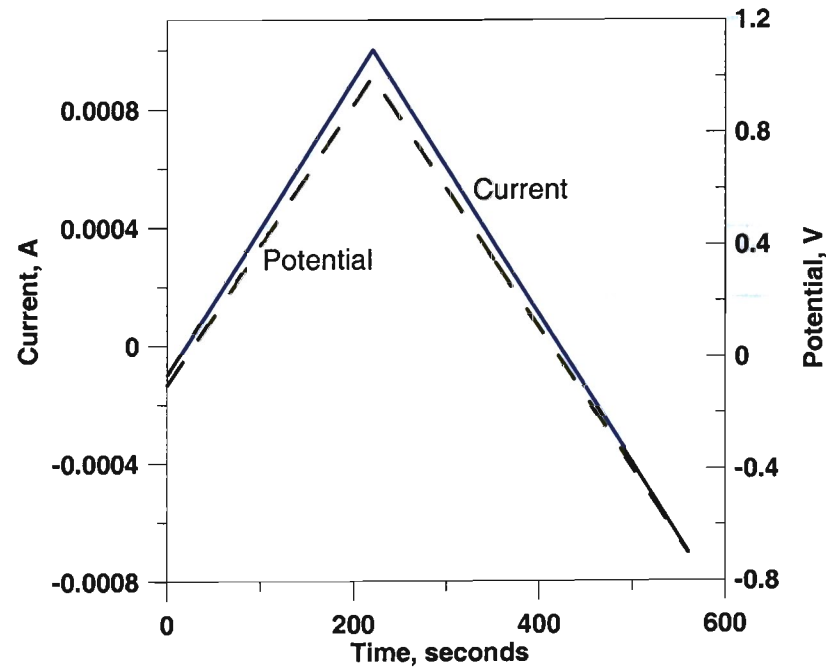
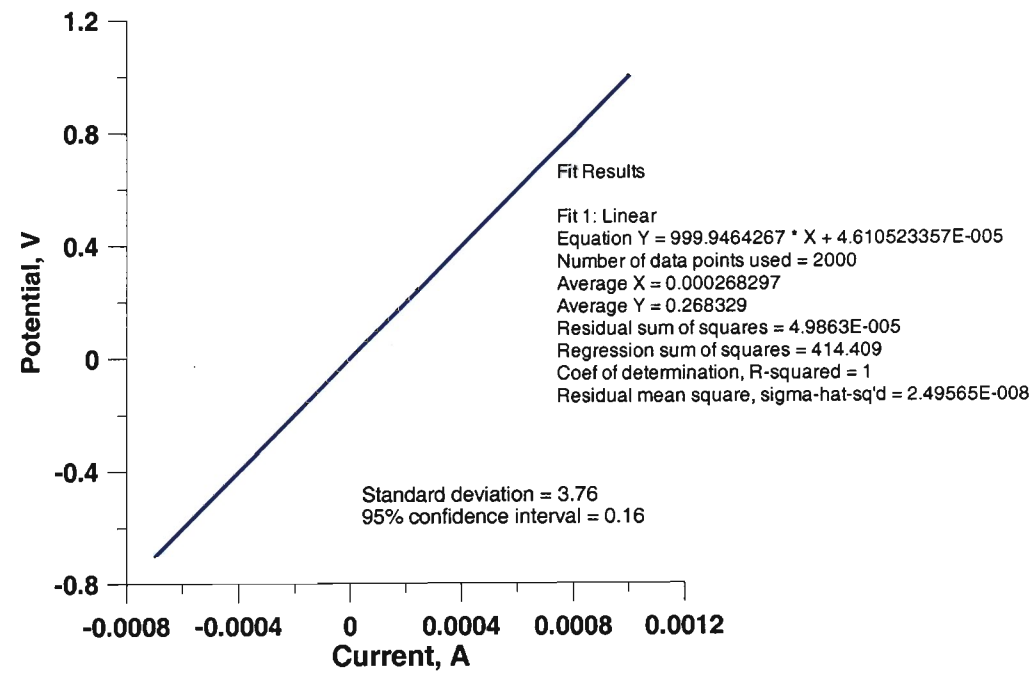
*x-h  
11/21/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch3, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: ~~540 seconds~~ 560 seconds  
 Actual time to finish scan: 560 seconds

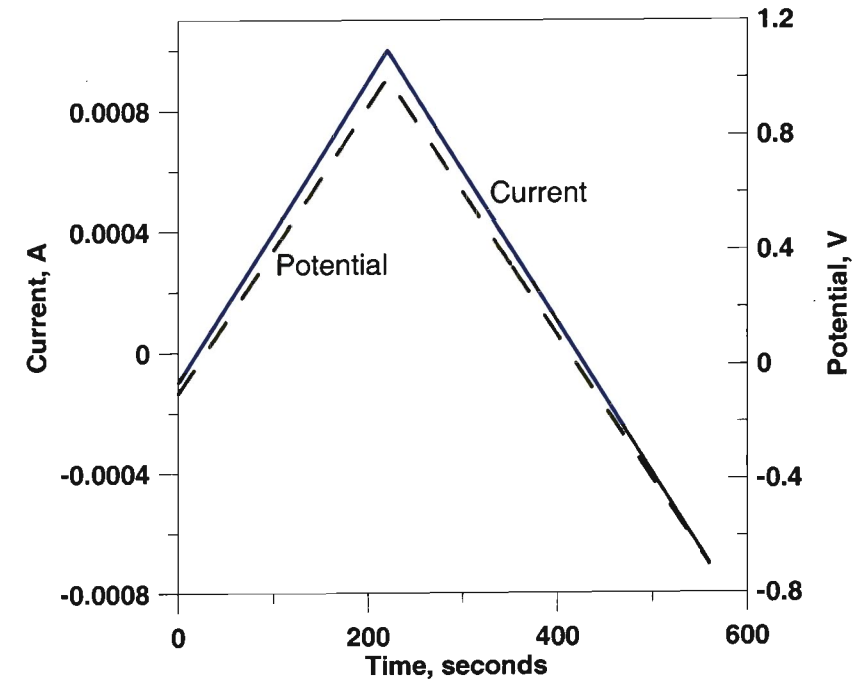
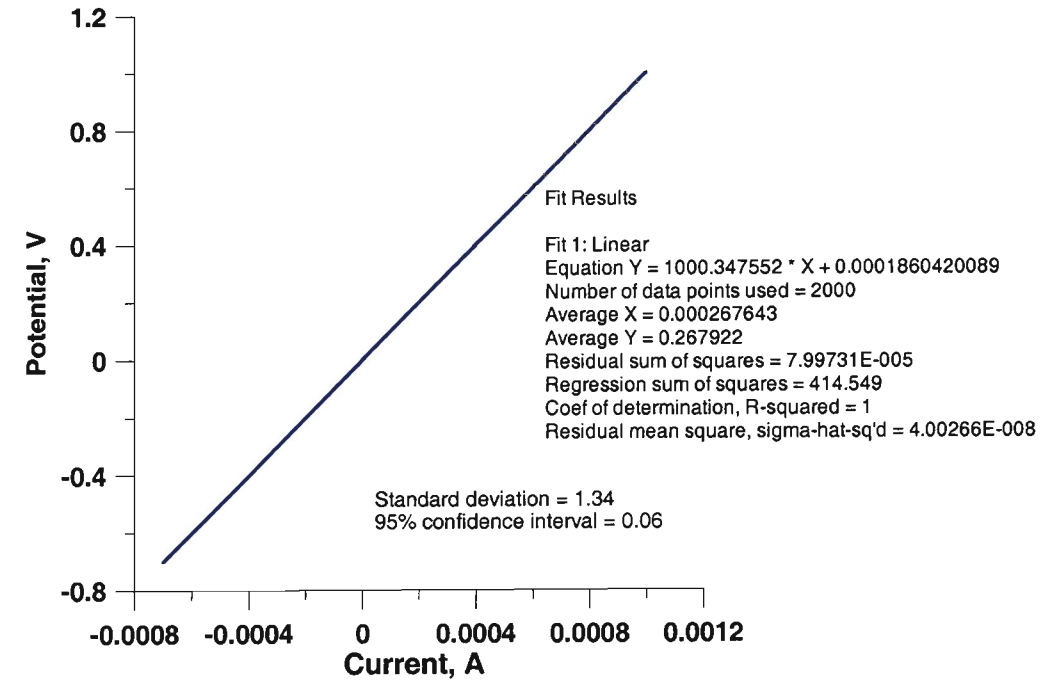
*Xihua He 10/25/05*

*x-h 11/21/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch4, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: ~~540 seconds~~ 560 seconds  
 Actual time to finish scan: 560 seconds

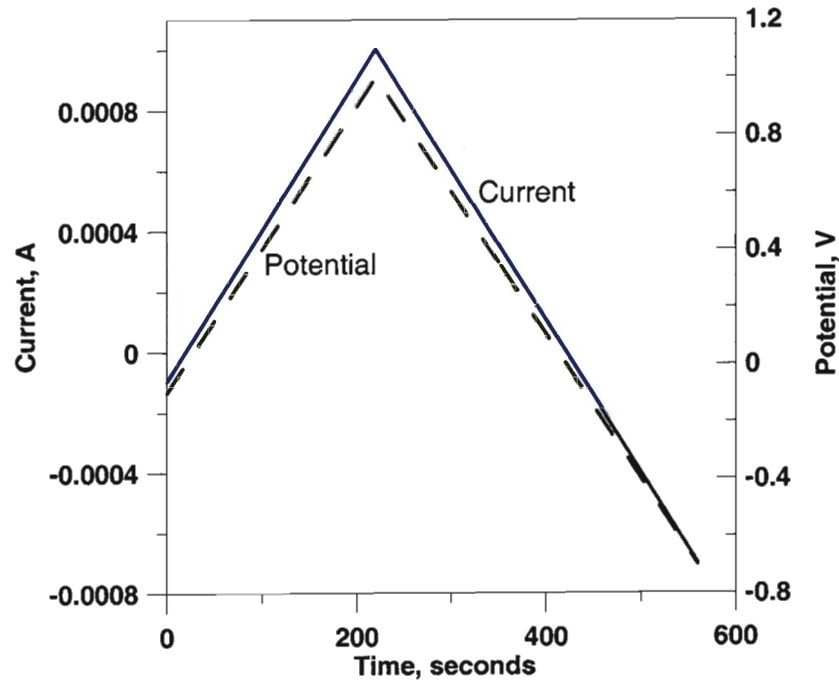
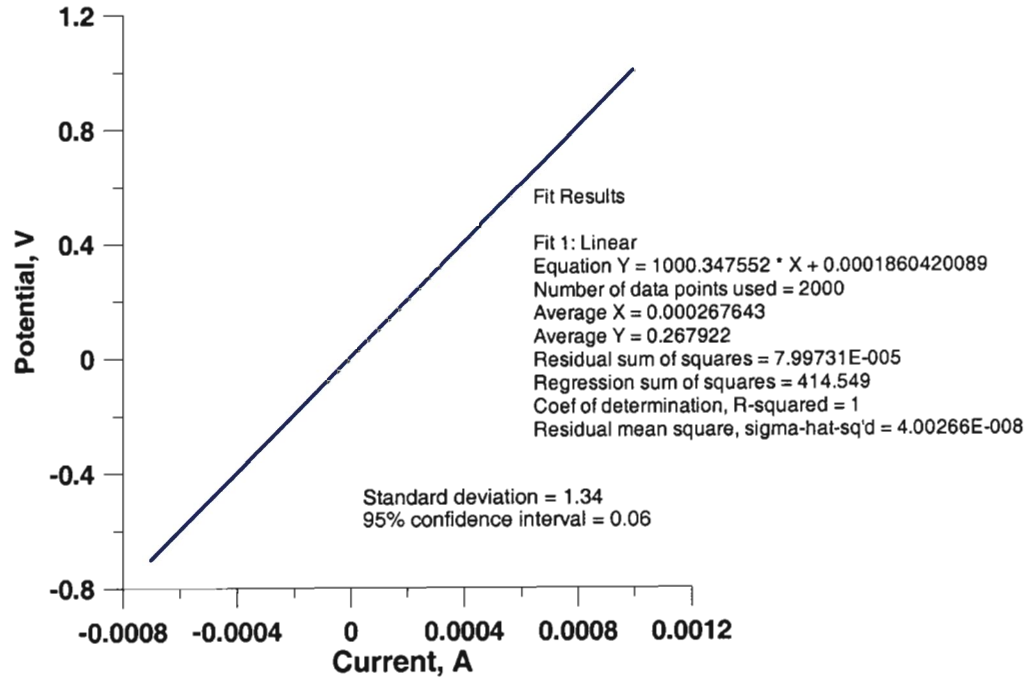
*Xihua He 10/25/05*



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch5, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: ~~540 seconds~~ 560 seconds  
 Actual time to finish scan: 560 seconds

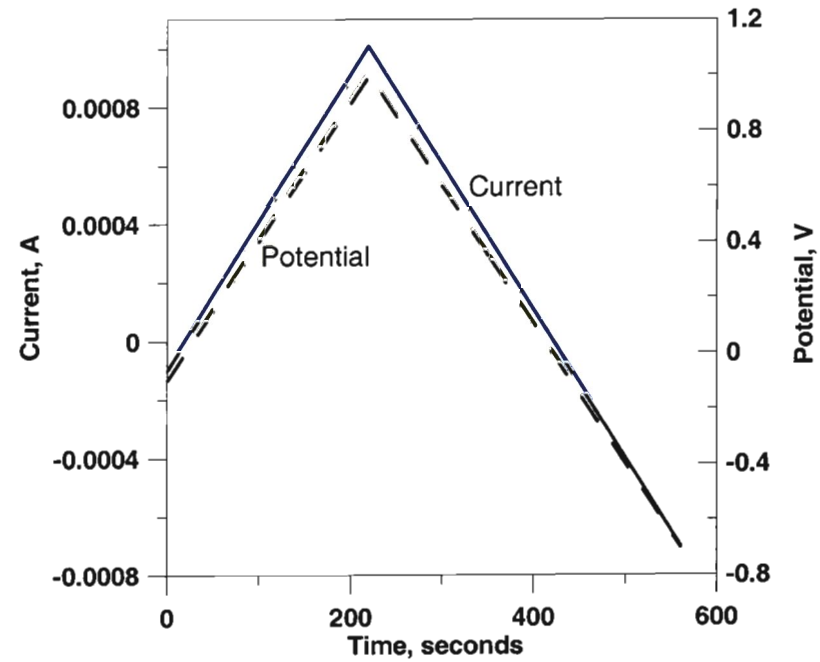
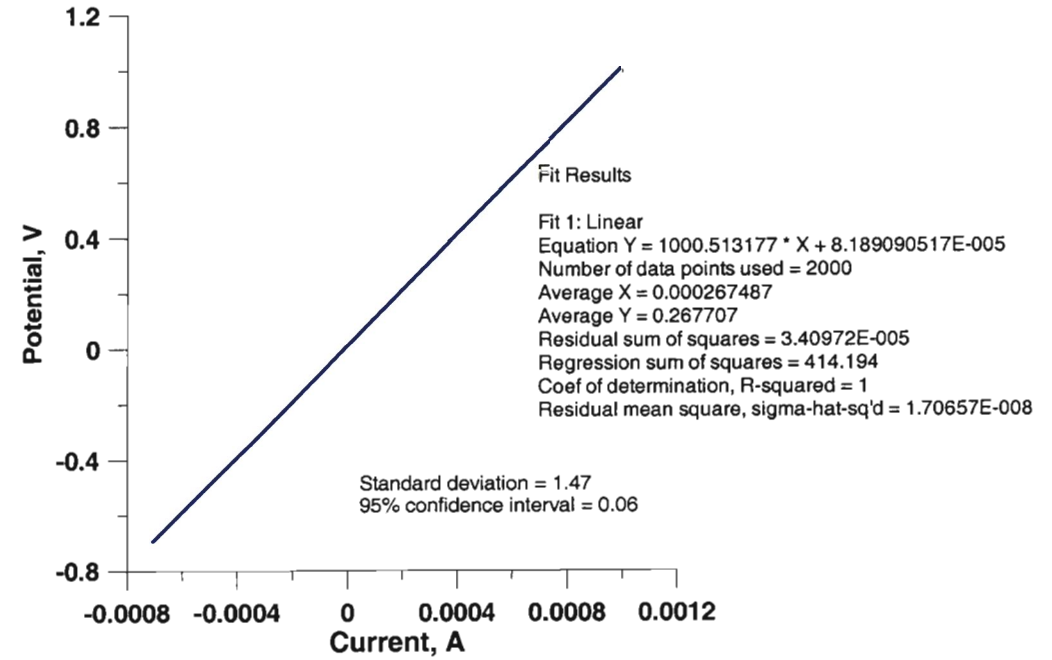
*Xihua He 10/25/05*





1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch6, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

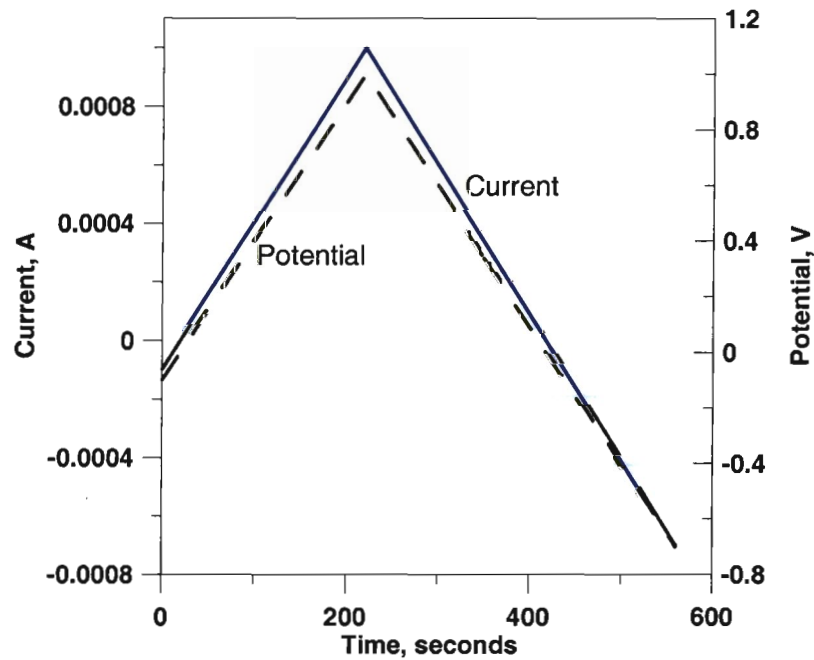
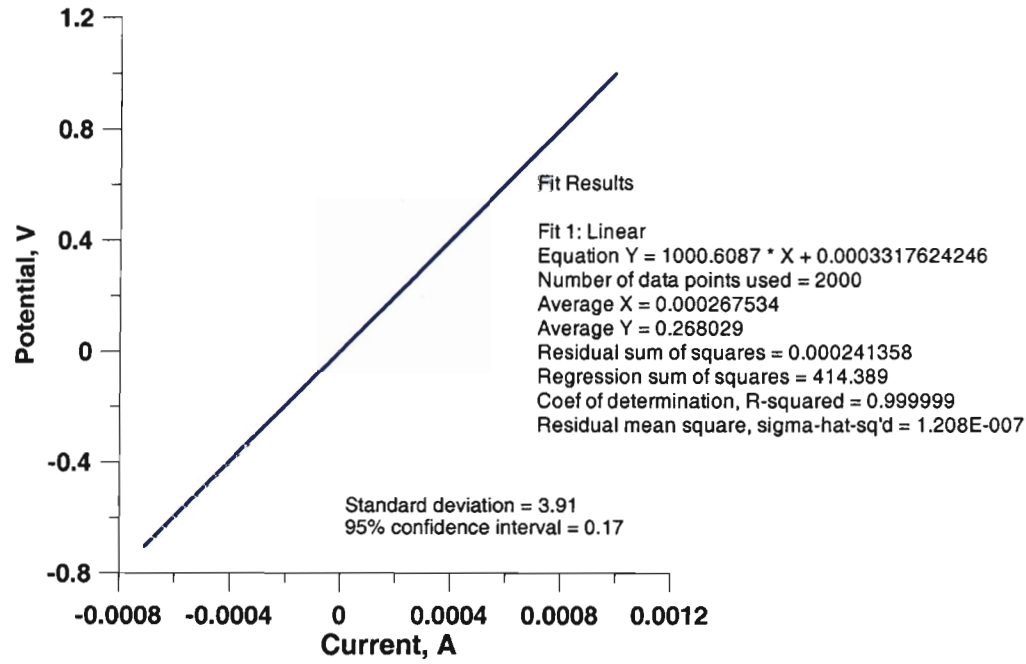
*He Xue* 10/25/05



1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch7, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

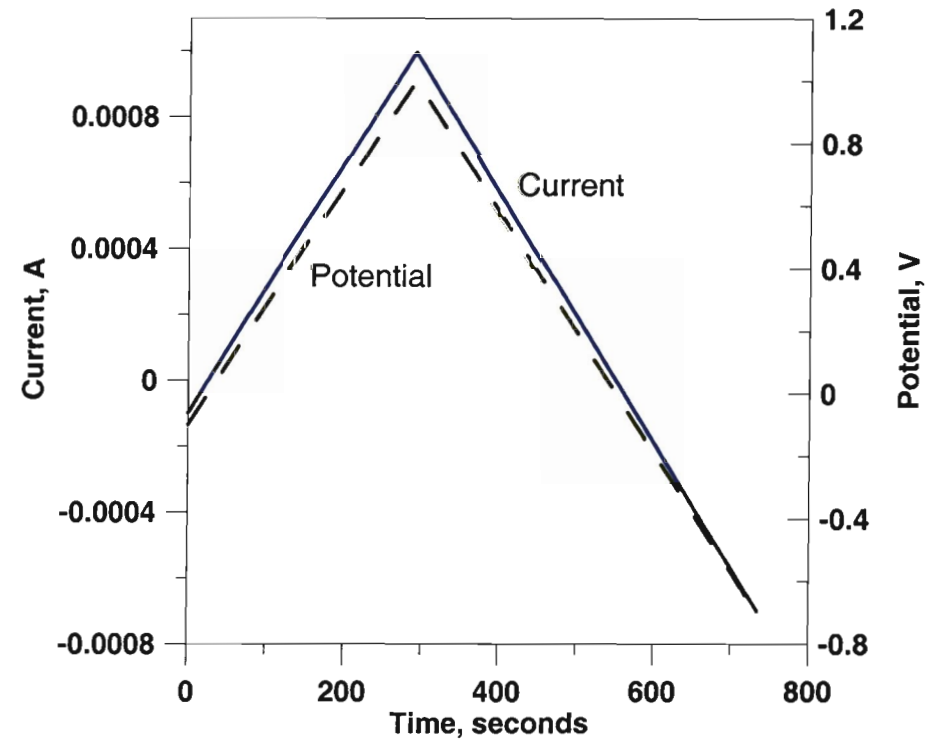
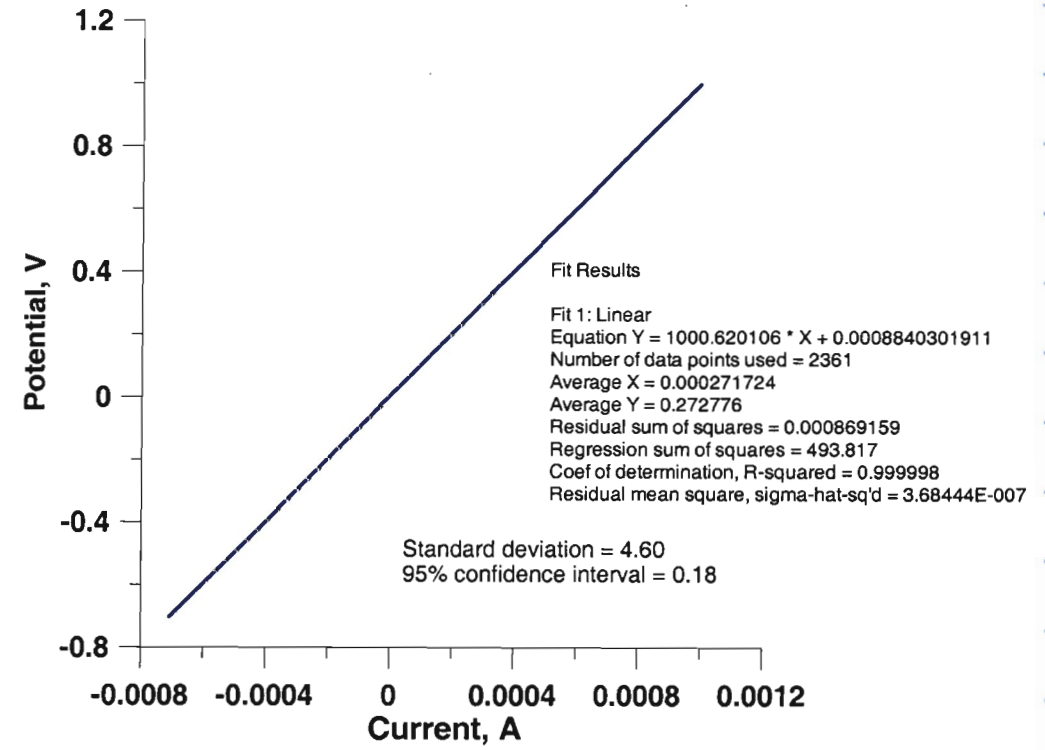
*Xue He* 10/25/05





1000 Ohm resistor, SN 171001, Cal 5/12/05, Due 11/11/05  
 Solartron 1480 Ch8, SN 00240551  
 10/25/05  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 540 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 10/25/05*



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1287 SN#001535500  
 11/16/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 735 seconds

*Xihua He 11/21/05*

Continued from pg #20

weekly pH Calibrations of EA940 SN#2330

cal: 7/25/05 due: 7/25/06

pH probe 13-620-296 SN#4065196

Date	Buffers Used	Int.
11/21/05	4-7-10	BK
11/22/05	4-7-10	BK
12/5/05	4-7-10	BK
12/12/05	4-7-10	BK
12/15/05	4-7-10	BK
1/3/06	4-7-10	BK
1/9/06	4-7-10	BK
1/16/06	4-7-10	BK
1/23/06	4-7-10	BK
1/31/06	4-7-10	BK
2/6/06	4-7-10	BK
2/13/06	4-7-10	BK
2/20/06	4-7-10	BK
2/27/06	4-7-10	BK
3/7/06	4-7-10	BK
3/13/06	4-7-10	BK
3/21/06	4-7-10	BK
3/27/06	4-7-10	BK
4/3/06	4-7-10	BK
4/11/06	4-7-10	BK
4/17/06	4-7-10	BK
4/24/06	4-7-10	BK

B.K. 11/21/05

Continued from pg #21

Weekly pH Calibrations of EA940 SN#4274

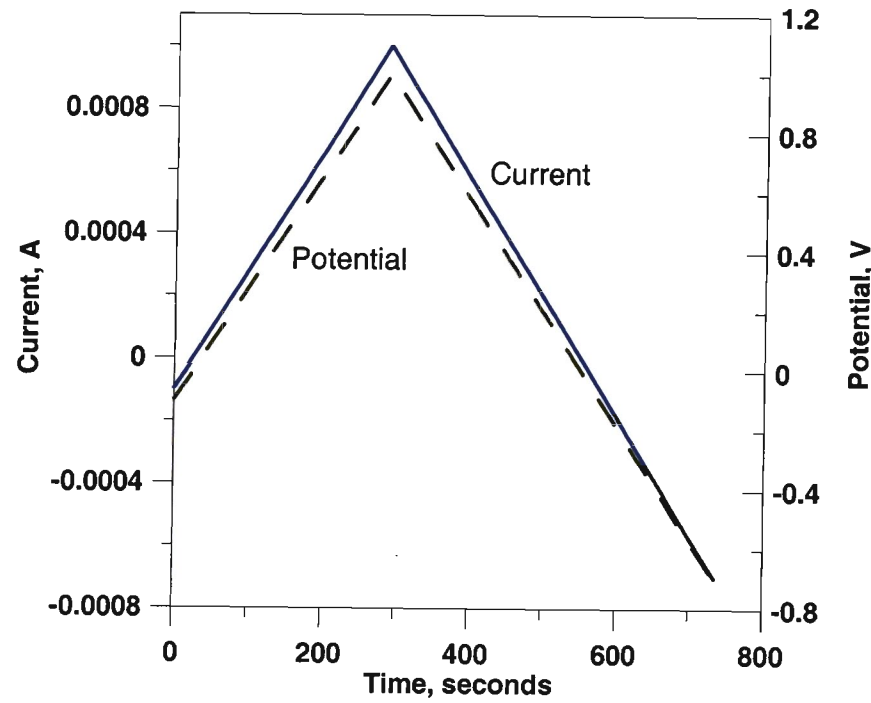
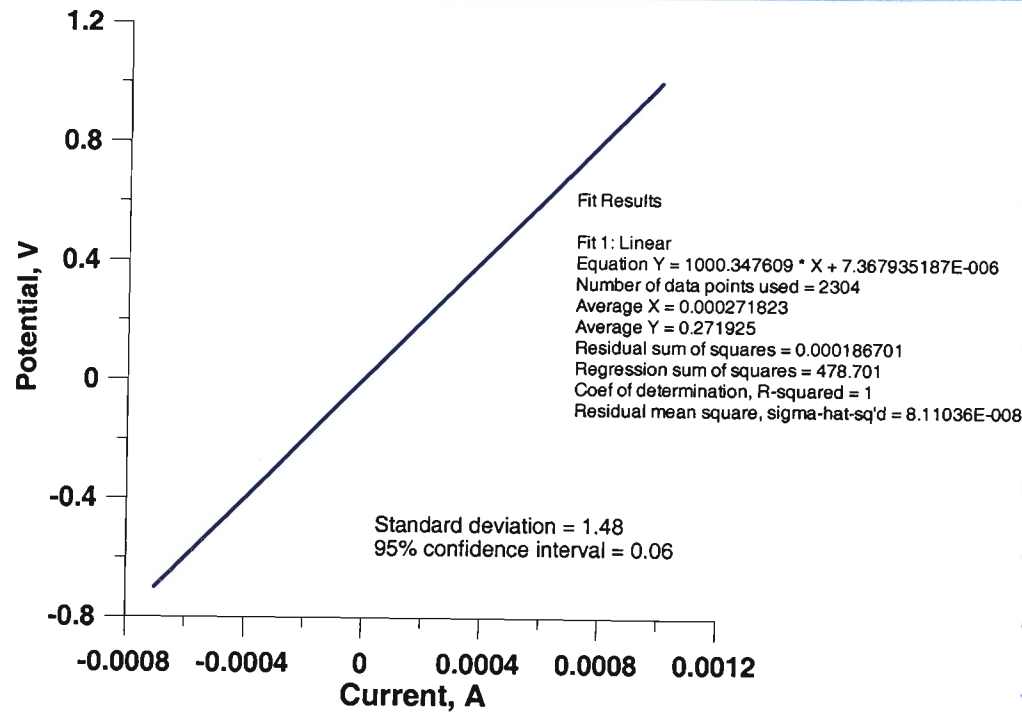
cal: 10/17/05 due: 3/17/06

pH probe 13-620-296 SN#5146019

Date	Buffers Used	Int.
11/21/05	4-7-10	BK
11/22/05	4-7-10	BK
12/5/05	4-7-10	BK
12/12/05	4-7-10	BK
12/19/05	4-7-10	BK
1/3/06	4-7-10	BK
1/9/06	4-7-10	BK
1/16/06	4-7-10	BK
1/23/06	4-7-10	BK
1/31/06	4-7-10	BK
2/6/06	4-7-10	BK
2/13/06	4-7-10	BK
2/20/06	4-7-10	BK
2/27/06	4-7-10	BK
3/7/06	4-7-10	BK
3/13/06	4-7-10	BK
3/20/06	4-7-10	BK
3/21/06	4-7-10	BK
4/3/06	4-7-10	BK
Sent To Cal Lab		BK
4/17/06		BK
4/24/06		BK

not back from Cal Lab  
Still In Cal Lab

B.K. 11/21/05



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1287 SN#00148500  
 11/17/05  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 735 seconds

X. Hua PE 11/21/05

See pg #184-185 NB #308  
 Last Calibration 6/1/05 pg #195 NB #308

Additional Metallurgical Microscope Tests

Used Machine 304 L SS Block see pg #195 NB #308

Used Starrett Calipers Model # 721 SN# 03031512 cal 3/24/05 due 3/24/06

Actual (Inspection)	Starrett 721	Microscope Olympus PME3
20.3 $\mu$ m	0.02 mm	22 $\mu$ m
73.6 $\mu$ m	0.07 mm	73 $\mu$ m
116.8 $\mu$ m	0.11 mm	111 $\mu$ m
240.0 $\mu$ m	0.24 mm	232 $\mu$ m
488.9 $\mu$ m	0.47 mm	464 $\mu$ m

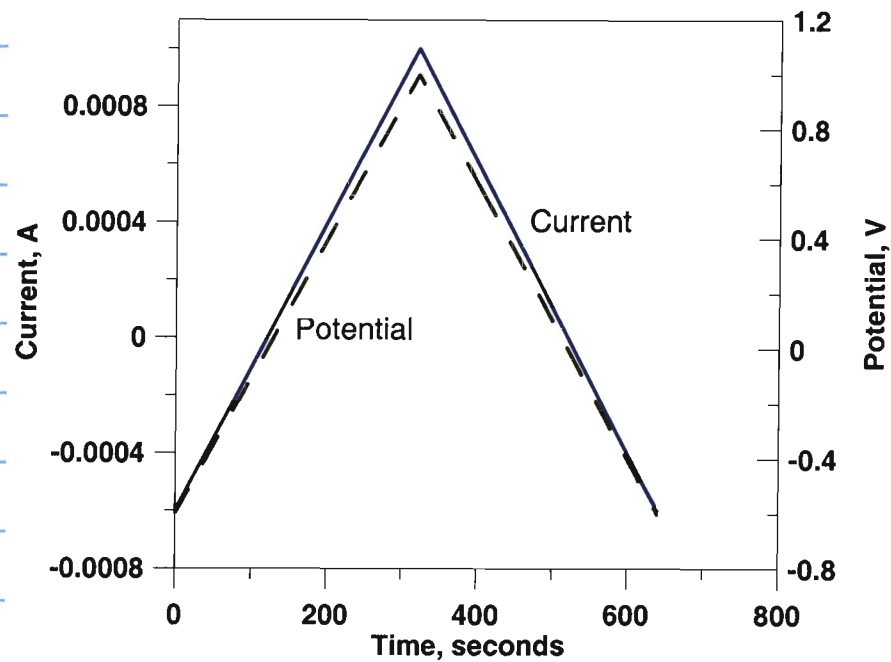
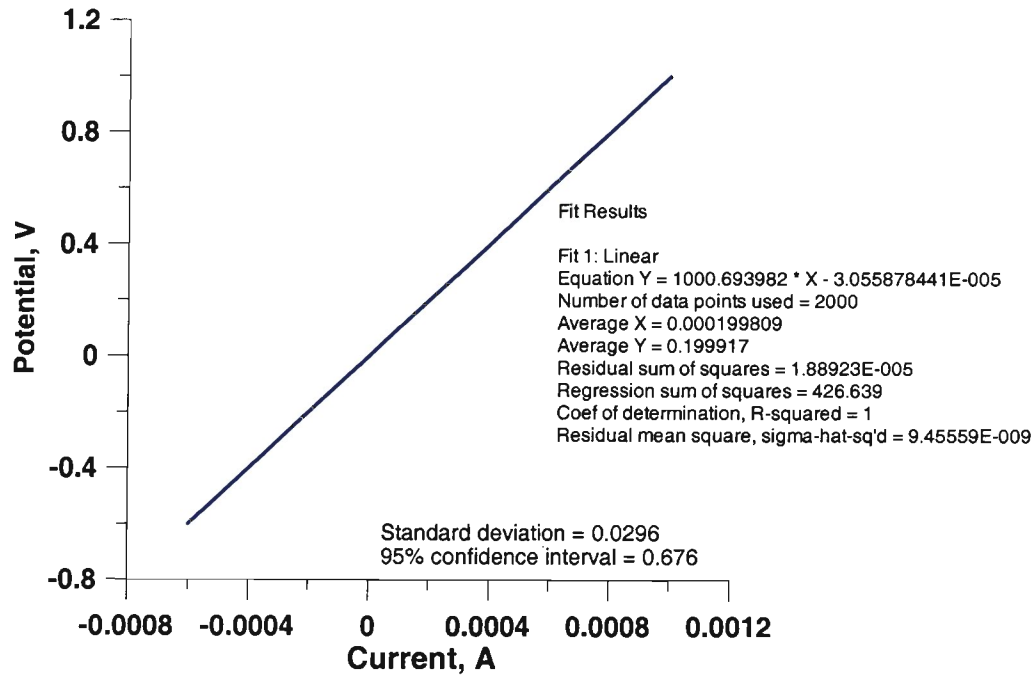
Procedure

Used objective lens measurement then the stage was moved and  
 A measurement was taken with the Starrett calipers using the  
 Back flat side of the Microscope Base for measurement

Conclusion: The Olympus PME3 microscope is sufficient for measuring  
 corrosion penetration per ASTM G46

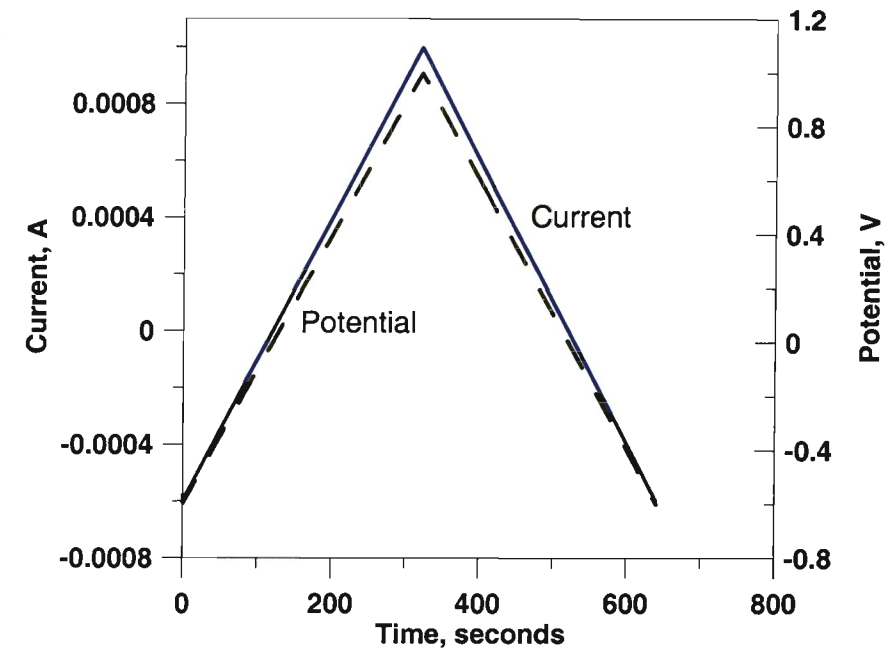
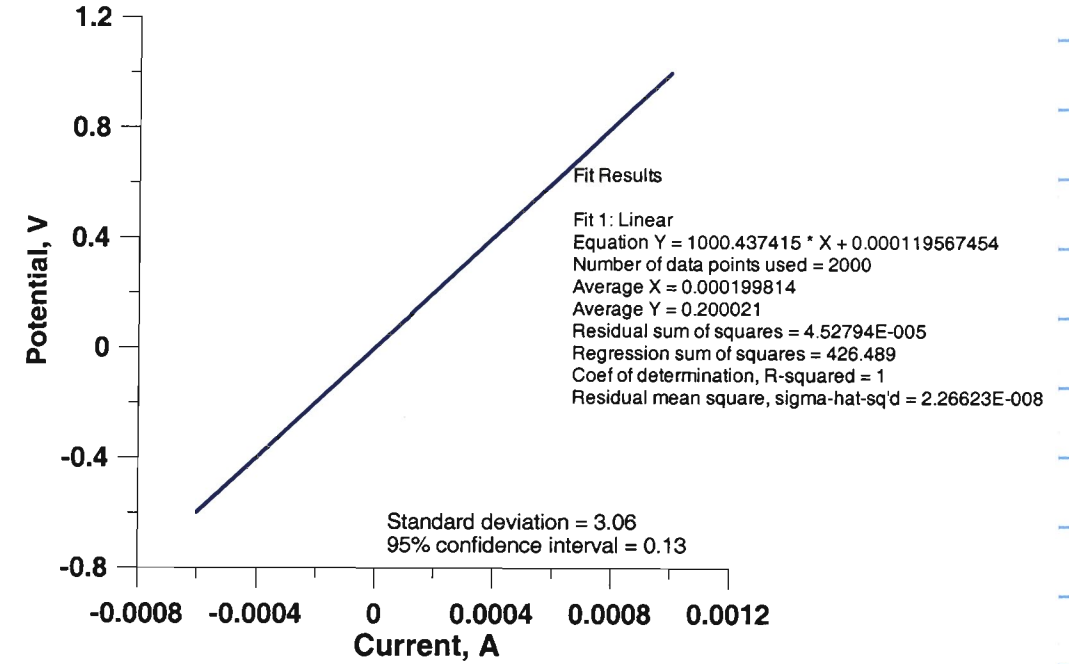
*[Signature]* 12/13/05





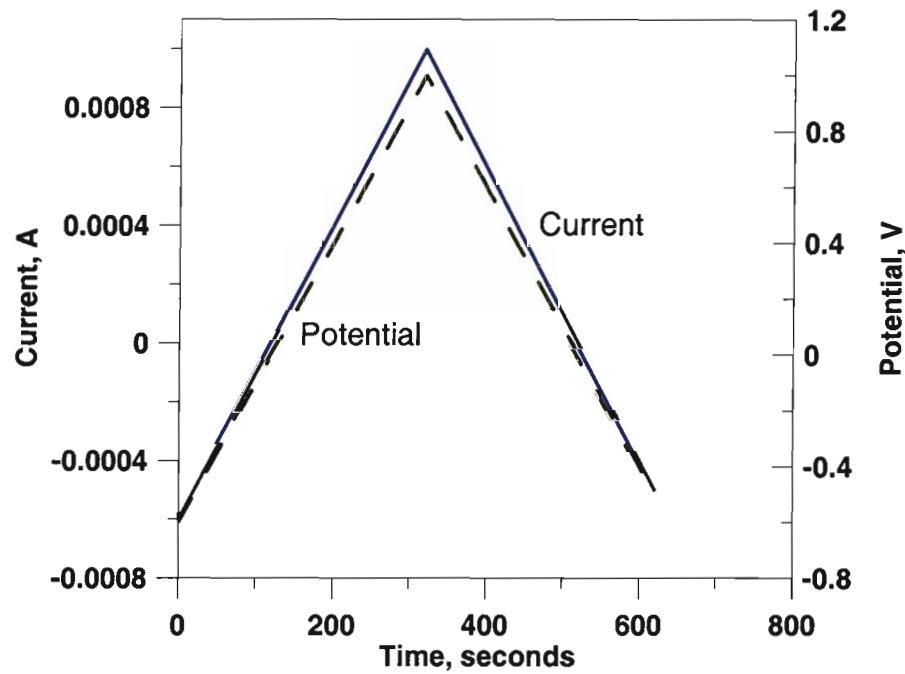
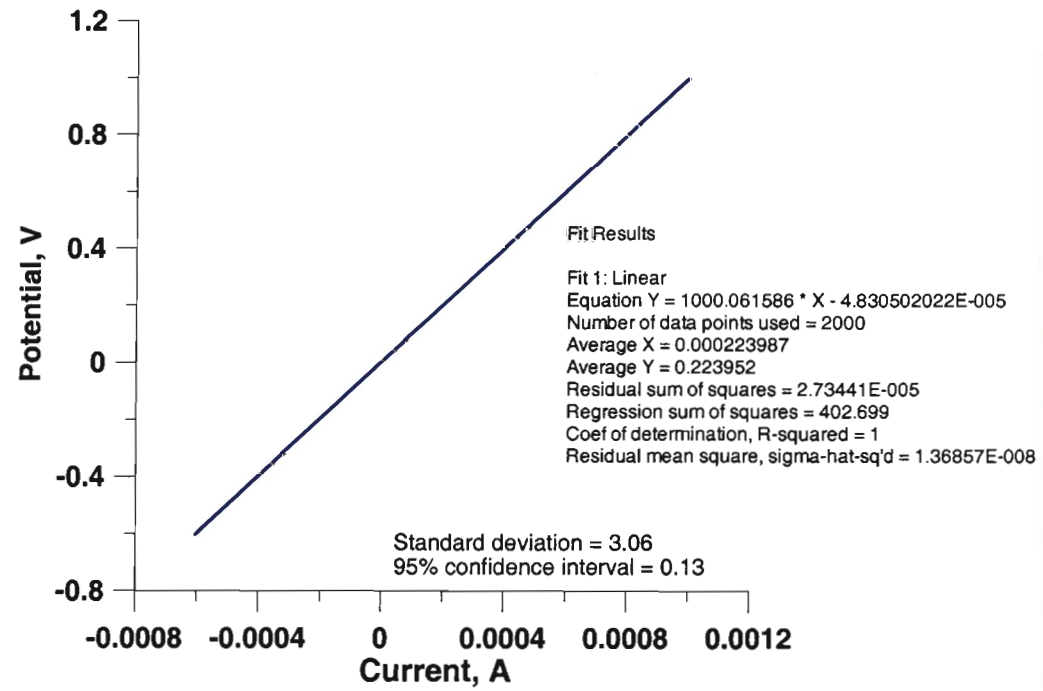
1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch1  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

*Xibue He 12/22/05*



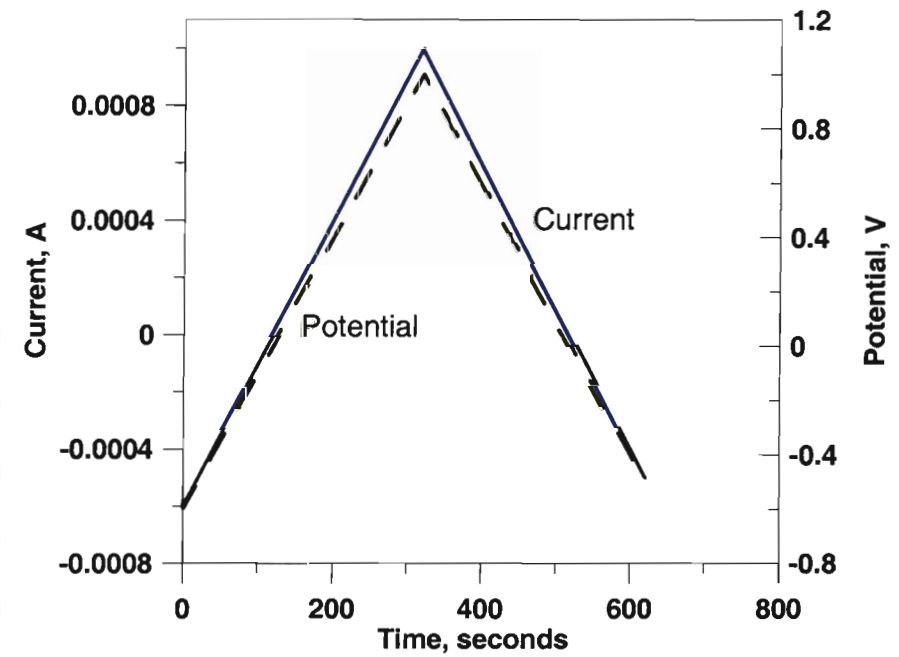
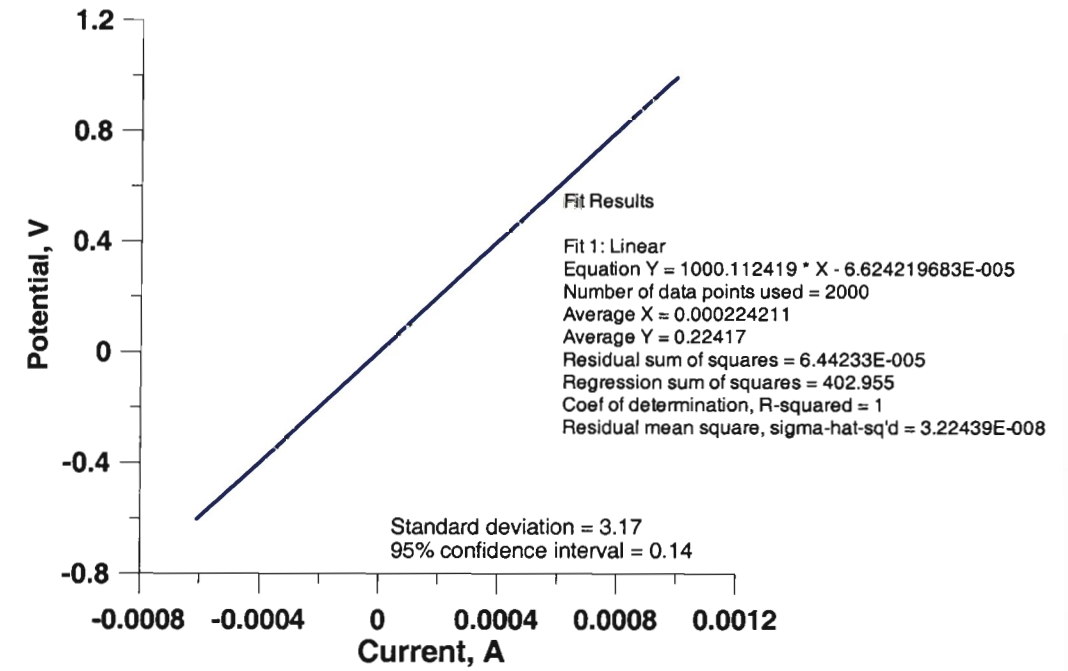
1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch2  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

*Xibue He 12/22/05*



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch3  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

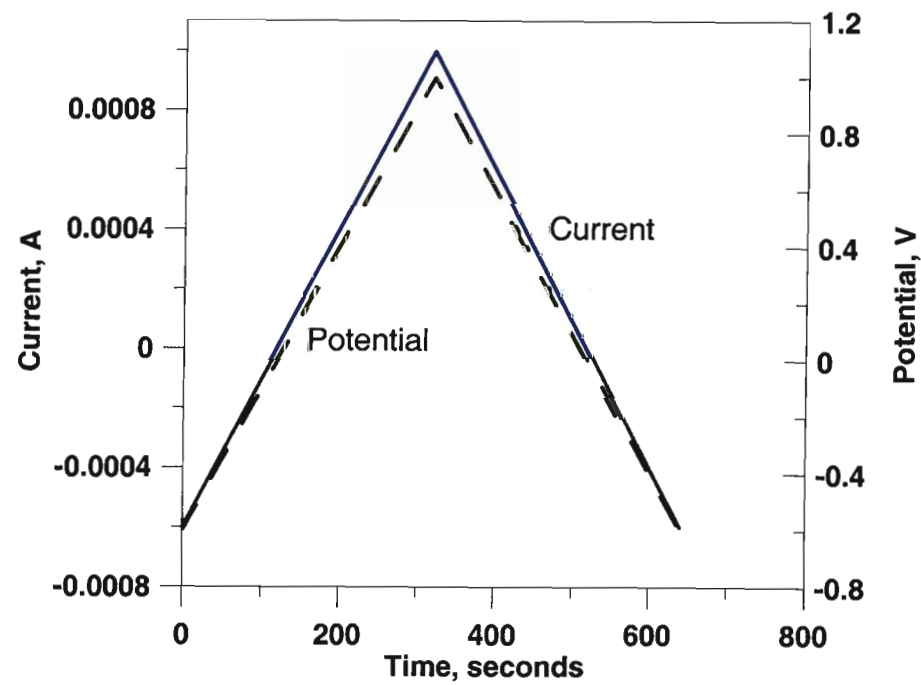
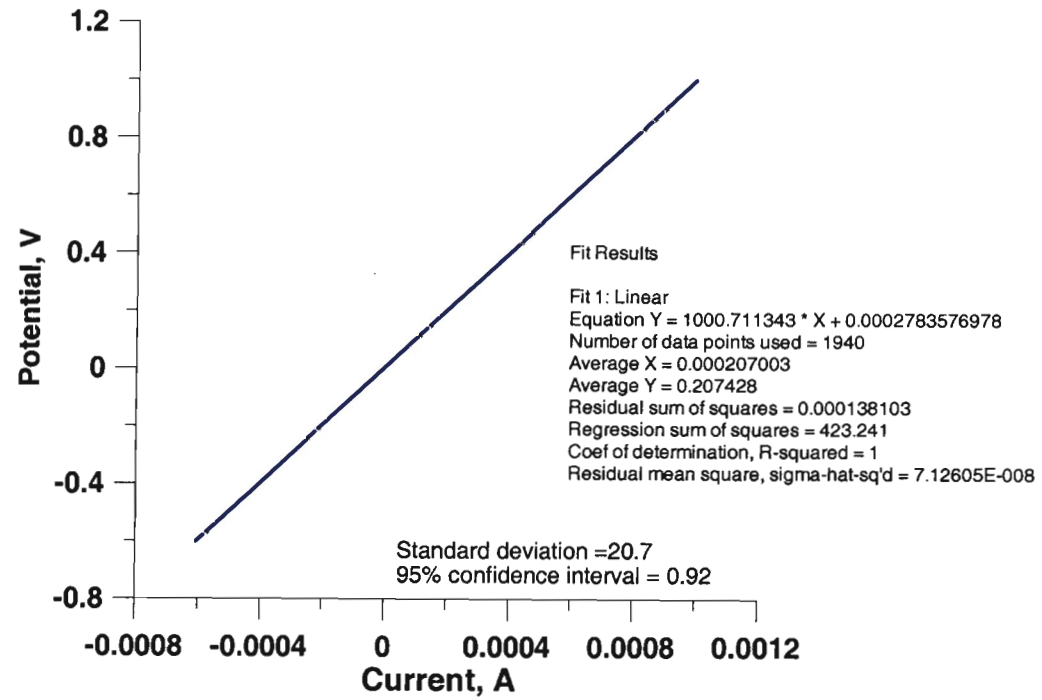
*Xihua He 12/22/05*  
*Xi 12/22/05*



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch4  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

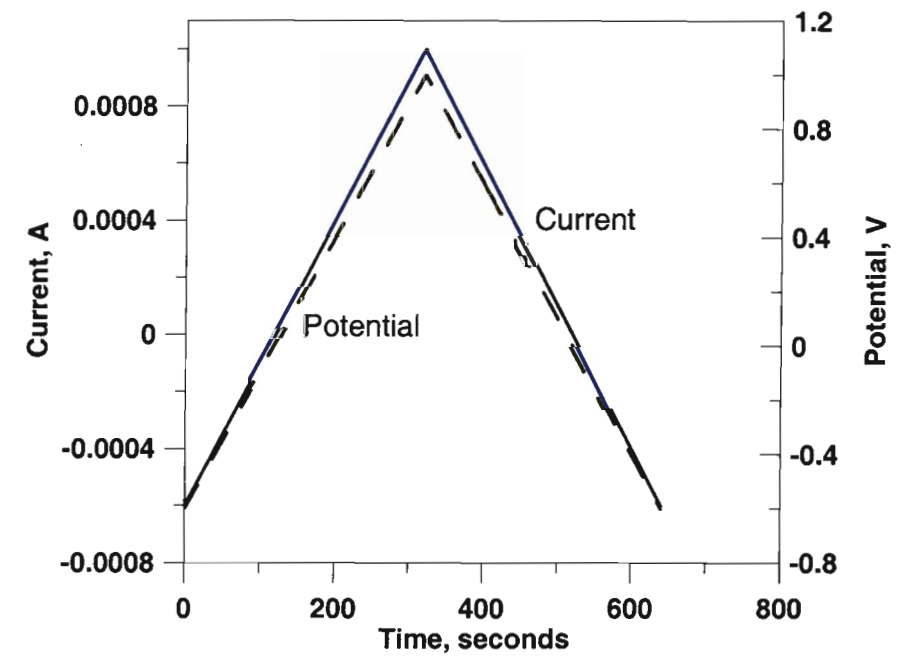
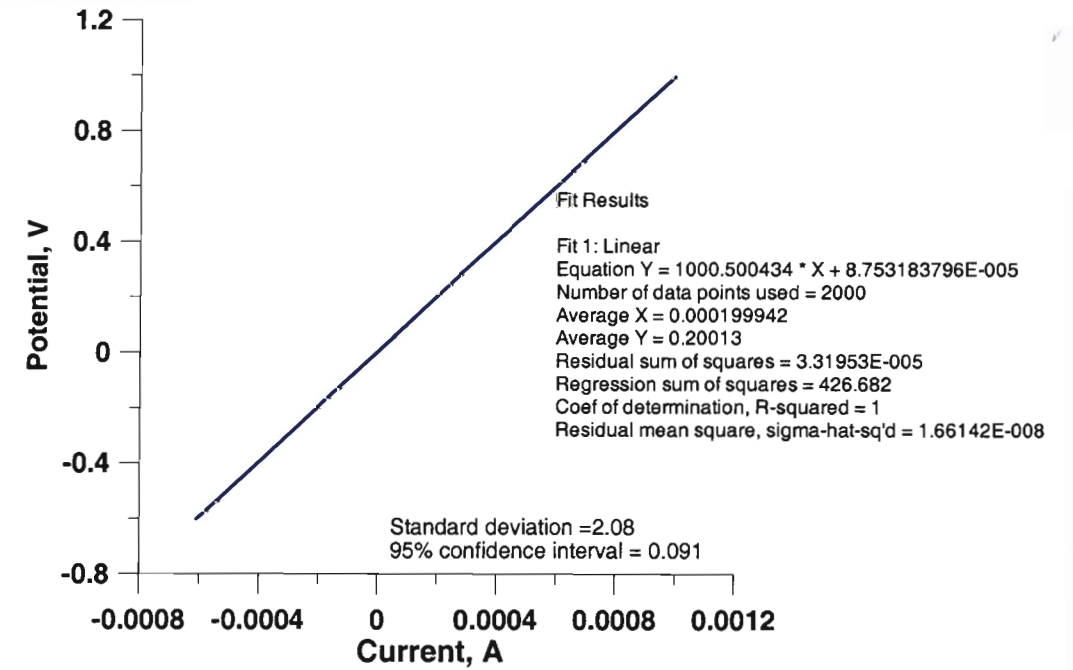
*Xihua He 12/22/05*





1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch5  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

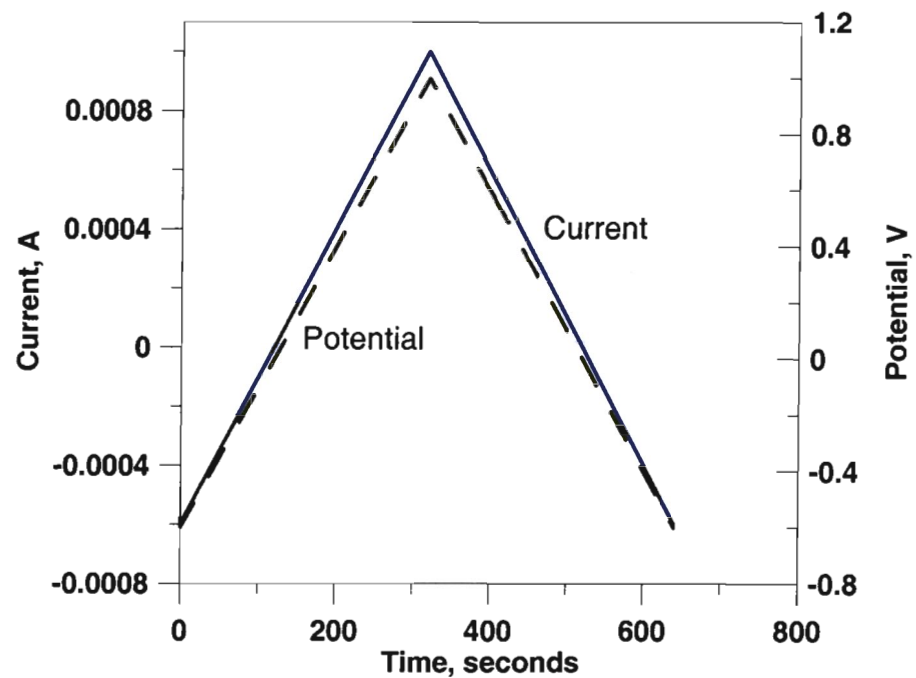
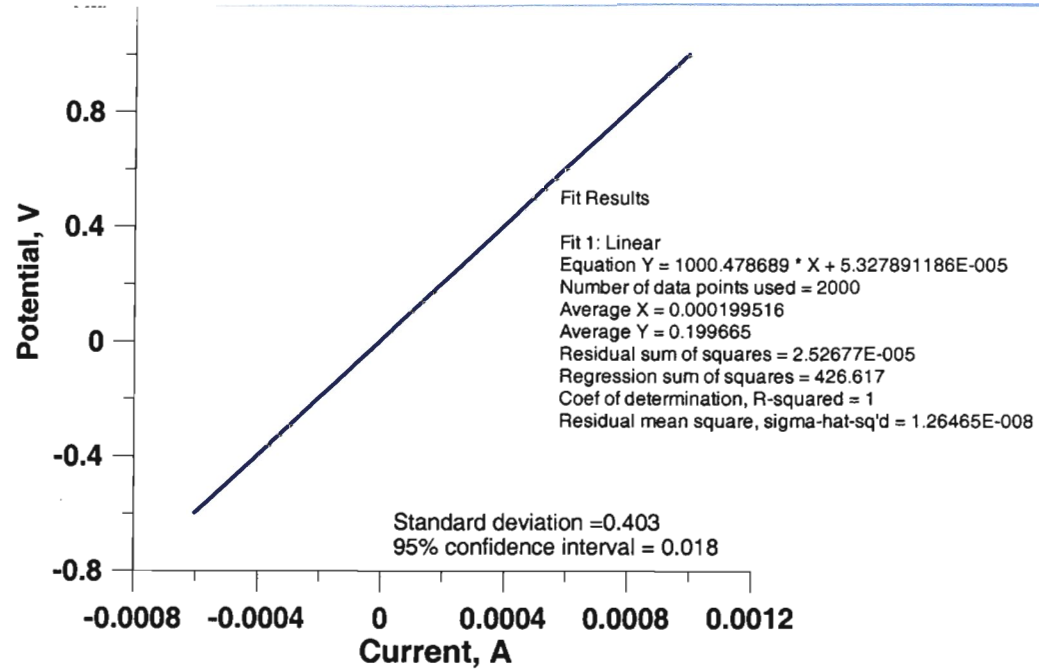
Xihua He 12/22/05



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch6  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

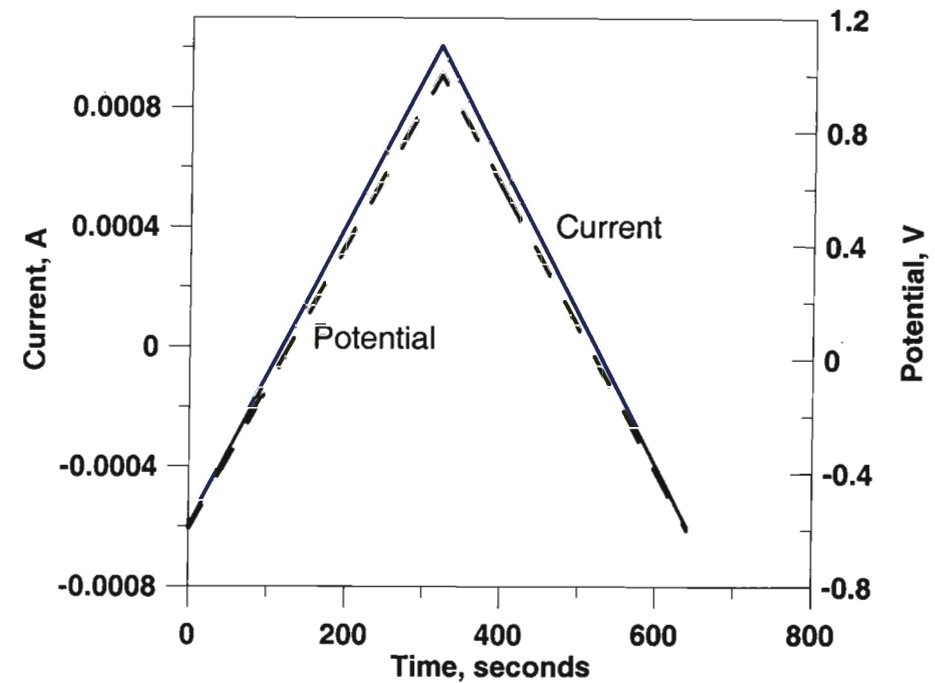
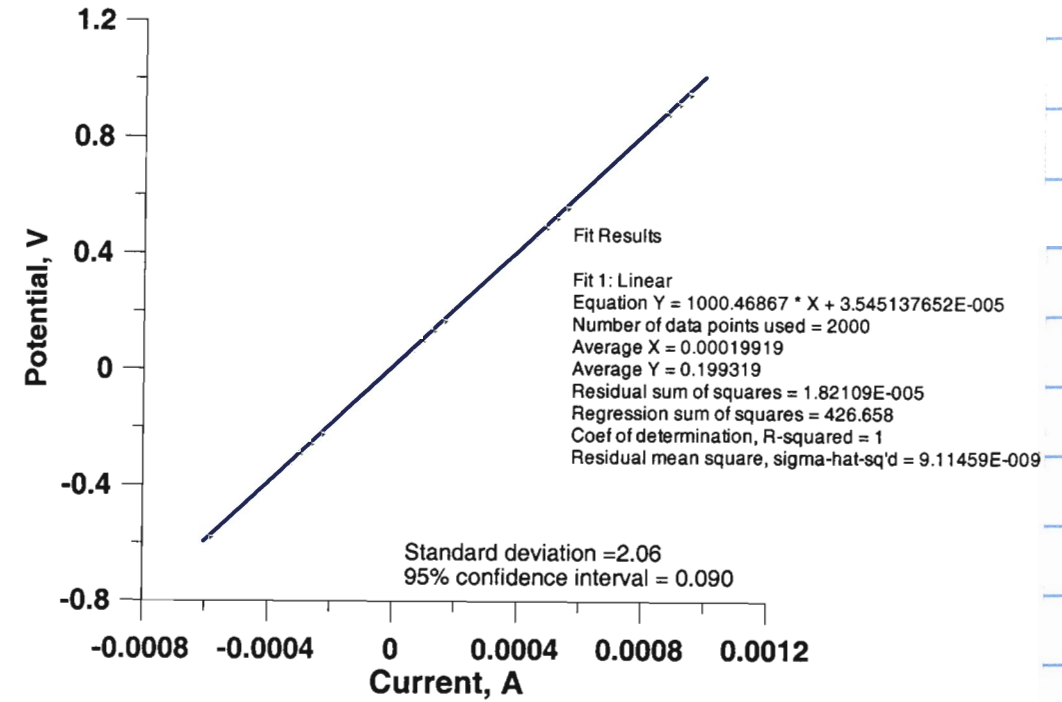
Xihua He 12/22/05





1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch7  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

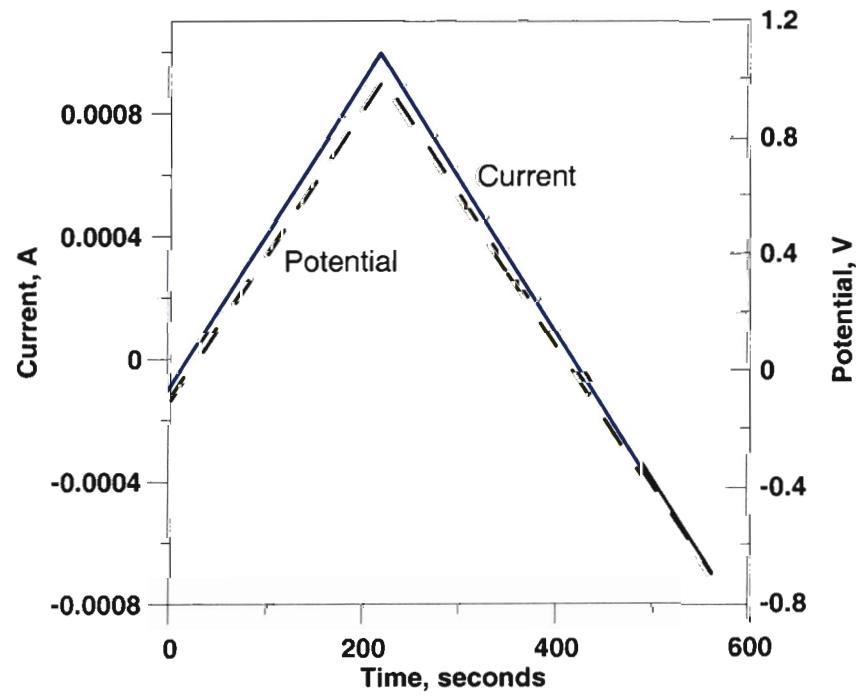
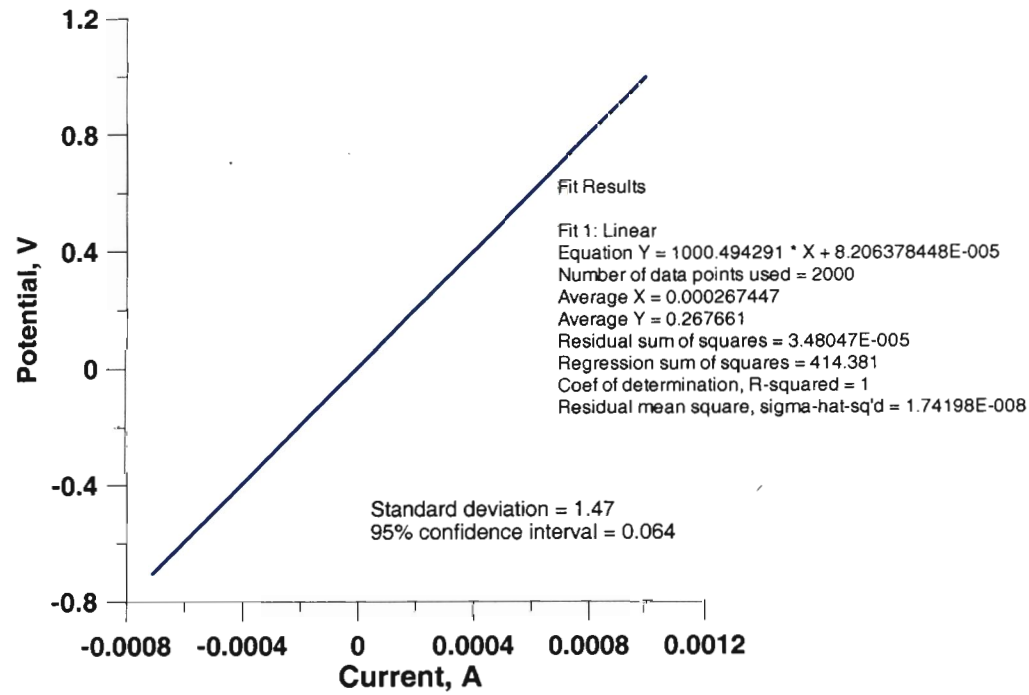
*Xi'hua He 12/22/05*



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch8  
 SN 00238265  
 12/21/05  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

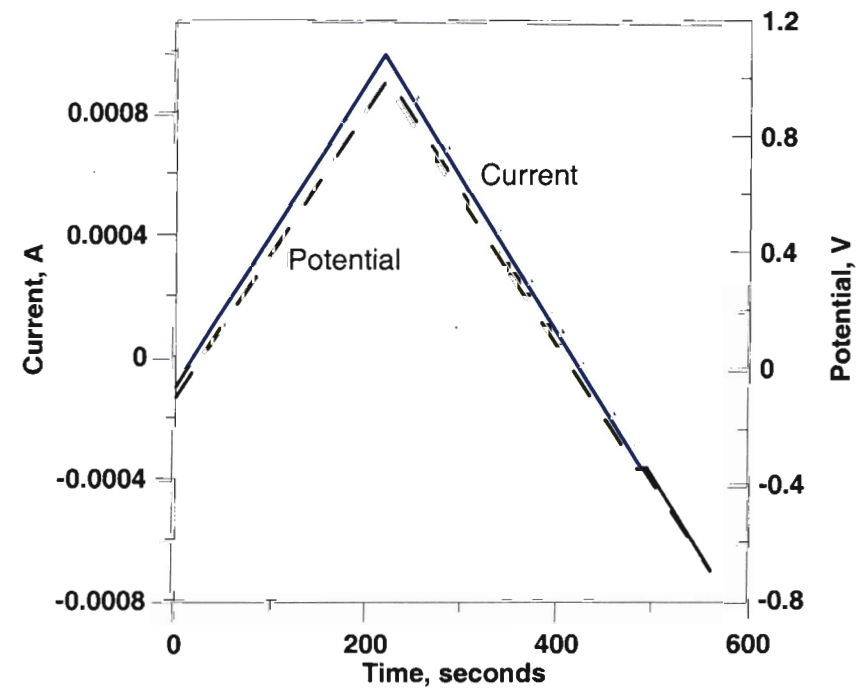
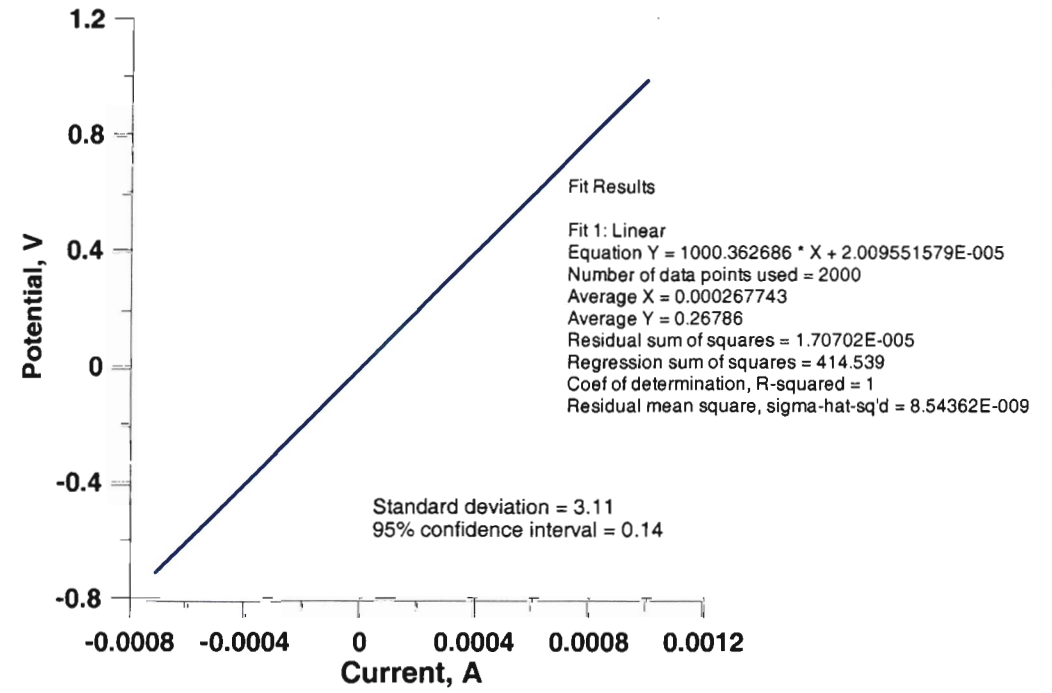
*Xi'hua He 12/22/05*





1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch1  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

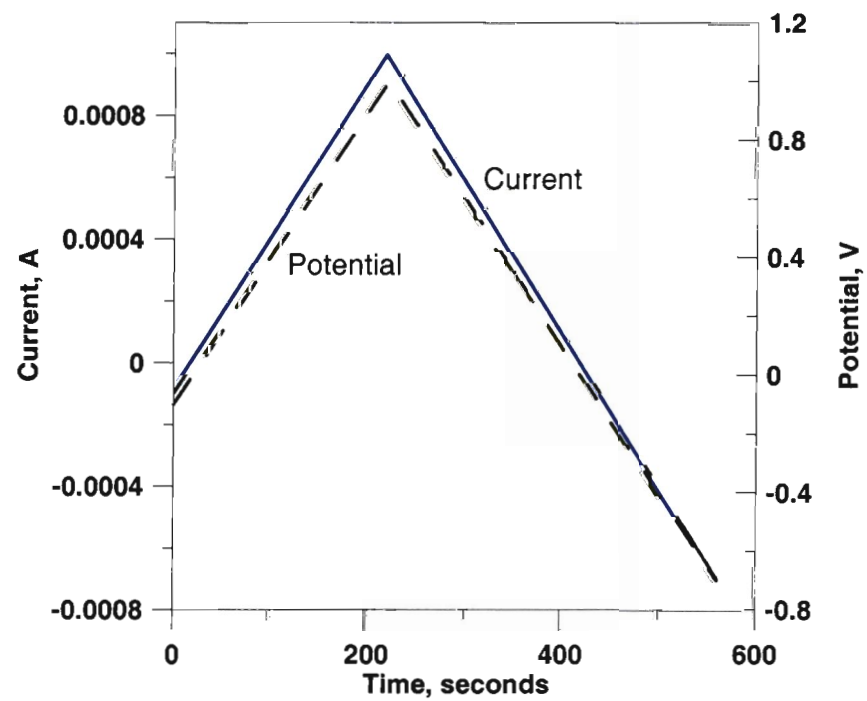
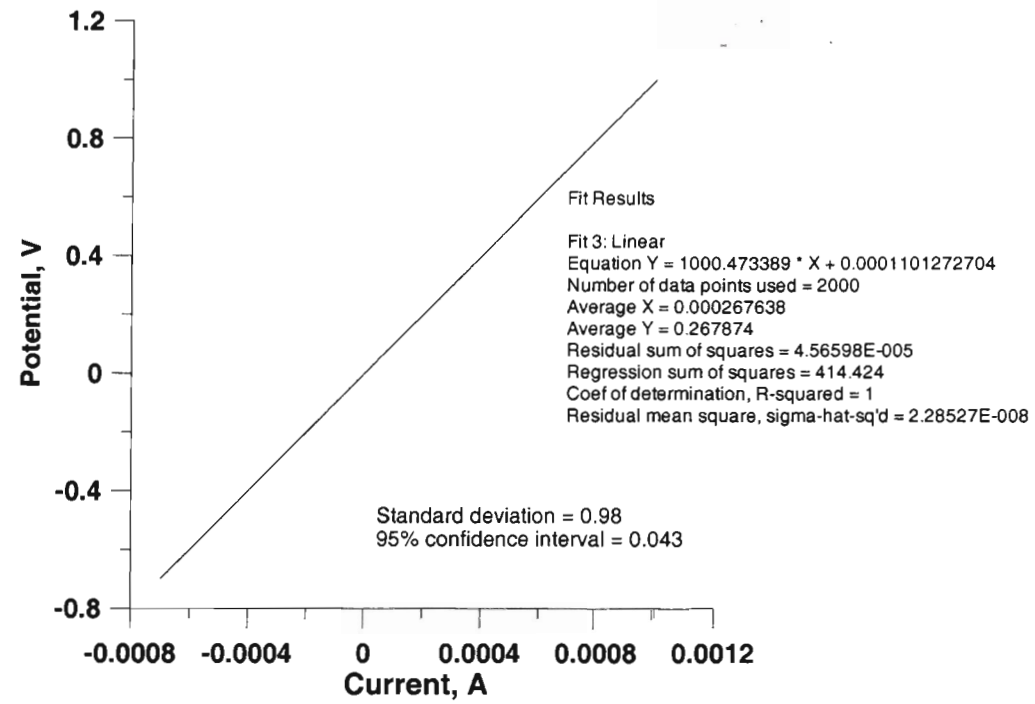
*[Handwritten signature]* 3/27/06



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch2  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

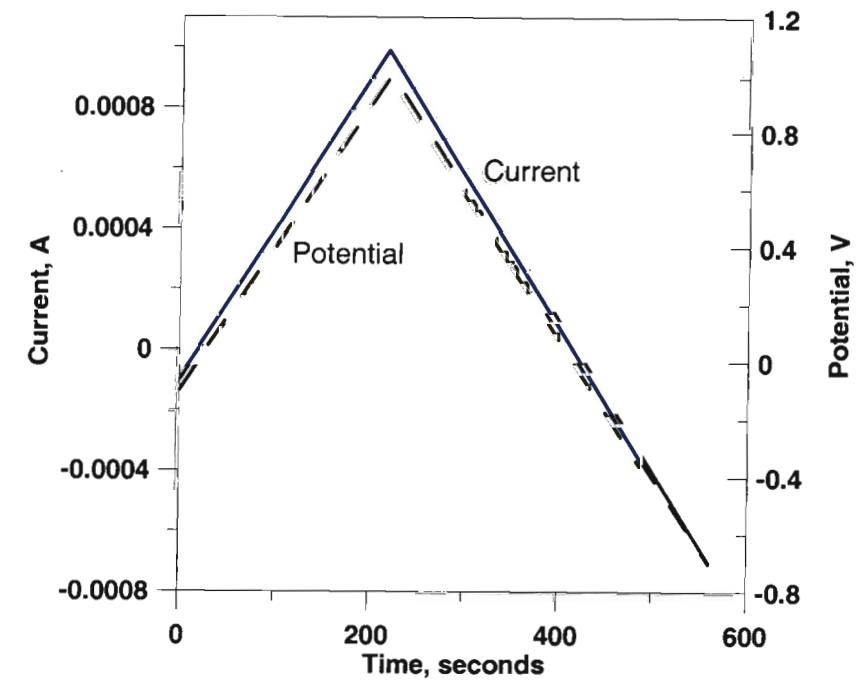
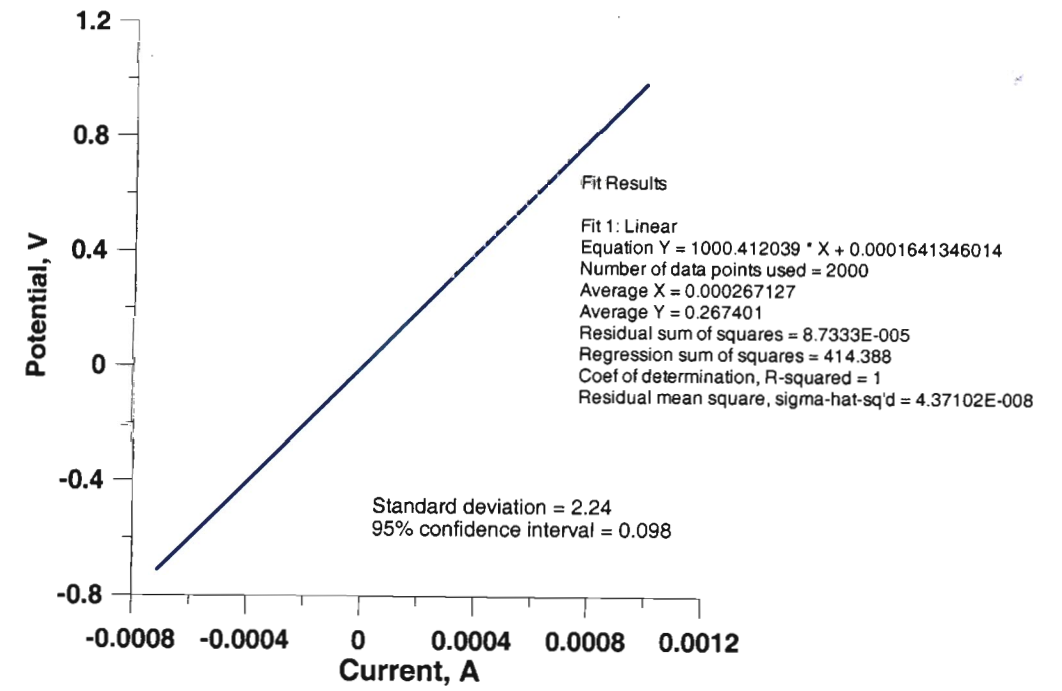
*[Handwritten signature]* 3/27/06





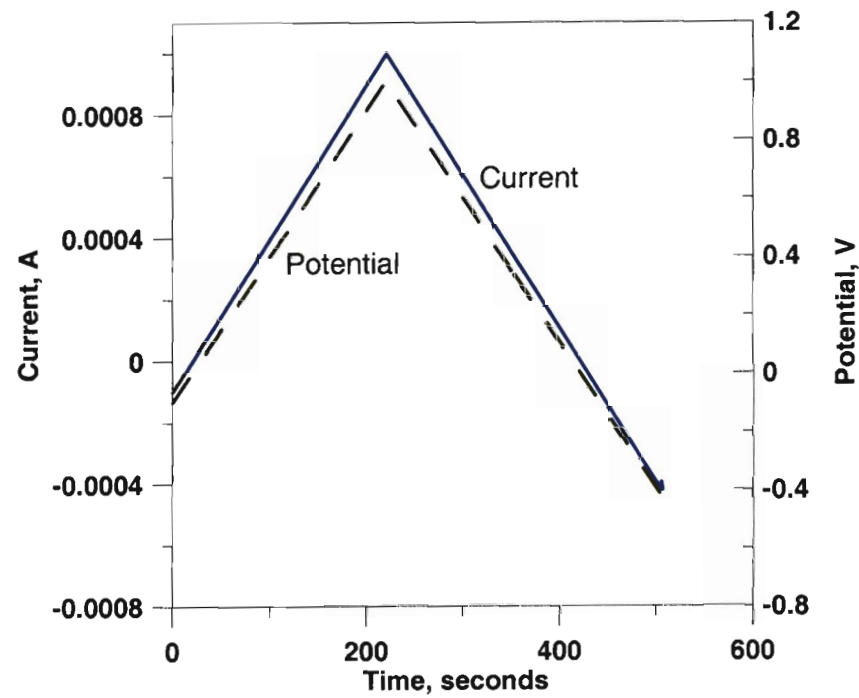
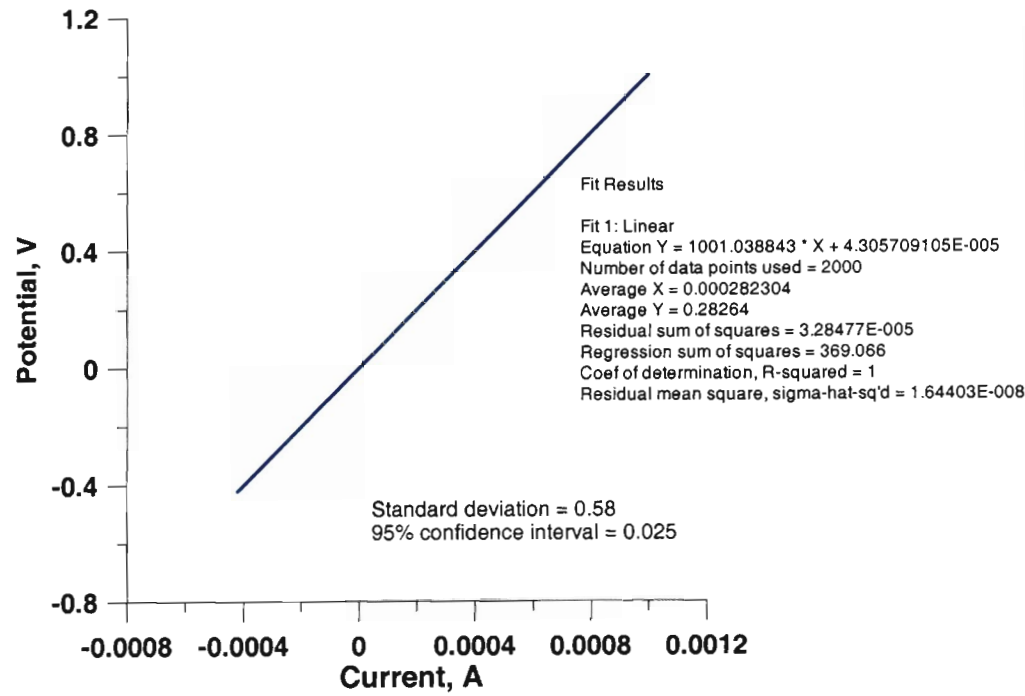
1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch3  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*B. F. J.* 3/27/06



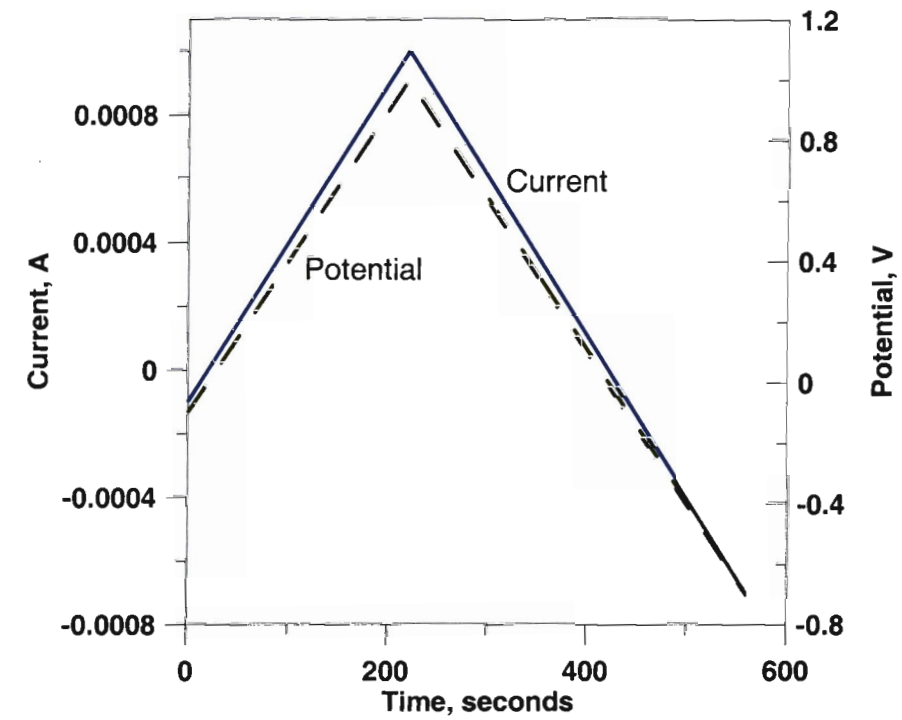
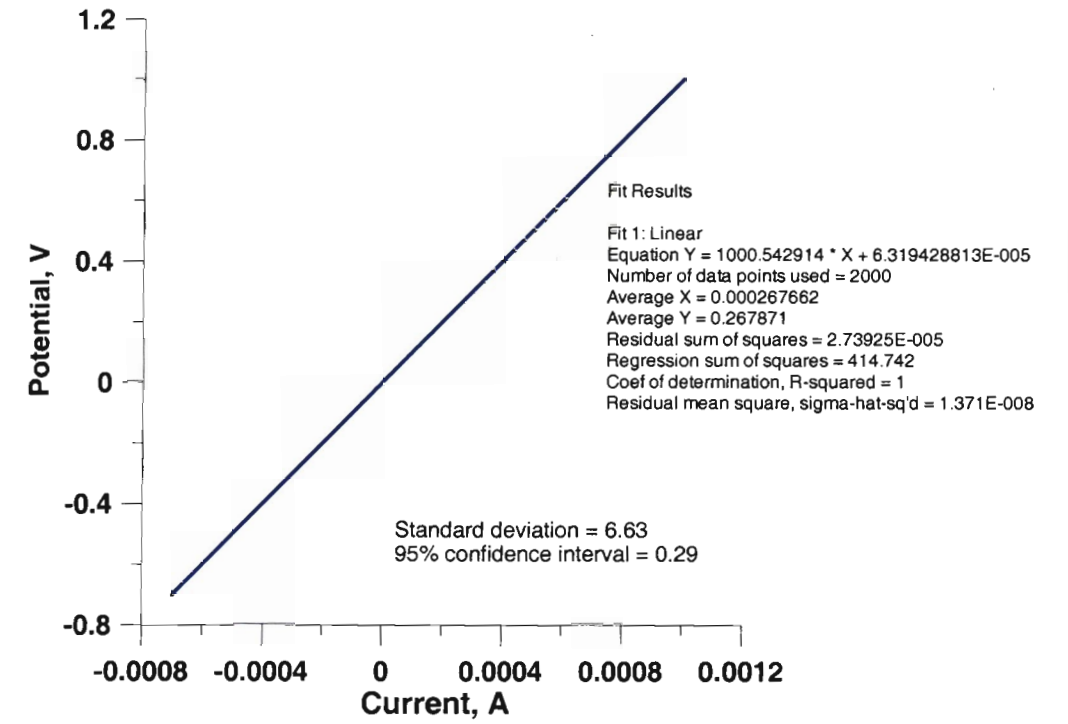
1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch4  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*B. F. J.* 3/27/06



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch5  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

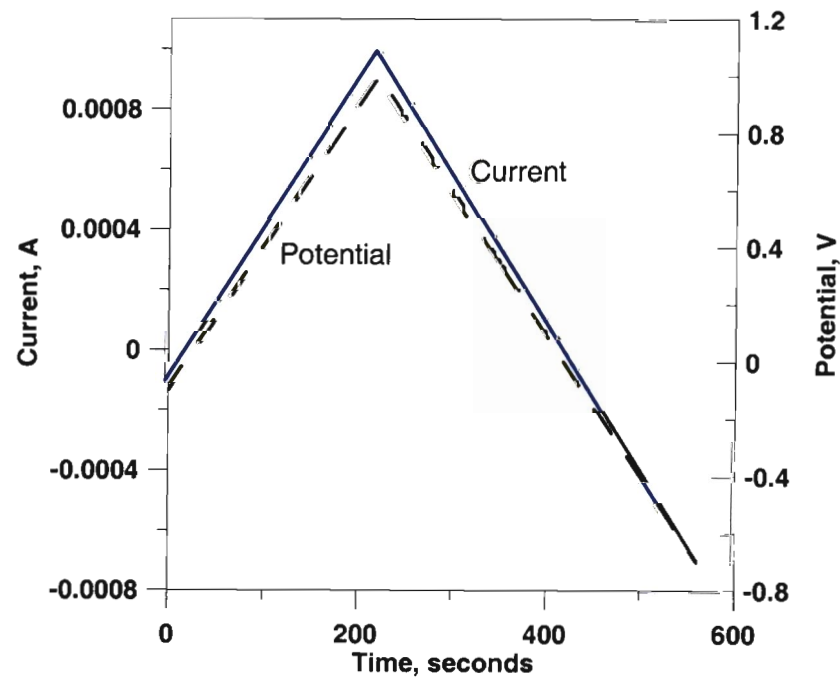
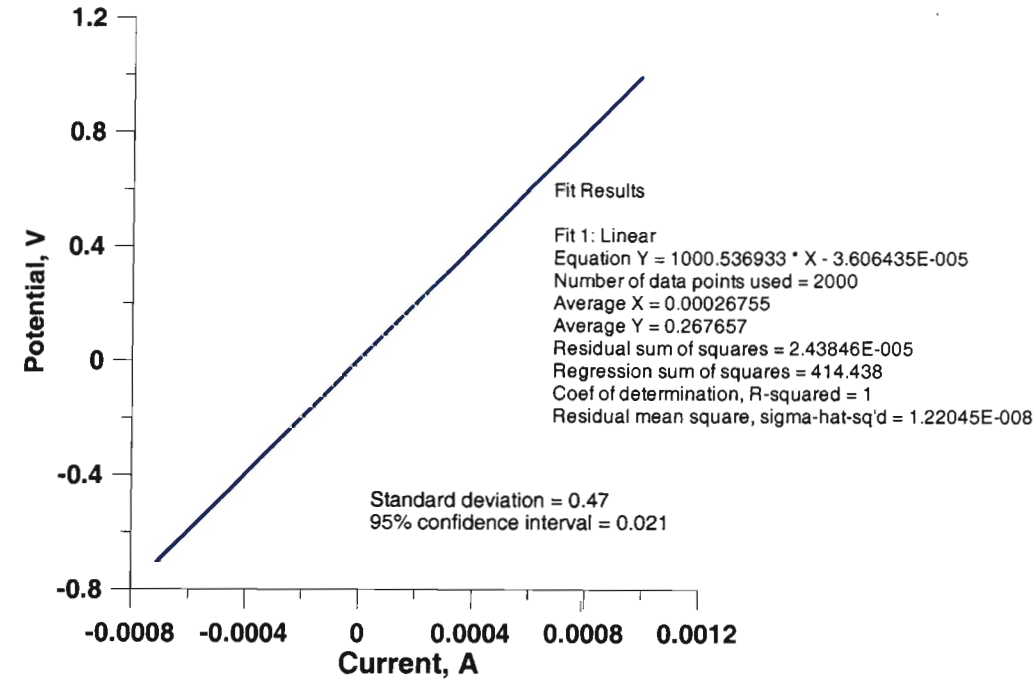
*B. R. J. 3/27/06*



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch6  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

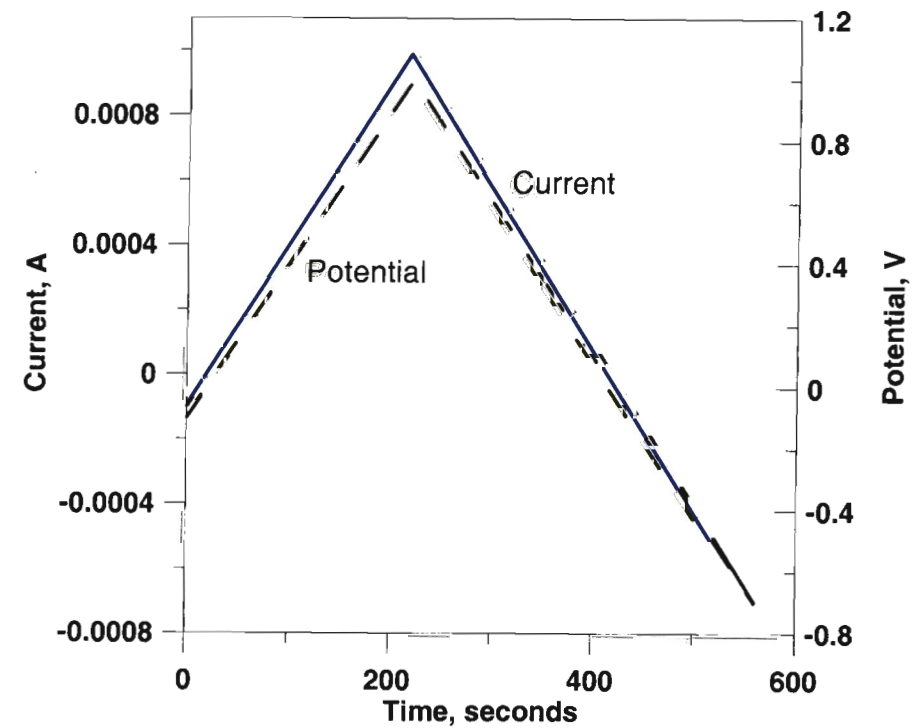
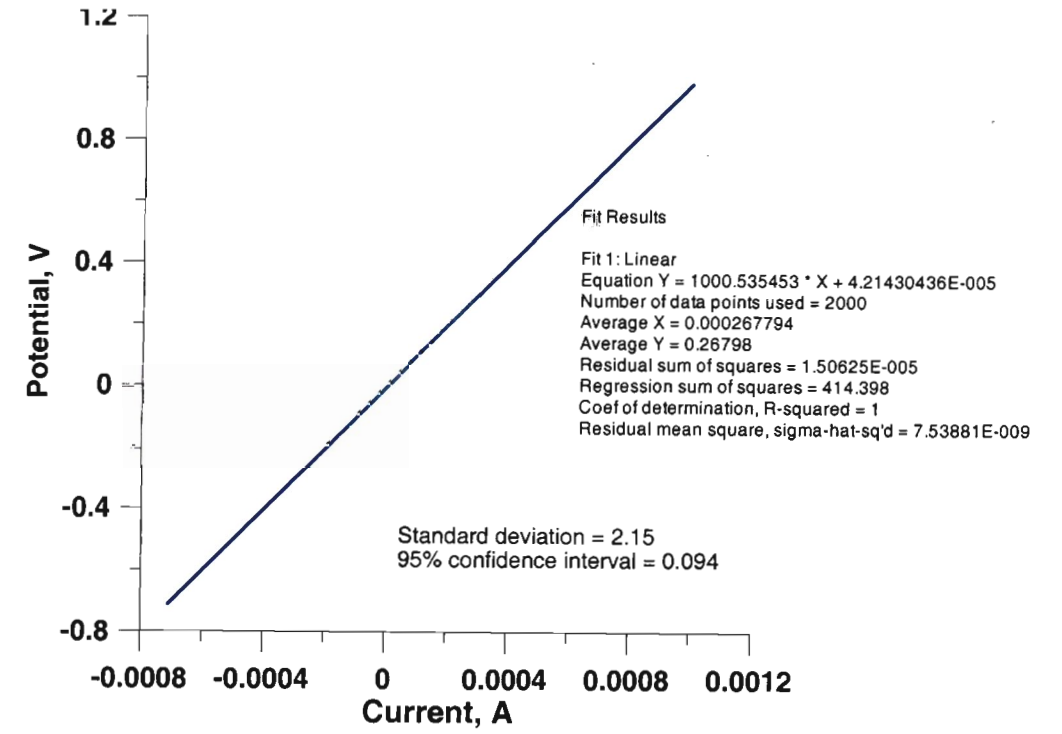
*B. R. J. 3/27/06*





1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch7  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*B. K. J. 3/27/06*



1000 Ohm resistor, SN 171001, Cal 11/7/05, Due 5/5/06  
 Solartron 1480 Ch8  
 SN 00240053  
 3/21/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*B. K. J. 3/27/06*

Continued from Pg #40  
 weekly pH Calibration of EA 940 SN# 2330  
 cal: 7/25/05 Due: 7/25/06 \* New Cal: 7/6/06 Due: 7/6/07  
 pH probe 13-620-296 SN# 5003095 New Probe

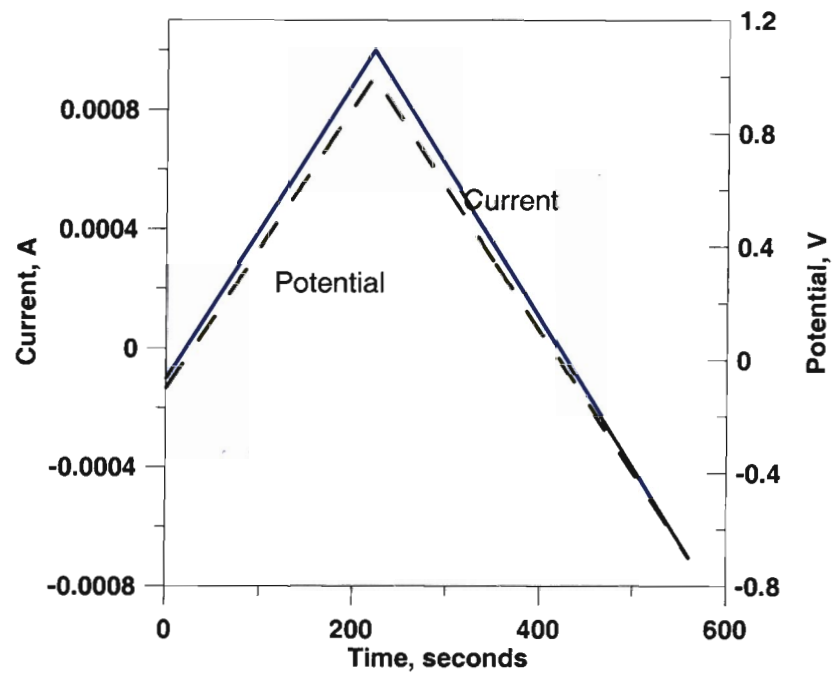
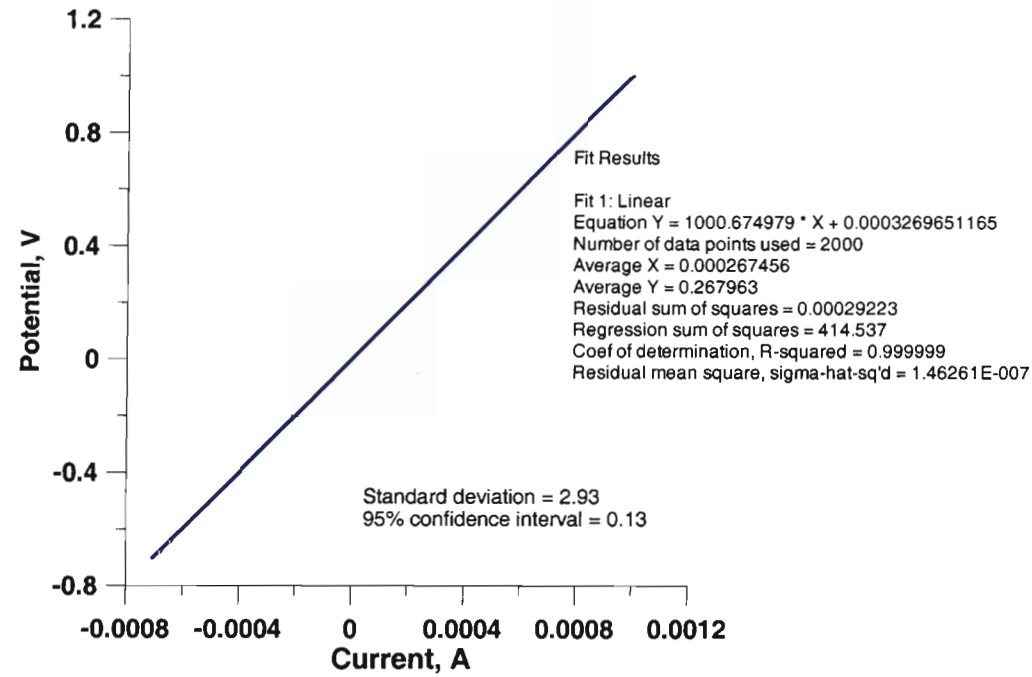
Date	Buffers Used	Int
5/1/06	4-7-10	BK5
5/5/06	4-7-10	BK5
5/15/06	4-7-10	BK5
5/22/06	4-7-10	BK5
5/30/06	4-7-10	BK5
6/5/06	4-7-10	SK0
6/12/06	4-7-10	BK5
6/19/06	4-7-10	BK5
6/27/06	4-7-10	BK5
*New Cal 7/6/06	4-7-10	BK5
7/10/06	4-7-10	BK5
7/17/06	4-7-10	BK20
7/24/06	4-7-10	BK5
7/31/06	4-7-10	SK5
8/9/06	4-7-10	BK5
8/14/06	4-7-10	BK5
8/21/06	4-7-10	SK5
8/28/06	4-7-10	BK5
9/5/06	4-7-10	BK5
9/11/06	4-7-10	BK5
9/18/06	4-7-10	BK5
9/25/06	4-7-10	BK5
10/2/06	4-7-10	BK5

B-K-J 5/1/06

Continued from Pg #41  
 weekly pH Calibrations of EA 940 SN# 4274  
 cal: 4/27/06 Due: 10/27/06  
 pH probe 13-620-296 SN# 5146019

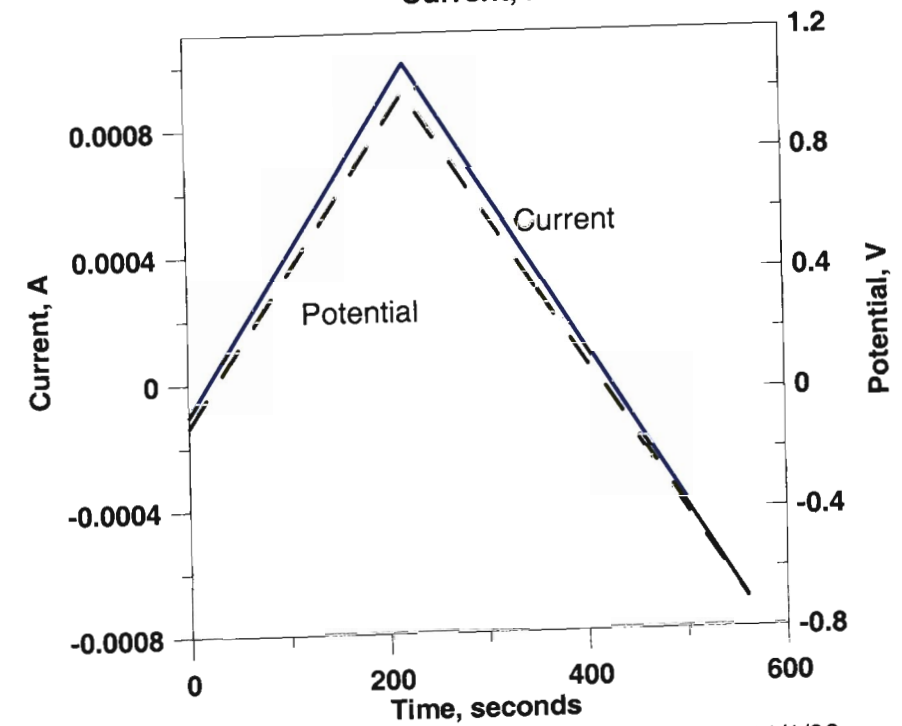
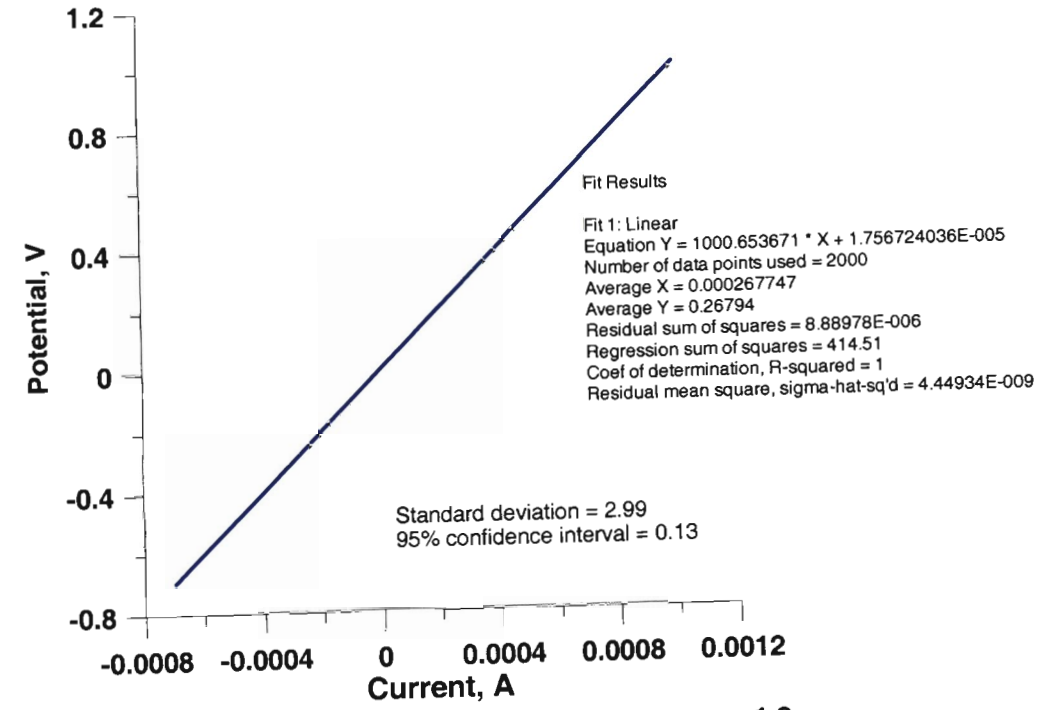
Date	Buffers Used	Int
5/1/06	4-7-10	BK0
5/8/06	4-7-10	BK5
5/15/06	4-7-10	BK5
5/22/06	4-7-10	BK5
5/30/06	4-7-10	BK5
6/5/06	4-7-10	BK5
6/12/06	4-7-10	BK5
6/19/06	4-7-10	BK5
6/27/06	4-7-10	BK5
7/6/06	4-7-10	BK5
7/16/06	4-7-10	BK5
7/17/06	4-7-10	BK5
7/24/06	4-7-10	BK5
7/31/06	4-7-10	BK5
8/9/06	4-7-10	OK5
8/14/06	4-7-10	OK5
8/21/06	4-7-10	BK5
8/21/06	4-7-10	BK5
9/3/06	4-7-10	BK5
9/11/06	4-7-10	BK5
9/18/06	4-7-10	BK5
9/25/06	4-7-10	BK5
10/2/06	4-7-10	BK5

B-K-J 5/1/06



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch1, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

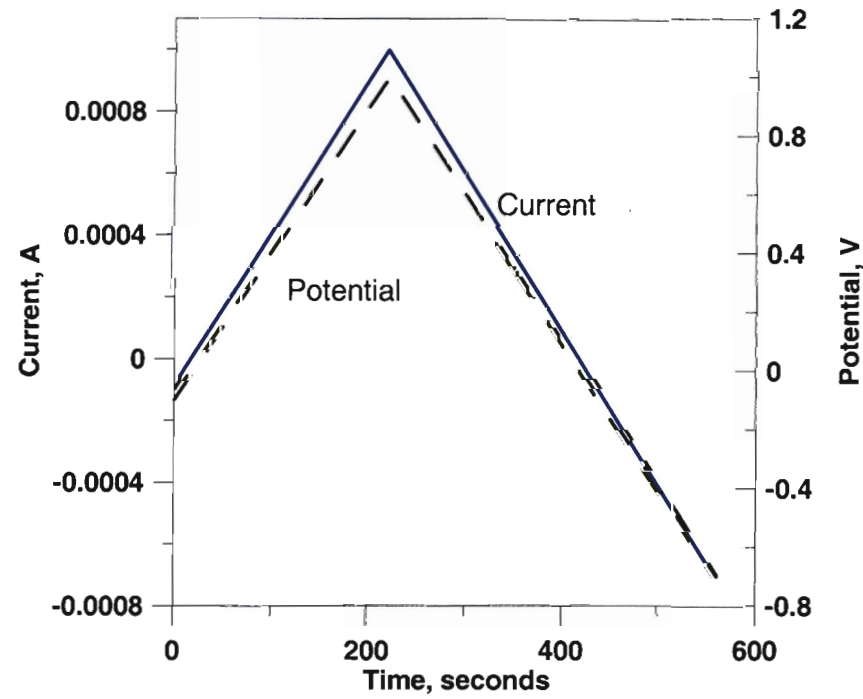
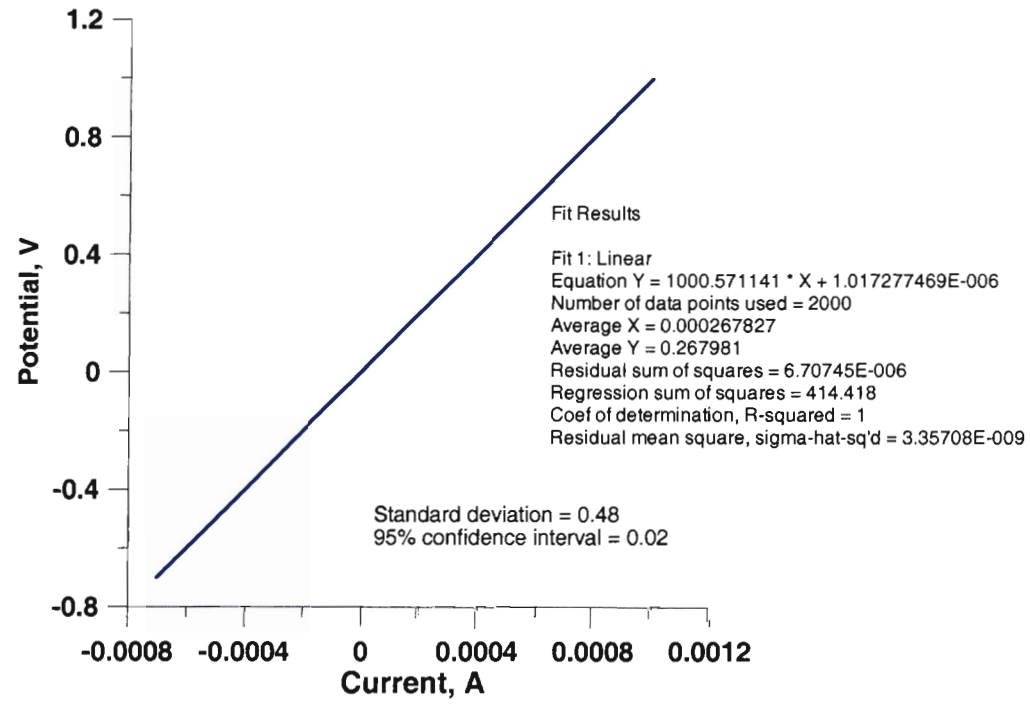
*B. E. J.* 5/4/06



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch2, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

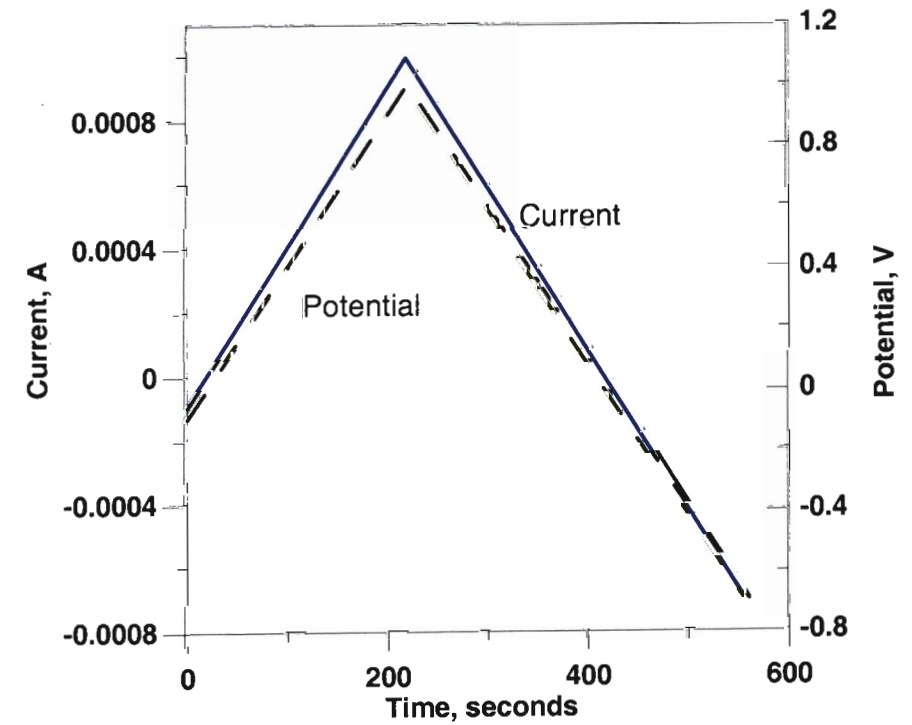
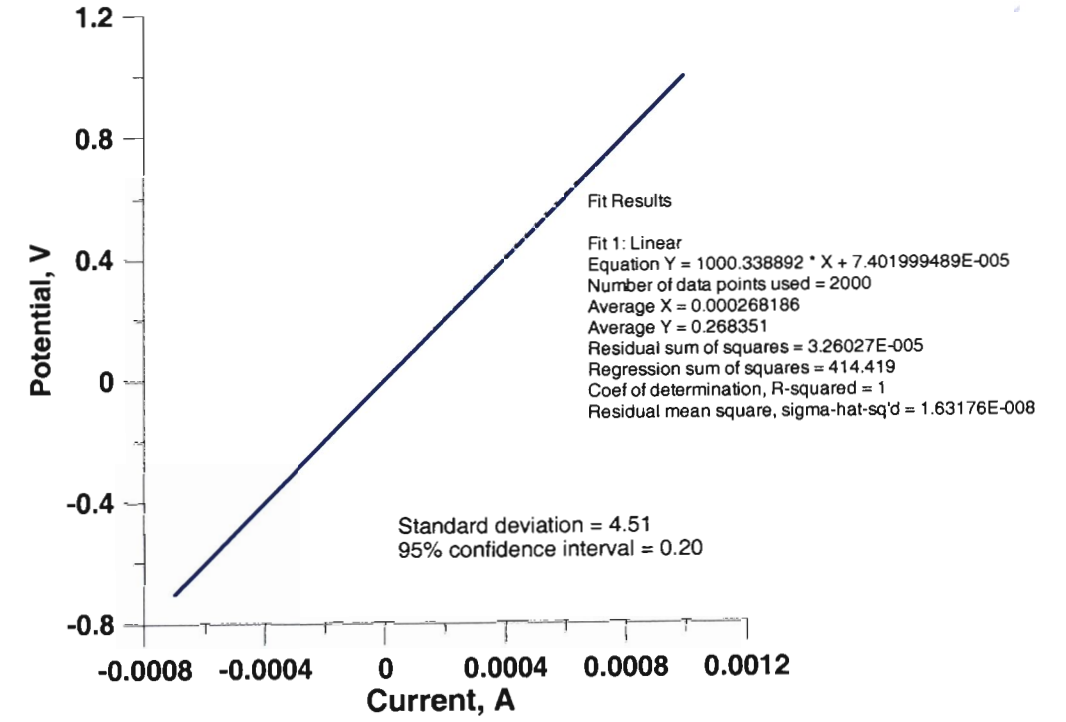
*B. E. J.* 5/4/06





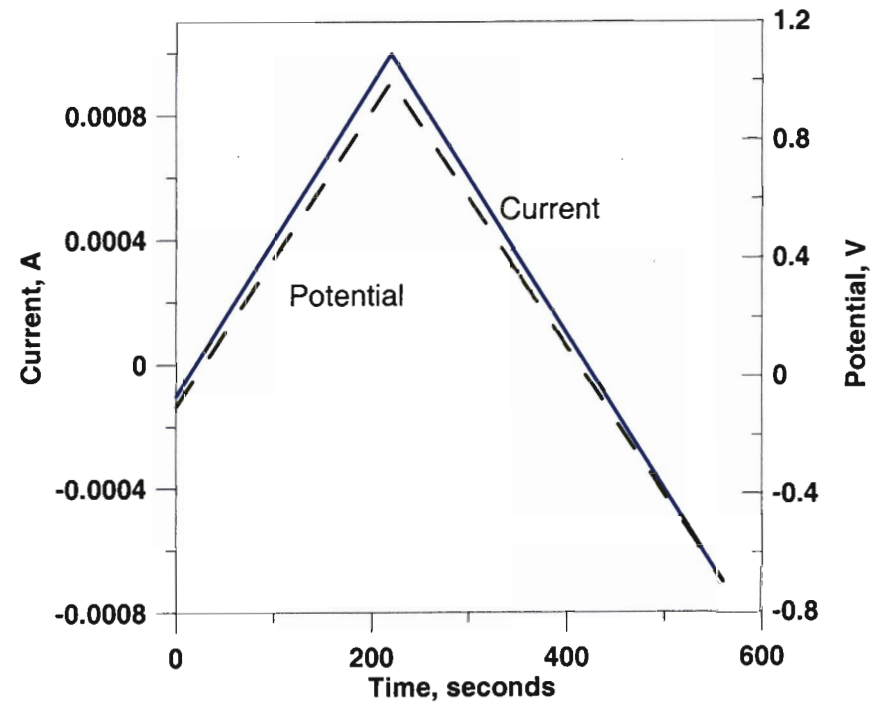
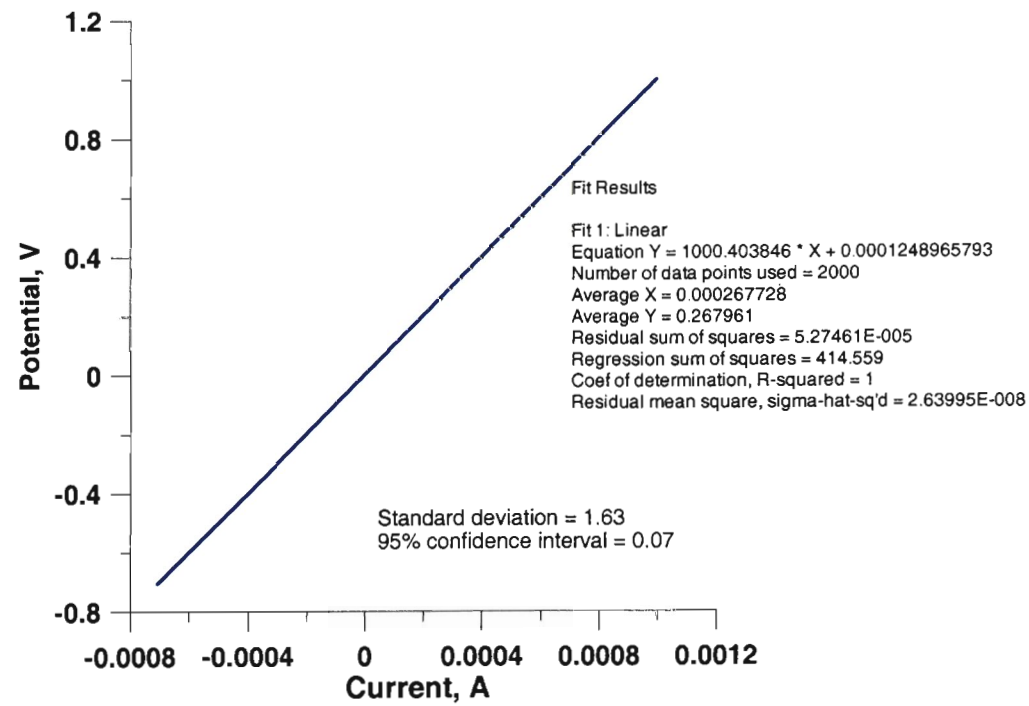
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch3, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

B. E. J. 5/4/06



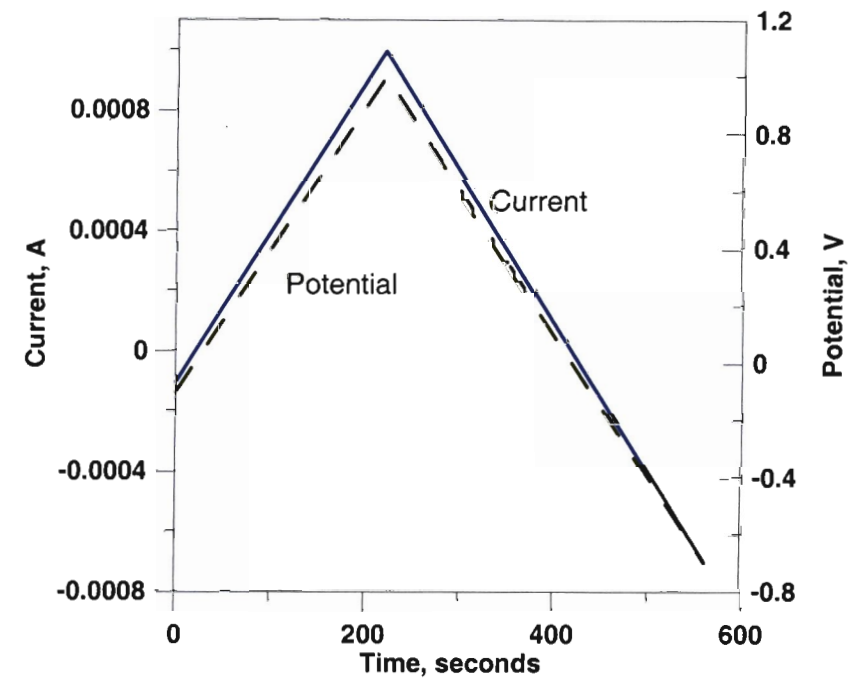
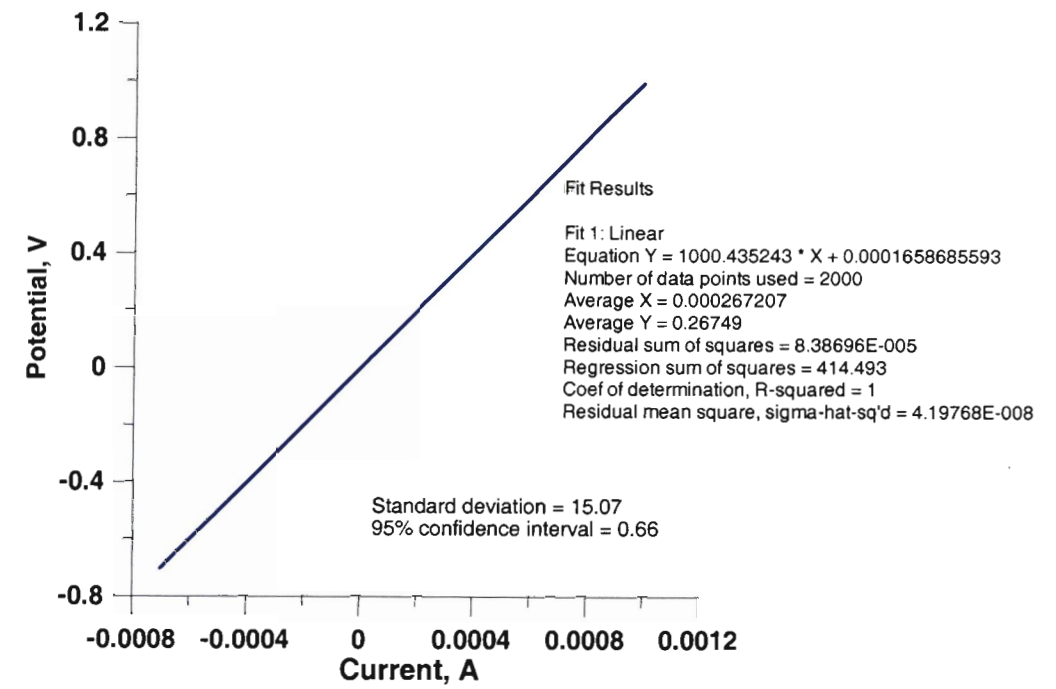
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch4, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

B. E. J. 5/4/06



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch5, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

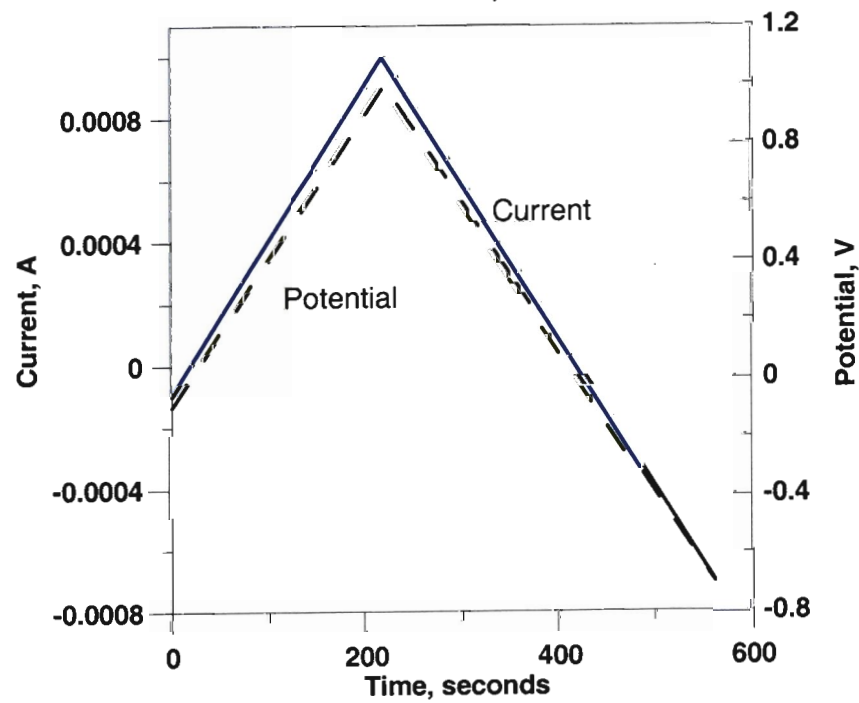
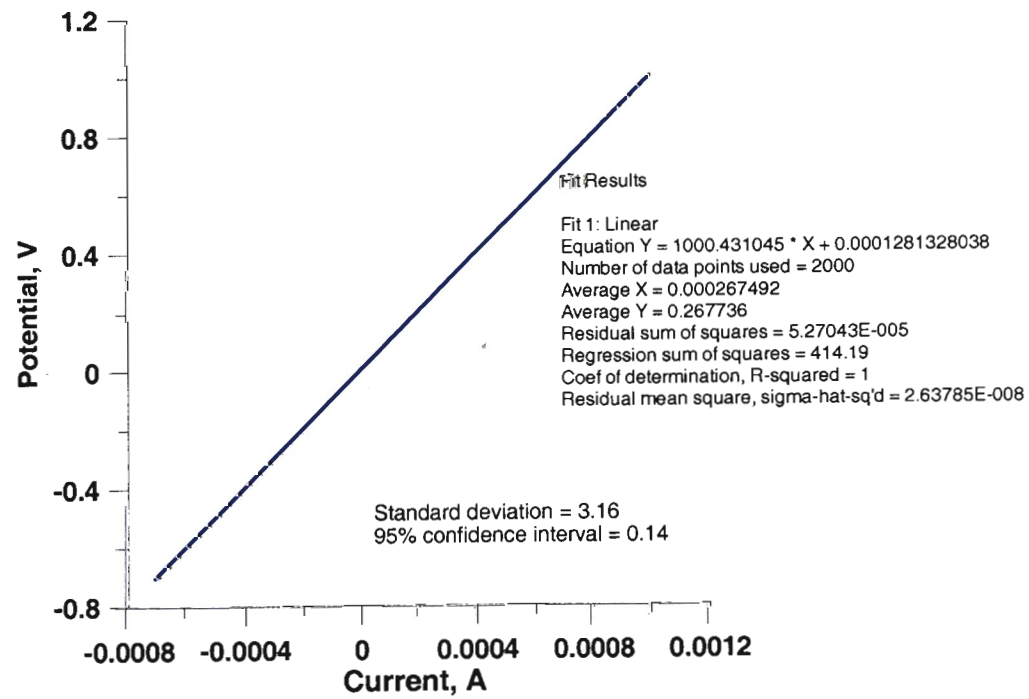
*[Handwritten signature]* 5/4/06



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch6, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

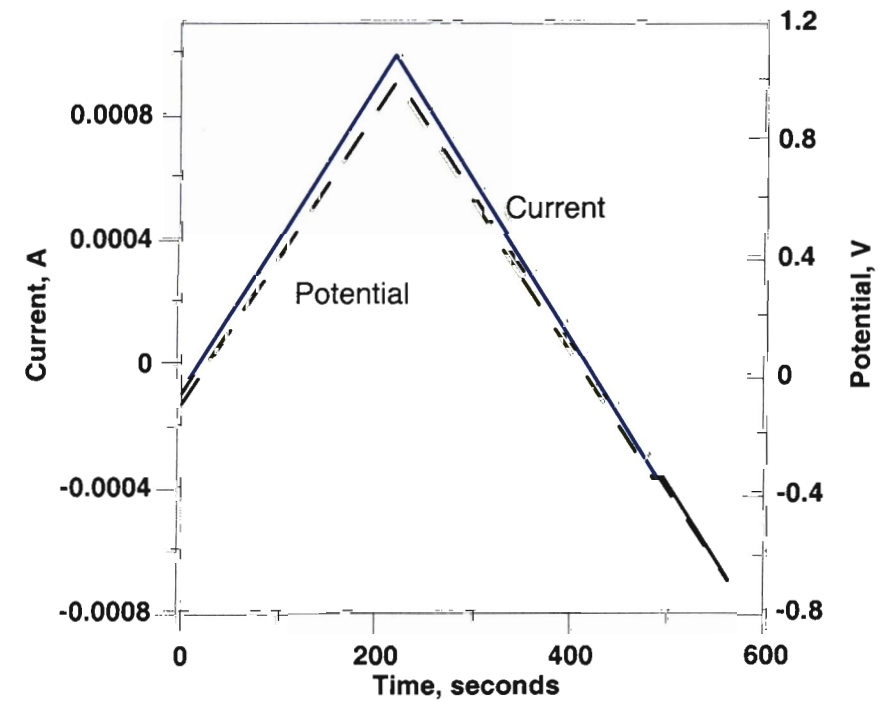
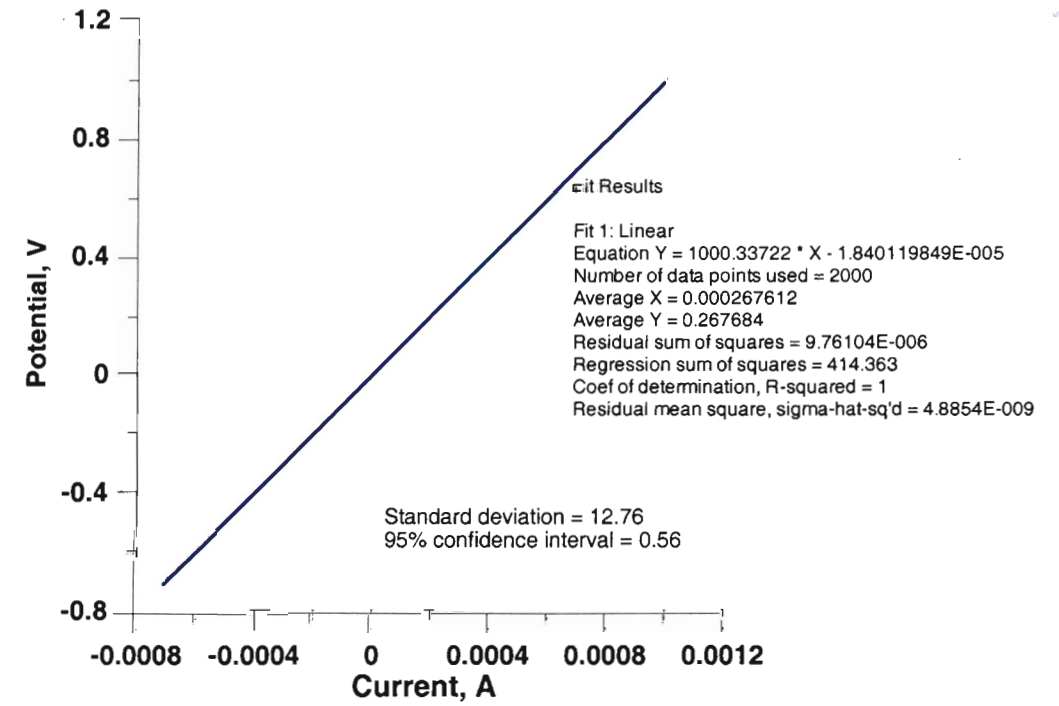
*[Handwritten signature]* 5/4/06





1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch7, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

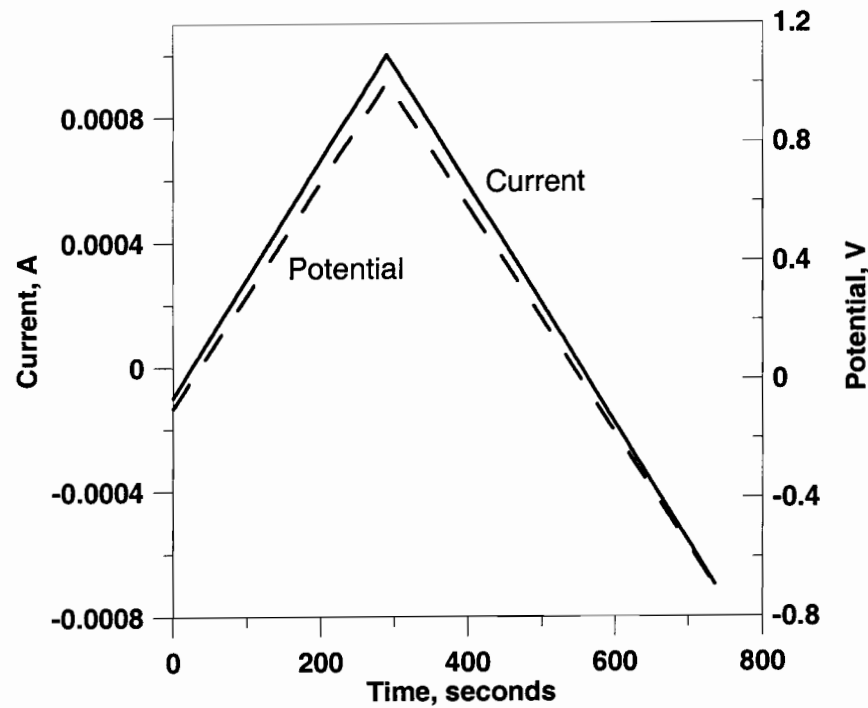
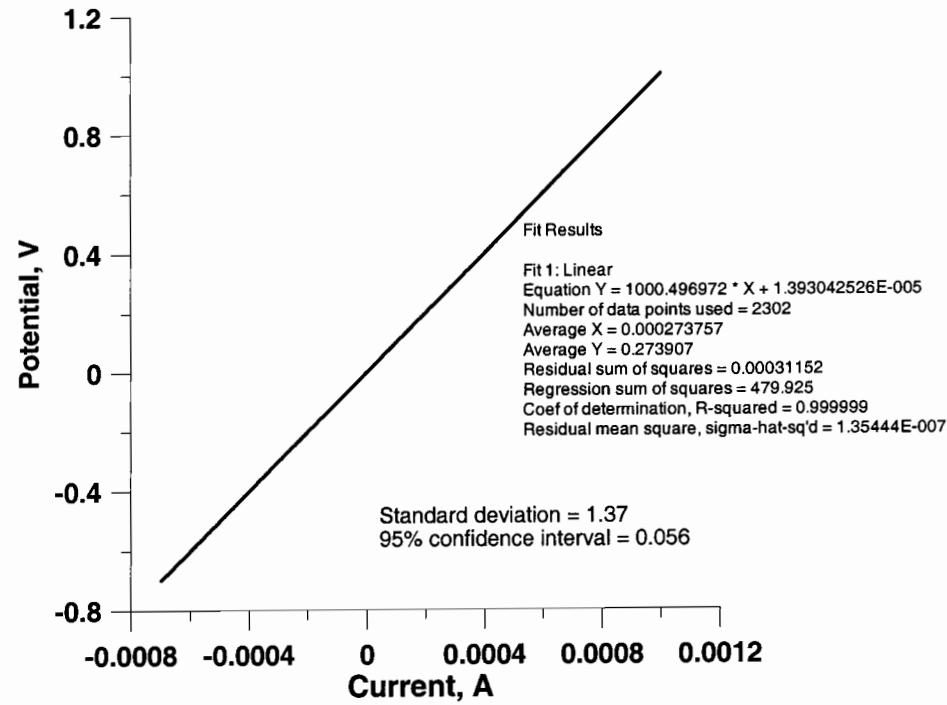
*B. D. J. 5/4/06*



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch8, SN 00240551  
 5/3/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

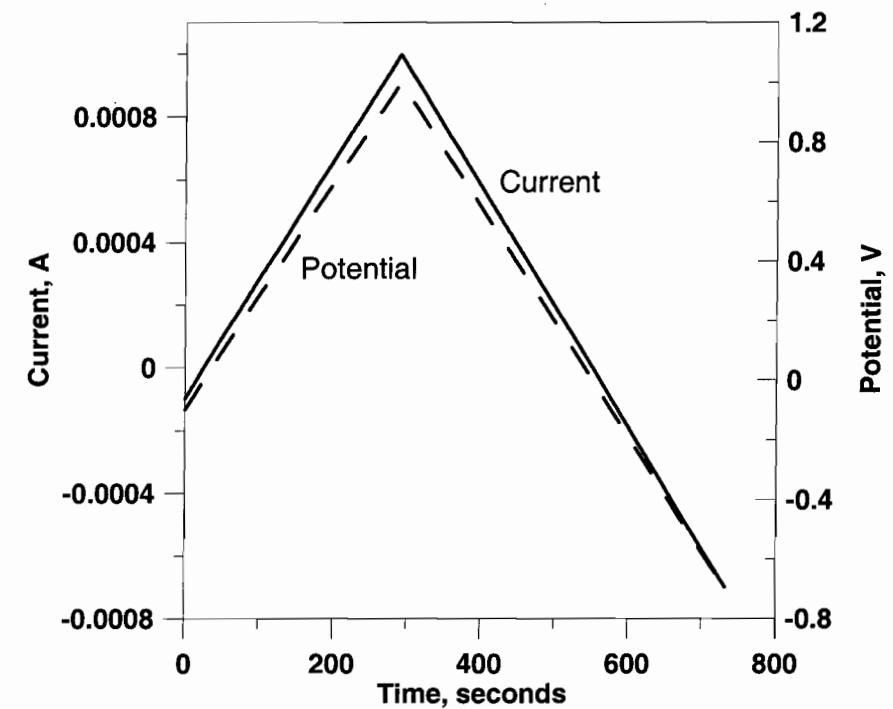
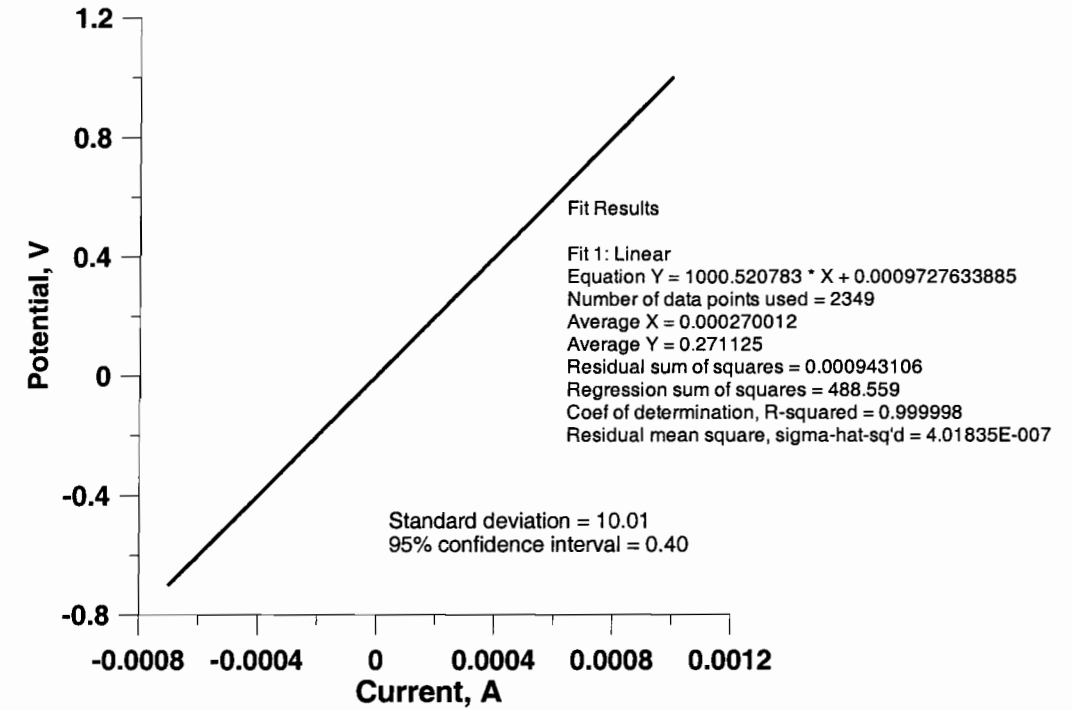
*B. D. J. 5/4/06*





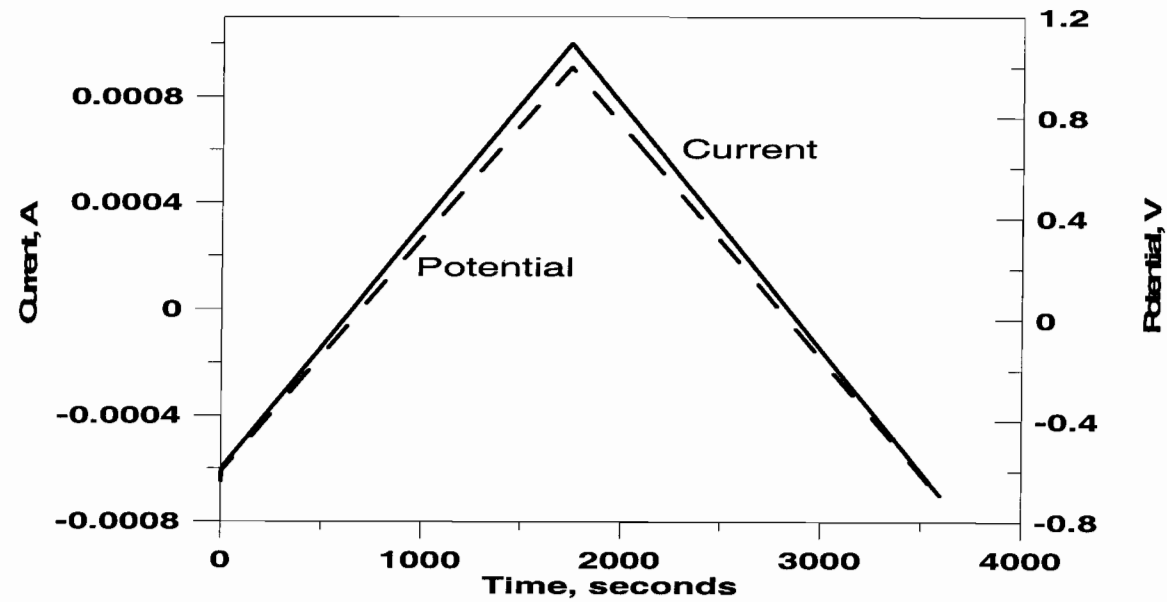
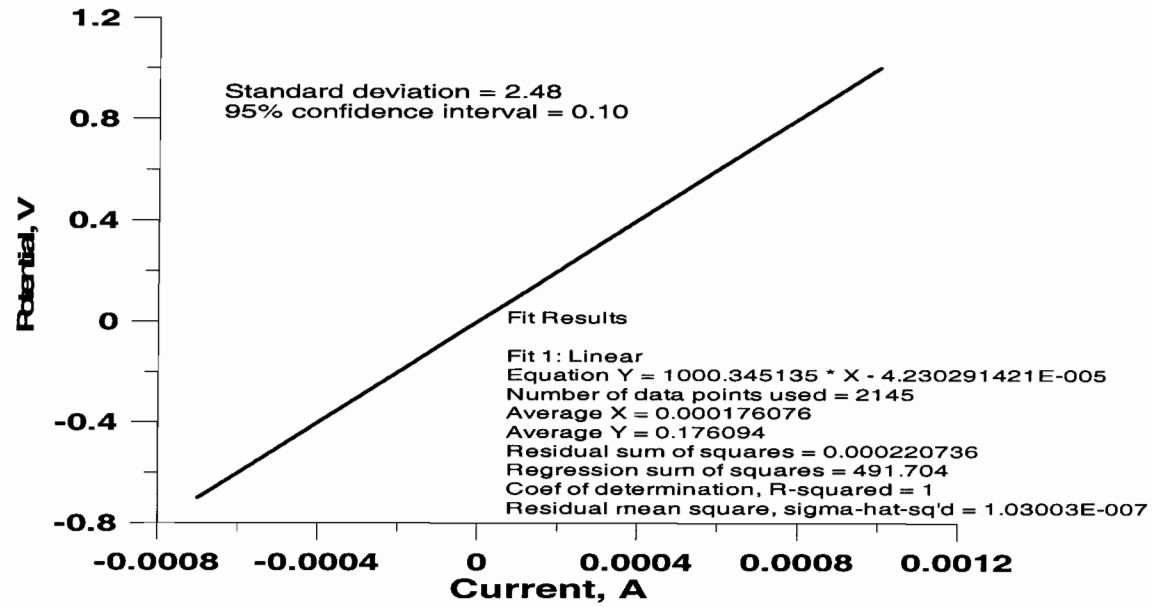
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1287 SN#00148500  
 5/15/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 735 seconds

*Xi Hua He 5/16/06*



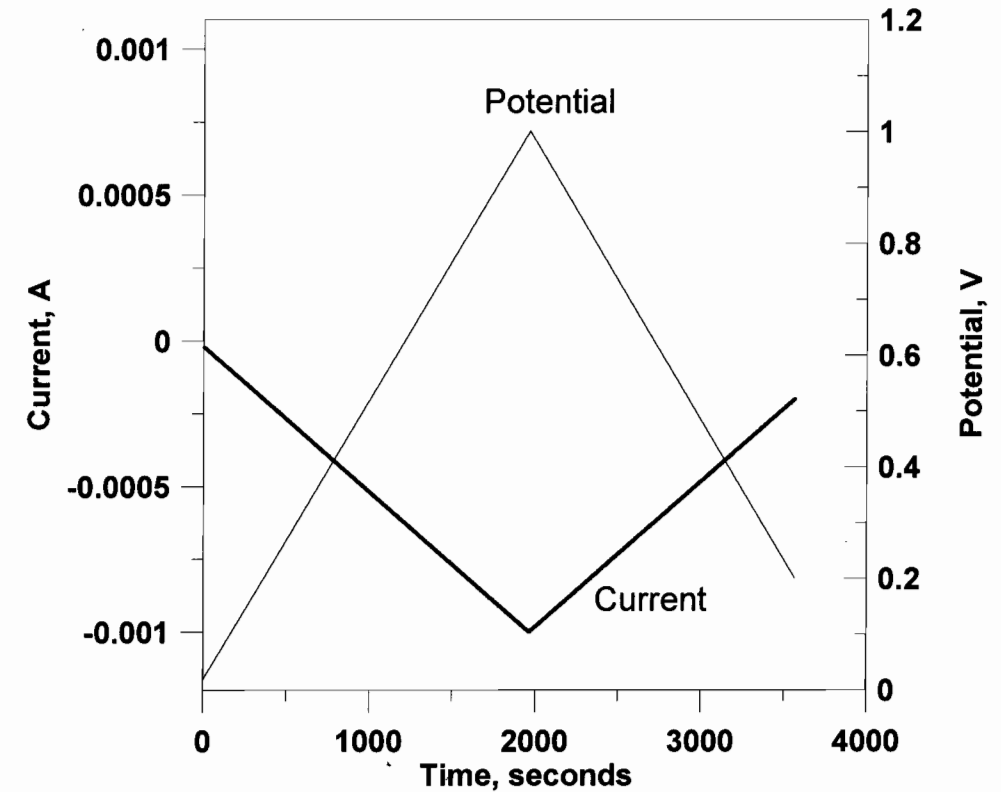
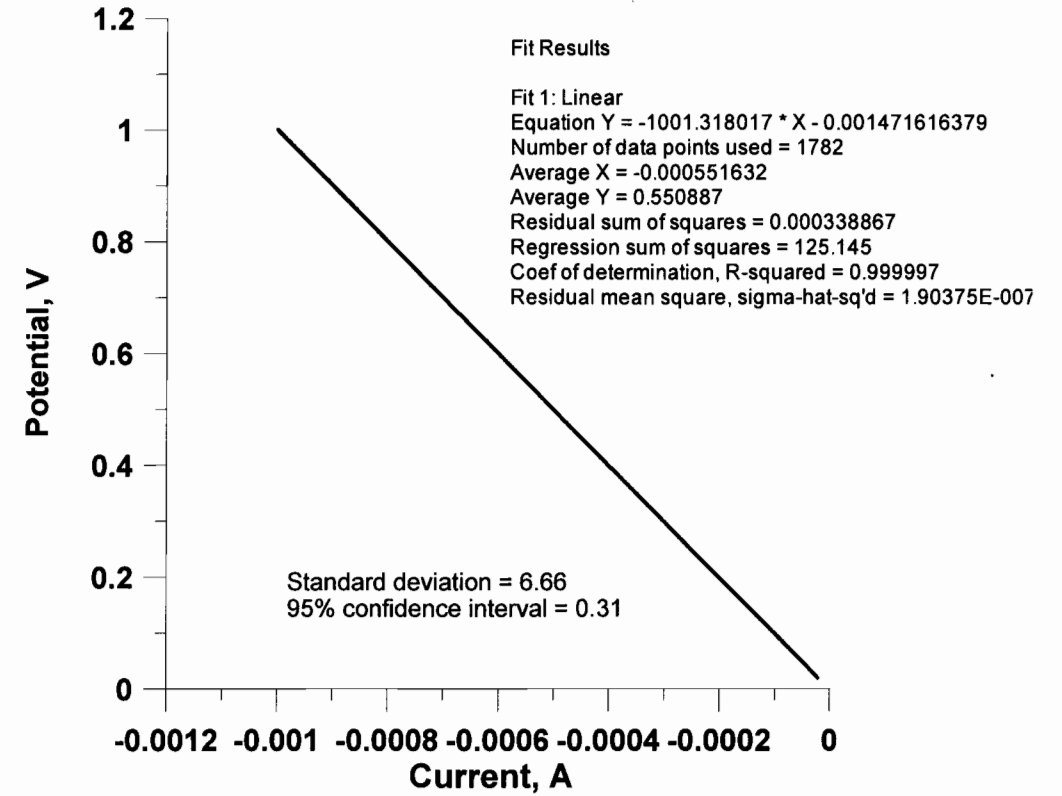
1000 Ohm resistor, SN 171001, Cal 5/01/06, Due 11/1/06  
 Solartron 1287 SN#001535500  
 5/19/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 735 seconds

*Xi Hua He 5/19/06*



1000 Ohm resistor, SN 171001, Cal 5/01/06, Due 11/1/06  
Solartron 1287 SN#00186634  
5/24/06  
Initial potential: -600 mV  
Vertex potential: 1000 mV  
Final potential: -700 mV  
Scan rate: 1 mV/s  
Calculated time to finish scan: 3300 seconds  
Actual time to finish scan: 3594 seconds

Xihua He 5/30/06



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
EG&G Versatrat, SN 20104, 06/12/06  
Initial potential: 20 mV; Vertex potential: 1000 mV  
Final potential: 200 mV; Scan rate: 0.5 mV/s  
Calculated time to finish scan: 3560 seconds;  
Actual time to finish scan: 3564 seconds

Xihua He 6/12/06

Olympus PME3 Performance Verification Check  
 Last cal: 12/13/05 Due: 6/13/06

Additional Metallurgical <sup>6/13/06</sup> microscope Tests  
 Used Machine 304 L SS Black Sea # 195 In NB # 305

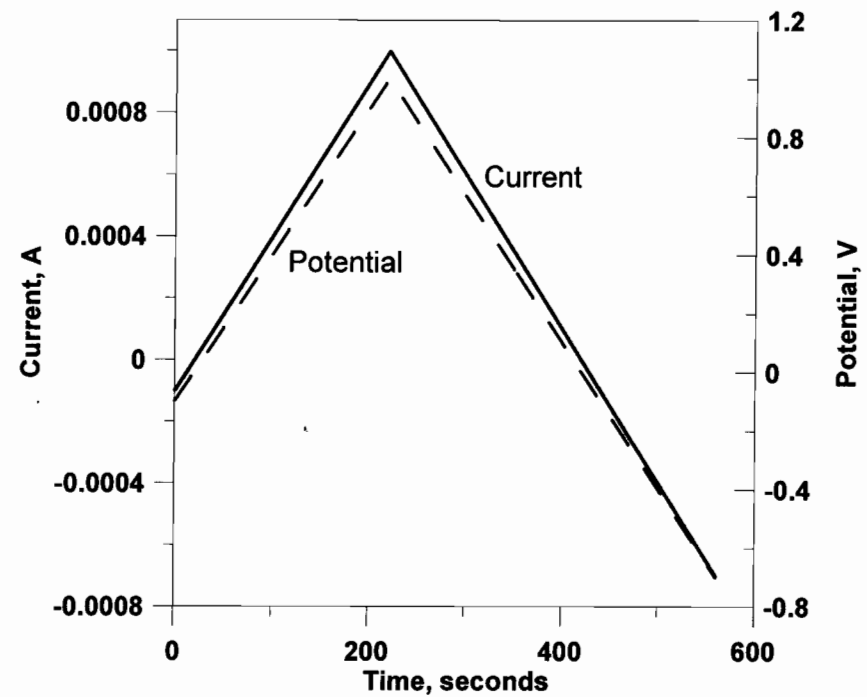
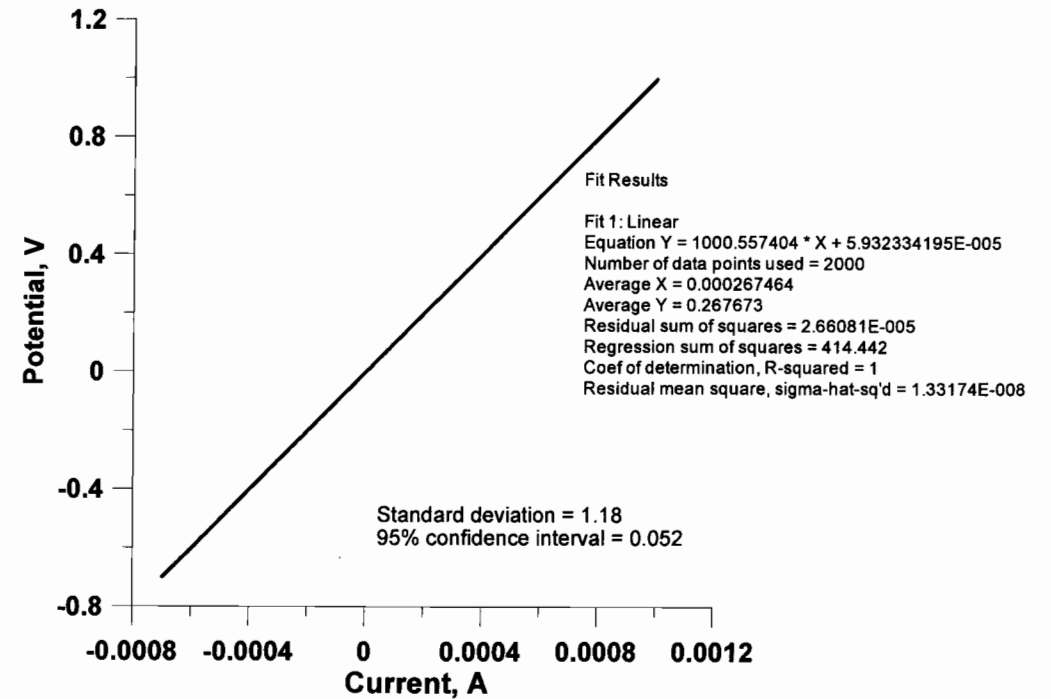
Used Starrett Calipers model # 721 SN# 03031512 cal 3/3/06 due 3/2/07

Actual (Inspection)	Starrett 721	Microscope Olympus PME3
20.4 $\mu$ m	0.02 $\mu$ m	21.8 $\mu$ m
73.6 $\mu$ m	0.07 $\mu$ m	73 $\mu$ m
116.2 $\mu$ m	0.11 $\mu$ m	113 $\mu$ m
240.0 $\mu$ m	0.24 $\mu$ m	231 $\mu$ m
488.9 $\mu$ m	0.48 $\mu$ m	466 $\mu$ m

Procedure: Use objective lens measurement then the stage is <sup>gap</sup> moved. An A measurement was taken with the Starrett Calipers using the back flat side of the microscope base for the measurement.

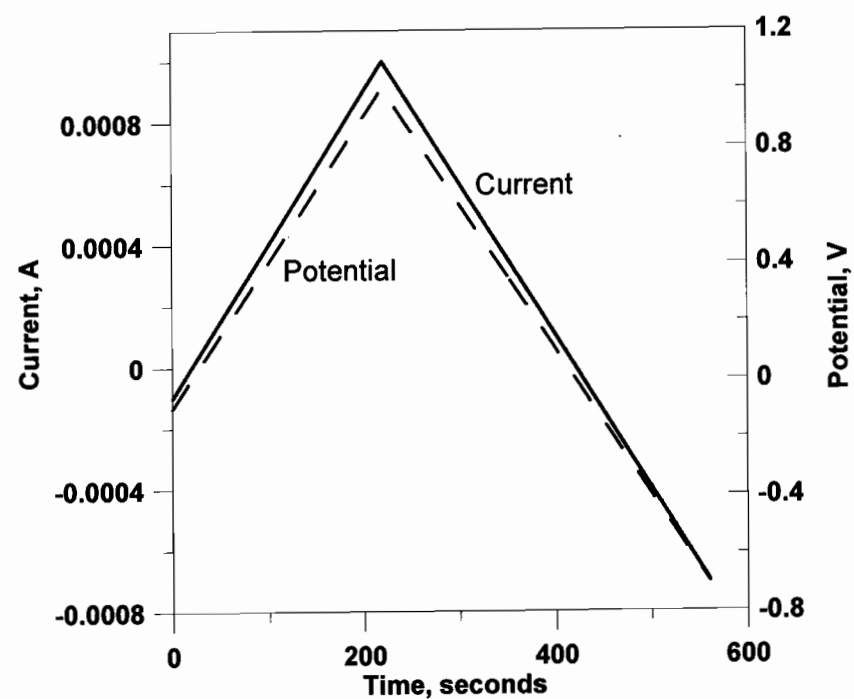
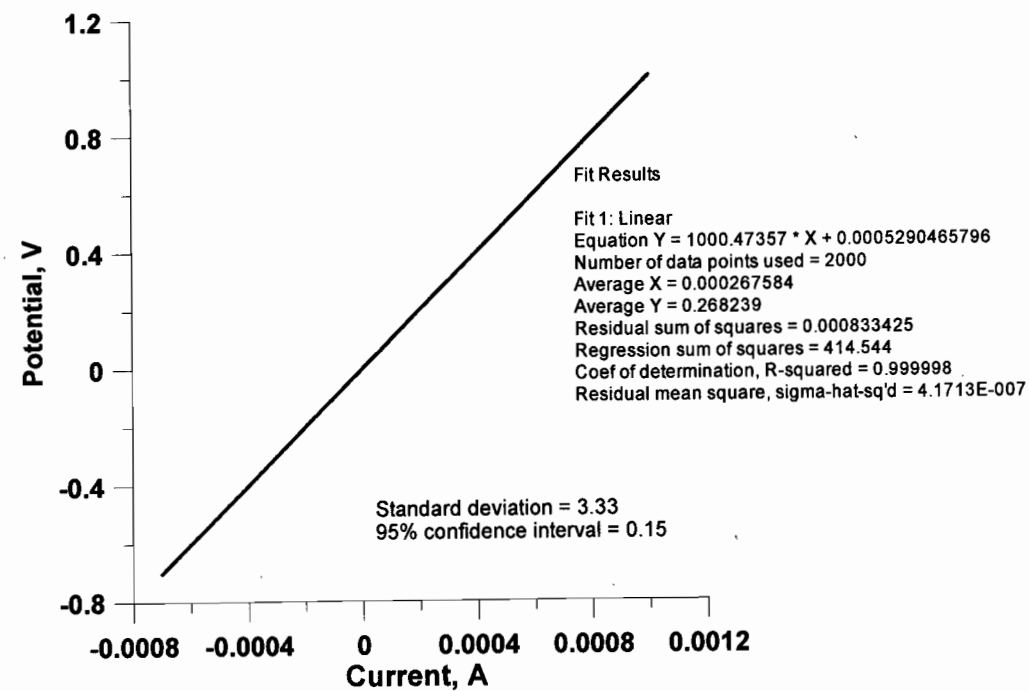
Conclusion: the Olympus PME3 microscope is sufficient for measurement of corrosion depth per ASTM G46

*[Signature]* 6/25/06



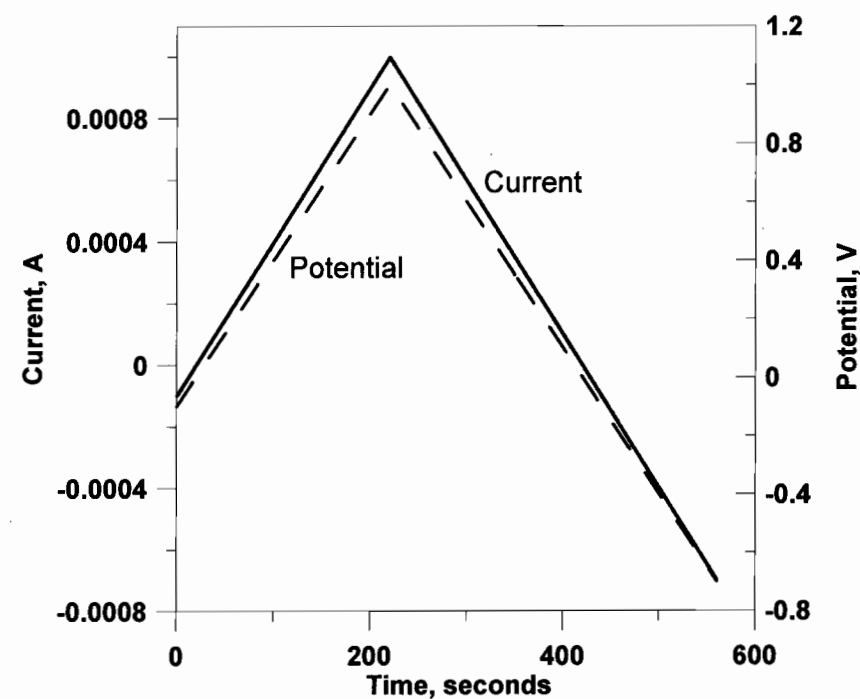
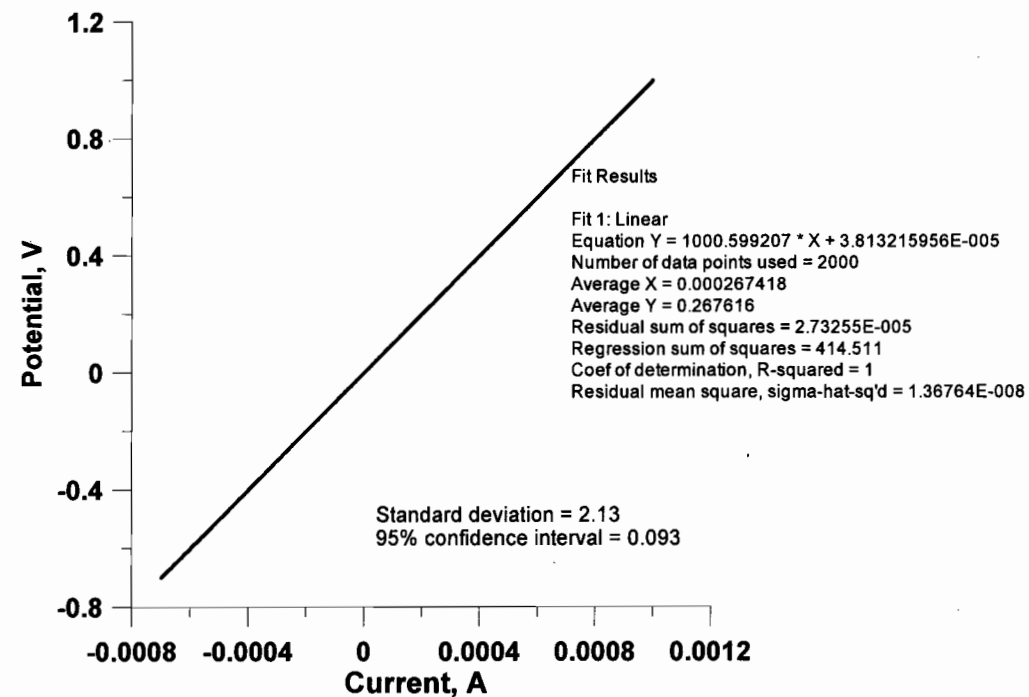
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch1  
 SN 00240053  
 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/23/06*



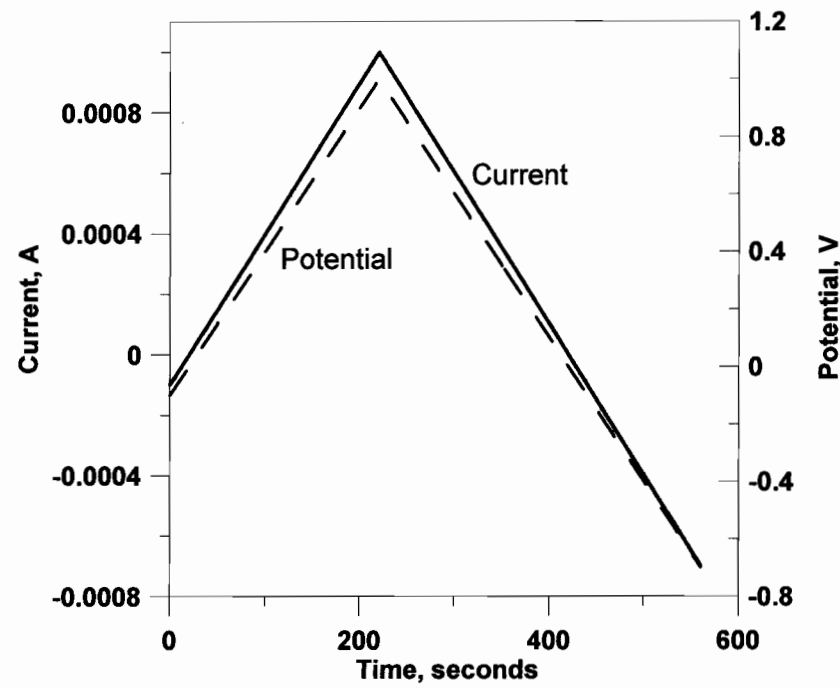
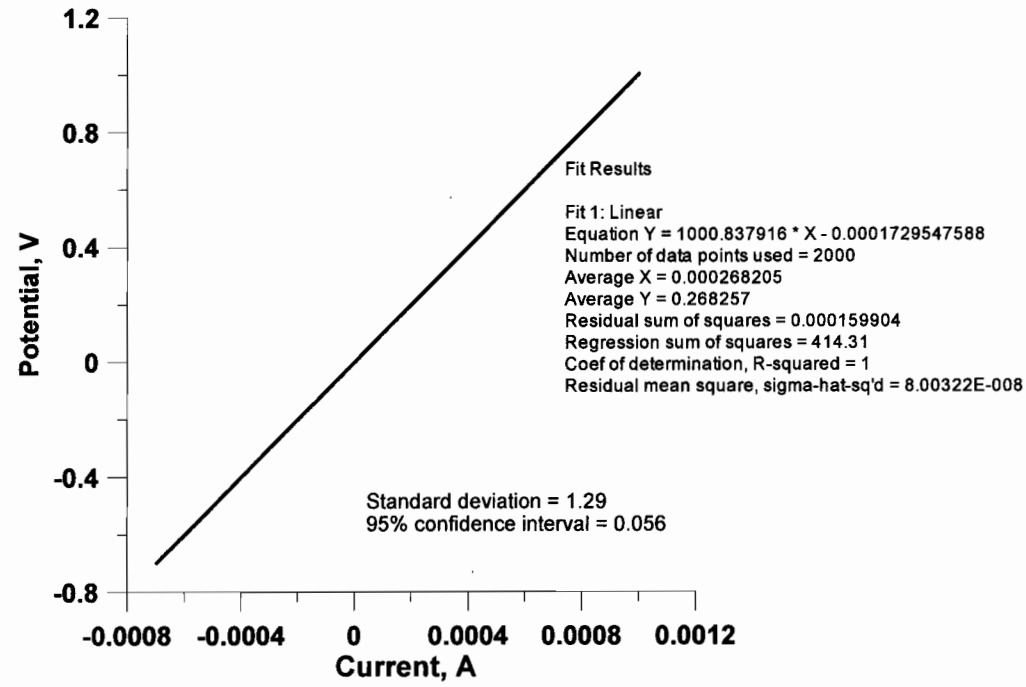
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch2  
 SN 00240053 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'huatle 8/23/06*



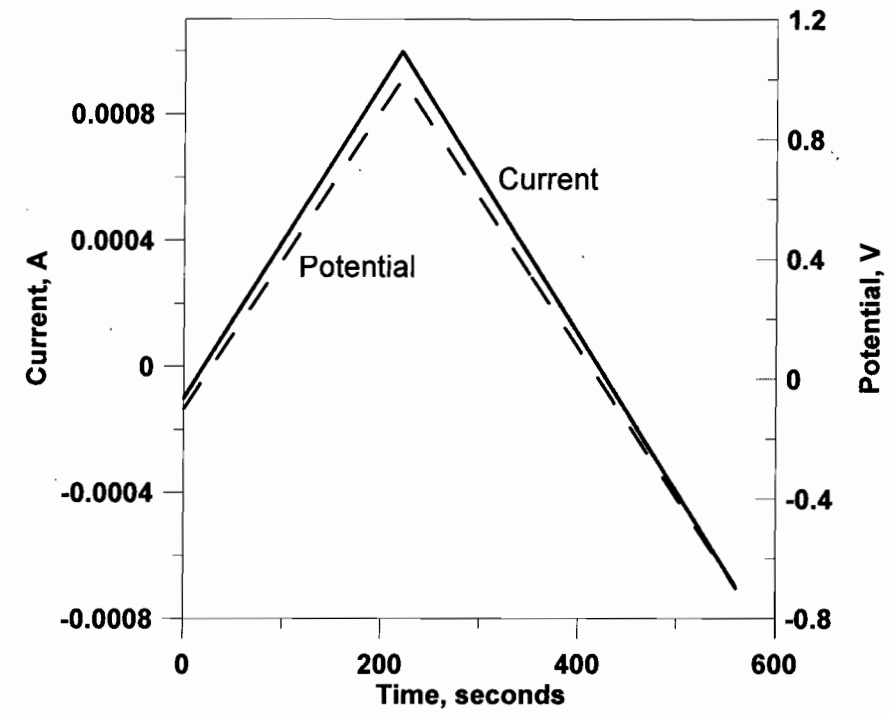
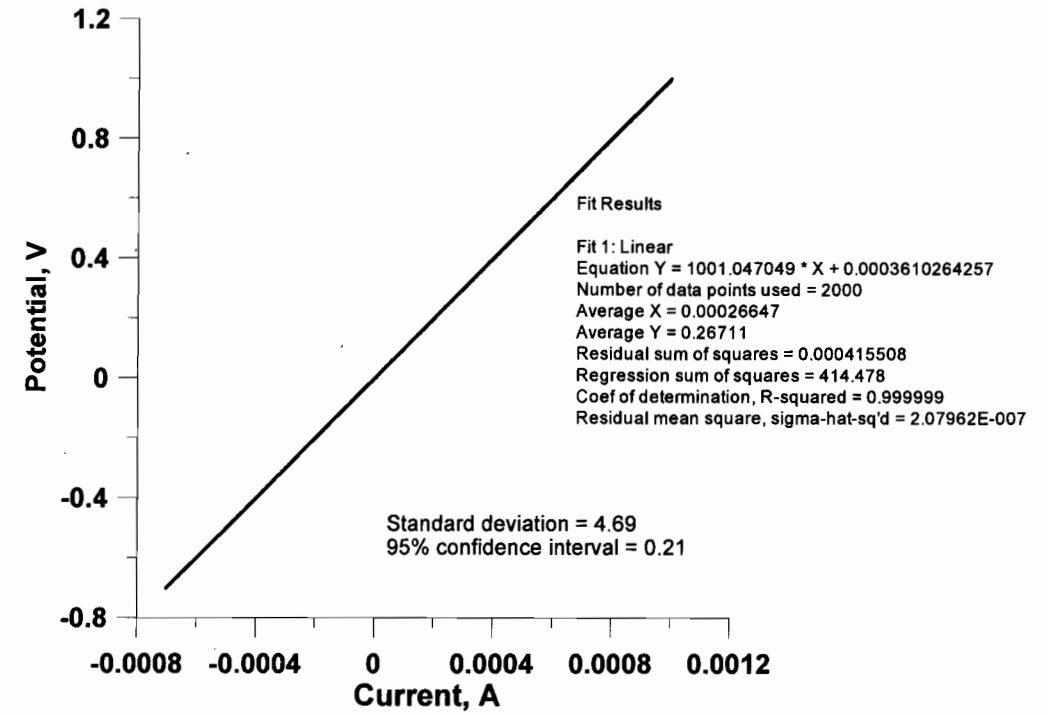
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch3  
 SN 00240053 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'huatle 8/23/06*



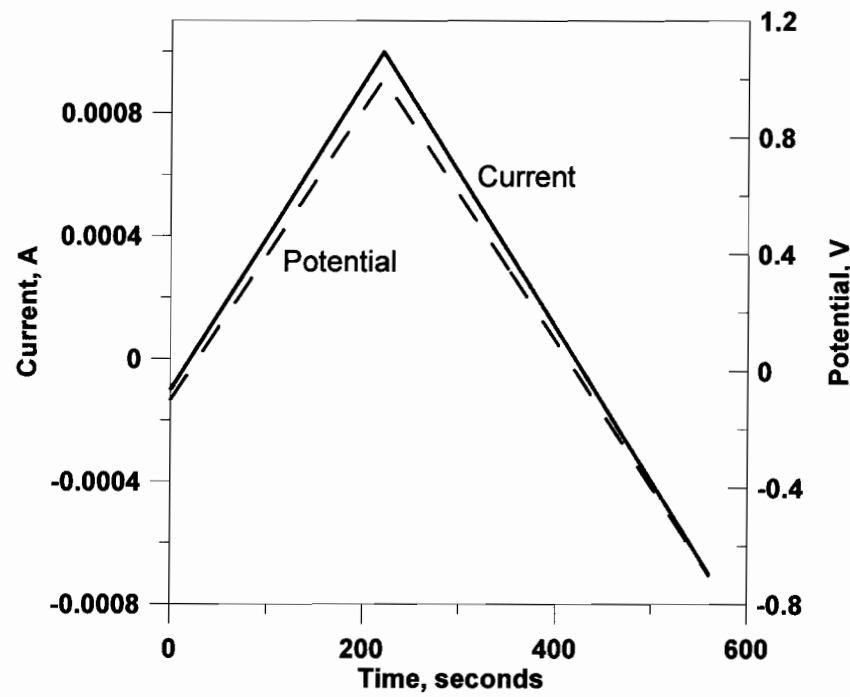
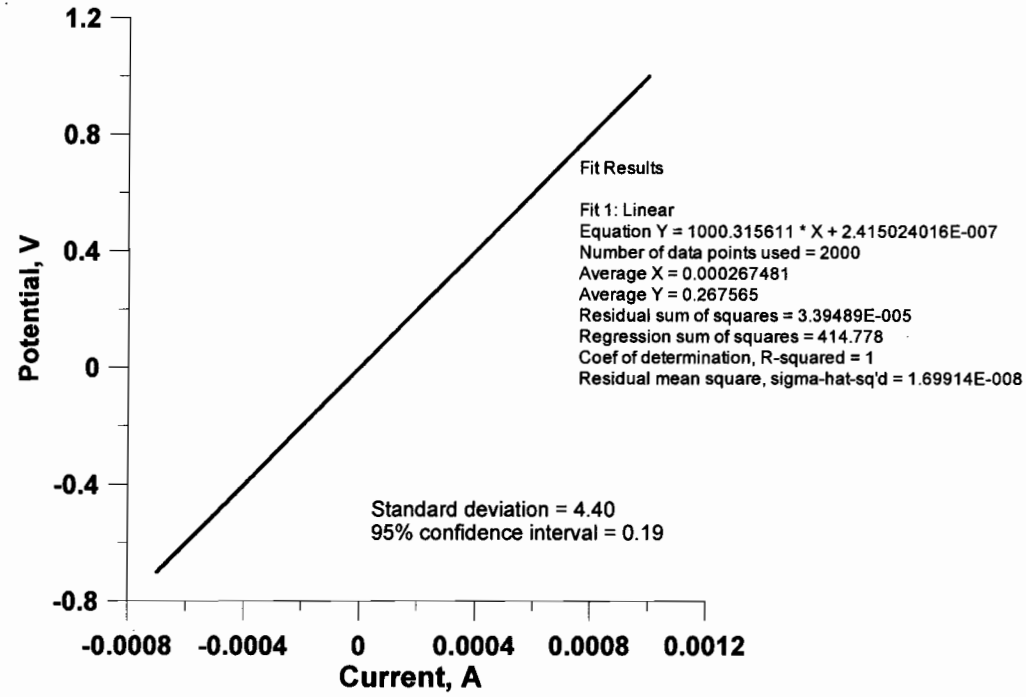
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch5  
 SN 00240053 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/23/06*



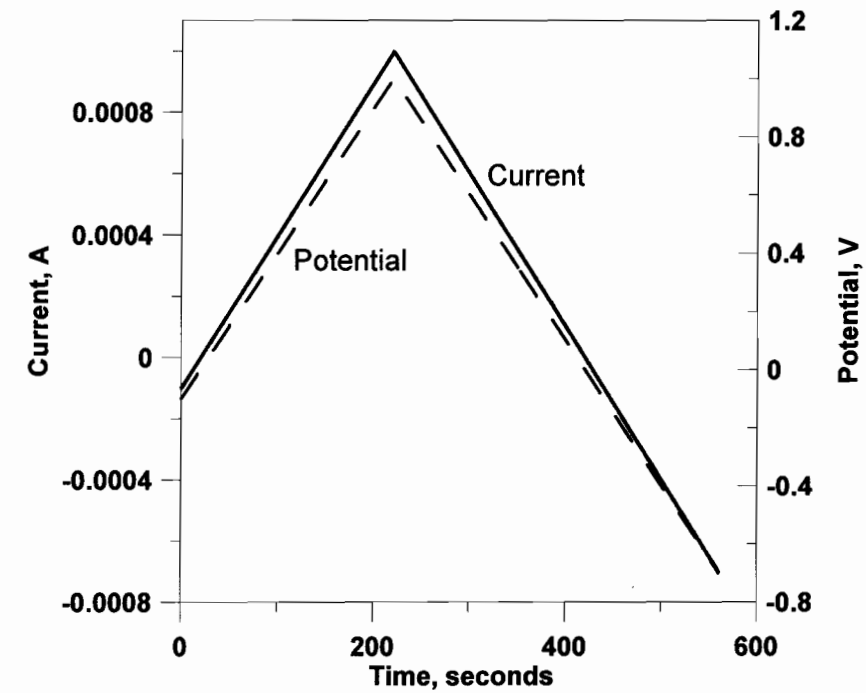
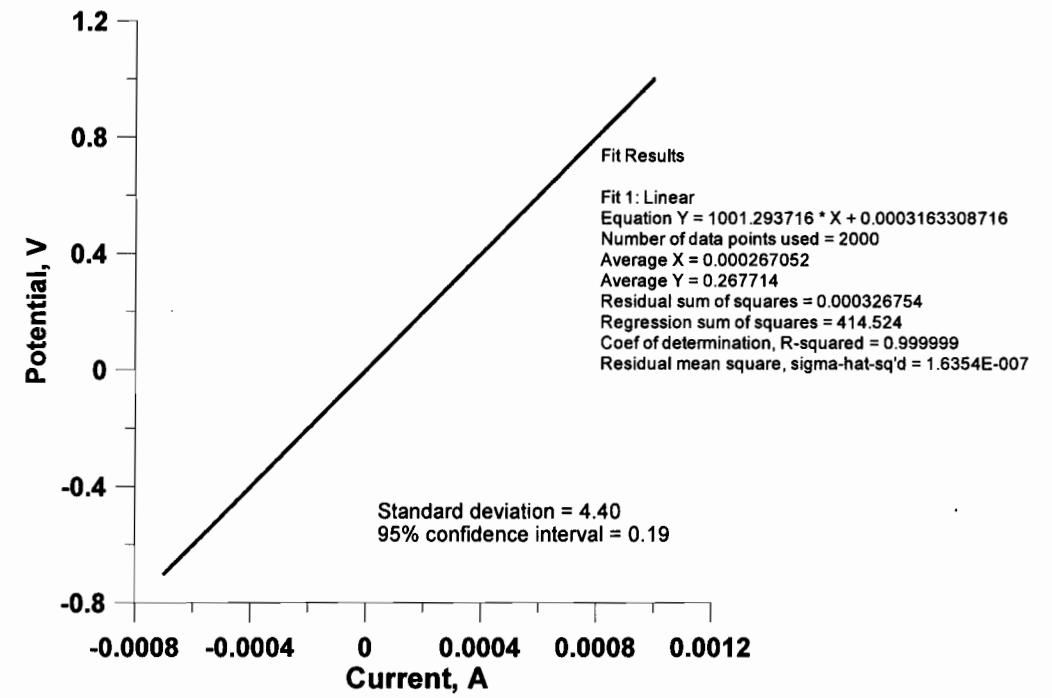
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch4  
 SN 00240053 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/23/06*



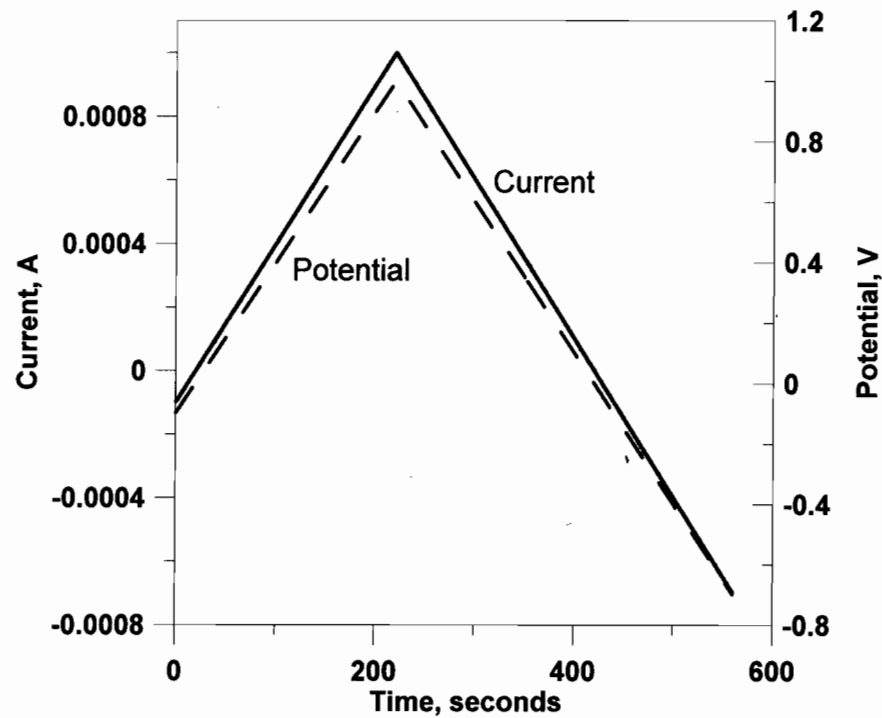
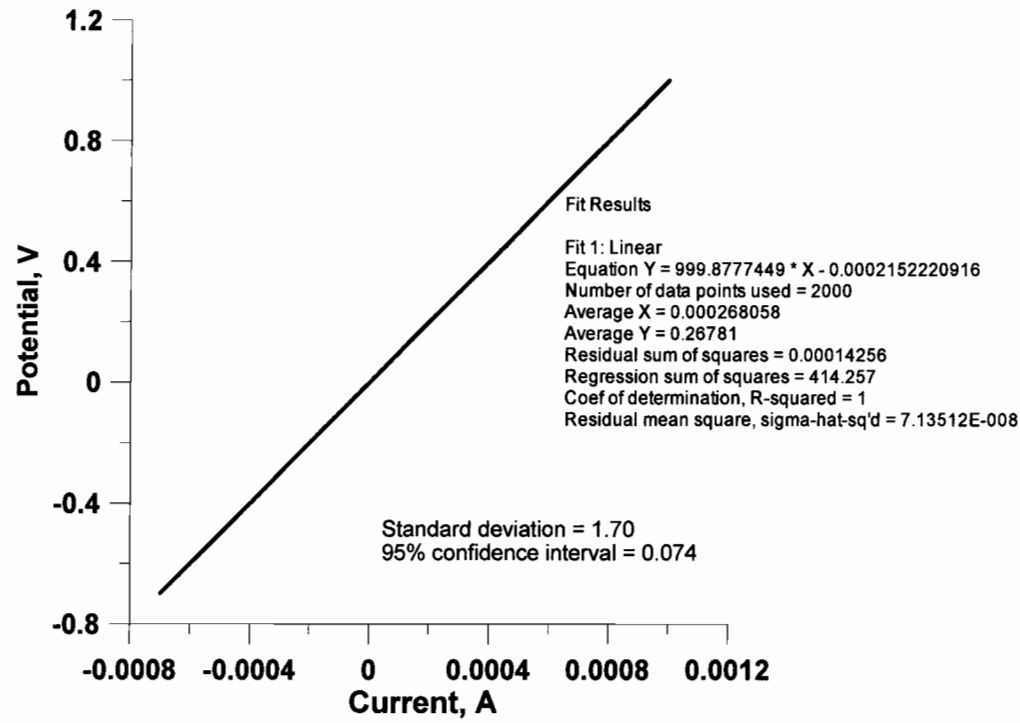
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch6  
 SN 00240053 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/23/06*



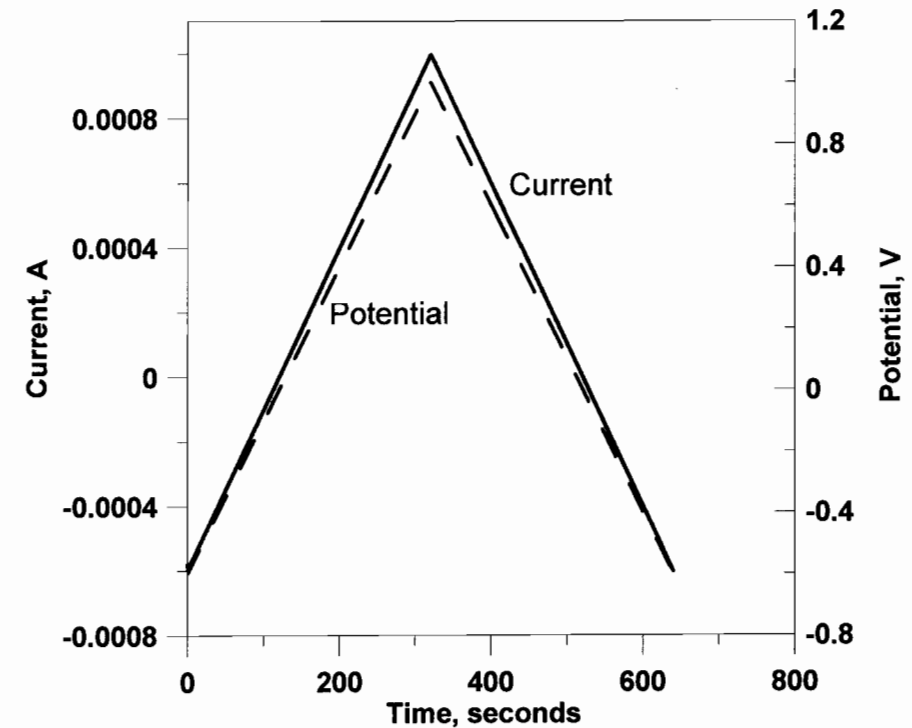
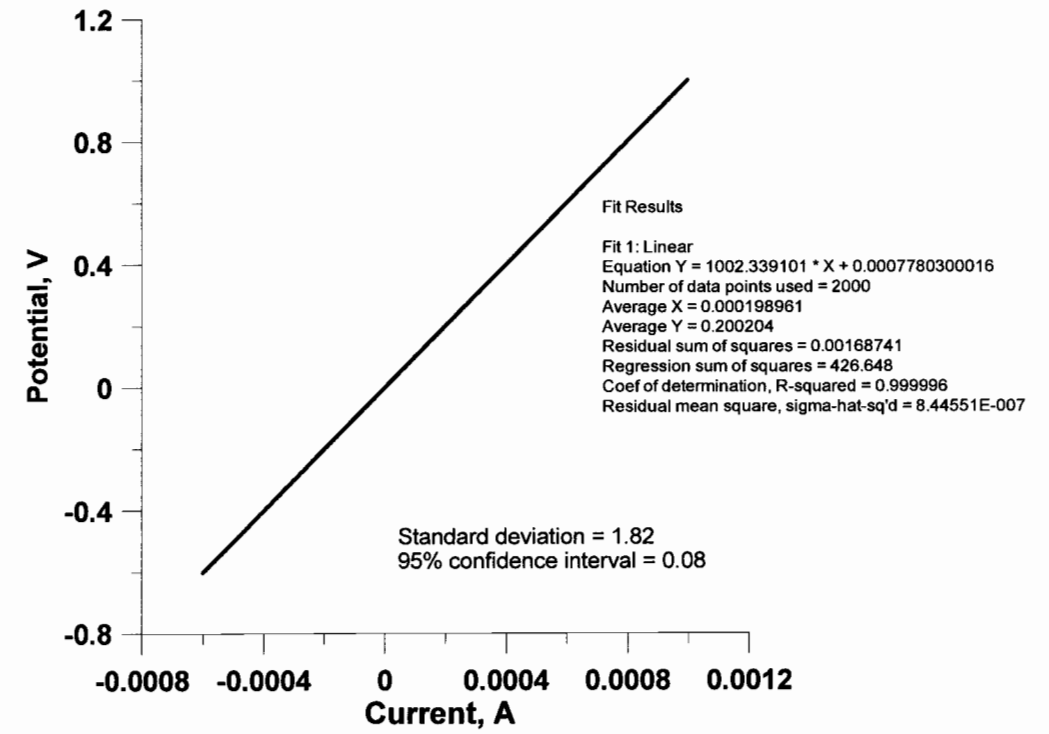
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch7  
 SN 00240053 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/23/06*



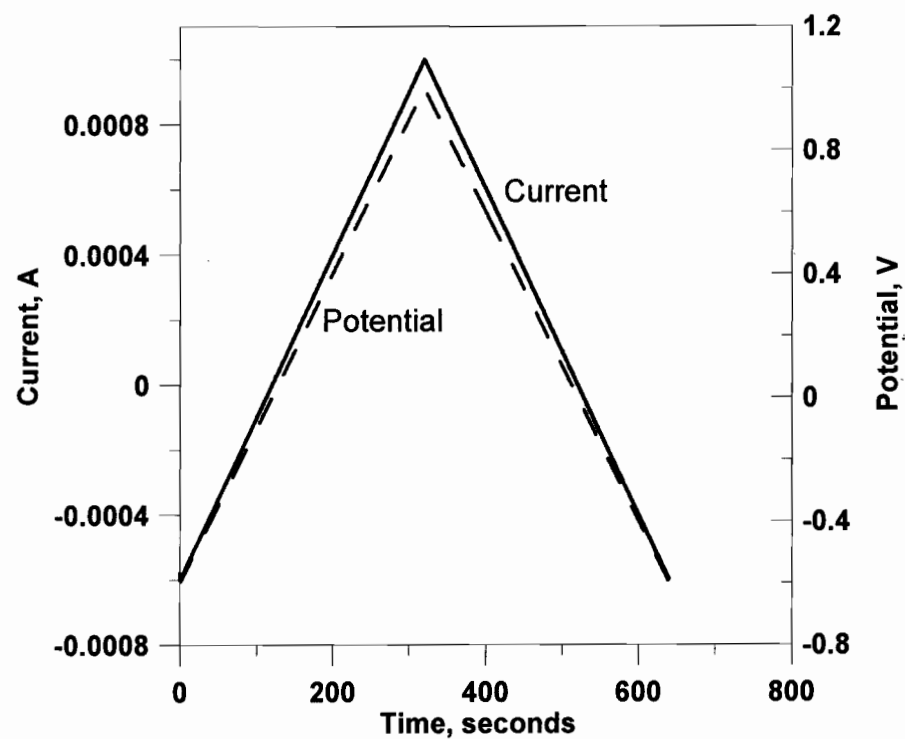
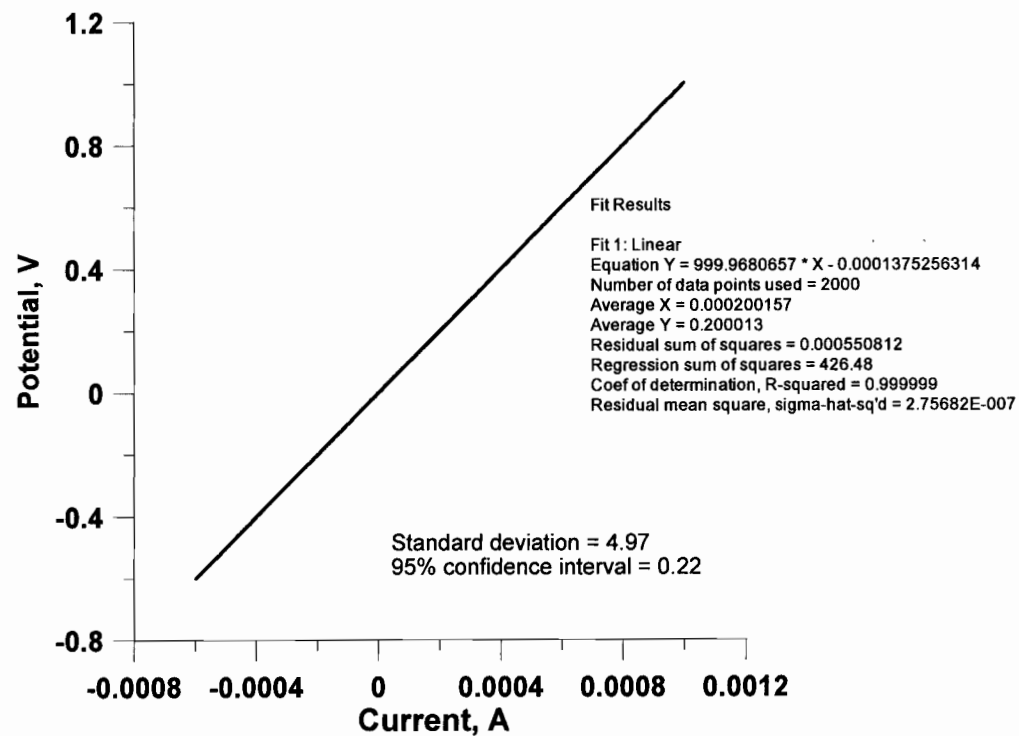
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch8  
 SN 00240053 8/23/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 8/23/06*



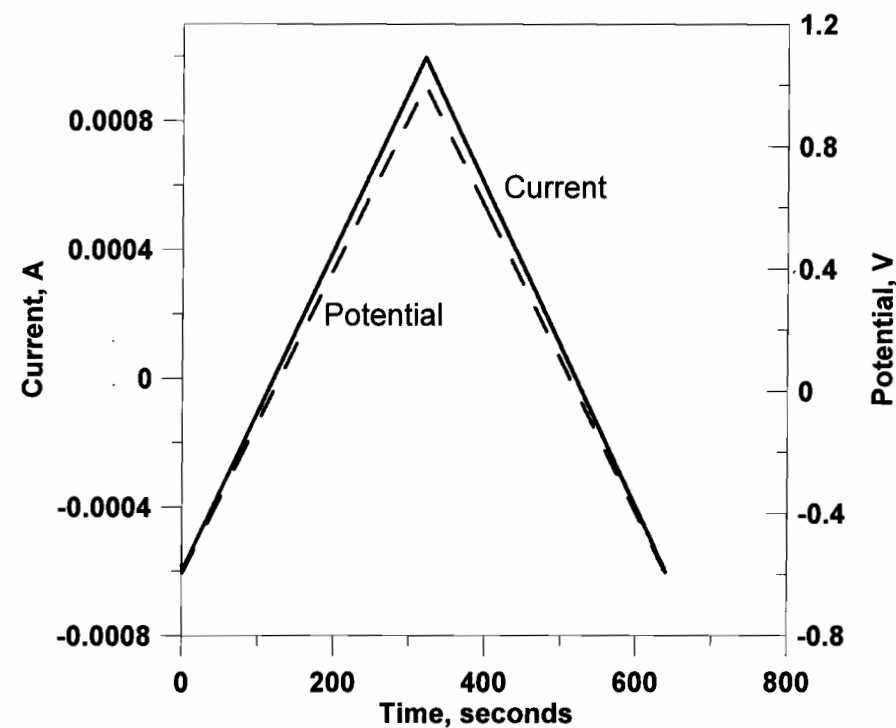
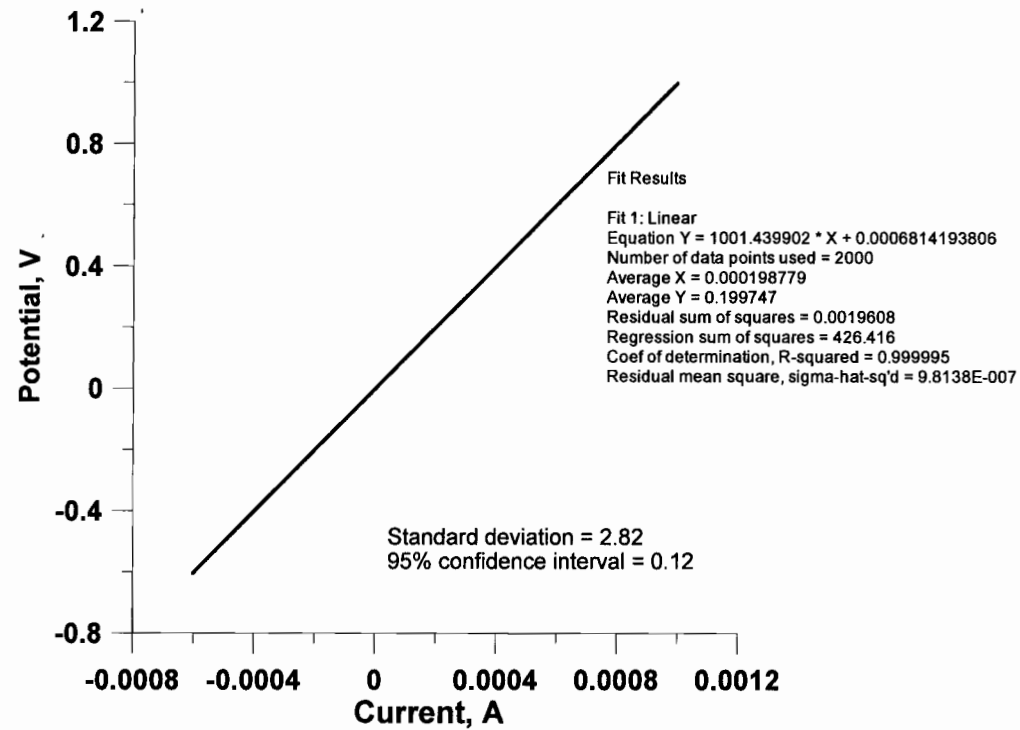
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch1  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 9/11/06*



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch2  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

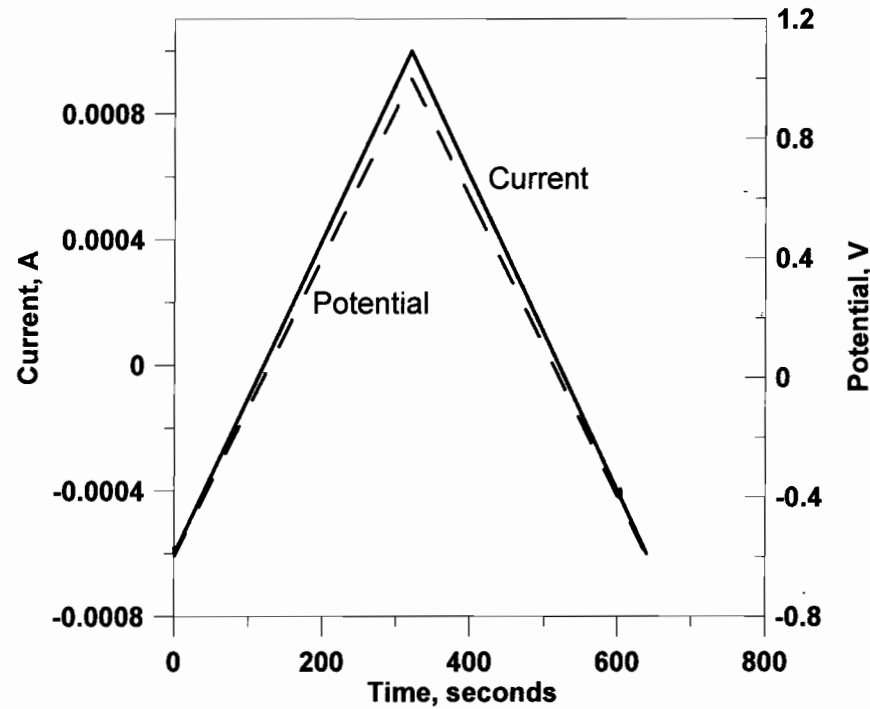
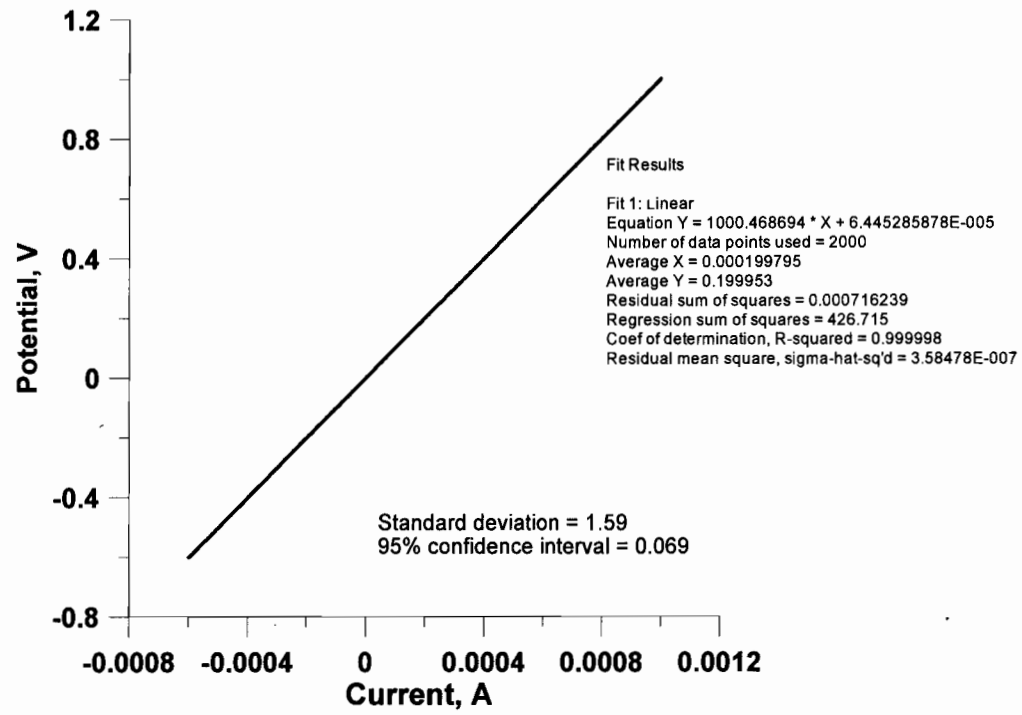
*Xihua He 9/12/06*



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch3  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

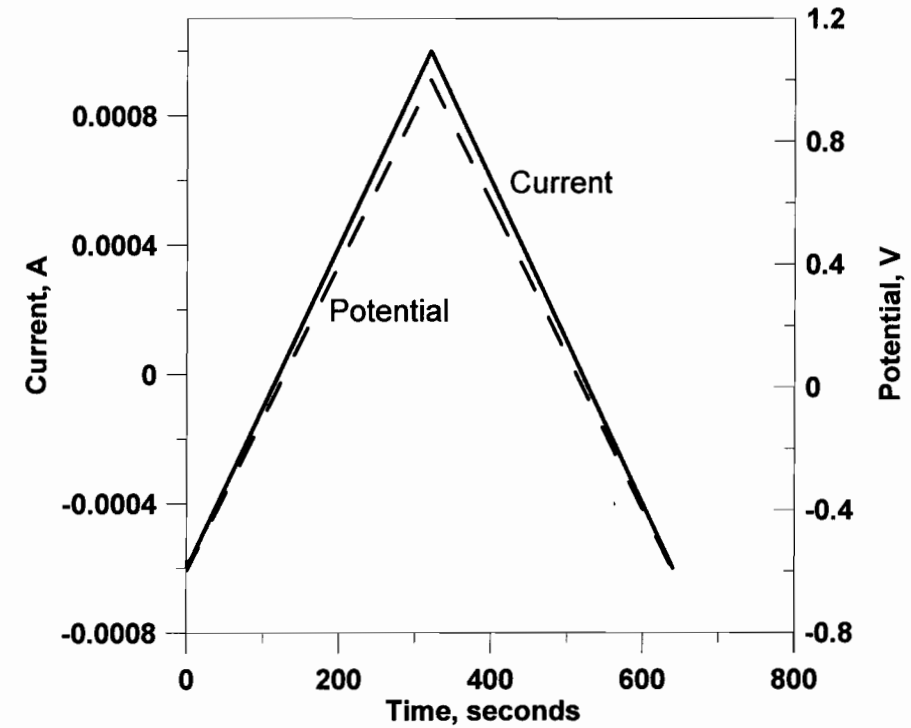
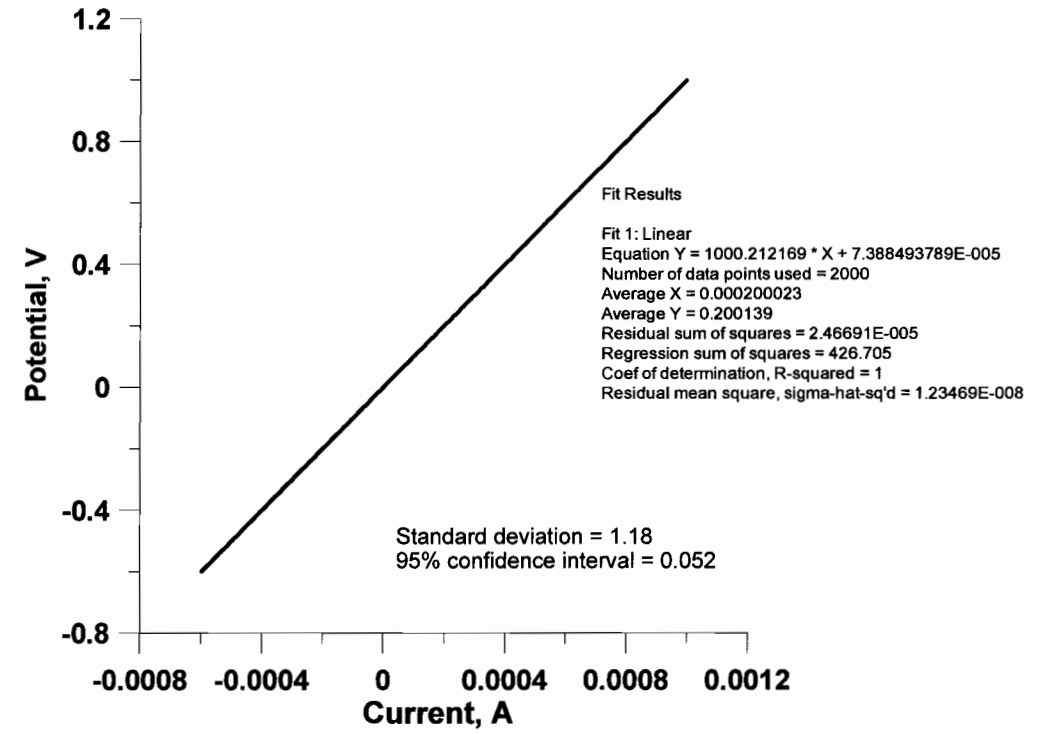
*Xihua He 9/12/06*





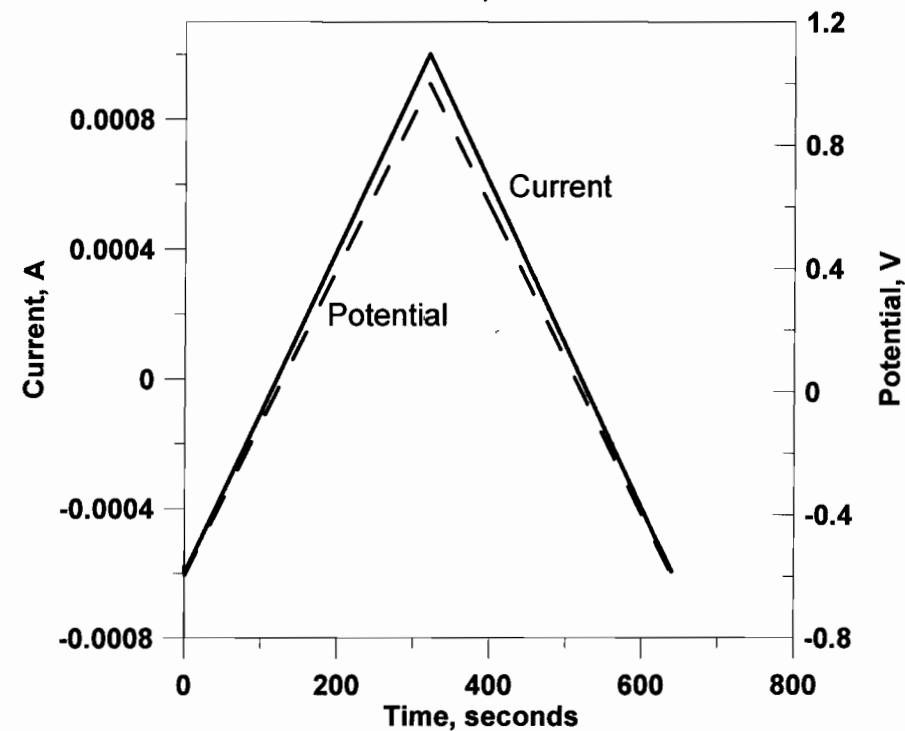
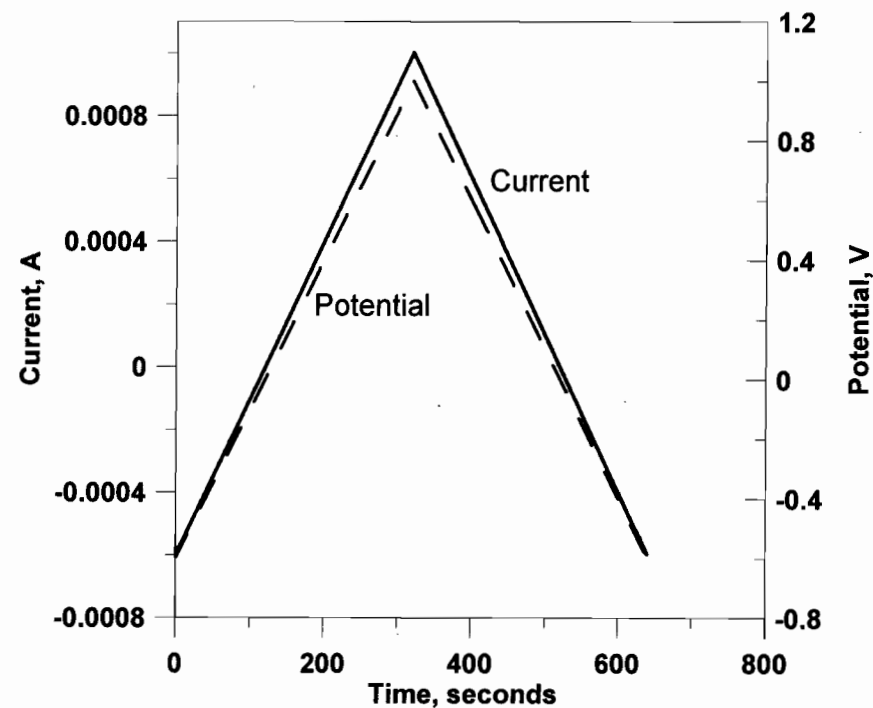
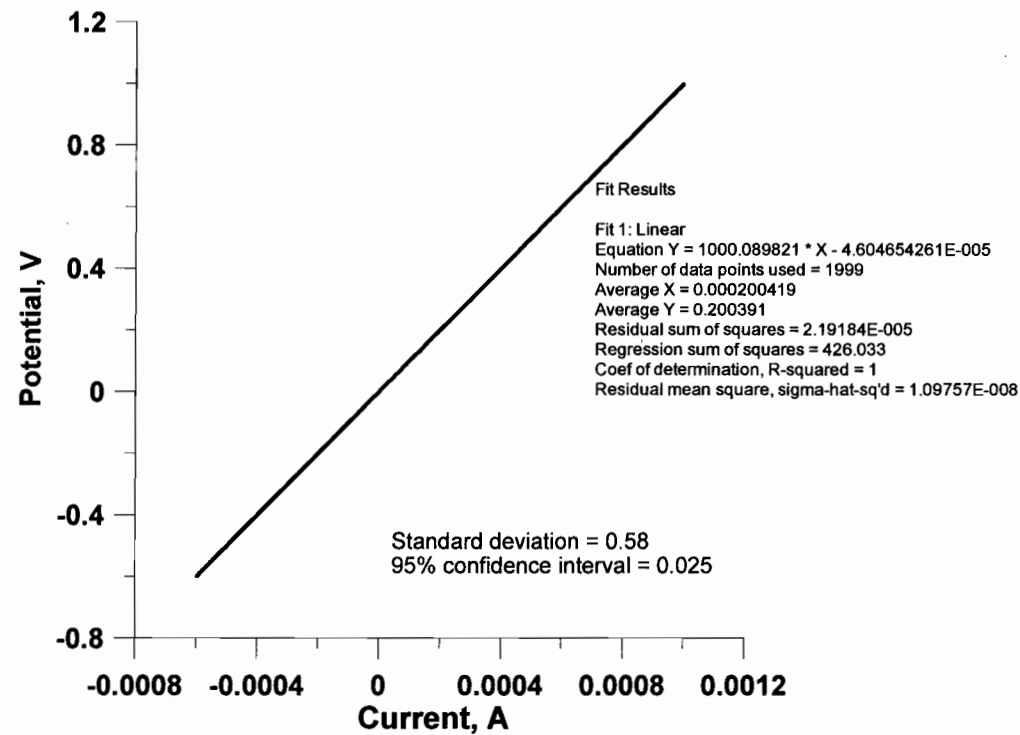
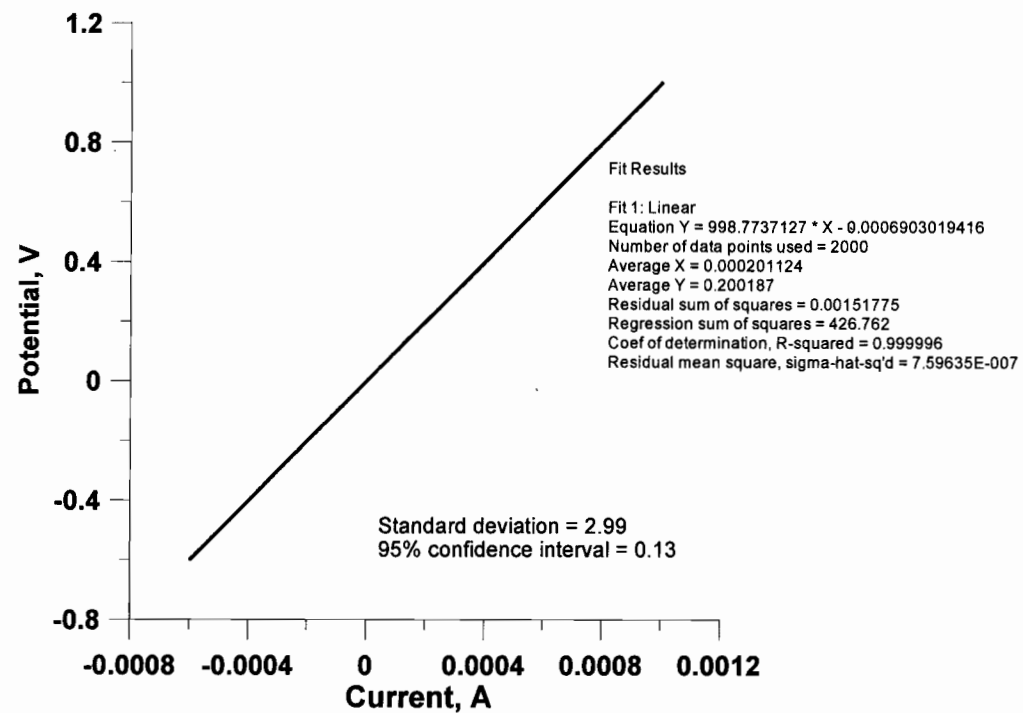
1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch4  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 9/12/06*



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch5  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 9/12/06*

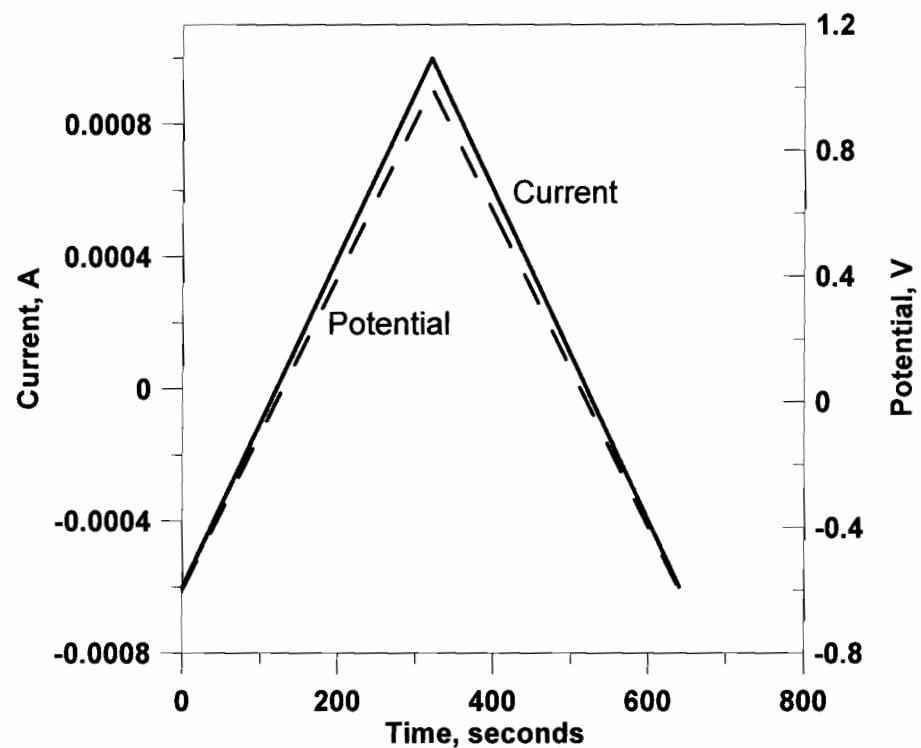
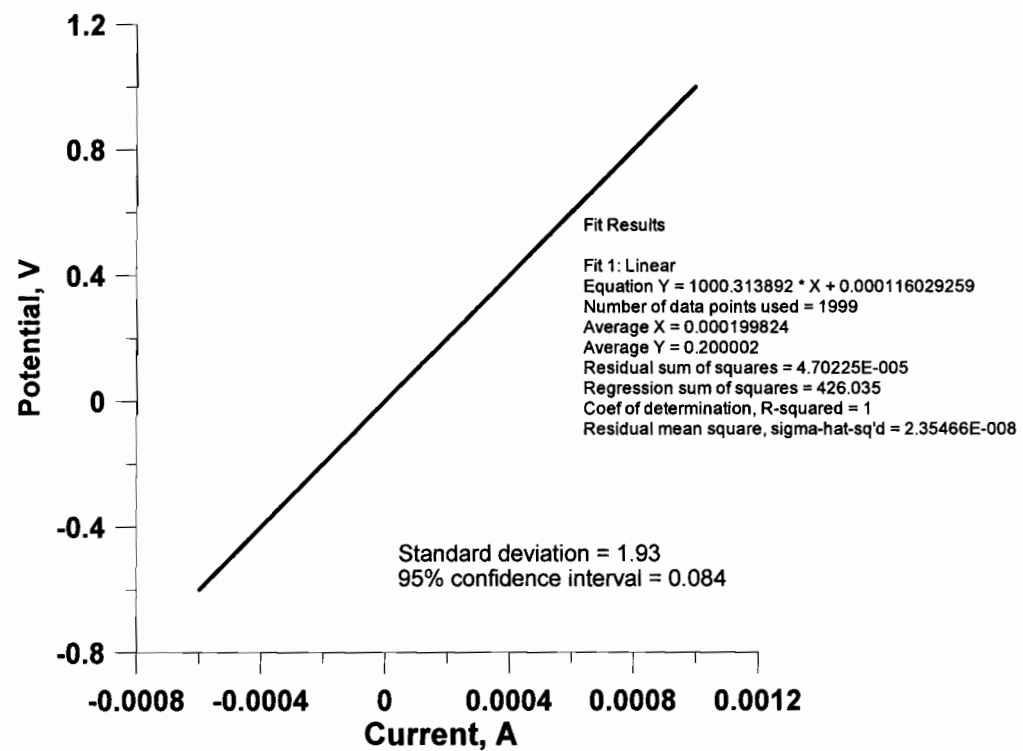


1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch6  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch6 7  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

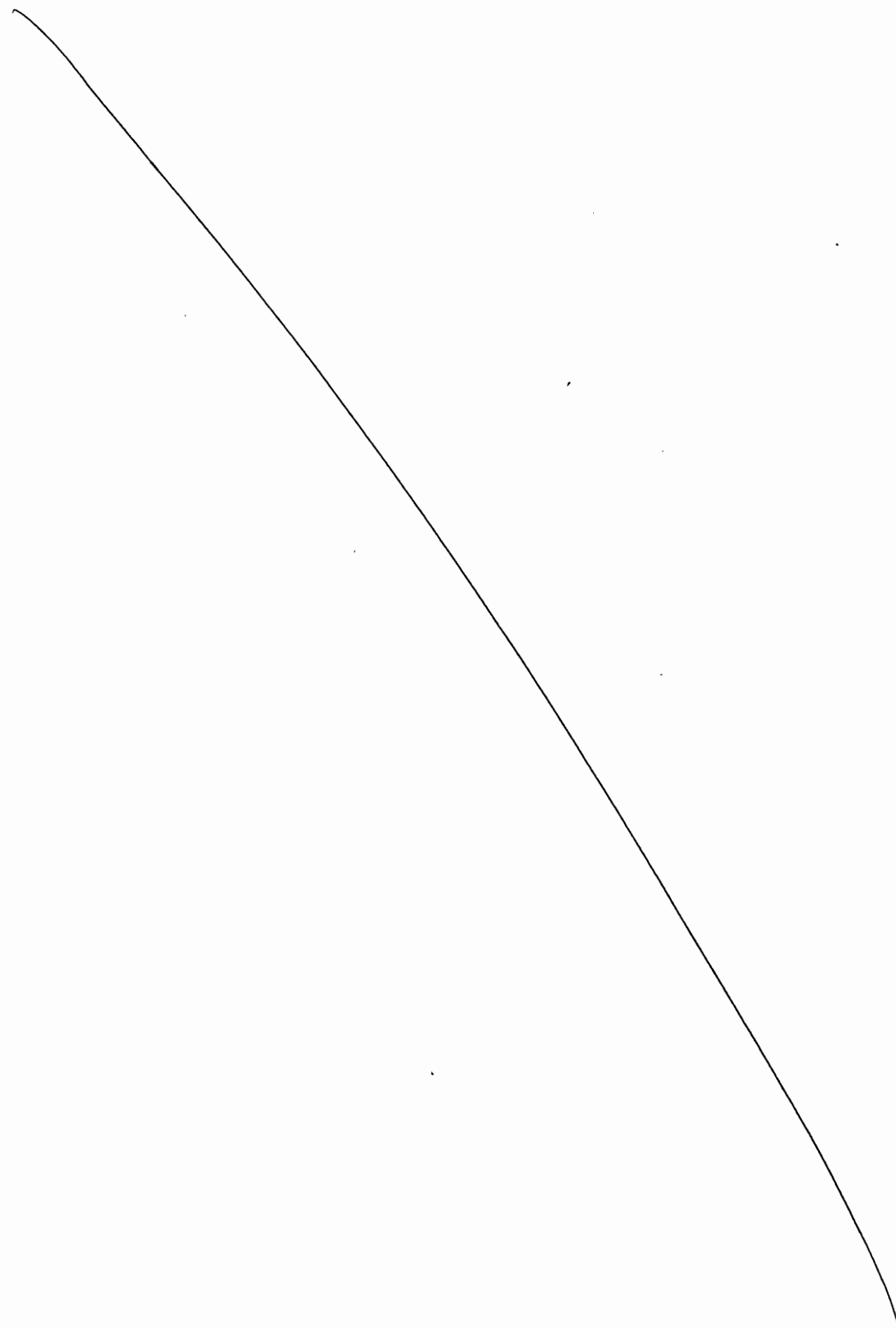
*Xihua He 9/12/06*

*Xihua He 9/12/06*



1000 Ohm resistor, SN 171001, Cal 5/1/06, Due 11/1/06  
 Solartron 1480 Ch8  
 SN 00238265  
 9/11/06  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xi Hua He 9/11/06*



*[Signature]*  
 10/2/06



Continued from Pg #60

Weekly pH Calibrations of EA 940 SN# 2330

Cal: 7/25/06 7/6/06 Due: 7/6/07

pH probe 13-620-296 SN# 5003095

Date	Buffers Used	Int.
10/3/06	4-7-10	BK5
10/16/06	4-7-10	BK5
10/23/06	4-7-10	BK5
10/30/06	4-7-10	BK5
11/6/06	4-7-10	BK5
11/13/06	4-7-10	BK5
11/20/06	4-7-10	BK5
11/27/06	4-7-10	BK5
12/4/06	4-7-10	BK5
12/11/06	4-7-10	BK5
12/18/06	4-7-10	BK5
12/25/06	4-7-10	BK5
1/1/07	4-7-10	BK5
1/8/07	4-7-10	BK5
1/15/07	4-7-10	BK5
1/22/07	4-7-10	BK5
1/29/07	4-7-10	BK5
2/5/07	4-7-10	BK5
2/12/07	4-7-10	BK5
2/19/07	4-7-10	BK5
2/26/07	4-7-10	BK5
3/5/07	4-7-10	BK5
3/12/07	4-7-10	BK5

B. E. J. 10/2/06

Continued from Pg #61

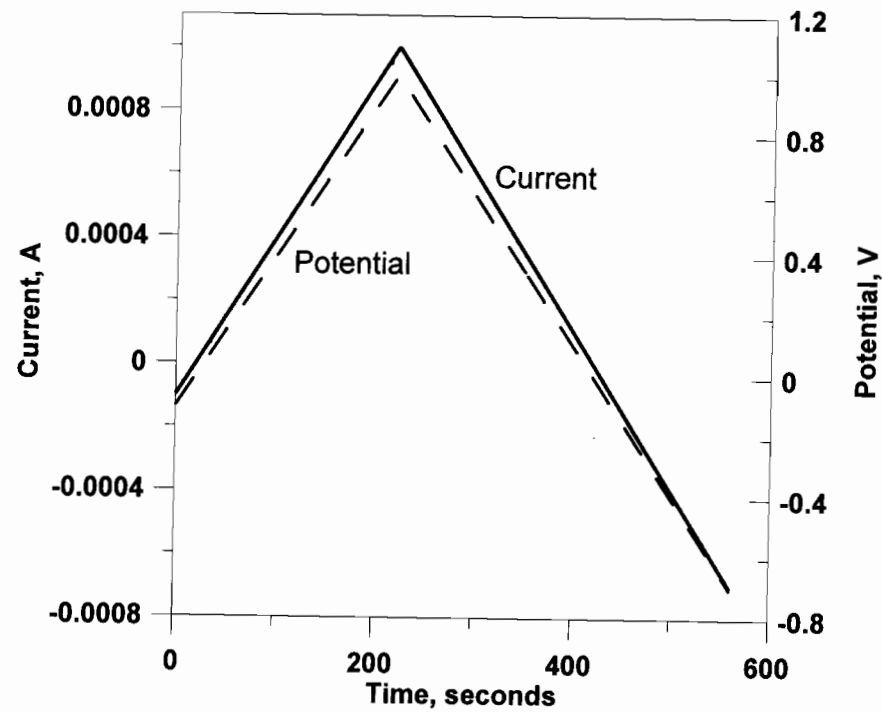
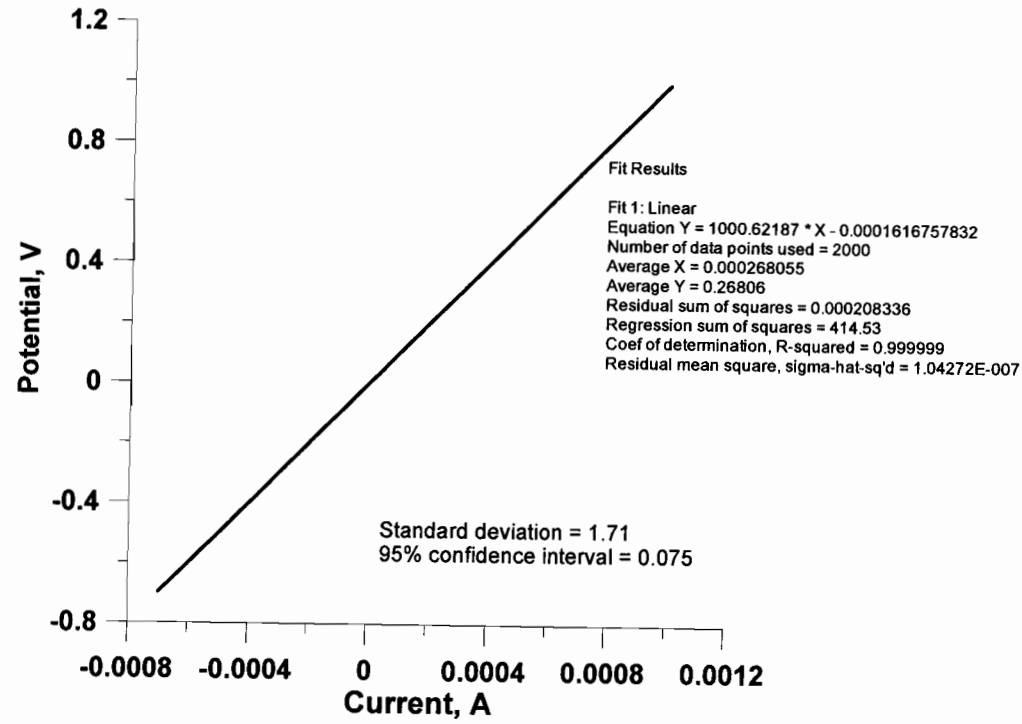
Weekly pH Calibrations of EA 940 SN# 4274

Cal: 4/27/06 Due: 10/27/06 \*New Cal: 11/6/06 Due: 5/6/07

pH probe 13-620-296 SN# 5146019

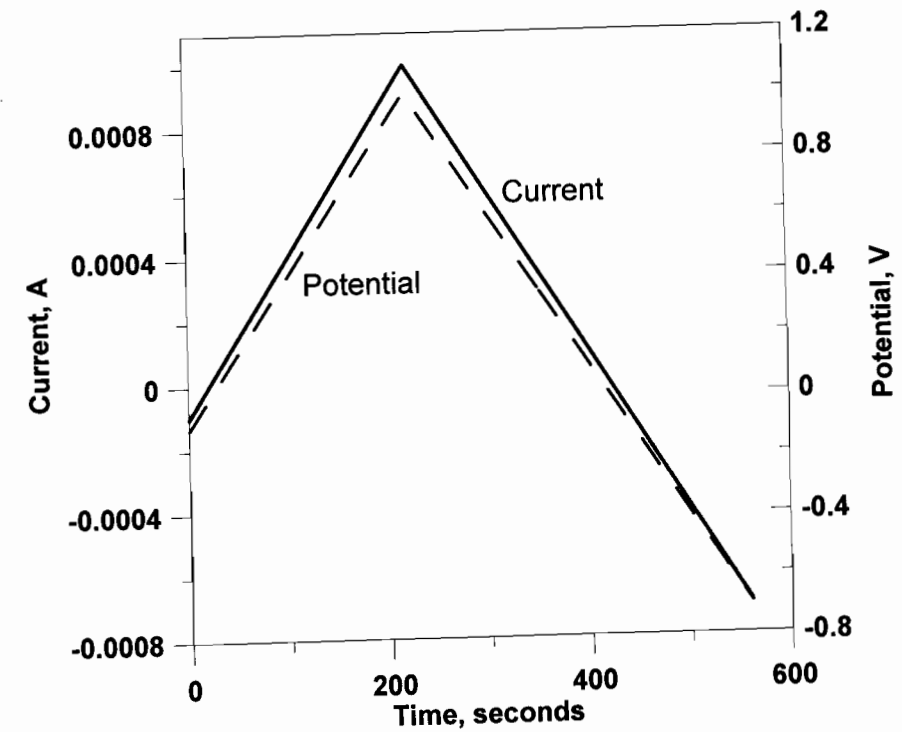
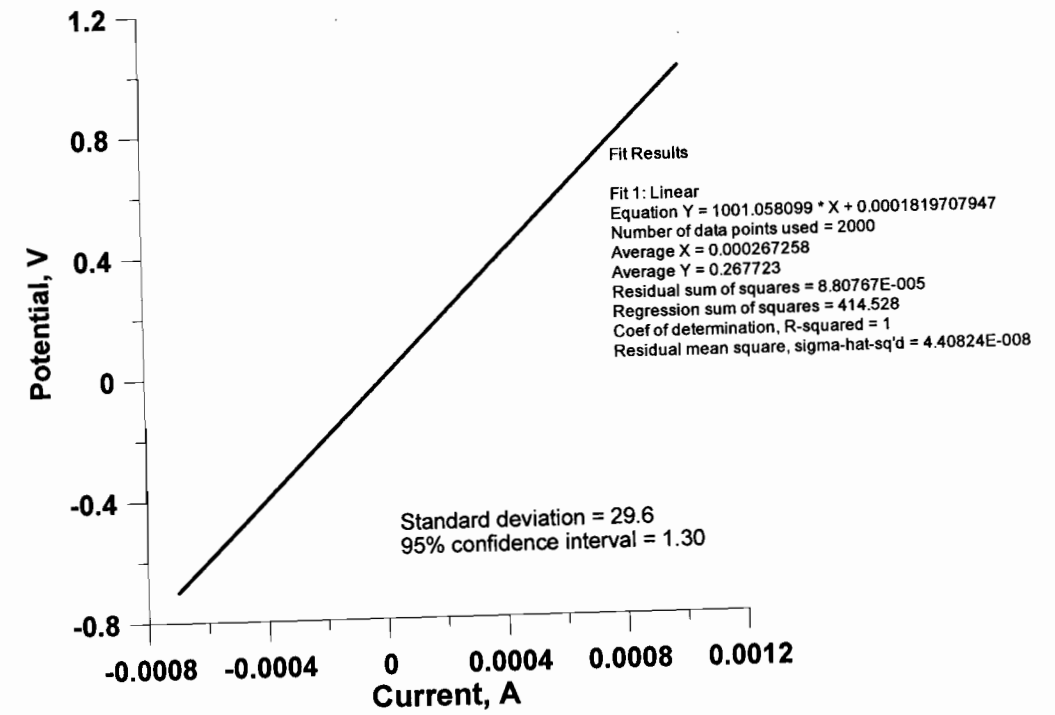
Date	Buffers Used	Int.
10/2/06	4-7-10	BK5
10/16/06	4-7-10	BK5
10/23/06	4-7-10	BK5
11/6/06	Sent to Cal Lab.	BK5
11/13/06	Cal Lab	BK5
11/20/06	4-7-10	BK5
11/27/06	4-7-10	BK5
12/4/06	4-7-10	BK5
12/11/06	4-7-10	BK5
12/18/06	4-7-10	BK5
12/25/06	4-7-10	BK5
1/1/07	4-7-10	BK5
1/8/07	4-7-10	BK5
1/15/07	4-7-10	BK5
1/22/07	4-7-10	BK5
1/29/07	4-7-10	BK5
2/5/07	4-7-10	BK5
2/12/07	4-7-10	BK5
2/19/07	4-7-10	BK5
2/26/07	4-7-10	BK5
3/5/07	4-7-10	BK5
3/12/07	4-7-10	BK5

B. E. J. 10/2/06



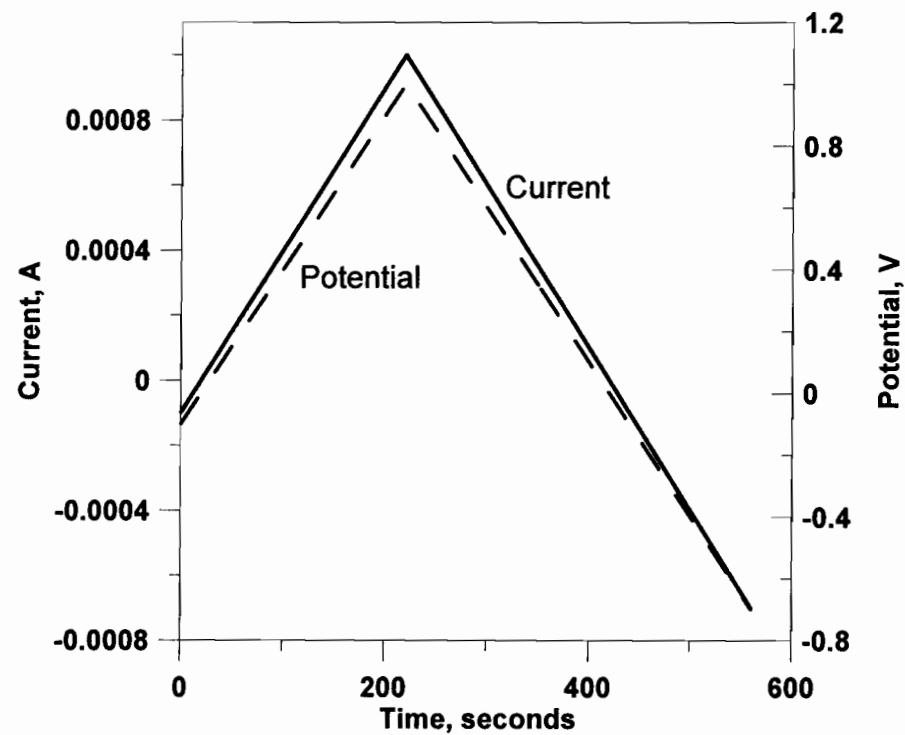
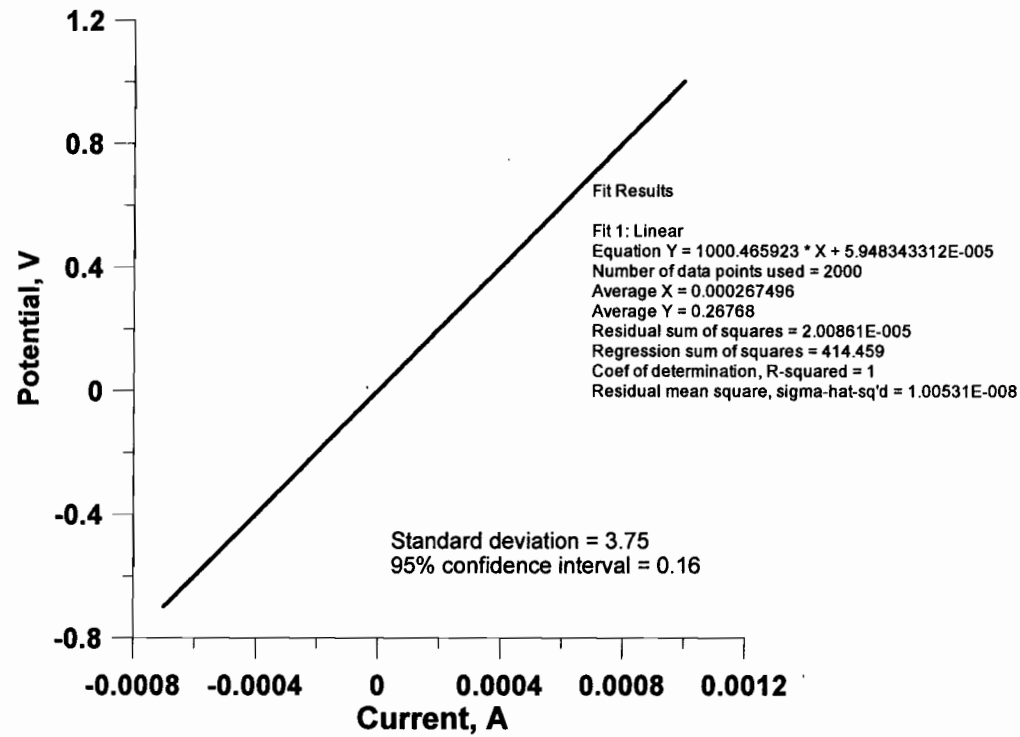
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch1  
 SN 00240551  
 11/6/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Handwritten signature and date: 11/7/06*



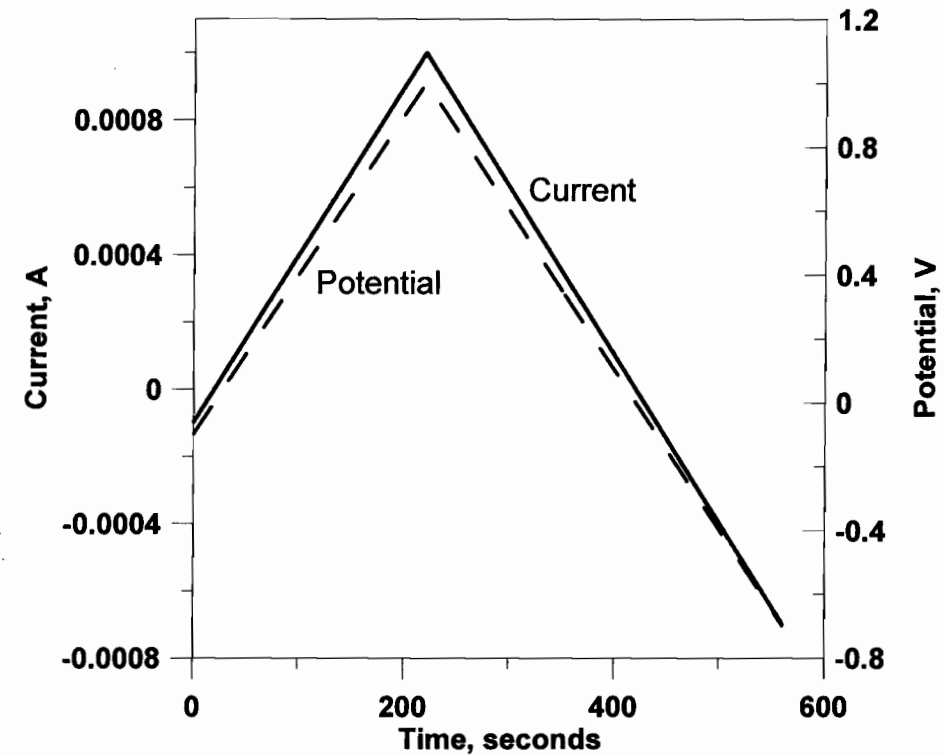
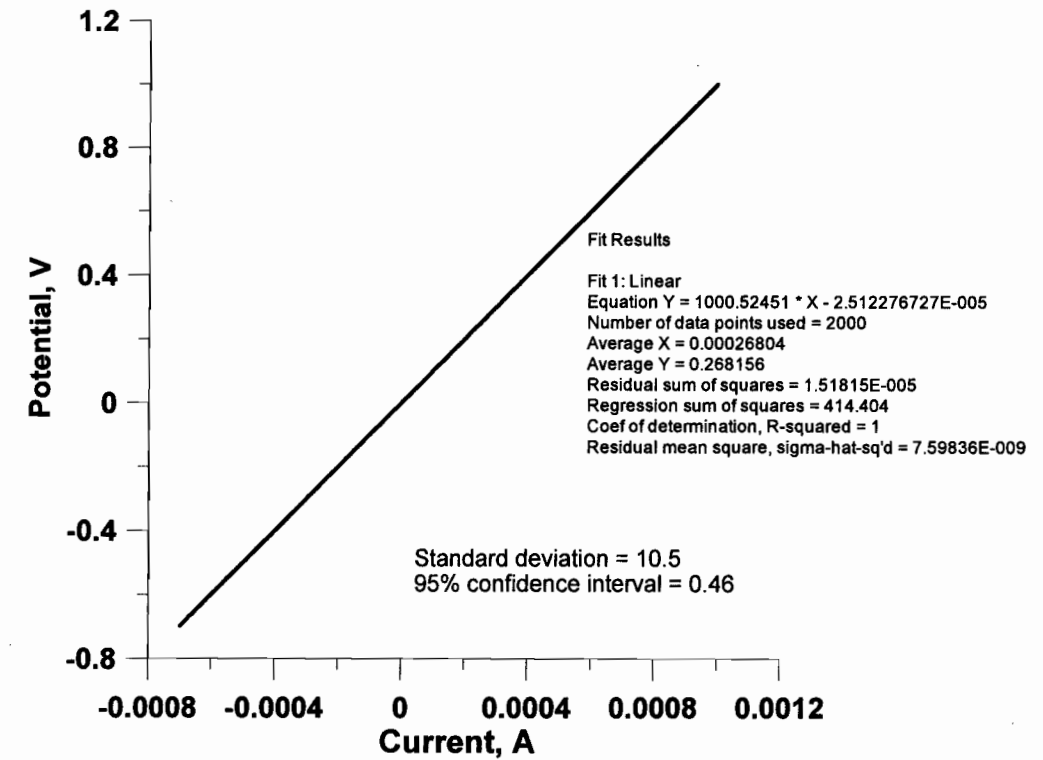
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch2  
 SN 00240551  
 11/6/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Handwritten signature and date: 11/7/06*



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch3, SN 00240551  
 3/16/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

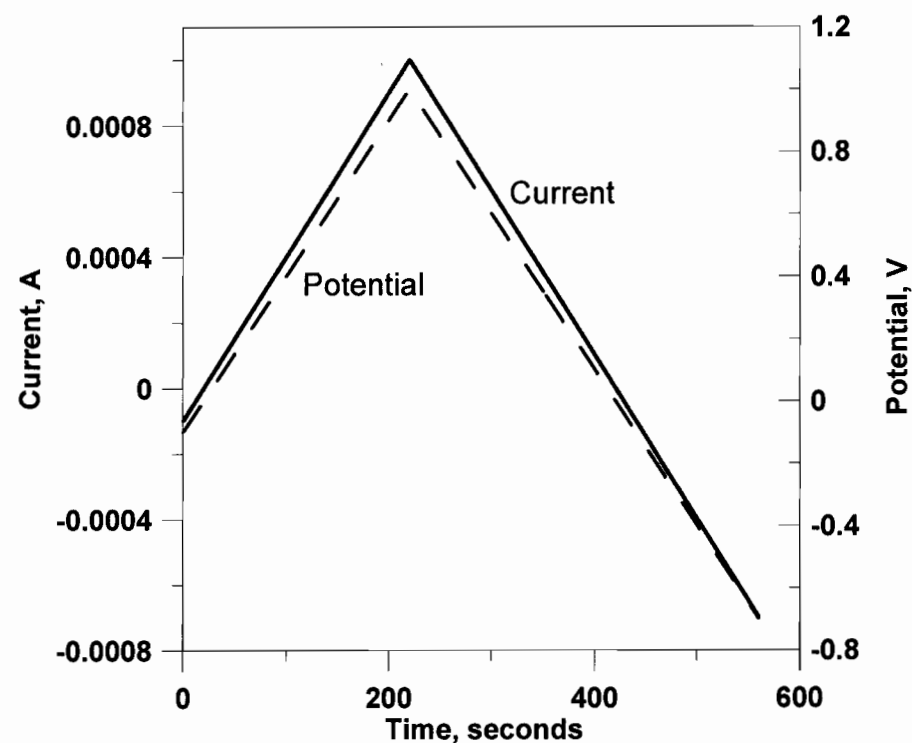
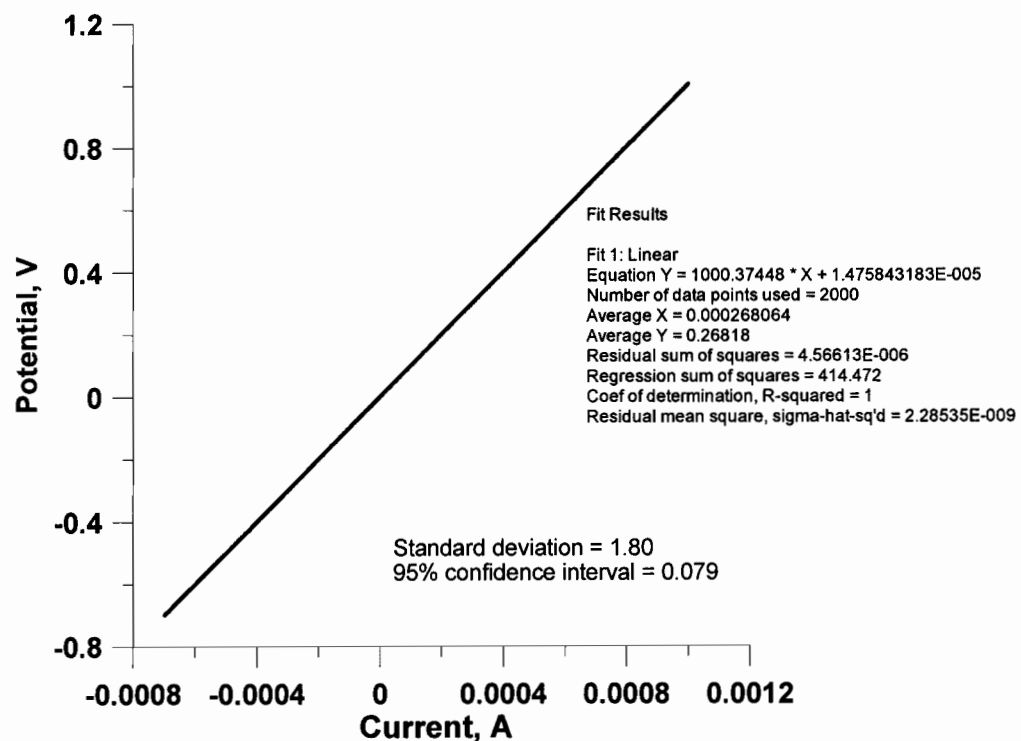
The performance of this channel is verified in accordance with TOP-22.  
 Xiuhua He 3/16/07



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch4, SN 00240551  
 3/16/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

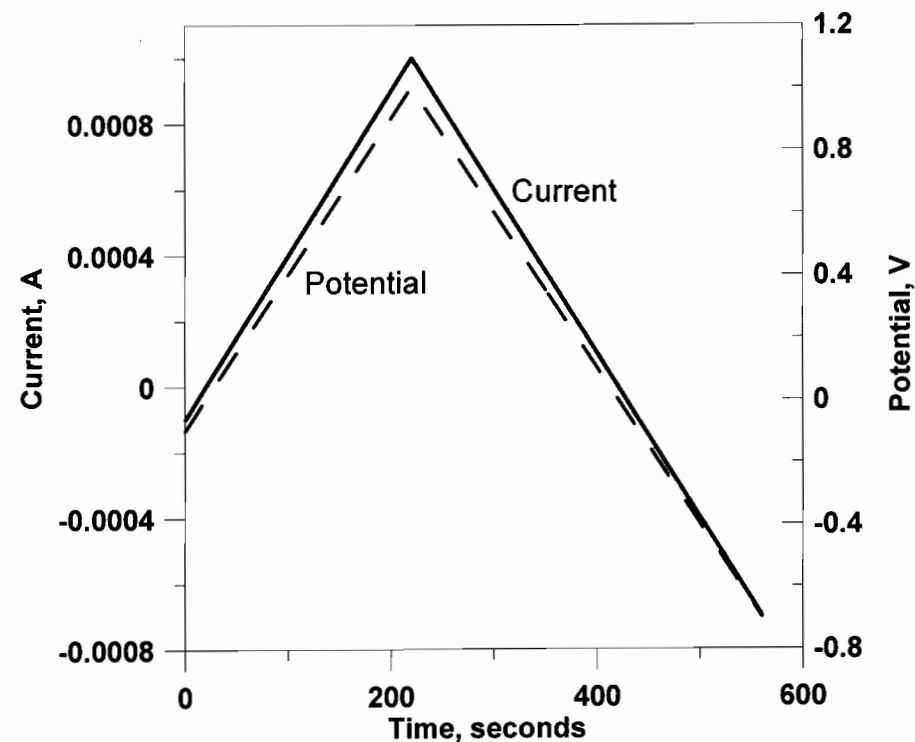
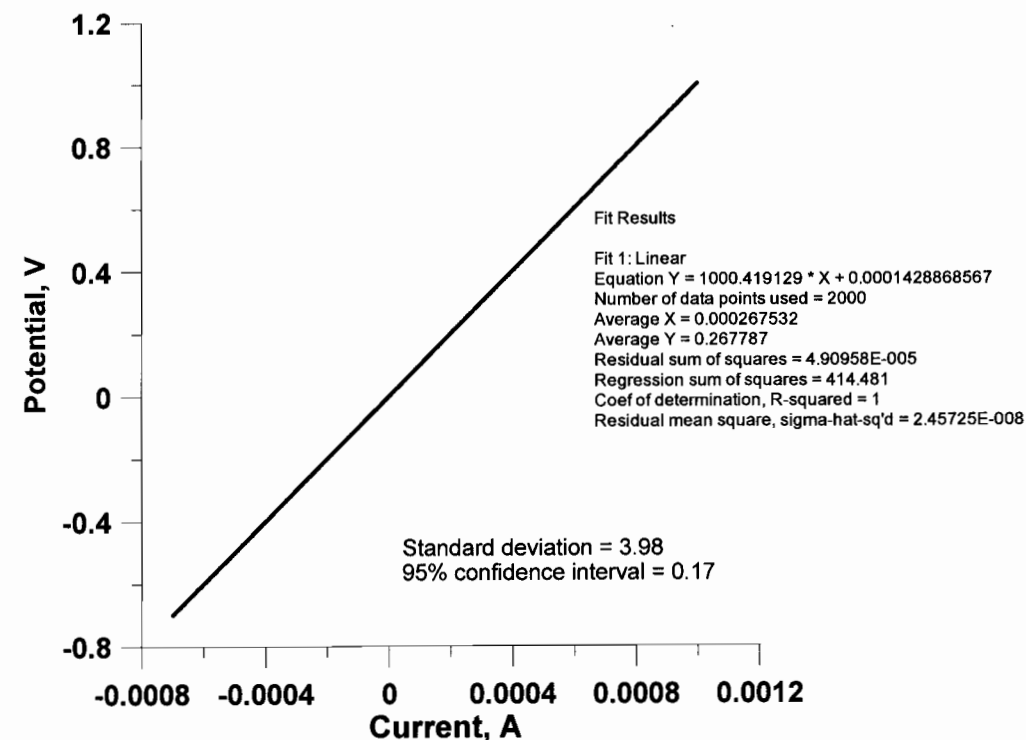
The performance is verified in accordance with TOP-22.  
 Xiuhua He 3/16/07





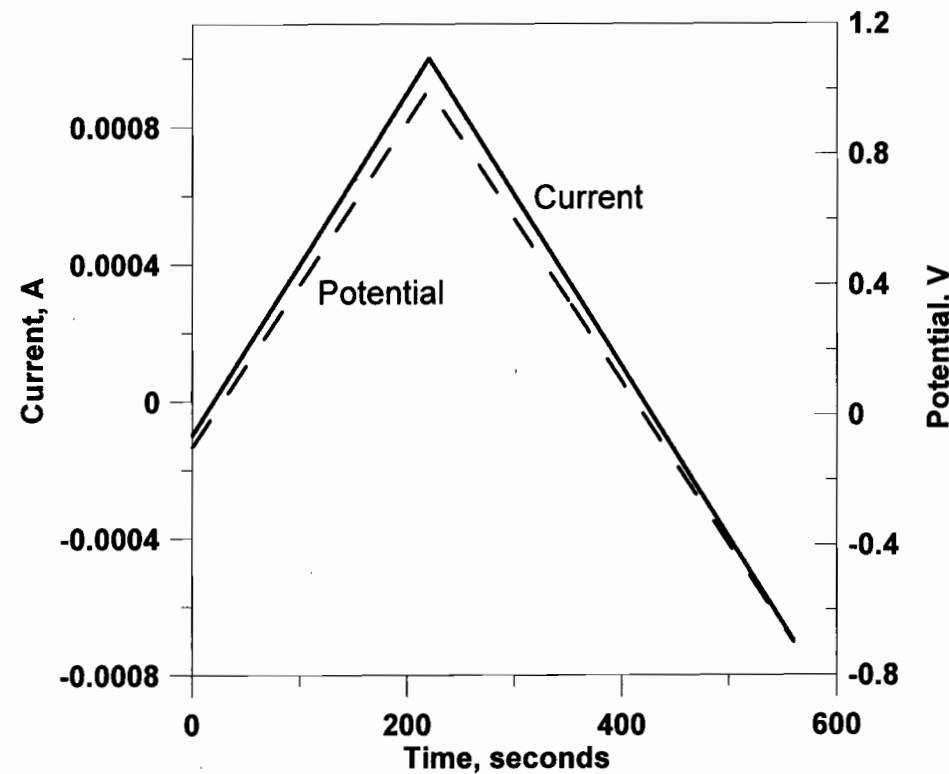
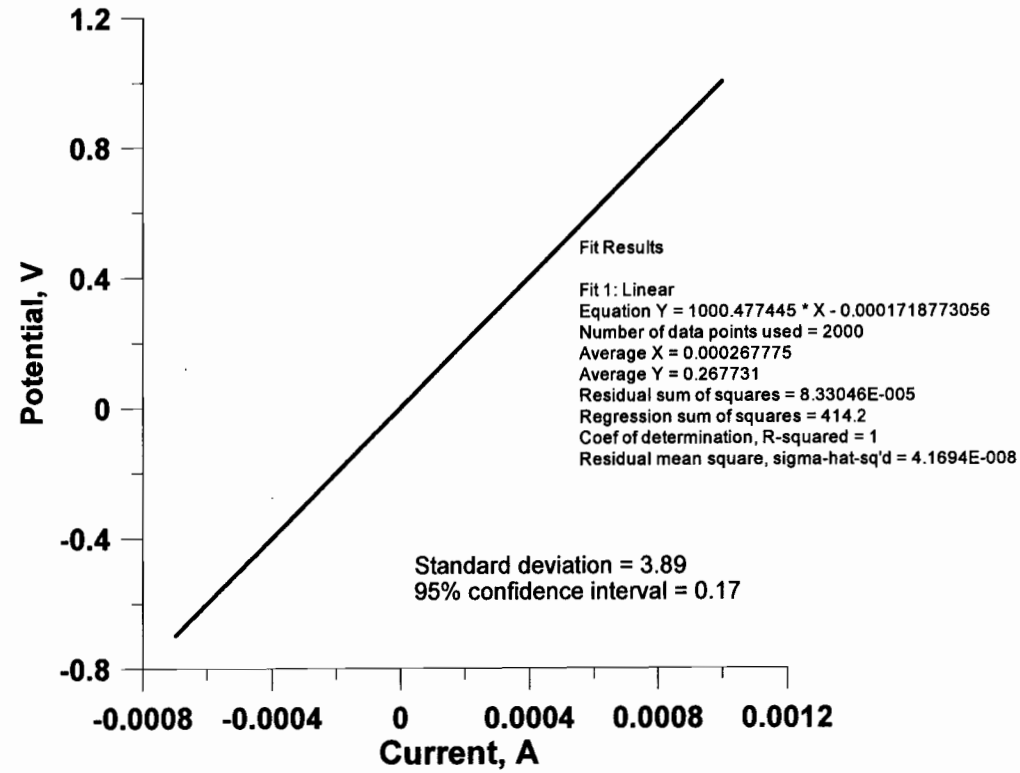
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch5  
 SN 00240551  
 11/6/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*[Handwritten signature]* 11/7/06



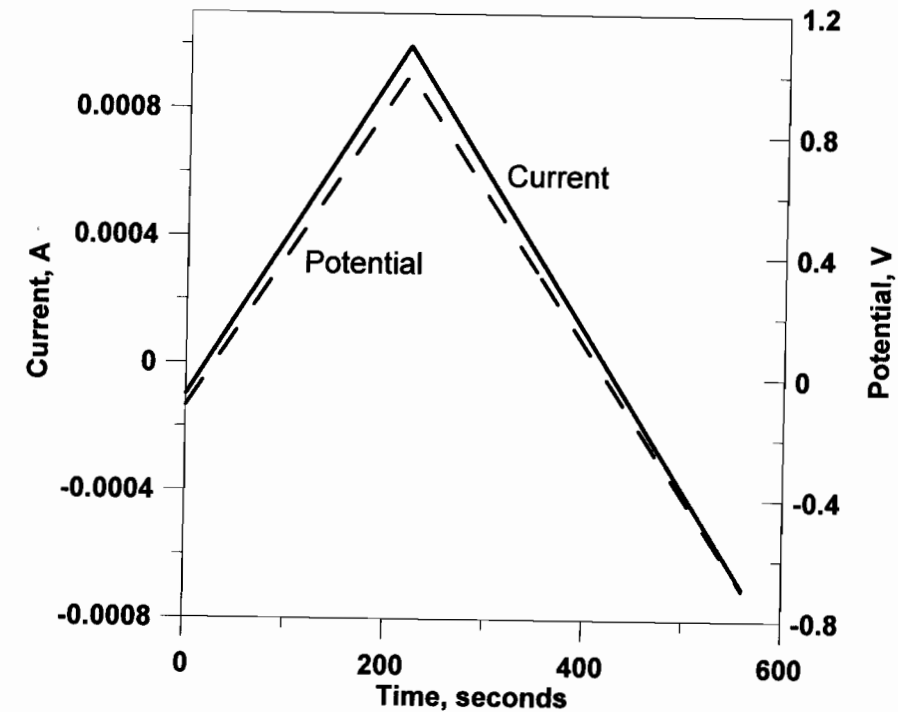
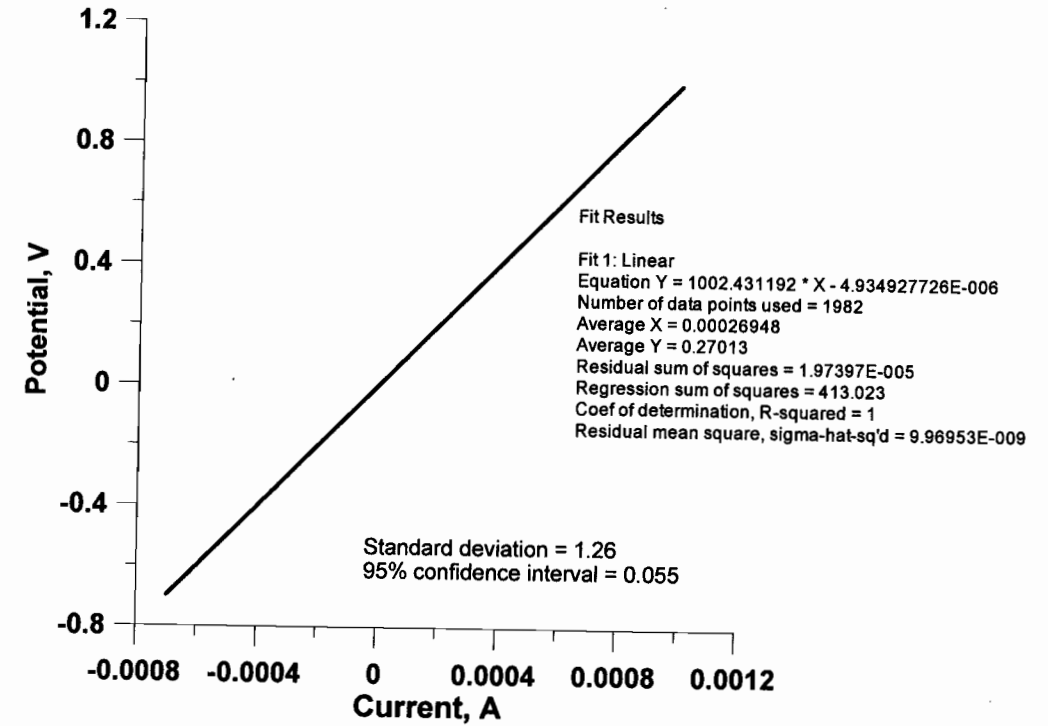
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch6  
 SN 00240551  
 11/6/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*[Handwritten signature]* 11/7/06



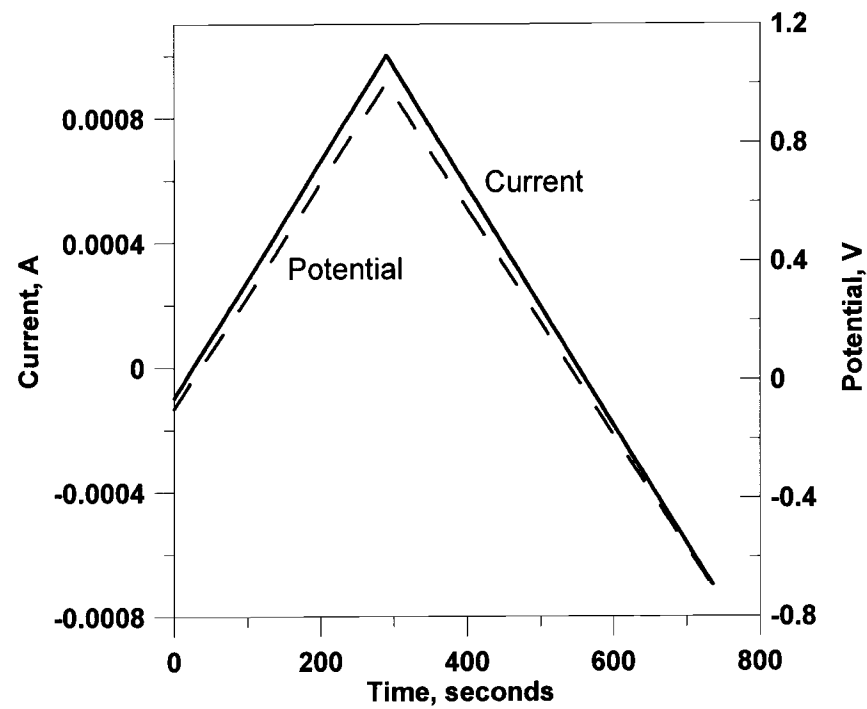
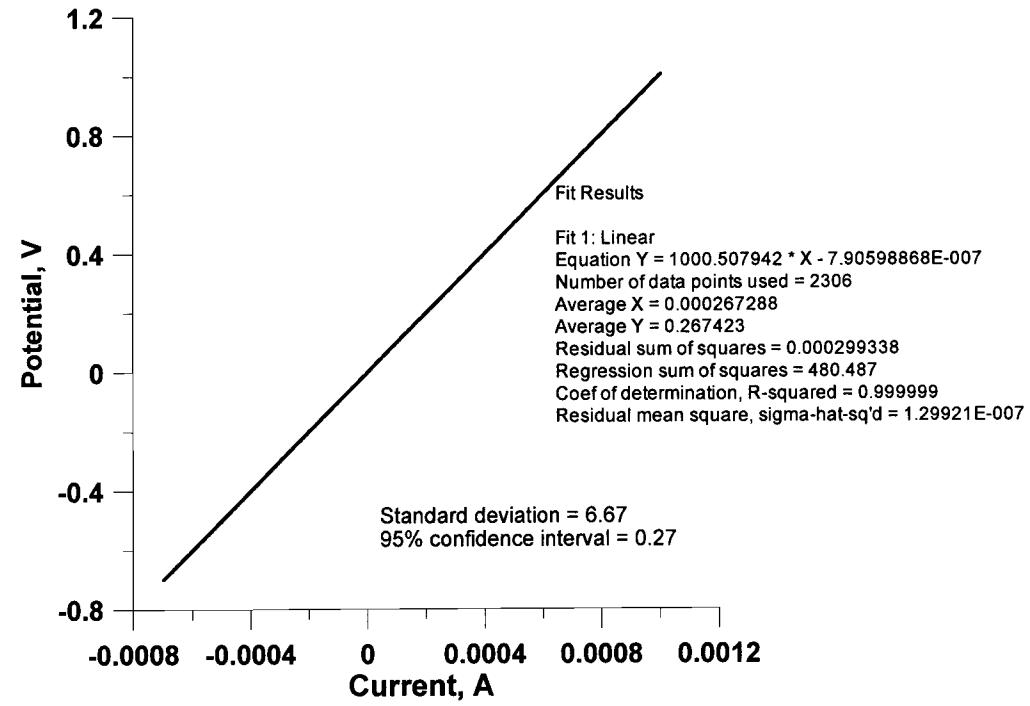
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch7, SN 00240551  
 3/16/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

The performance is verified in accordance with TOP-22.  
 Xother rle 3/16/07



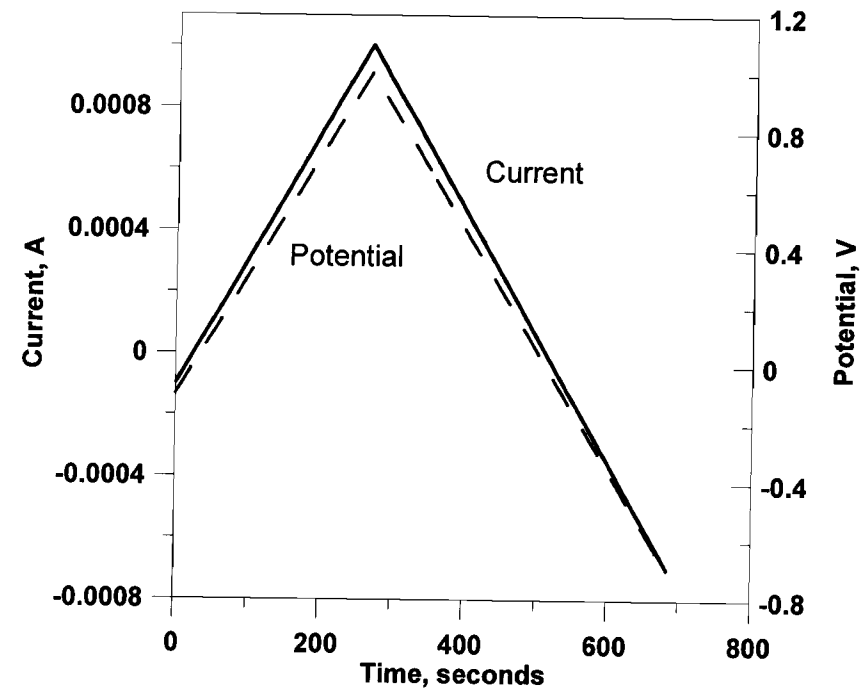
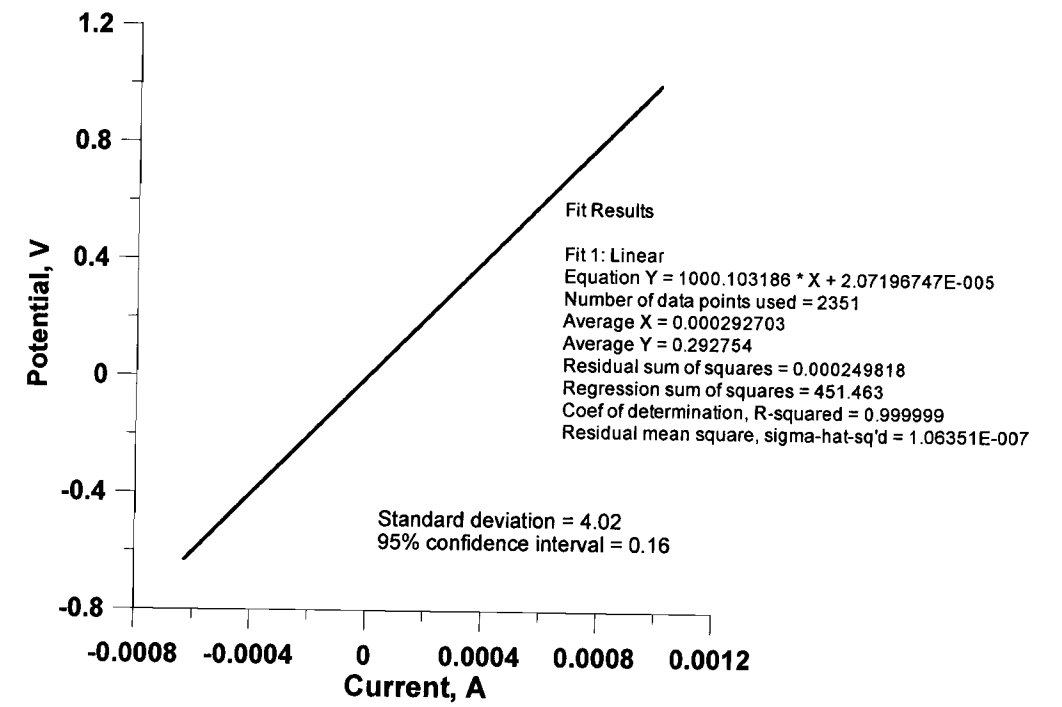
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch8, SN 00240551  
 3/16/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

The performance is verified in accordance with TOP-22  
 Xother rle 3/16/07



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1287 SN#00148500  
 11/7/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s

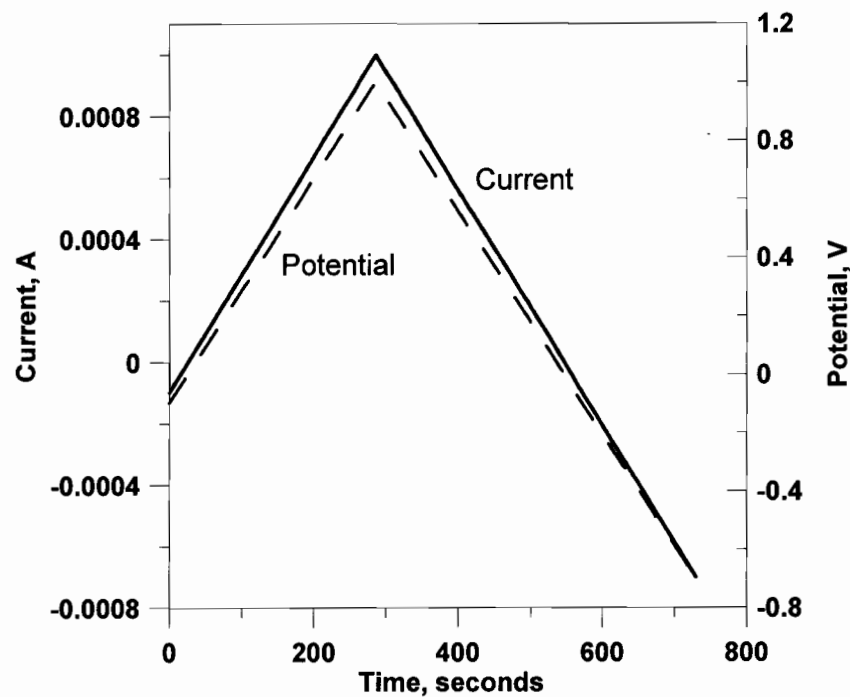
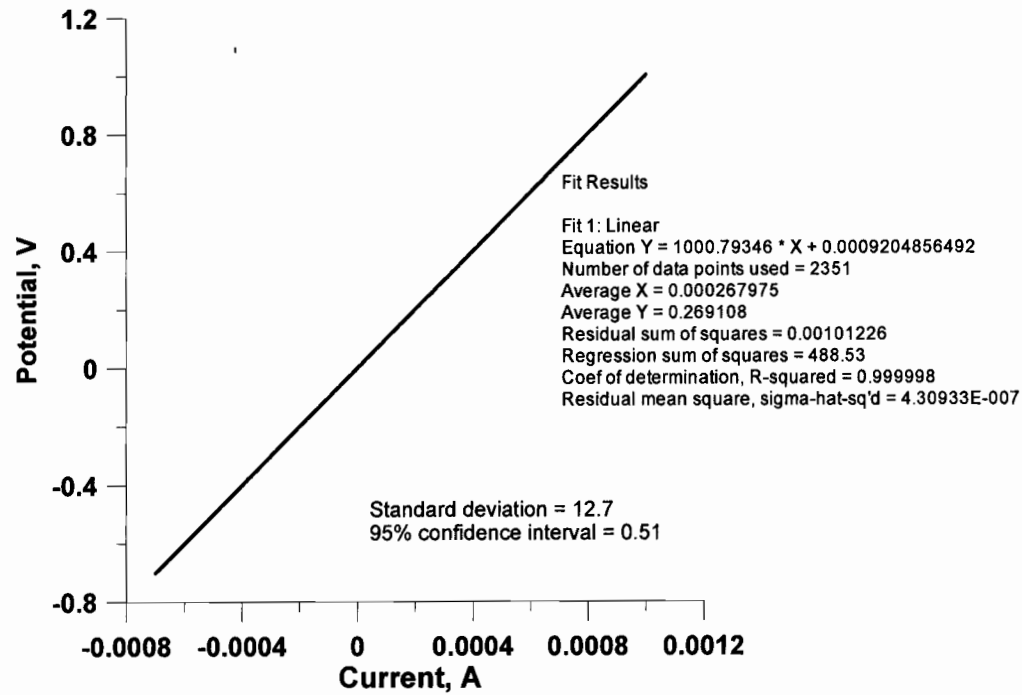
*Xihua He 11/7/06*



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1287 SN#00186634  
 11/7/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s

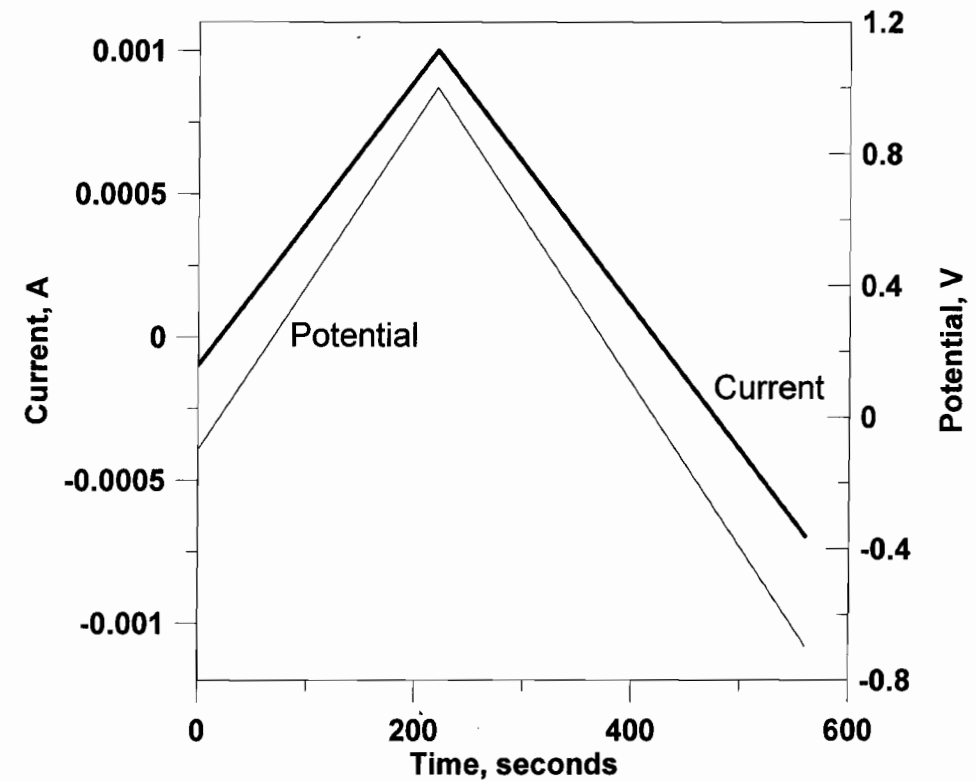
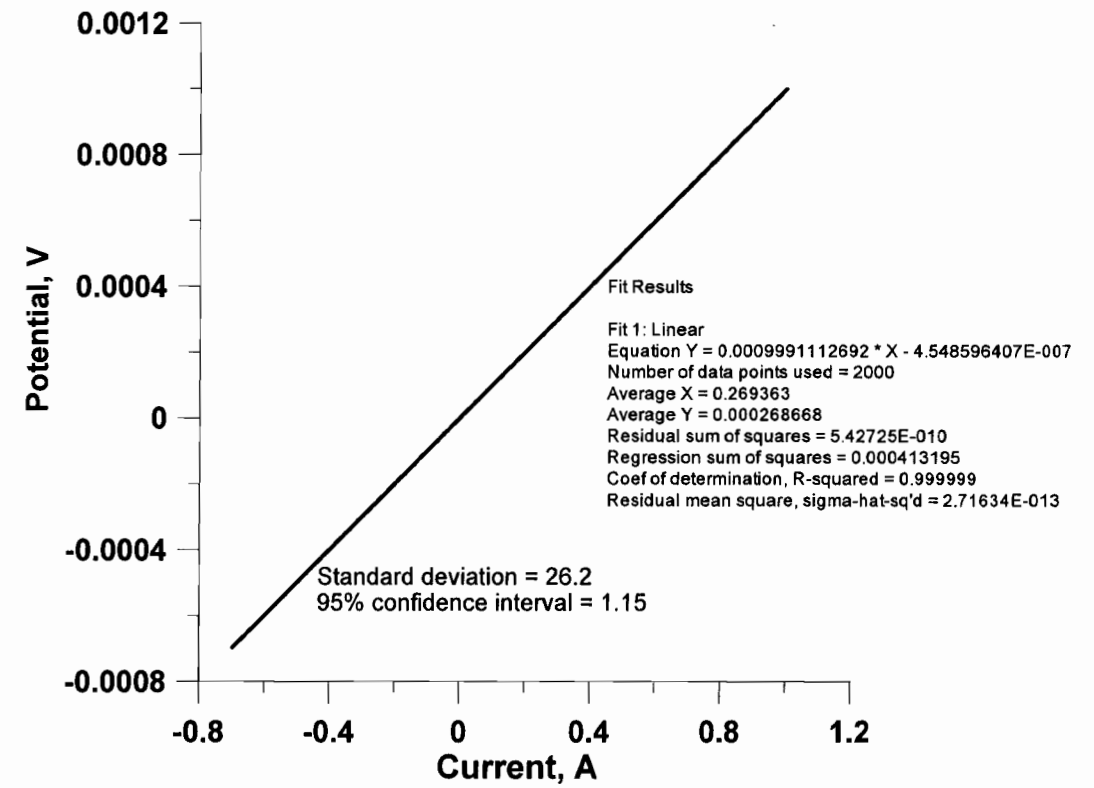
*Xihua He 11/7/06*





1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1287 SN#001535500  
 11/7/06  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 735 seconds

*Xi Hua He 11/7/06*



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 EG&G Versat, SN 263  
 11/07/06  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 0.5 mV/s

*Xi Hua He 11/9/06*

Olympus PME3 Performance Verification Check  
 Last Cal: 6/15/06 Due: 12/15/06

Additional Metallurgical Microscope Tests

Useo Machineo 304 L SS Block See pg #195 In NB #308

Starrett Calipers Model #721 SN# 03031512 Cal: 3/3/06 Due: 3/2/07

Actual (Inspection)	Starrett 721	Microscope Olympus PME3
20.4 $\mu$ m	0.02 mm	21.6 $\mu$ m
73.6 $\mu$ m	0.7 mm	74.4 $\mu$ m
116.84 $\mu$ m	0.11 mm	112 $\mu$ m
240.03 $\mu$ m	0.23 mm	234 $\mu$ m
488.95 $\mu$ m	0.47 mm	472 $\mu$ m

Procedure: Use objective lens measurement then the stage is moved and a second measurement taken with the Starrett Calipers using the back flat side of the microscope base for the measurement

Conclusion: the Olympus PME3 Microscope is sufficient for measurement of Corrosion Depth per ASTM G46  
 The performance of the microscope is verified.

Xi'hua He 3/17/07  
 x.H 3/17/07

*[Signature]* 12/21/06

Olympus PME3 Performance Verification Check  
 Last Cal: 12/21/06 Due: 6/21/07  
 New Cal: 7/16/07 Due: 1/16/08

Additional Metallurgical Microscope Test

Useo Machineo 304 L SS Block See pg #195 In NB #308

Starrett Calipers Model #721 SN# 03031512 Cal: 3/1/07 Due: 3/1/08

Actual Inspection	Starrett 721	Microscope Olympus PME3
20.4 $\mu$ m	0.02 mm	22 $\mu$ m
73.6 $\mu$ m	0.72 mm	73.8 $\mu$ m
116.84 $\mu$ m	0.11 mm	113 $\mu$ m
240.03 $\mu$ m	0.24 mm	236 $\mu$ m
488.95 $\mu$ m	0.46 mm	472 $\mu$ m

procedure: Use objective lens measurement then the stage is moved and a second measurement was taken with the Starrett Calipers using the back side of the microscope base for the measurement

Conclusion: the Olympus PME3 Microscope is sufficient for measurement of Corrosion Depth per ASTM G46  
 the performance of the microscope is verified

*[Signature]* 7/17/07

Continued from Pg # <sup>82</sup> ~~92~~ <sup>82</sup> 92

weekly pH Calibration of EA 940 SN# 2330  
 cal 7/4/06 Due 7/6/07 pH probe 13-620-296 SN# 5003095

\* New cal

Date	Buffers Used	Int.
3/26/07	4-7-10	BLK
4/2/07	4-7-10	BLK
4/9/07	4-7-10	BLK
4/16/07	4-7-10	BLK
4/23/07	4-7-10	BLK
4/30/07	4-7-10	BLK
5/7/07	4-7-10	BLK
5/14/07	4-7-10	BLK
5/21/07	4-7-10	BLK
5/29/07	4-7-10	BLK
6/11/07	4-7-10	BLK
6/18/07	4-7-10	BLK
6/25/07	4-7-10	BLK
7/2/07	4-7-10	BLK
7/9/07	4-7-10	BLK
7/16/07	4-7-10	BLK
7/24/07	4-7-10	BLK
7/30/07	4-7-10	BLK
8/6/07	4-7-10	BLK
8/13/07	4-7-10	BLK
8/20/07	4-7-10	BLK
8/27/07	4-7-10	BLK
9/4/07	4-7-10	BLK

\* Cal: Rush pH meter cal: 7/6/07 Due 7/6/08

B-K-D 3/26/07

Continued from Pg # 93

weekly pH Calibration of EA 940 SN# 4274  
 cal: 11/6/06 Due: 5/6/07 pH probe 13-620-296 SN# 514609

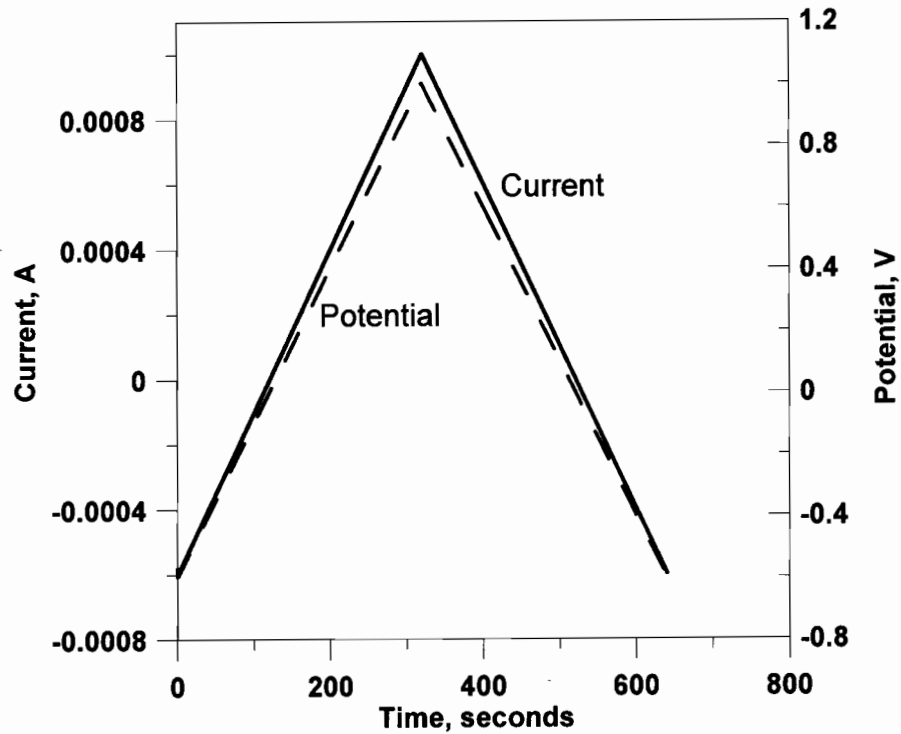
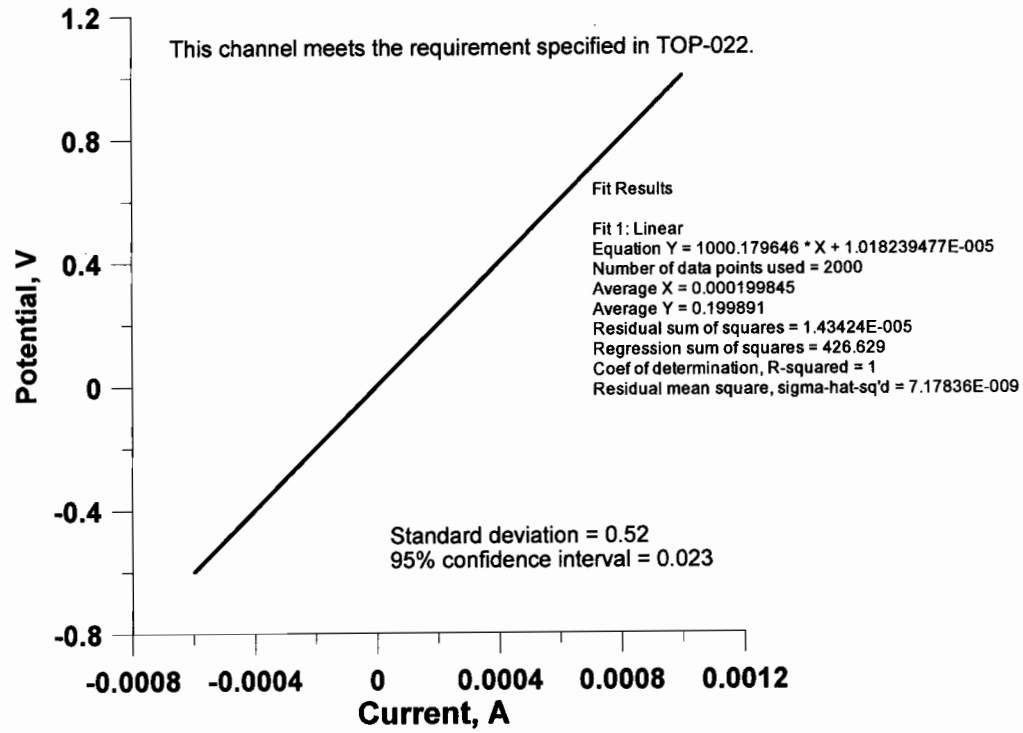
\* New cal

Date	Buffers Used	Int.
3/26/07	4-7-10	BLK
4/2/07	4-7-10	BLK
4/9/07	4-7-10	BLK
4/16/07	4-7-10	BLK
4/23/07	4-7-10	BLK
* sent Meter To Calibration Lab 4/27/07		BLK
5/7/07	4-7-10	BLK
5/14/07	4-7-10	BLK
5/21/07	4-7-10	BLK
5/29/07	4-7-10	BLK
6/4/07	4-7-10	BLK
6/18/07	4-7-10	BLK
6/25/07	4-7-10	BLK
7/2/07	4-7-10	BLK
7/9/07	4-7-10	BLK
7/16/07	4-7-10	BLK
7/24/07	4-7-10	BLK
7/30/07	4-7-10	BLK
8/6/07	4-7-10	BLK
8/13/07	4-7-10	BLK
8/20/07	4-7-10	BLK
8/27/07	4-7-10	BLK
9/4/07	4-7-10	BLK

\* New cal cal 5/1/07 due: 11/1/07

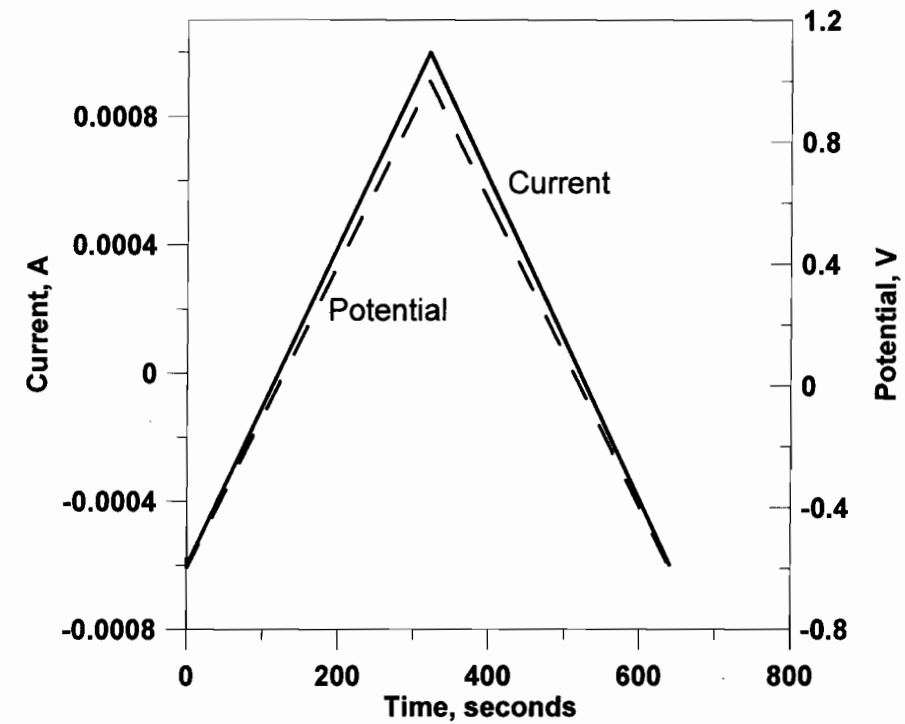
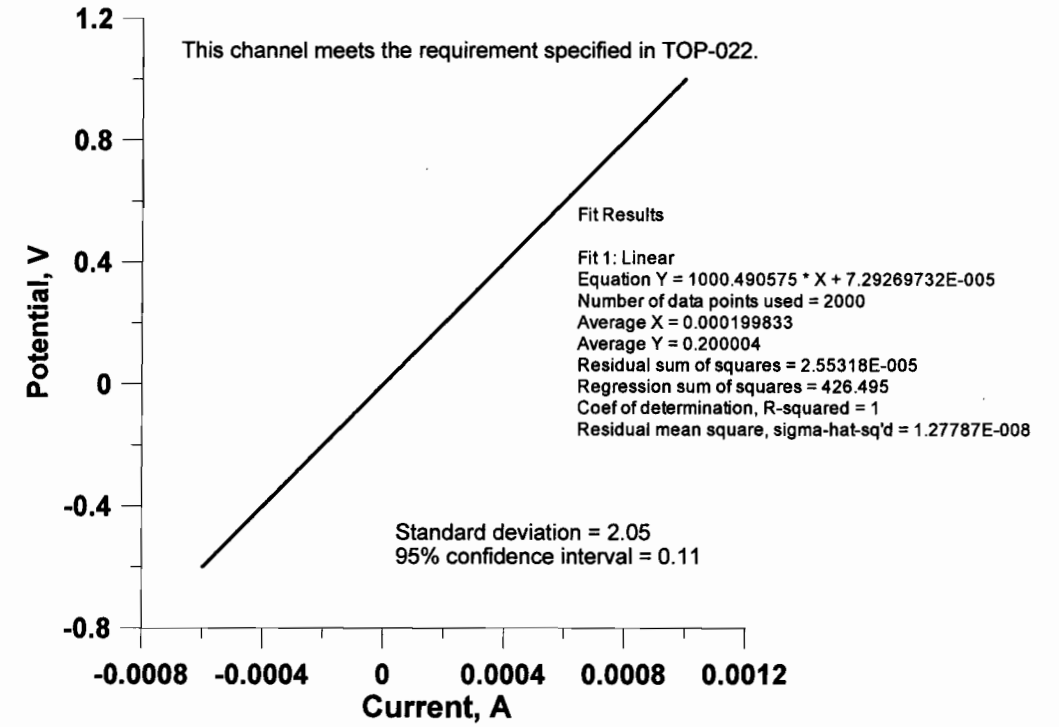
B-K-D 3/26/07





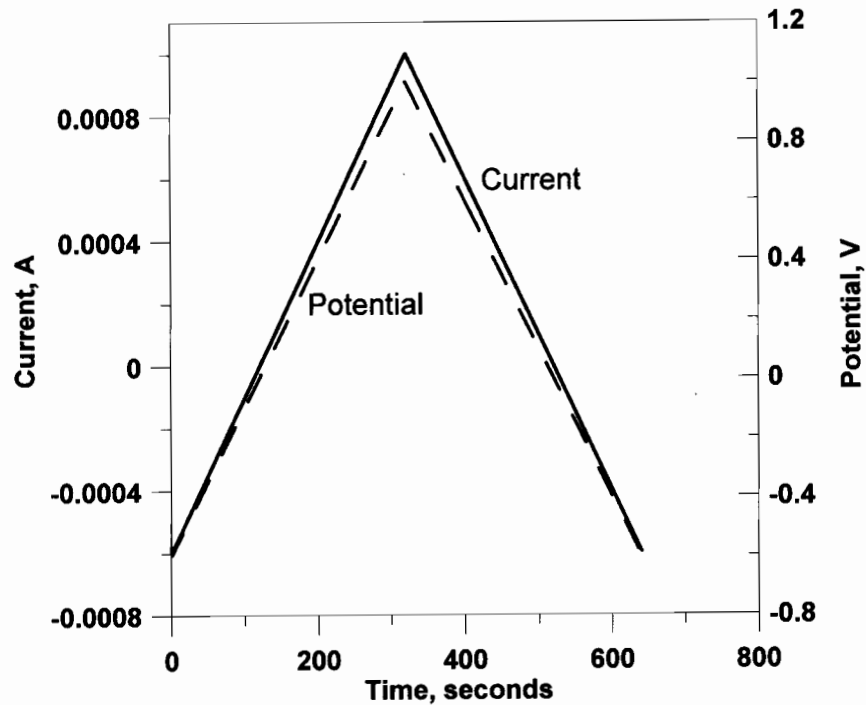
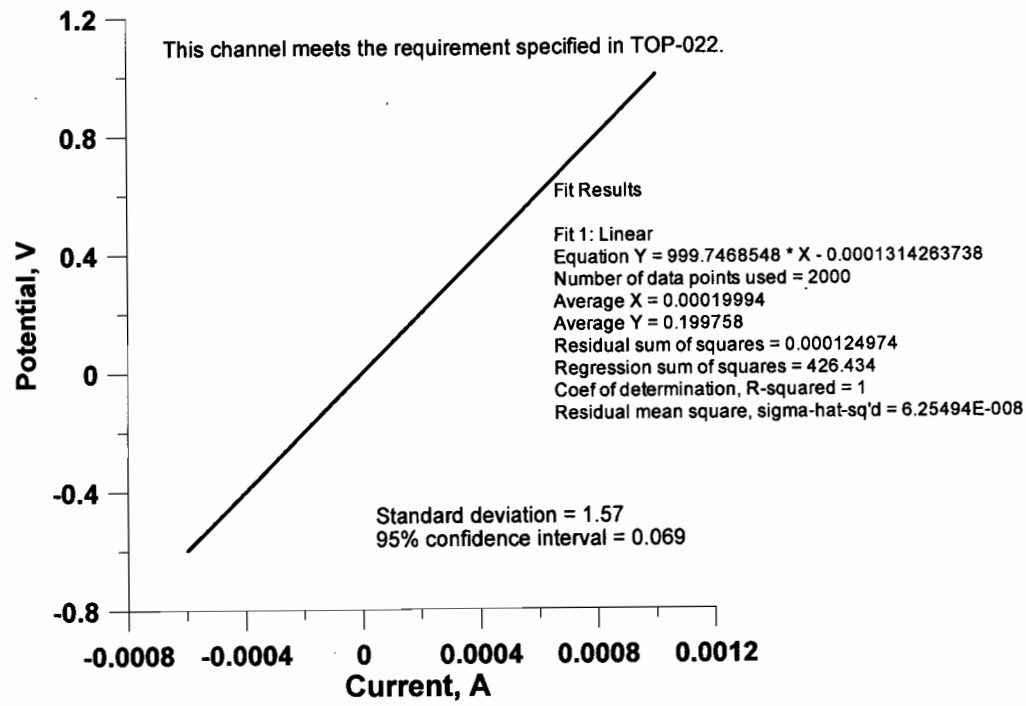
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch1  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV

*Xihua He 4/3/07*



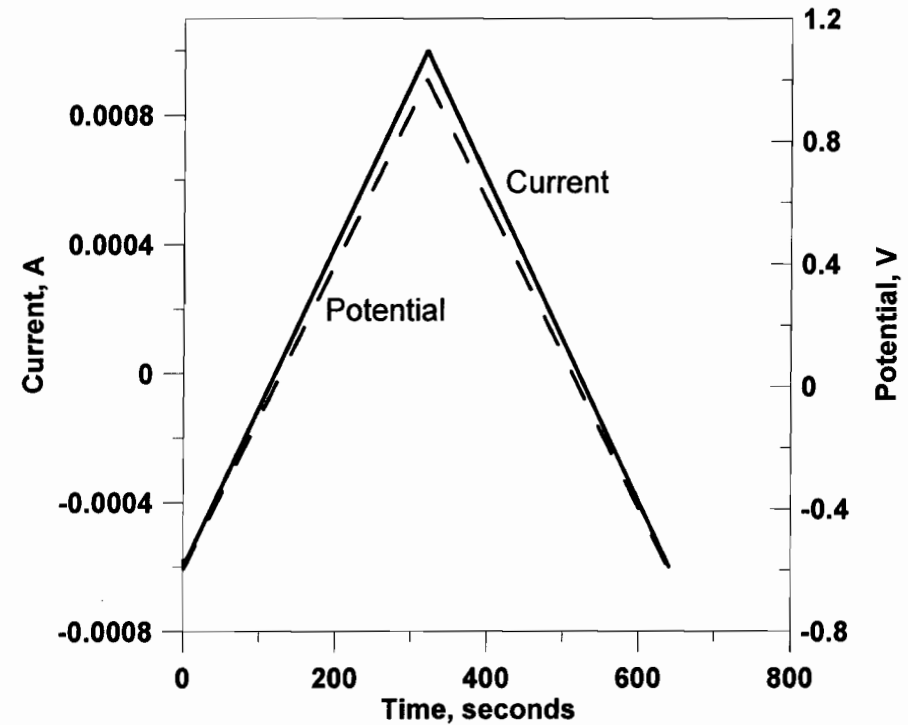
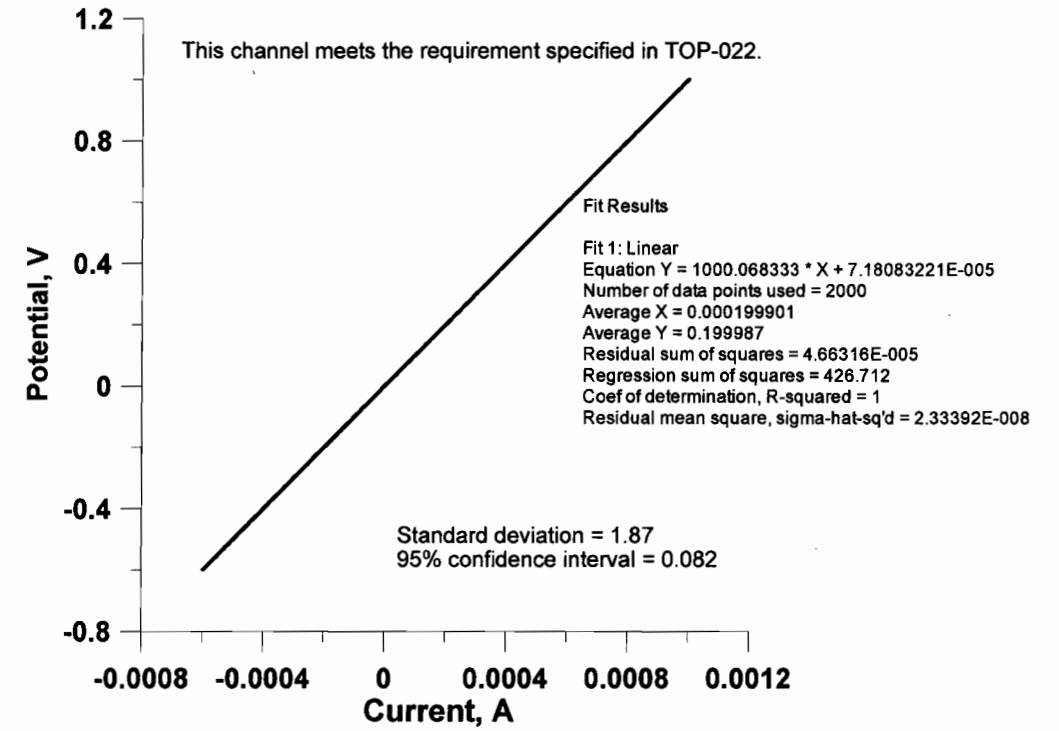
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch2  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 4/3/07*



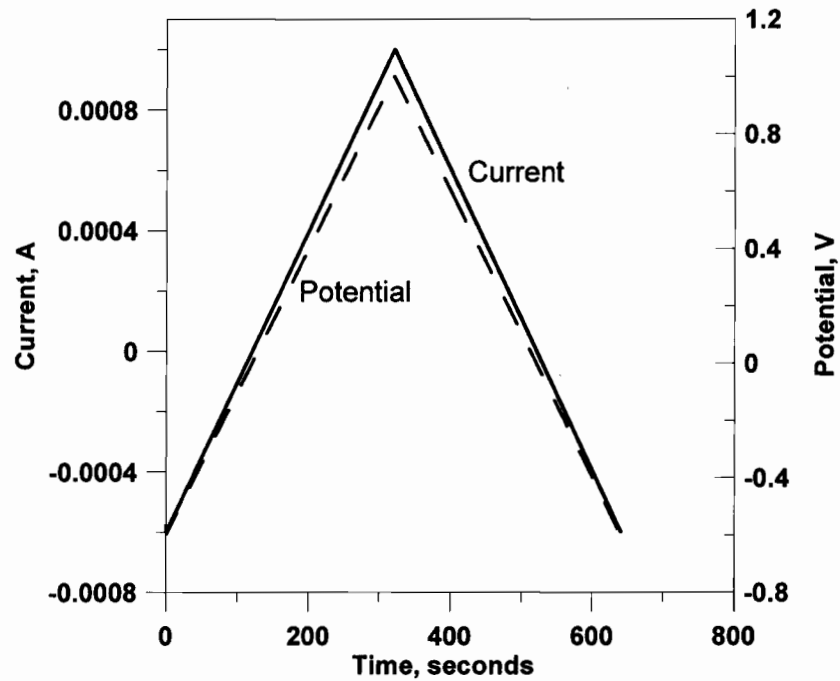
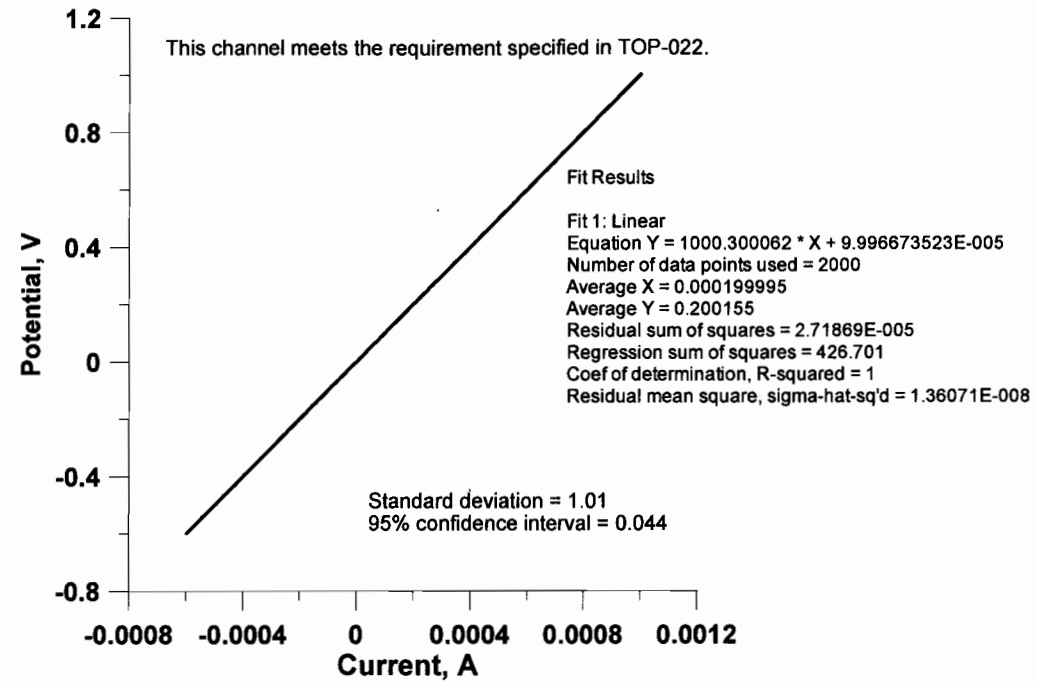
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch3  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Arthur He 4/3/07*



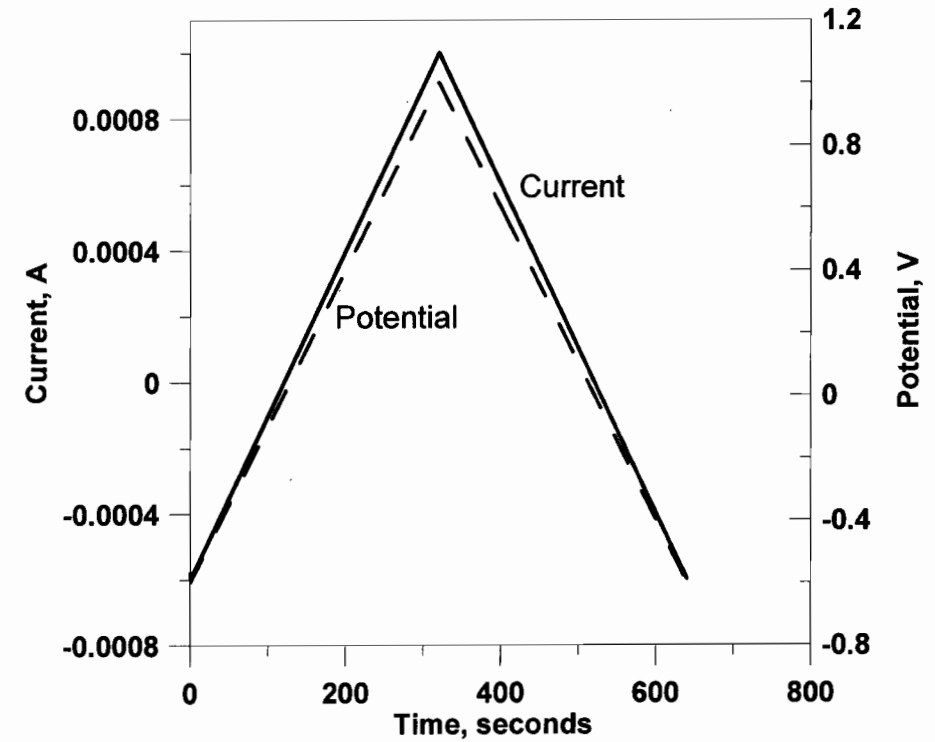
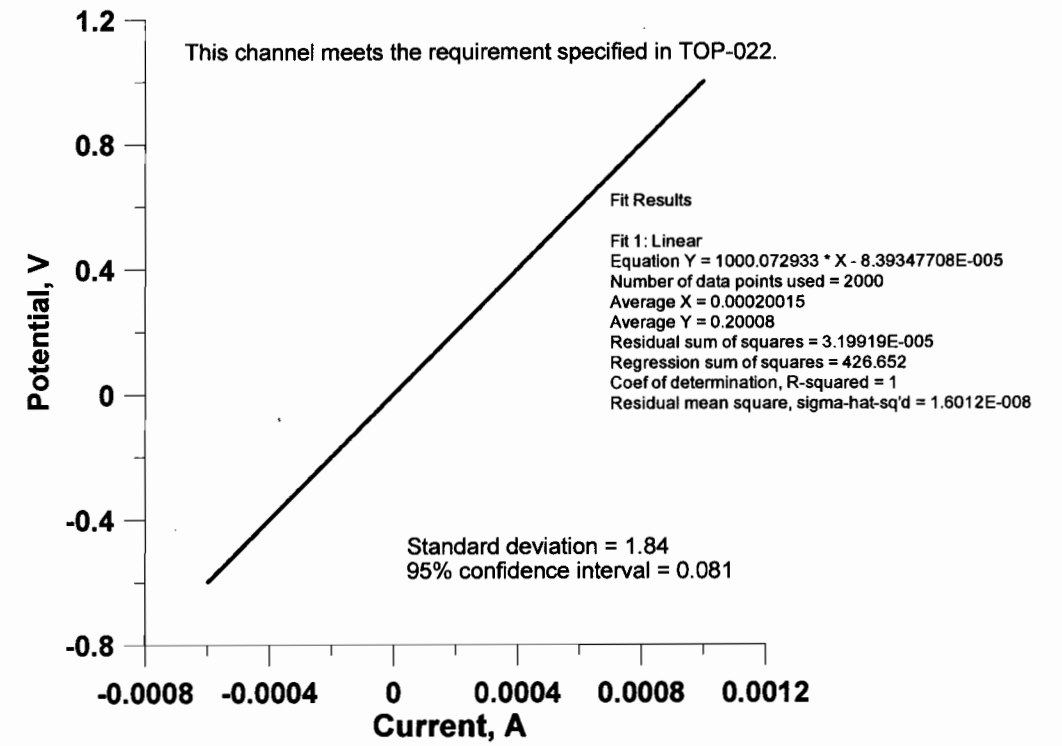
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch4  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Arthur He 4/3/07*



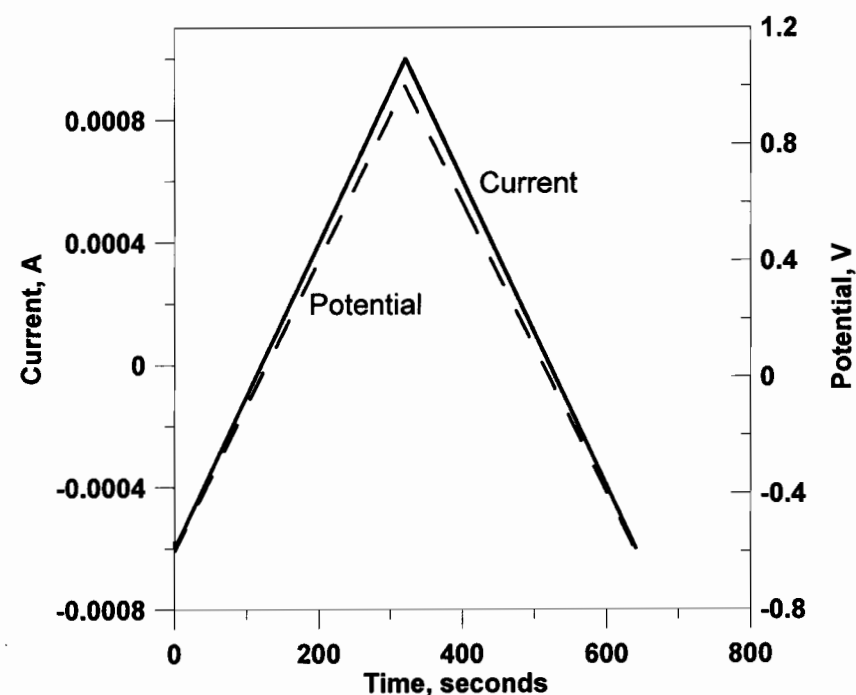
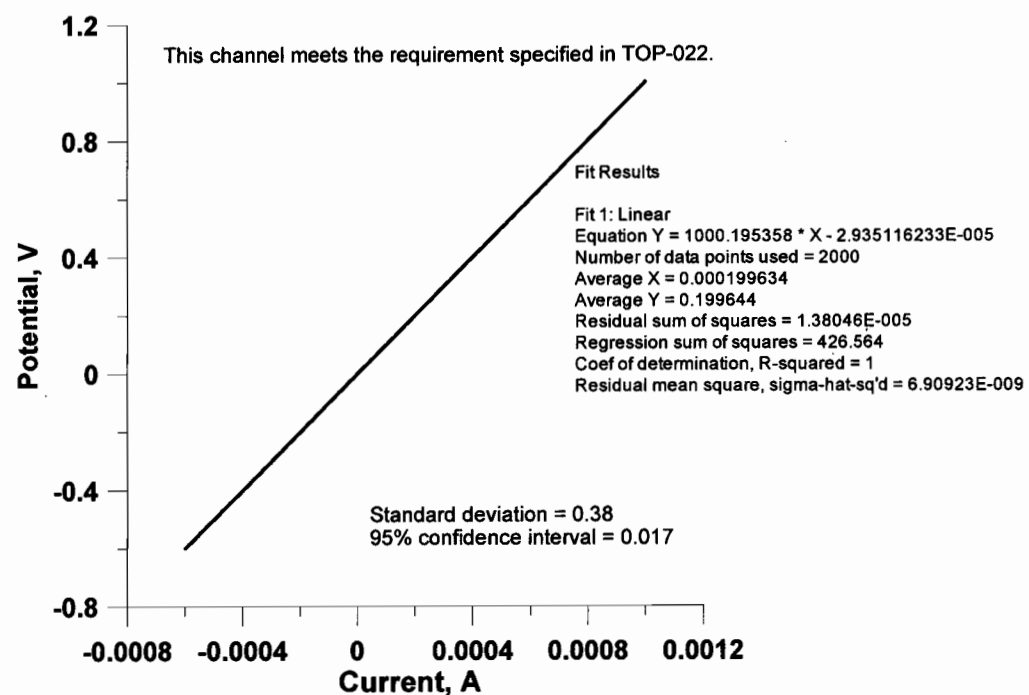
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch5  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 4/3/07*



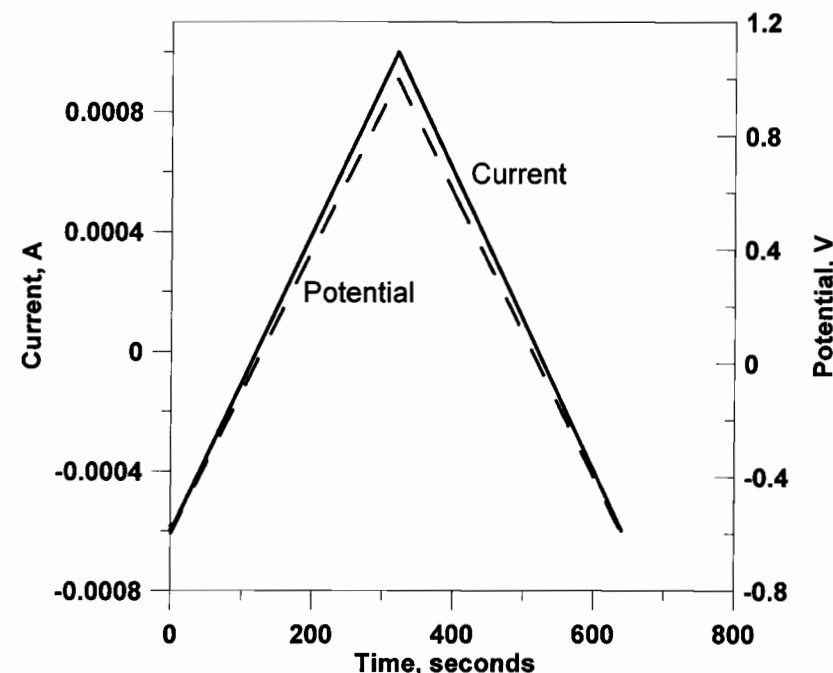
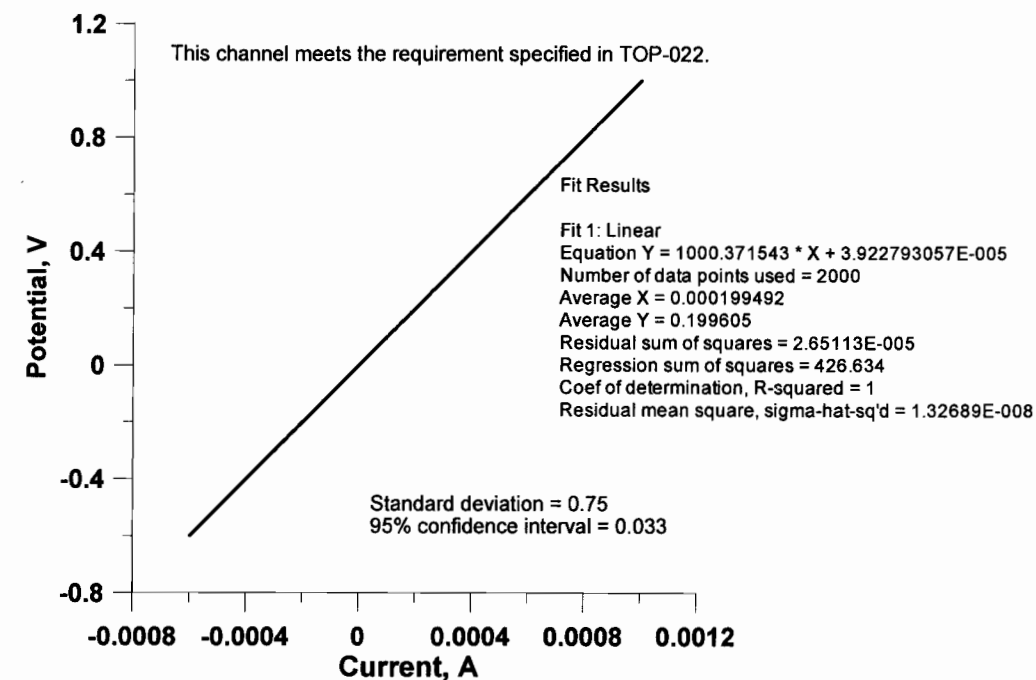
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch5  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

*Xihua He 4/3/07*



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch7  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

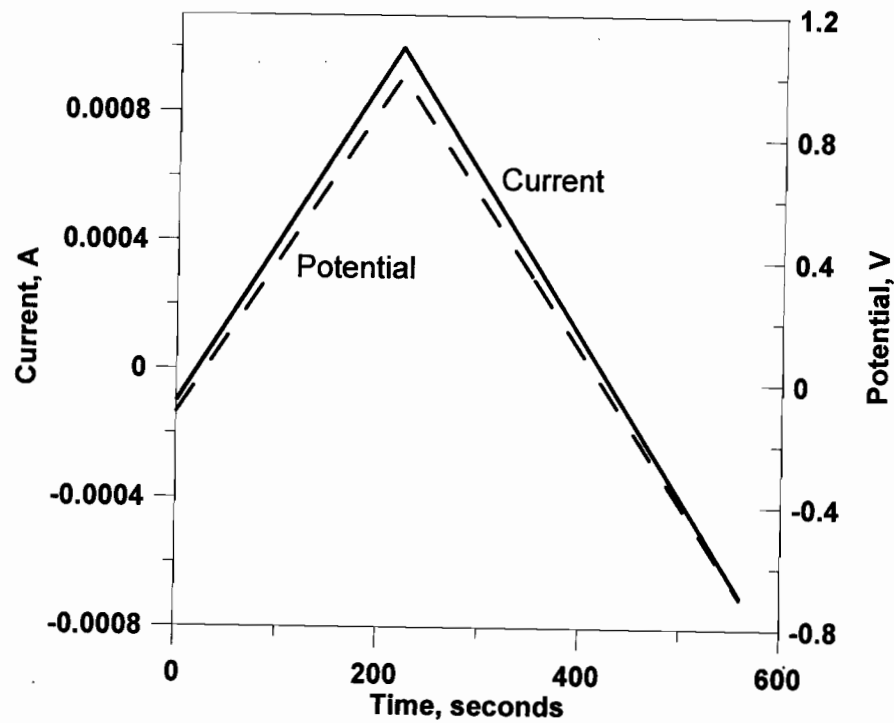
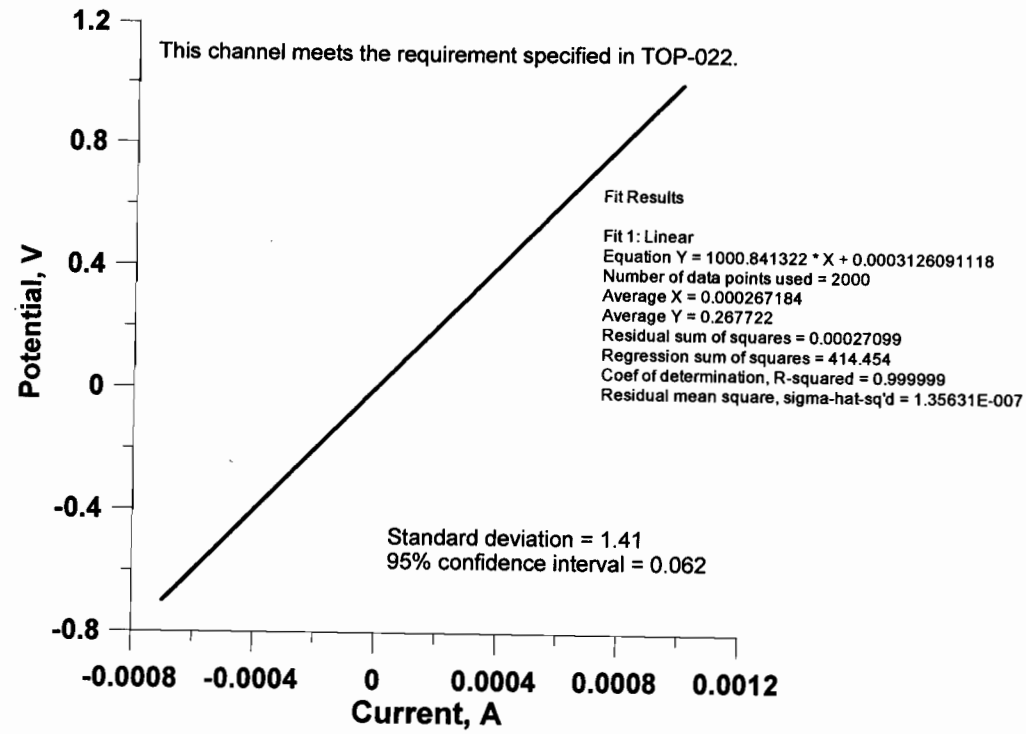
*Xi Hua He 4/3/07*



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch8  
 SN 00238265  
 4/2/07  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s

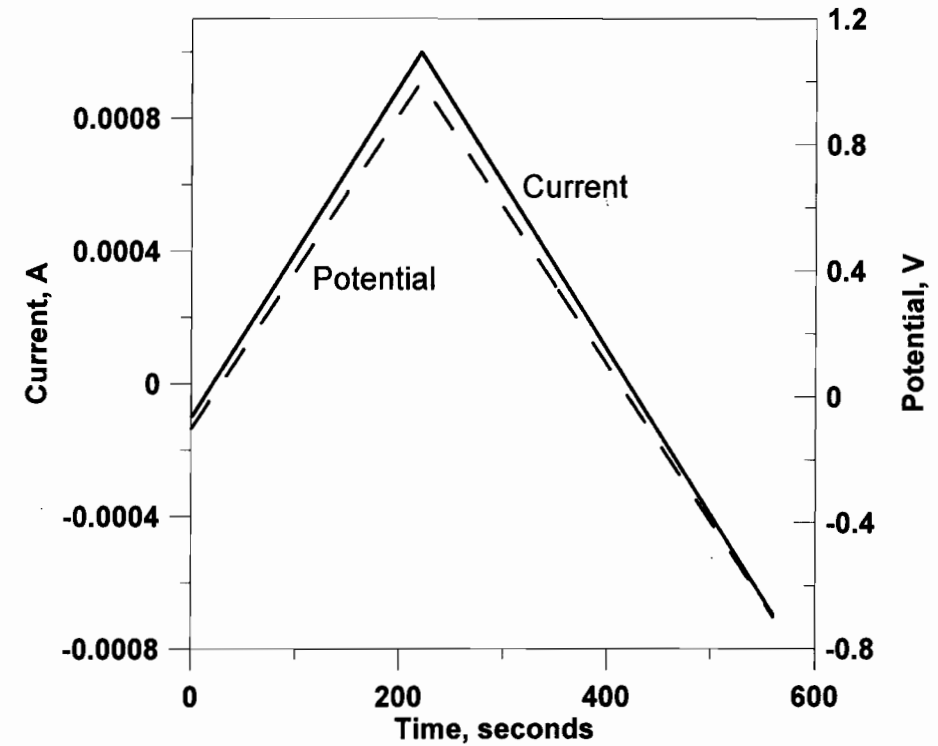
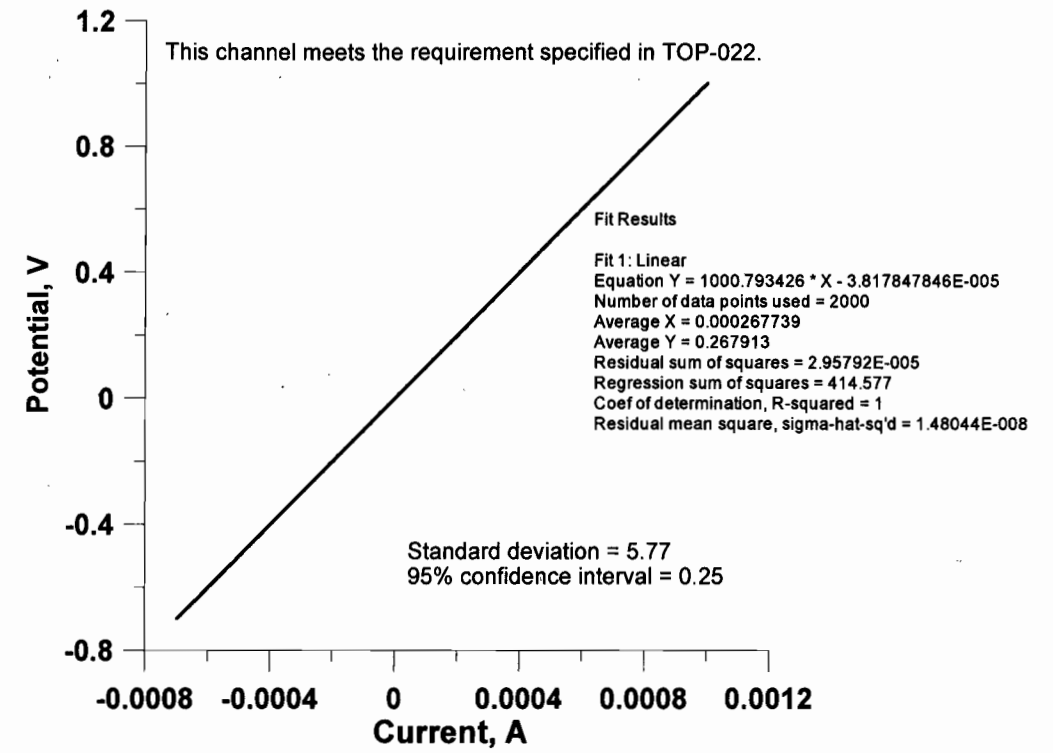
*Xi Hua He 4/3/07*





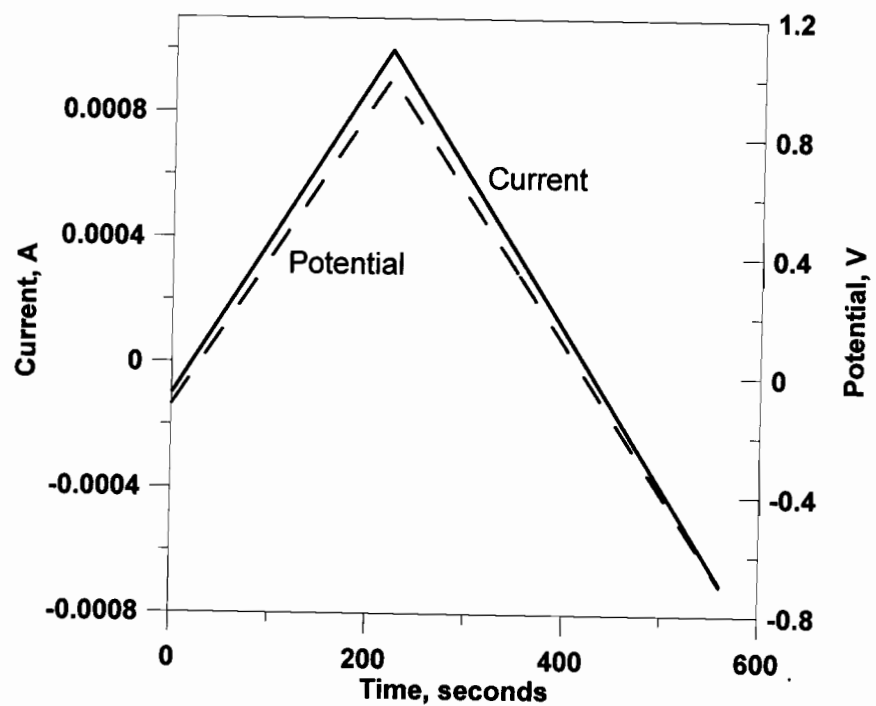
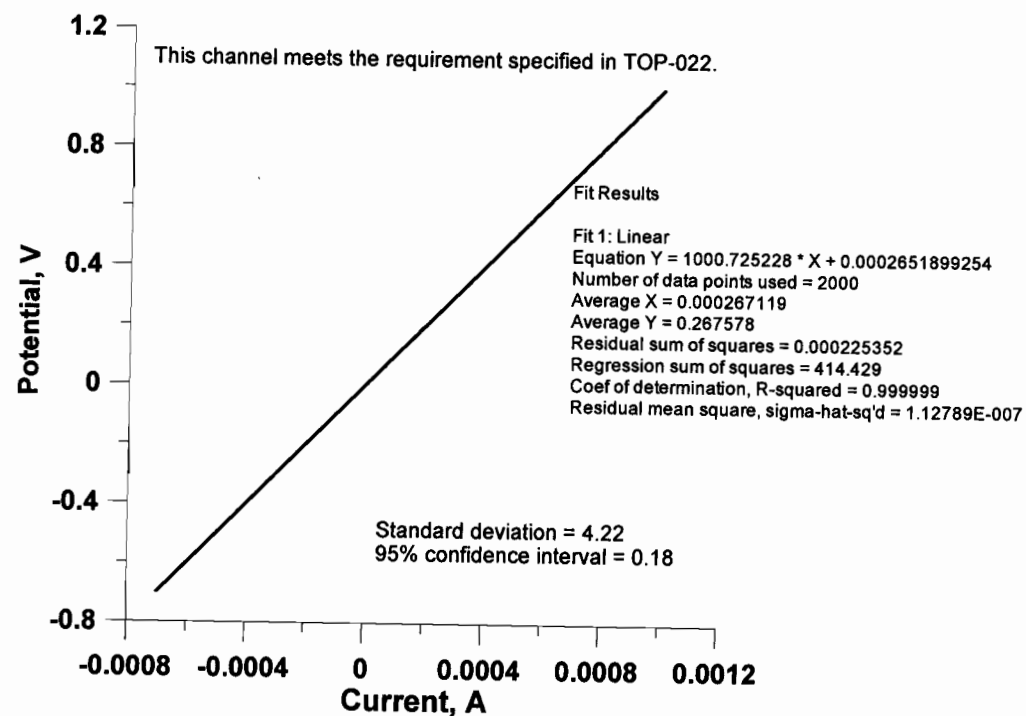
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch1  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'huale 4/12/07*



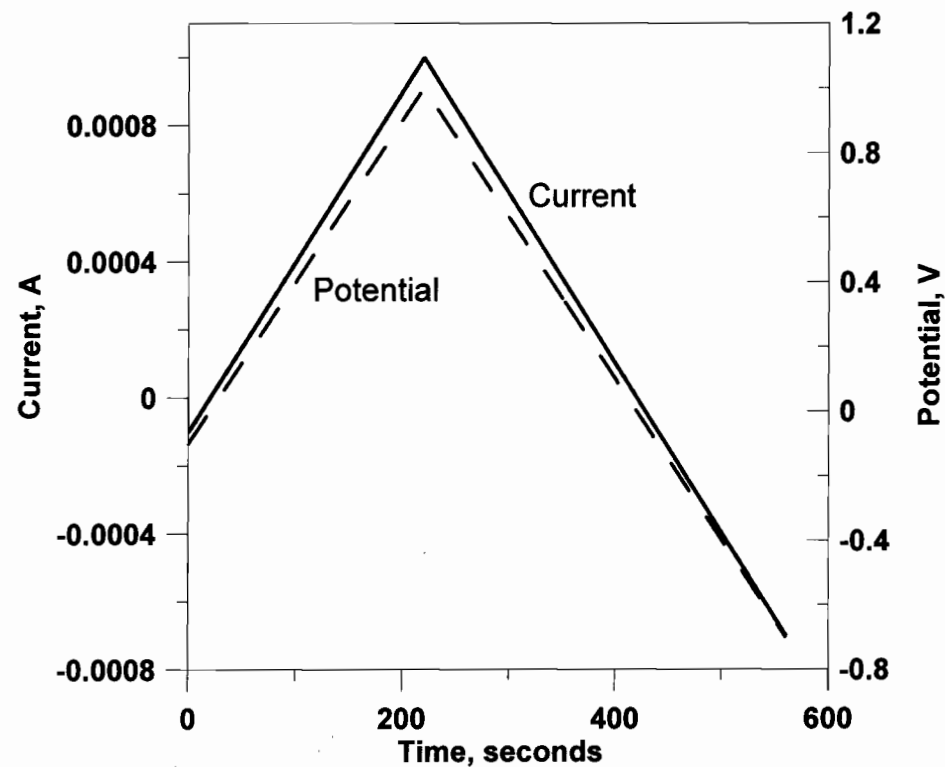
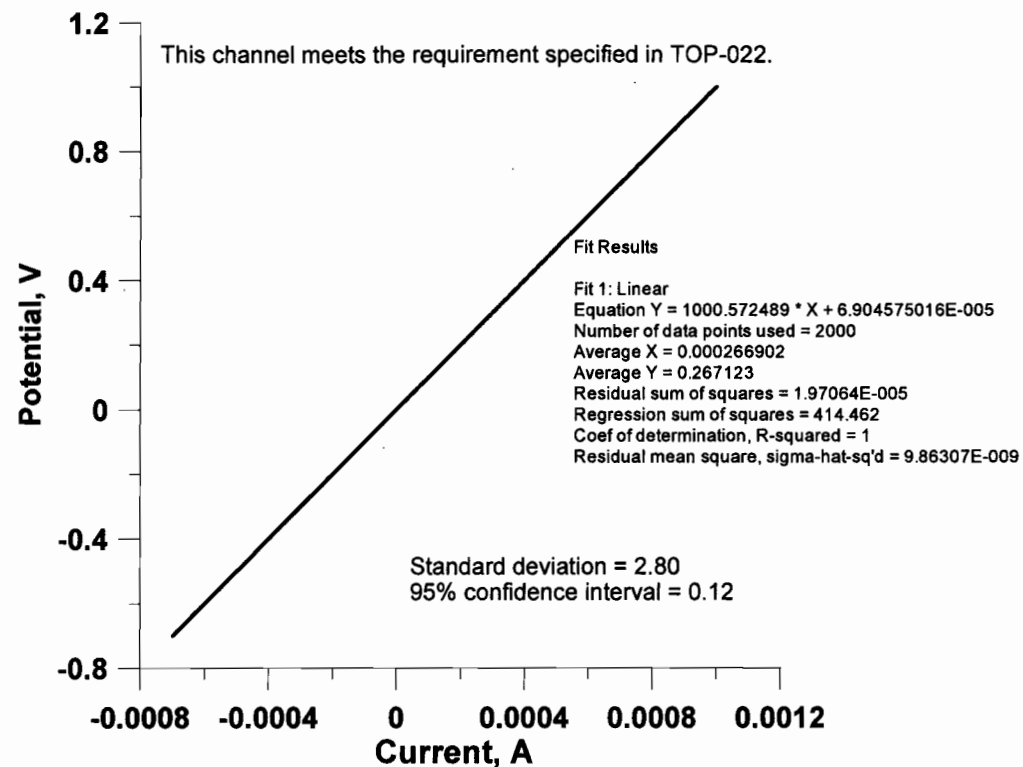
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch2  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'huale 4/12/07*



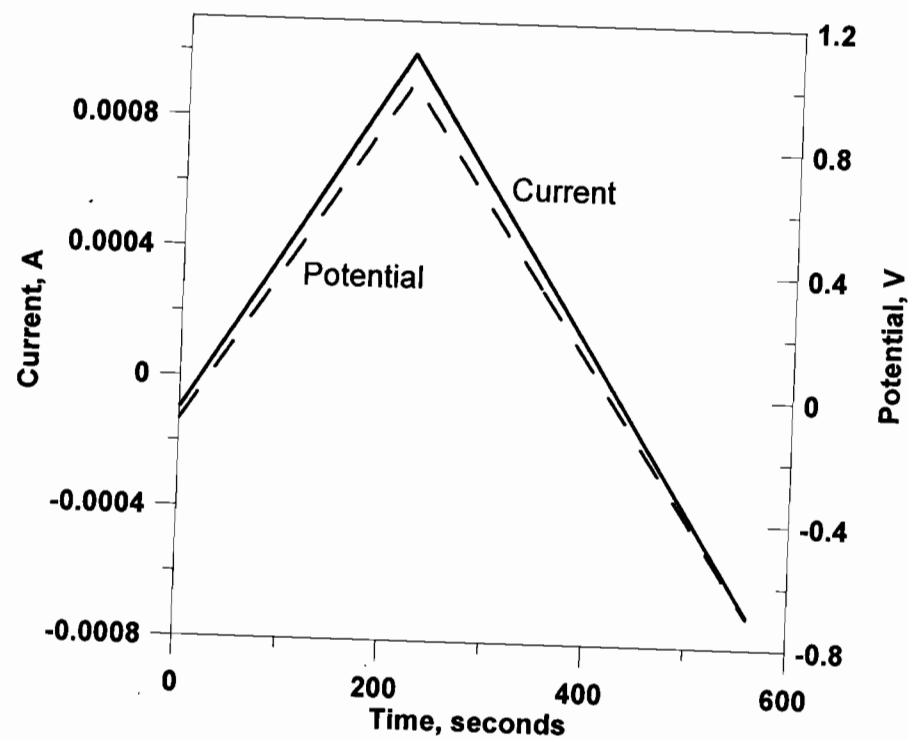
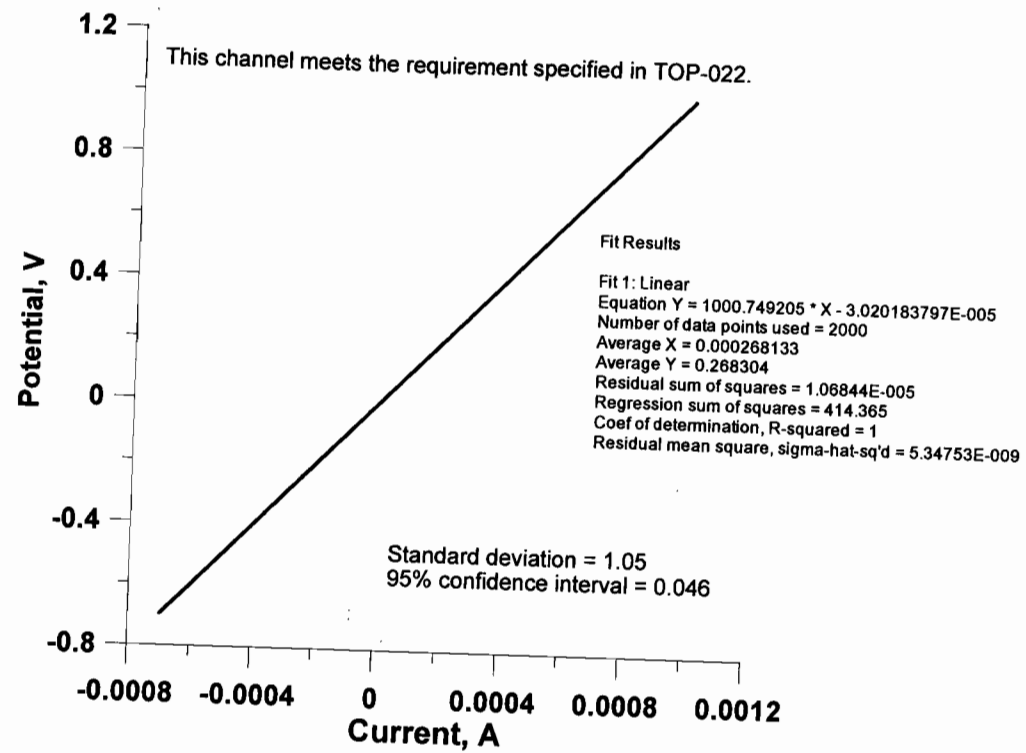
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch3  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'haite 4/12/07*



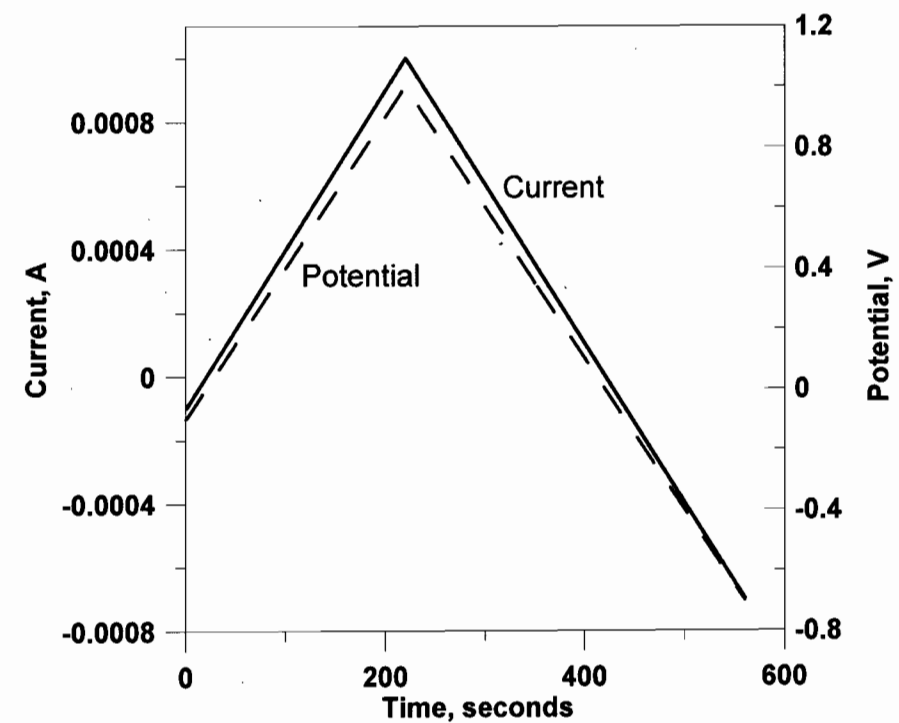
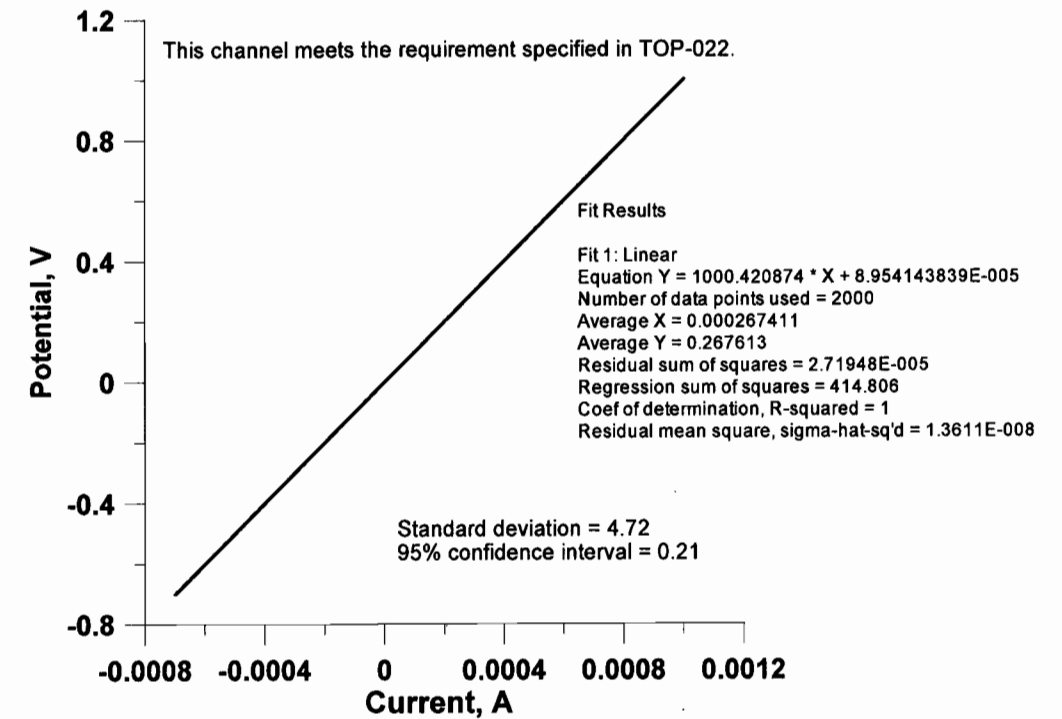
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch4  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'haite 4/12/07*



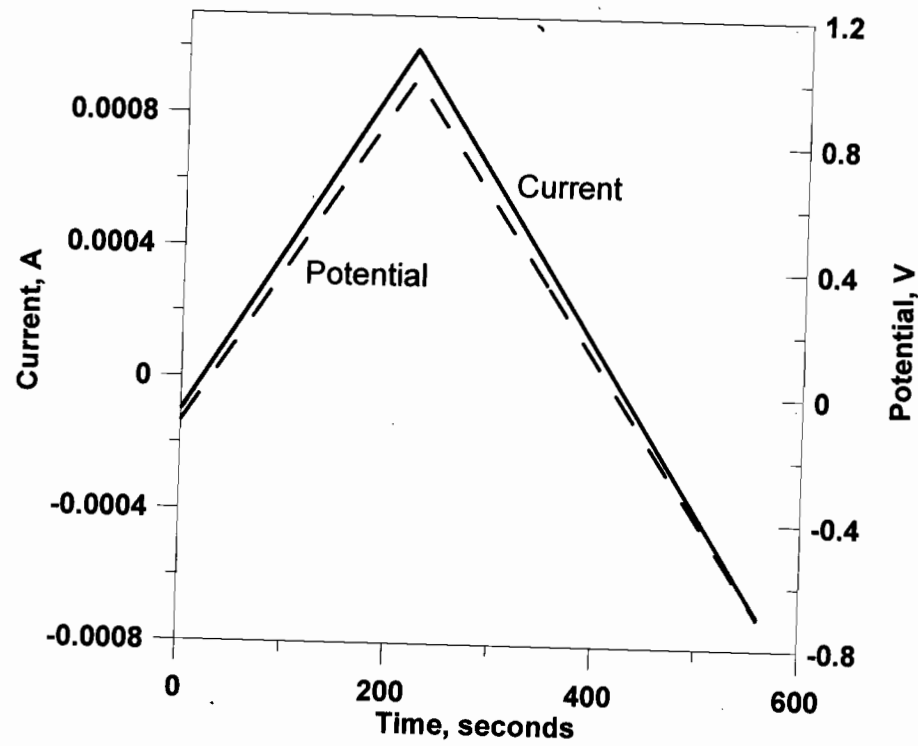
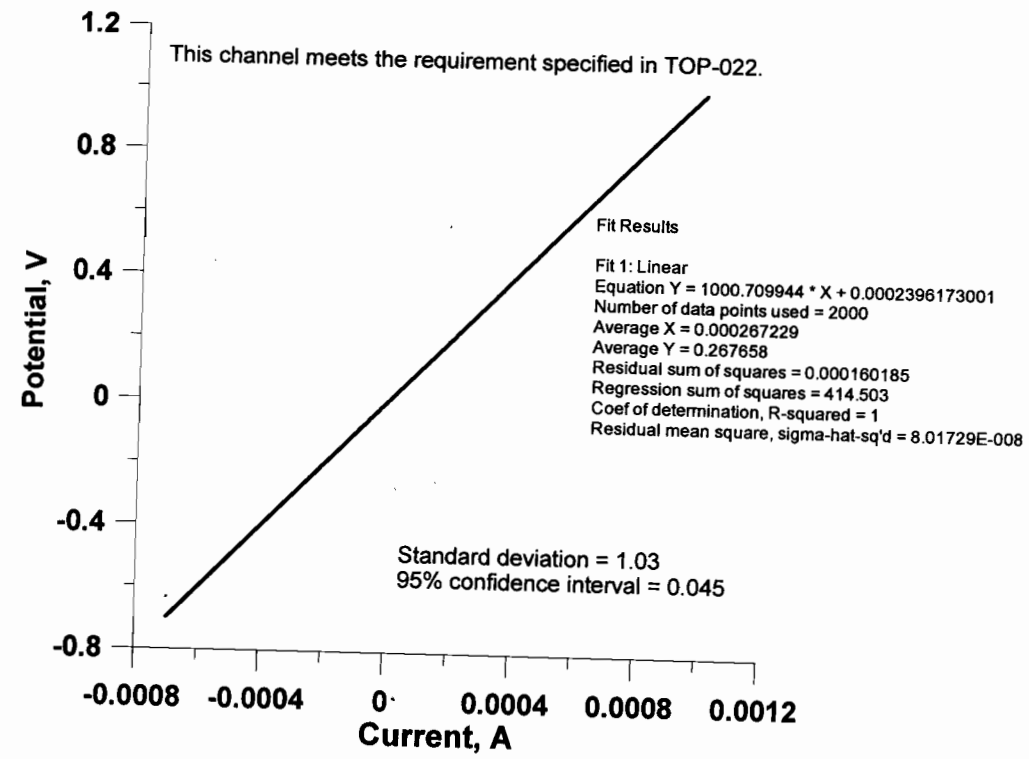
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch5  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xitruan 4/12/07*



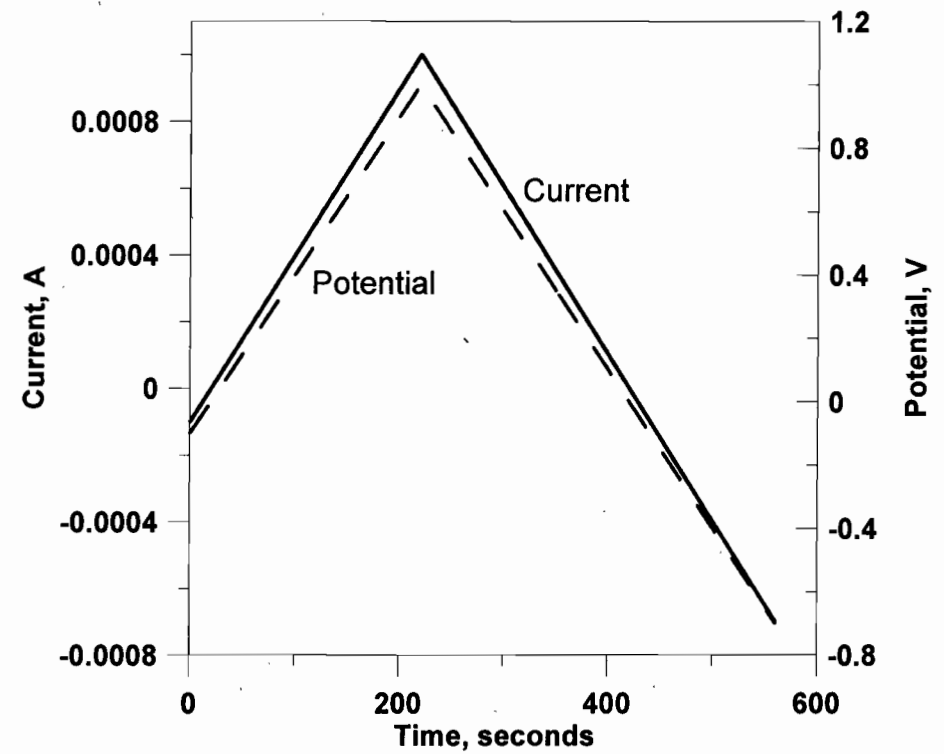
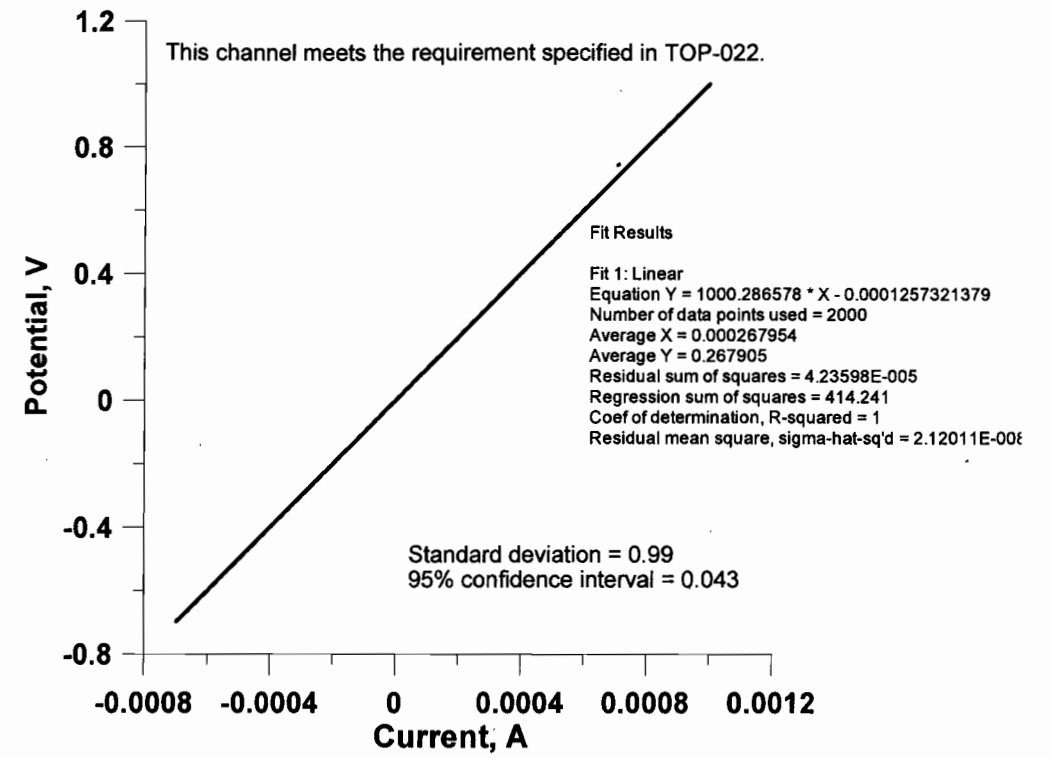
1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch6  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xitruan 4/12/07*



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch7  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

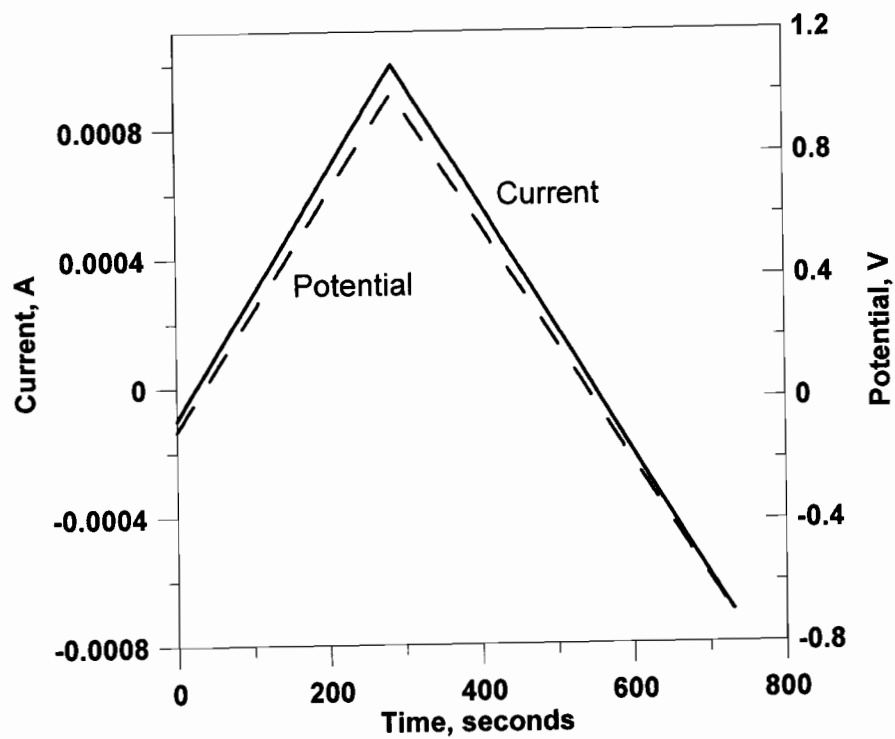
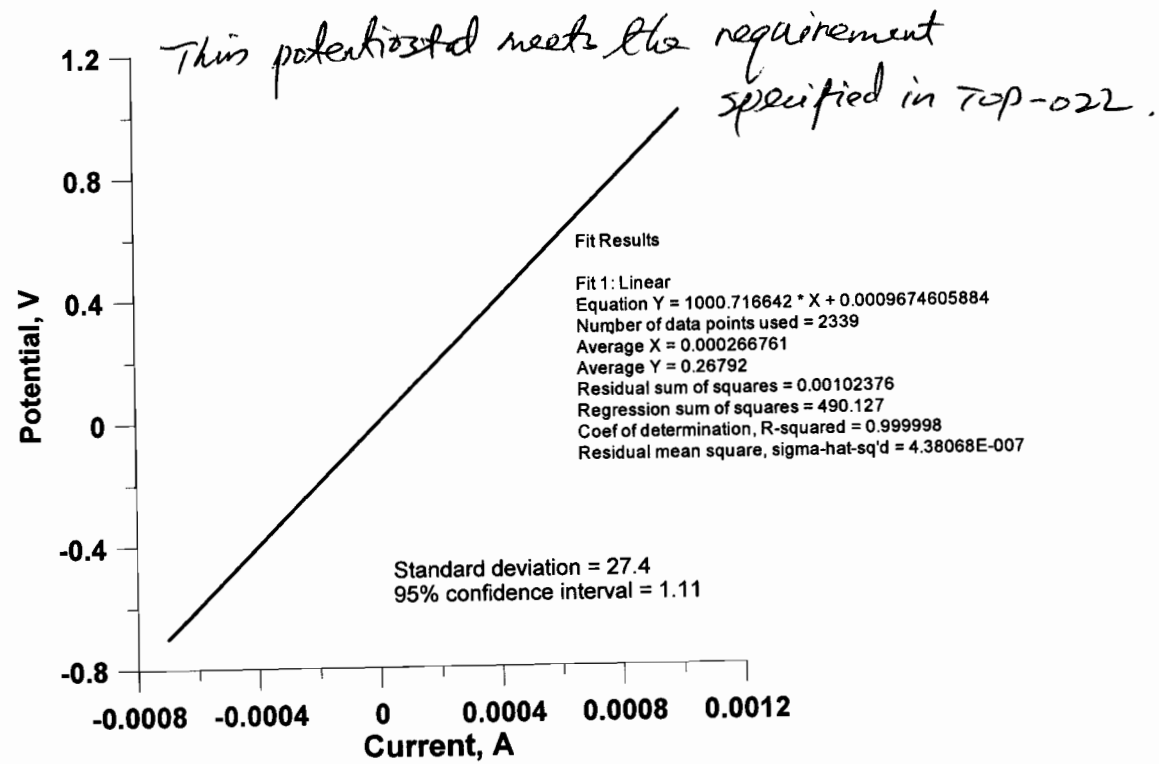
*Xc huall 4/12/07*



1000 Ohm resistor, SN 171001, Cal 10/30/06, Due 4/30/07  
 Solartron 1480 Ch8  
 SN 00240053  
 4/9/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

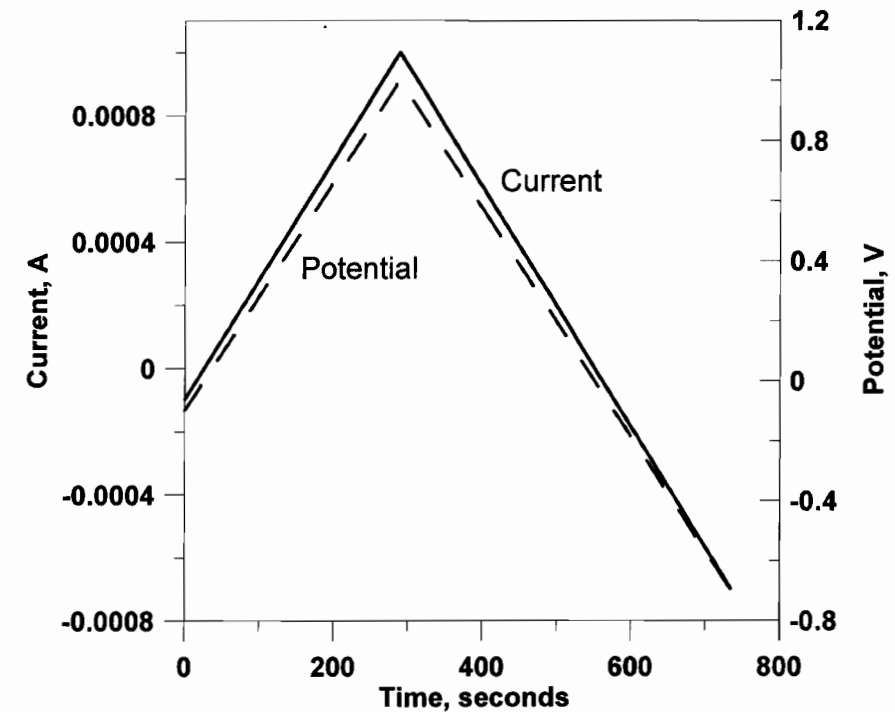
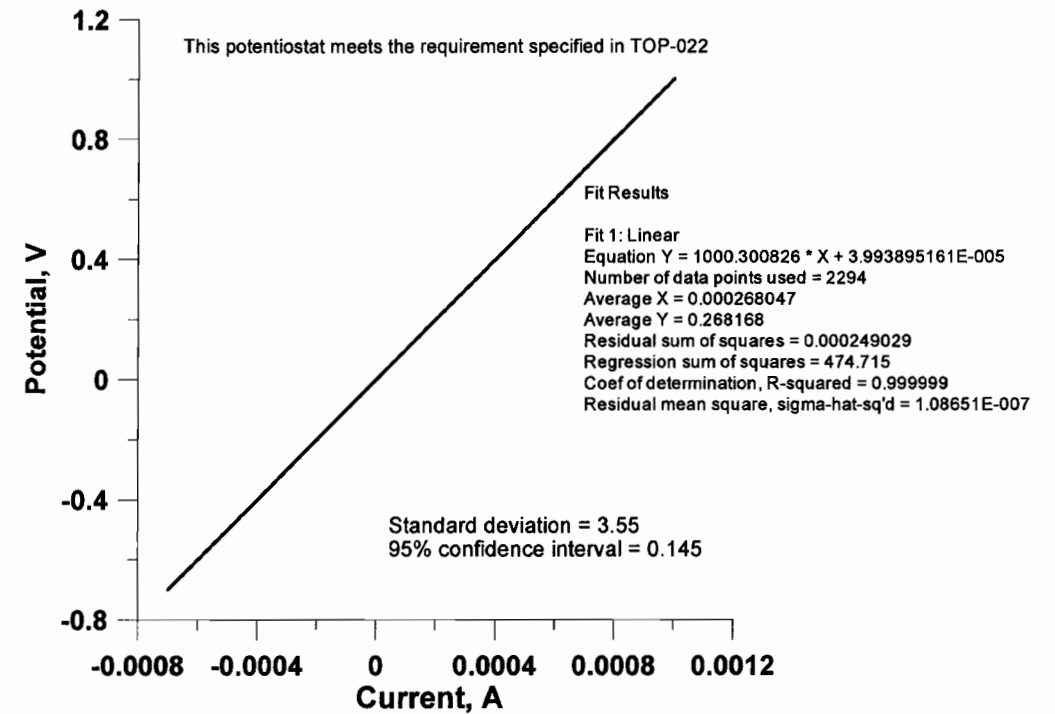
*Xc huall 4/12/07*





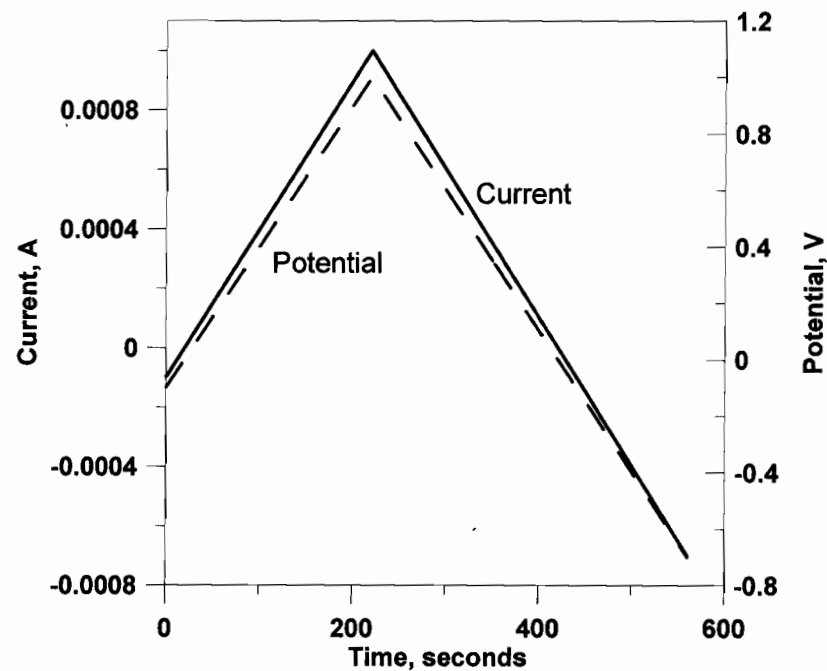
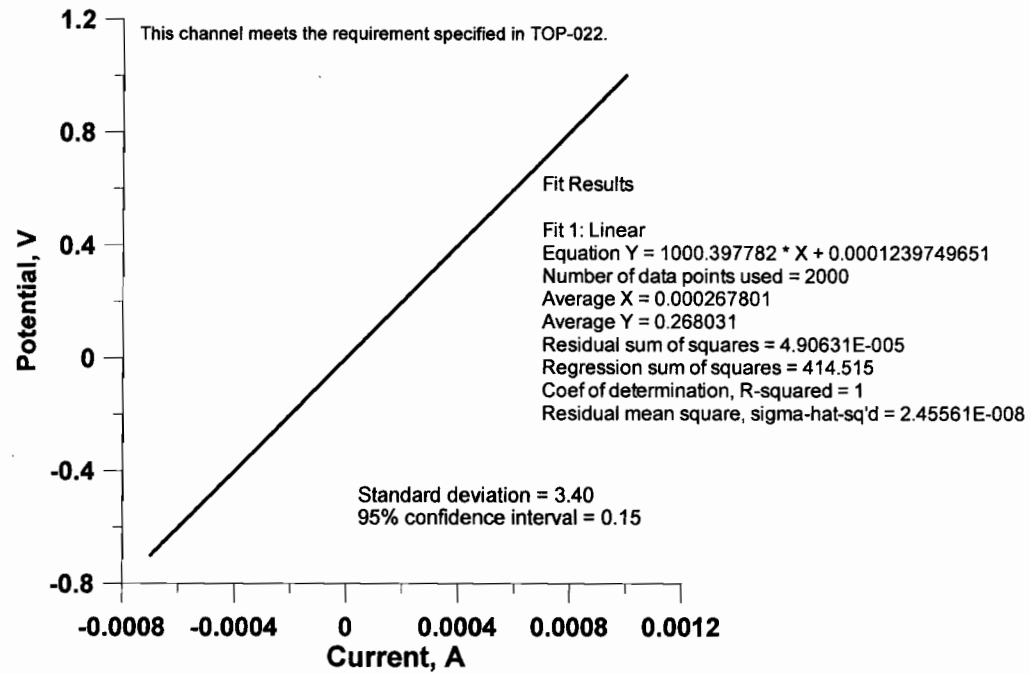
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 Solartron 1287 SN#001535500  
 5/3/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 730 seconds

*V. Helle 5/14/07*



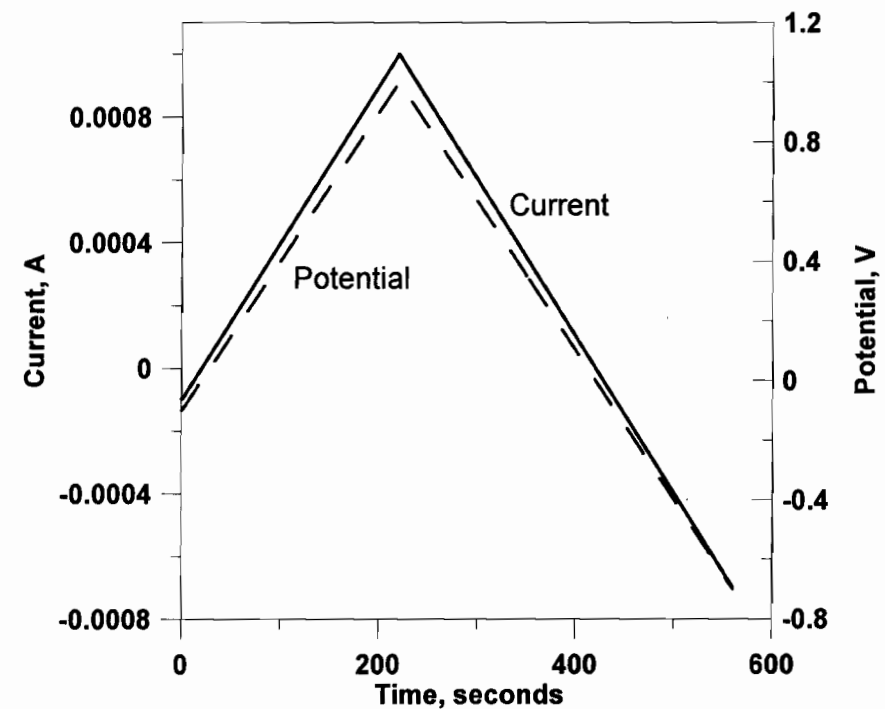
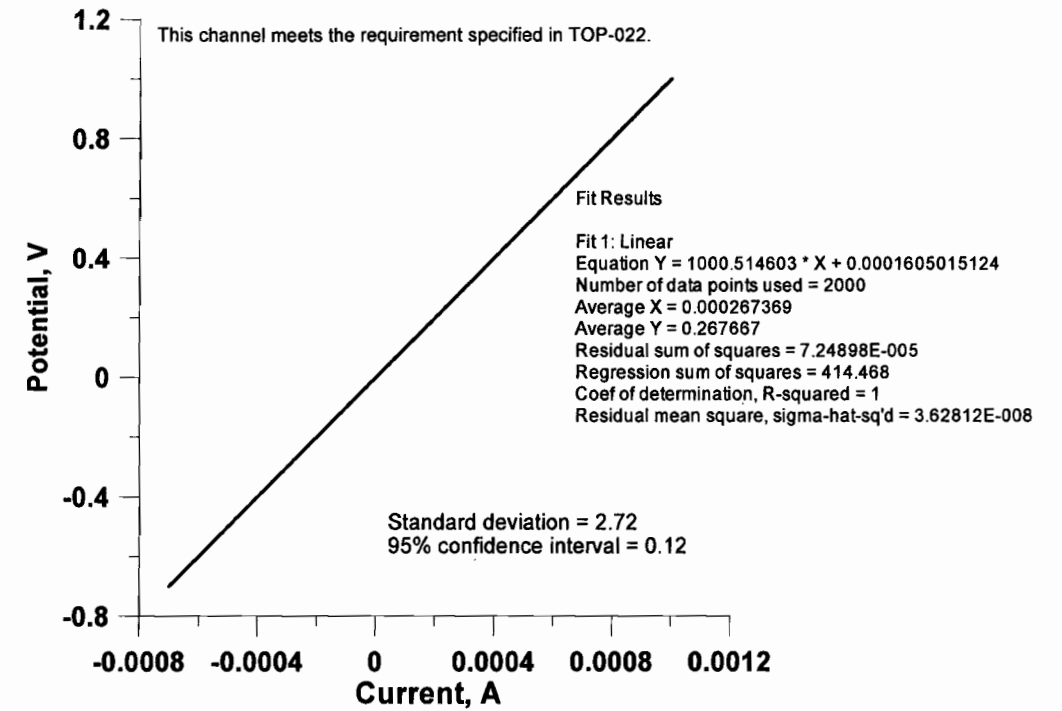
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00148500  
 5/3/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 734 seconds

*X. Helle 5/14/07*



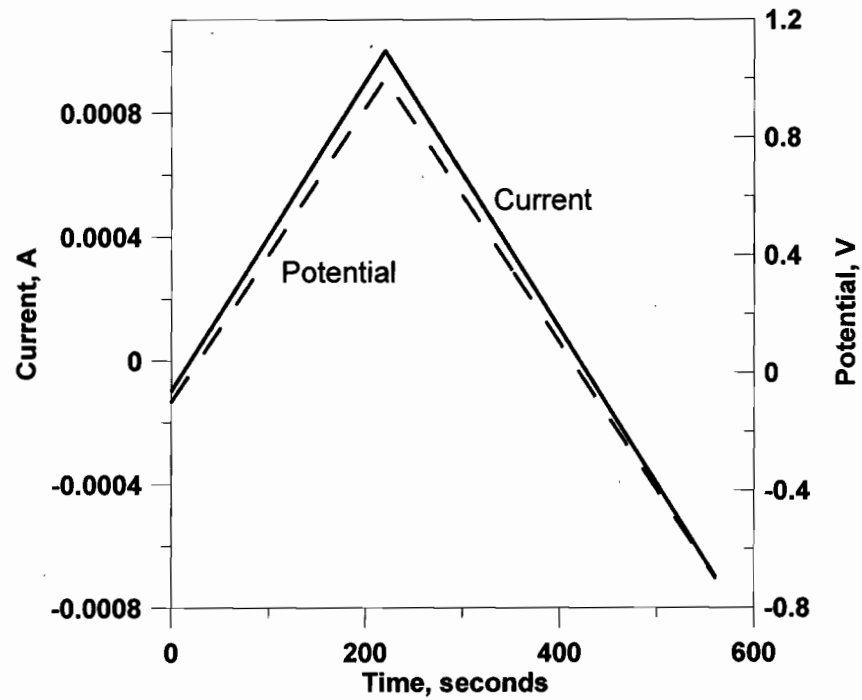
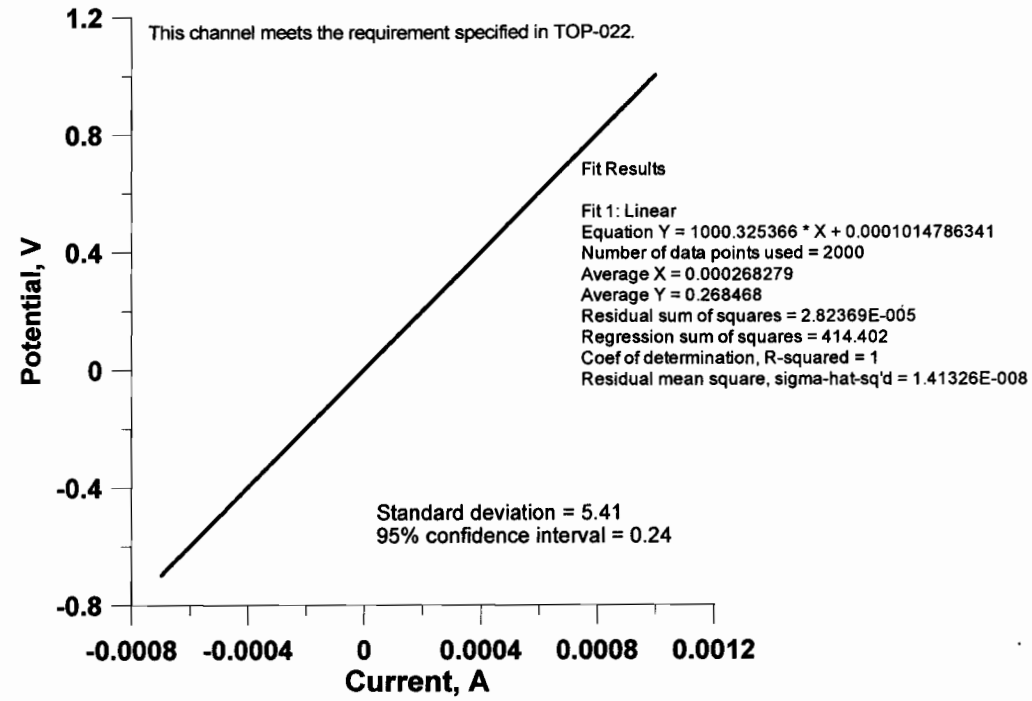
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch2, SN 00240551  
 5/15/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 5/15/07*



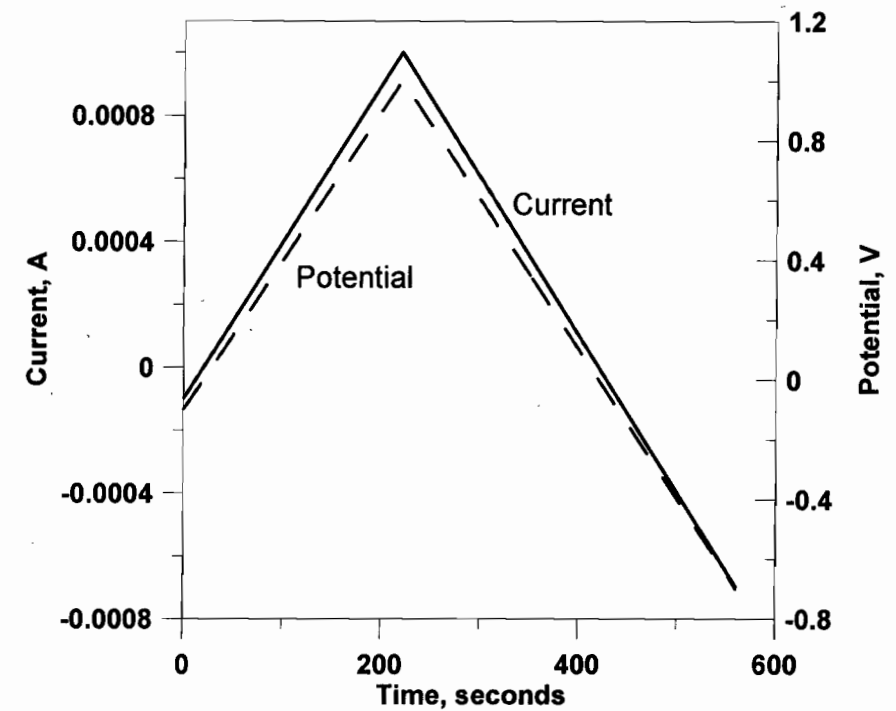
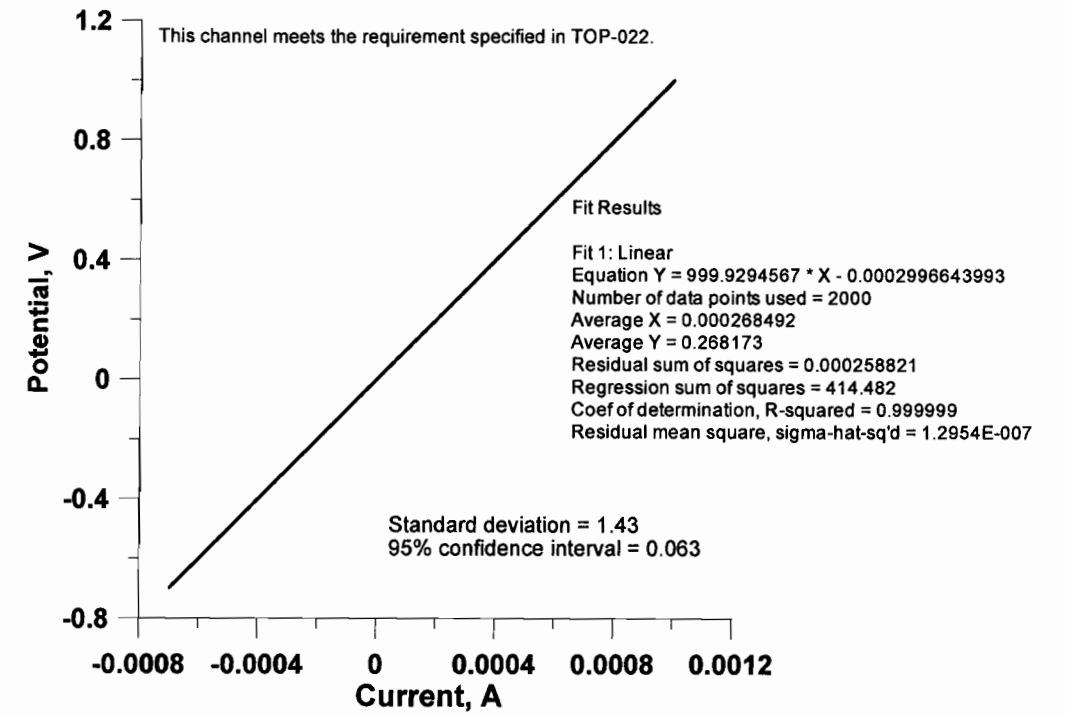
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch3, SN 00240551  
 5/15/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 5/15/07*



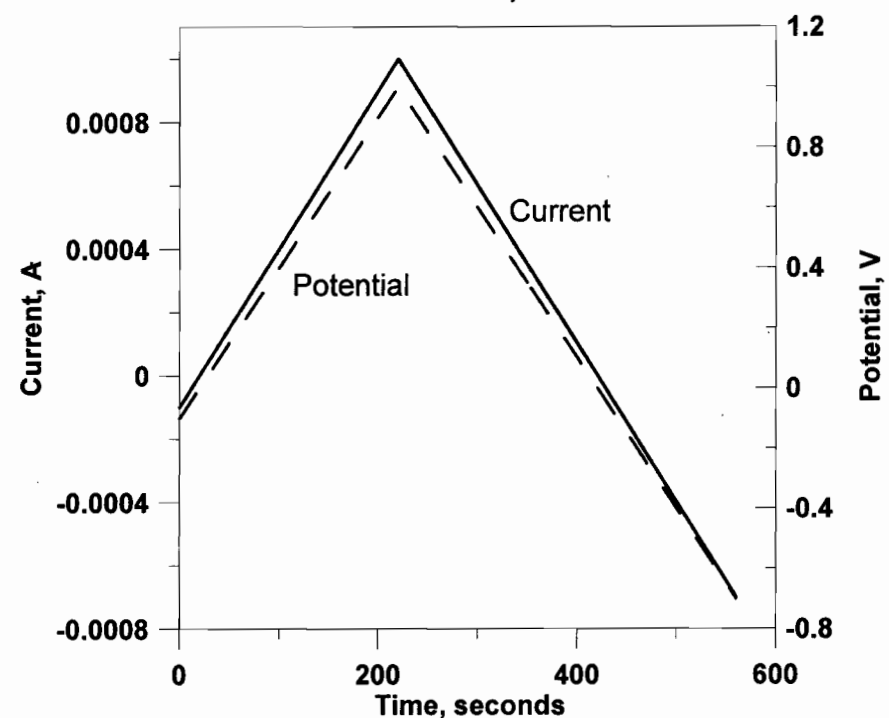
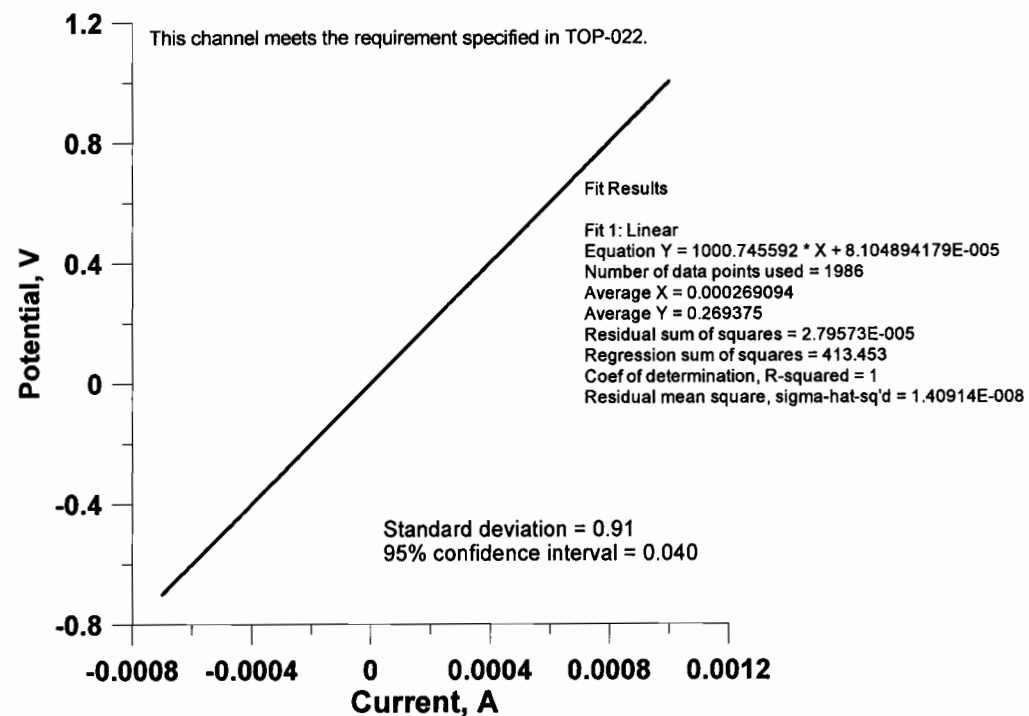
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch4, SN 00240551  
 5/15/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 5/15/07*



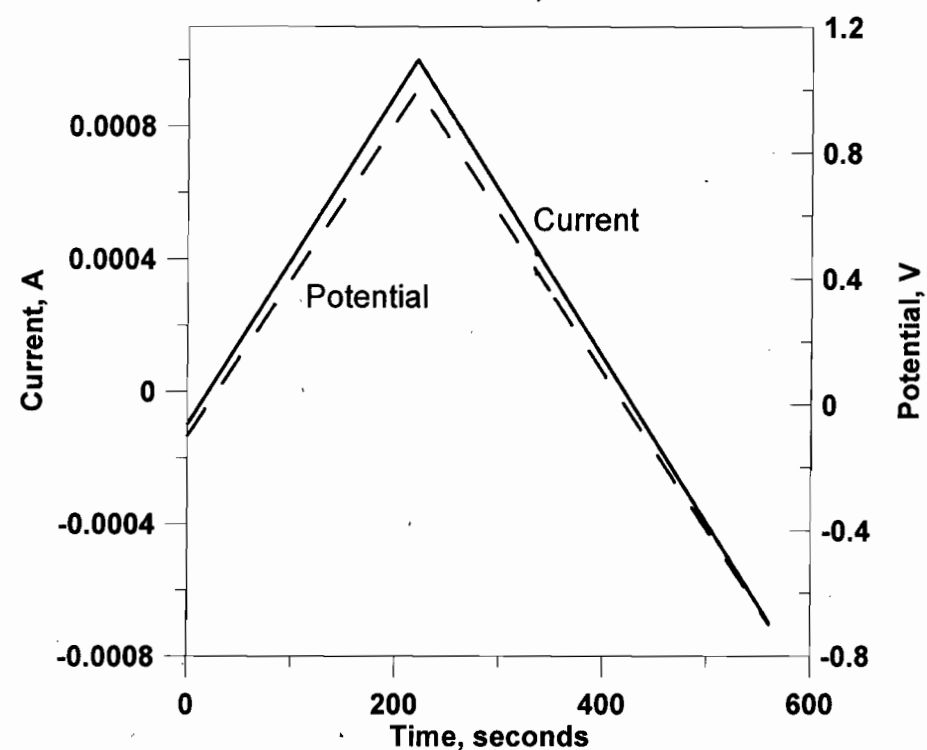
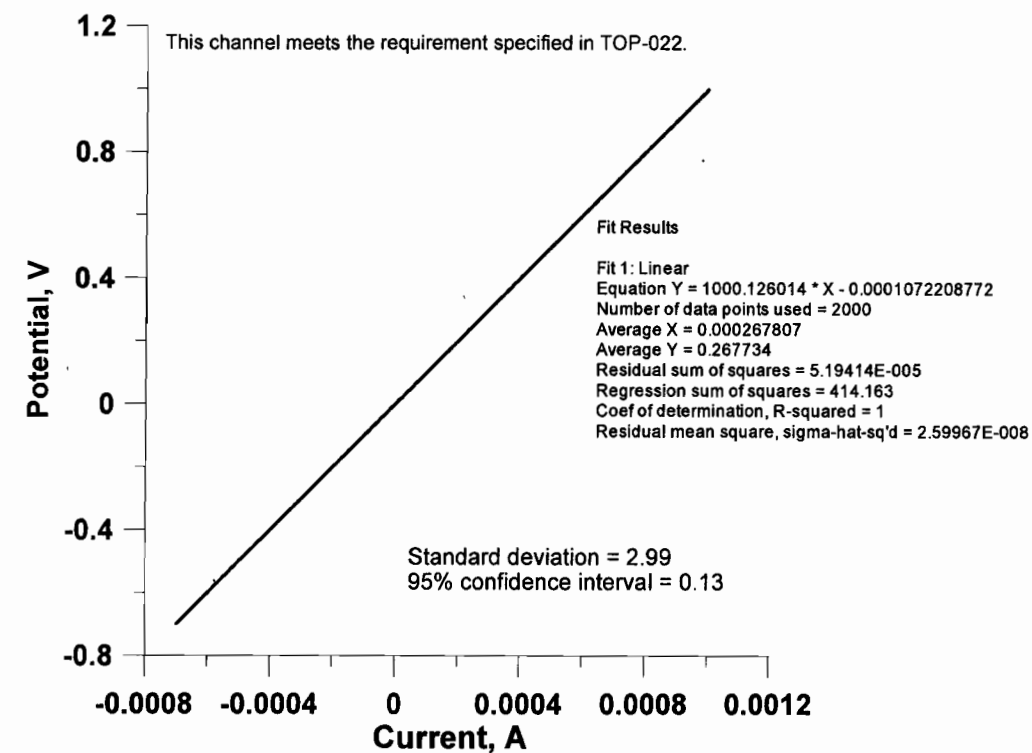
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch5; SN 00240551  
 5/15/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 5/15/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch6, SN 00240551  
 5/15/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

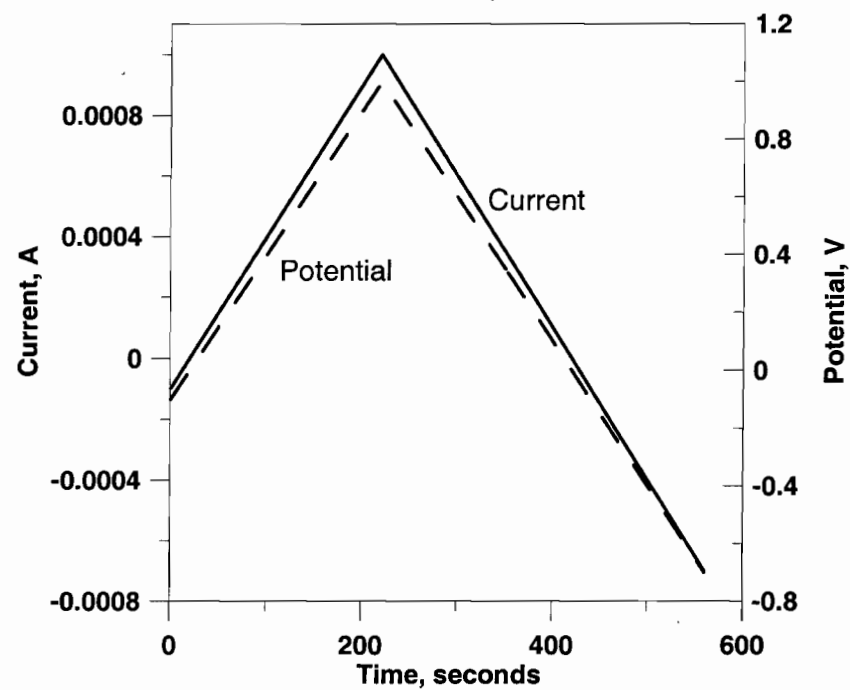
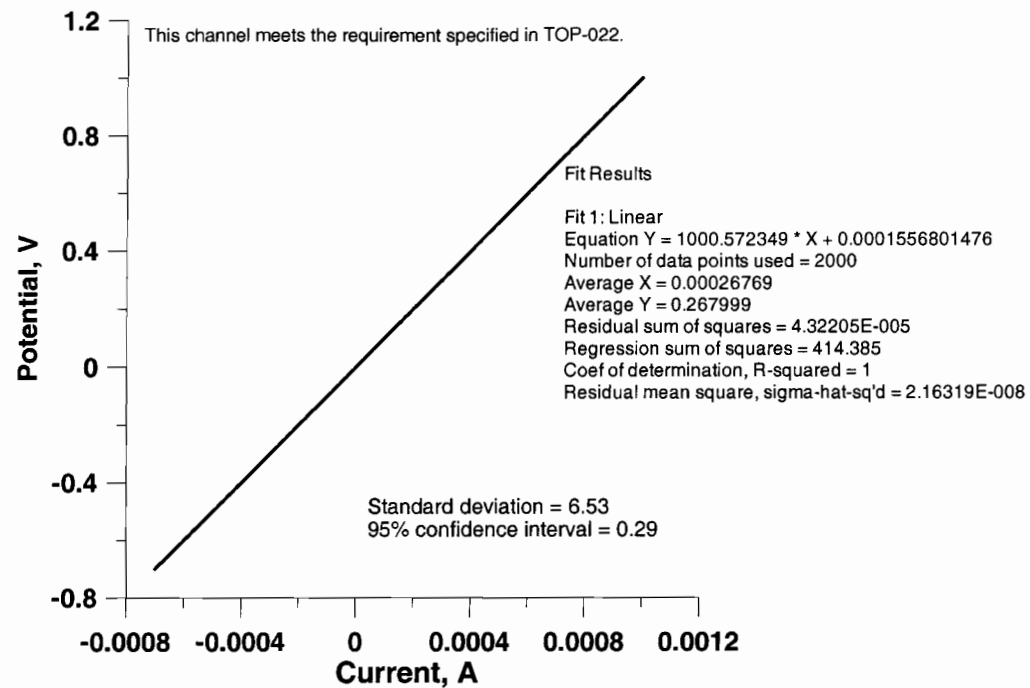
*Xi Hua He 5/15/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch7, SN 00240551  
 5/15/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

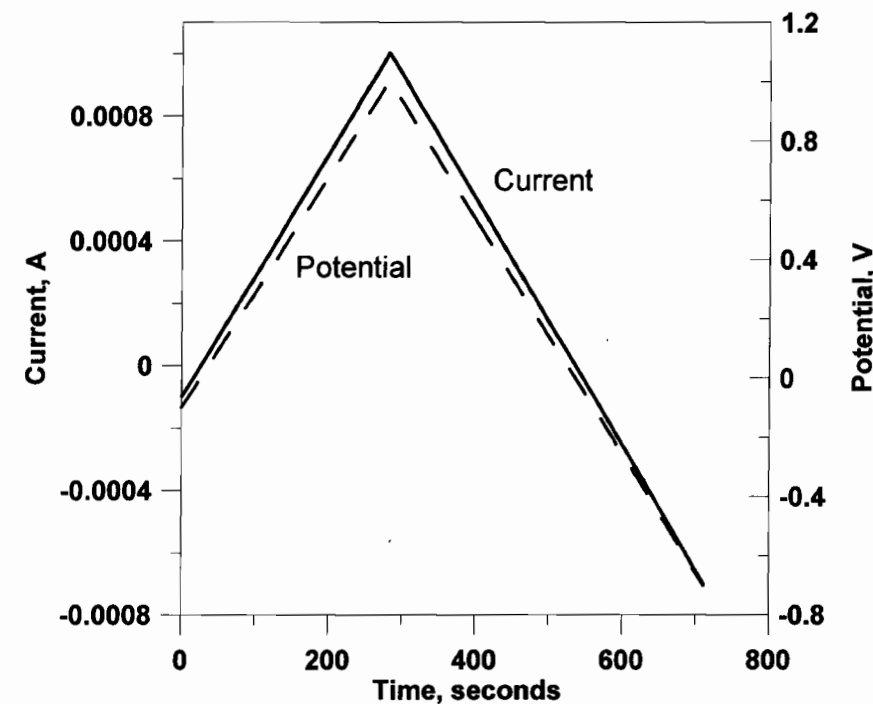
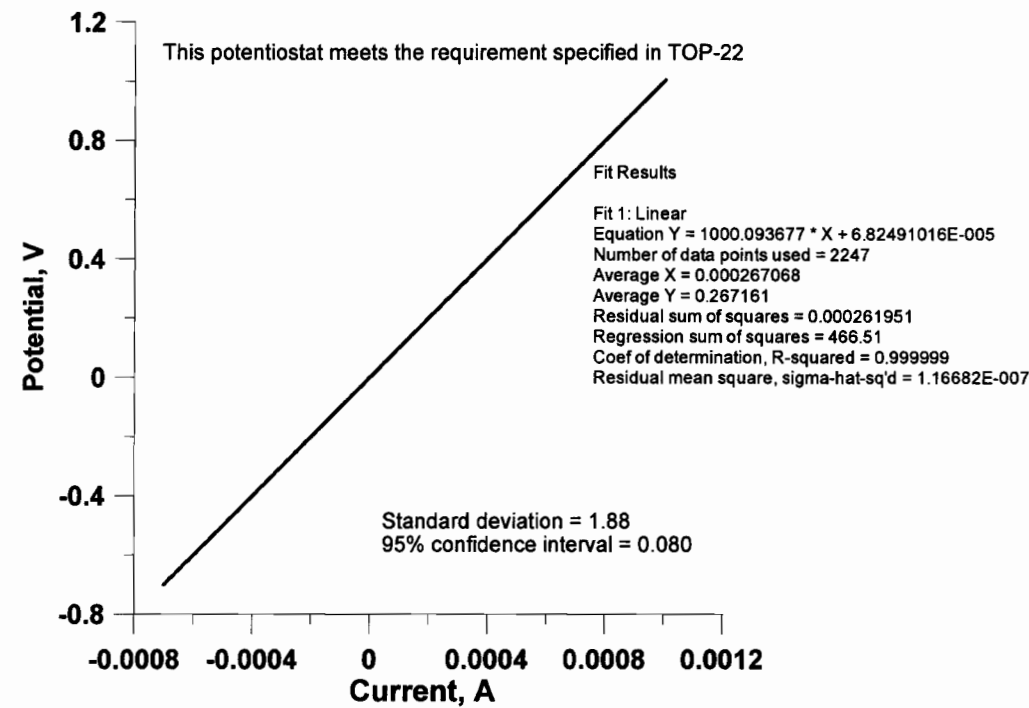
*Xi Hua He 5/15/07*





1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch8, SN 00240551  
 5/15/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi Hua He 5/15/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1287 SN#00186634  
 6/26/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s

*Xi Hua He 6/29/07*

Continued from pg # 108

weekly pH Calibrations of EA940 SN# 2330

Cal: 7/6/07 due: 7/6/08 pH probe 13-620-296 SN# 5003095

Date	Buffers Used	Int.
9/17/07	4-7-10	BLU
9/24/07	4-7-10	BLU
10/1/07	4-7-10	BLU
10/8/07	4-7-10	BLU
10/15/07	4-7-10	BLU
10/23/07	4-7-10	BLU
10/29/07	4-7-10	BLU
10/29/07	pH meter was unplugged ReCAL 4-7-10	BLU
11/5/07	4-7-10	BLU
11/12/07	4-7-10	BLU
11/15/07	4-7-10	BLU
11/26/07	4-7-10	BLU
12/3/07	4-7-10	BLU
12/10/07	4-7-10	BLU
12/17/07	4-7-10	BLU
1/2/08	4-7-10	BLU
1/14/08	4-7-10	BLU
1/21/08	4-7-10	BLU
1/28/08	4-7-10	BLU
2/5/08	4-7-10	BLU
2/11/08	4-7-10	BLU
3/3/08	4-7-10	BLU
3/10/08	4-7-10	BLU

B. 10/1/07

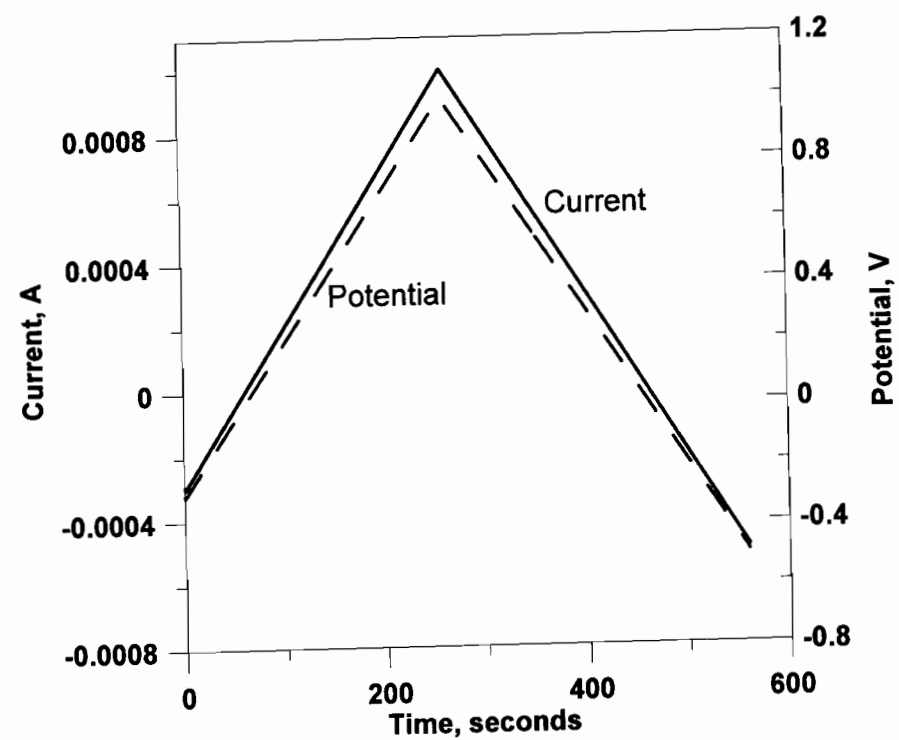
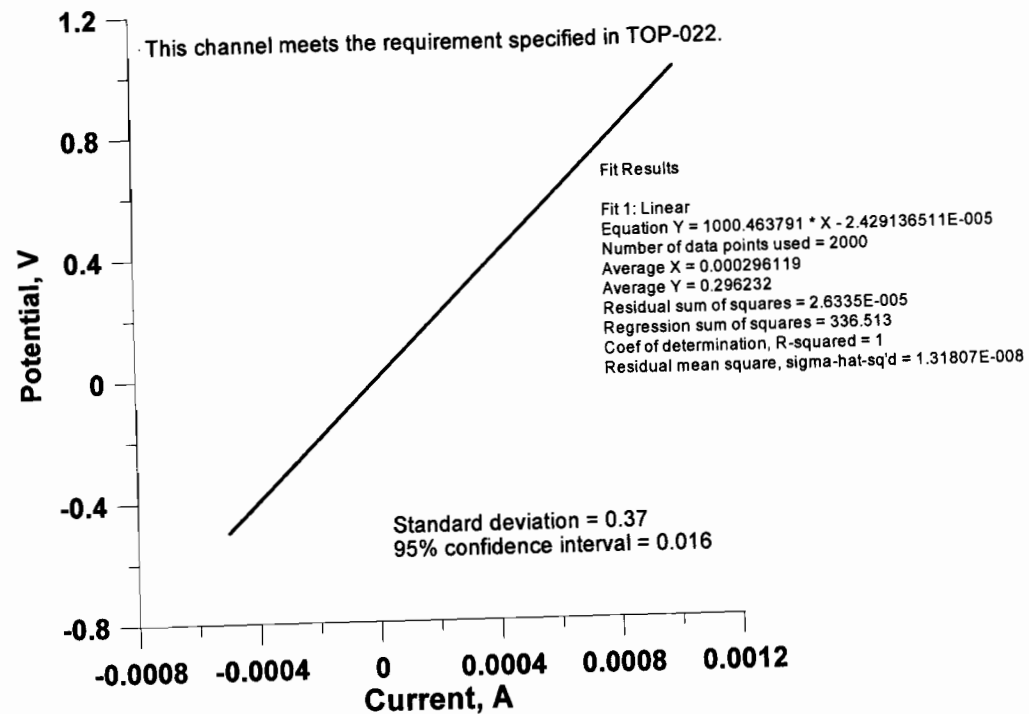
Continued from pg # 109

weekly pH Calibration of EA940 SN# 4274

Cal: 4/27/07 5/1/07 Due: 11/1/07 pH probe 13-620-296 SN# 5146019

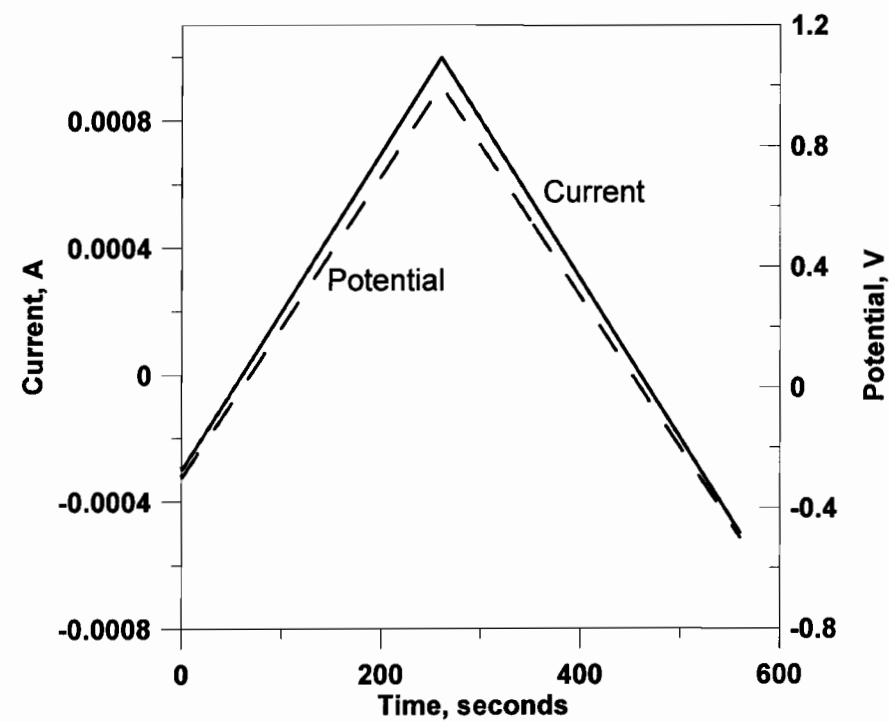
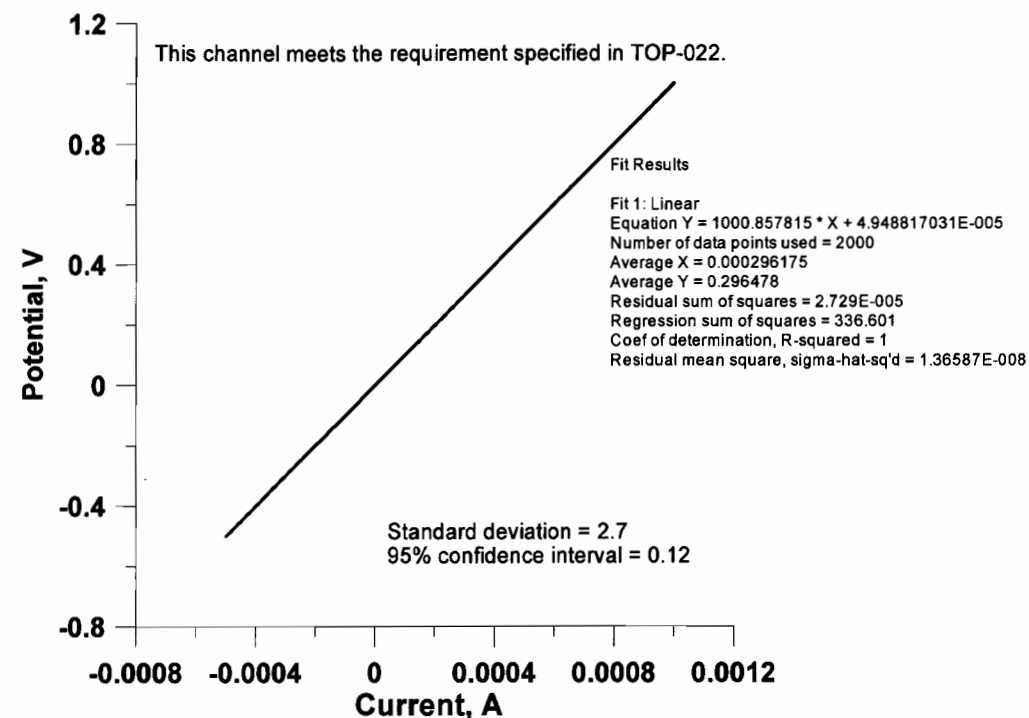
Date	Buffers Used	Int.
9/17/07	4-7-10	BLU
9/24/07	4-7-10	BLU
10/1/07	4-7-10	BLU
10/8/07	4-7-10	BLU
10/15/07	4-7-10	BLU
10/23/07	4-7-10	BLU
10/29/07	In Cal Lab	BLU
11/5/07	New Cal: 10/30/07 due 4/30/08 4-7-10	BLU
11/12/07	4-7-10	BLU
11/19/07	4-7-10	BLU
11/26/07	4-7-10	BLU
12/3/07	4-7-10	BLU
12/10/07	4-7-10	BLU
12/17/07	4-7-10	BLU
1/2/08	4-7-10	BLU
1/14/08	4-7-10	BLU
1/21/08	4-7-10	BLU
1/28/08	4-7-10	BLU
2/5/08	4-7-10	BLU
2/11/08	4-7-10	BLU
3/3/08	4-7-10	BLU
3/10/08	4-7-10	BLU

9/5/07



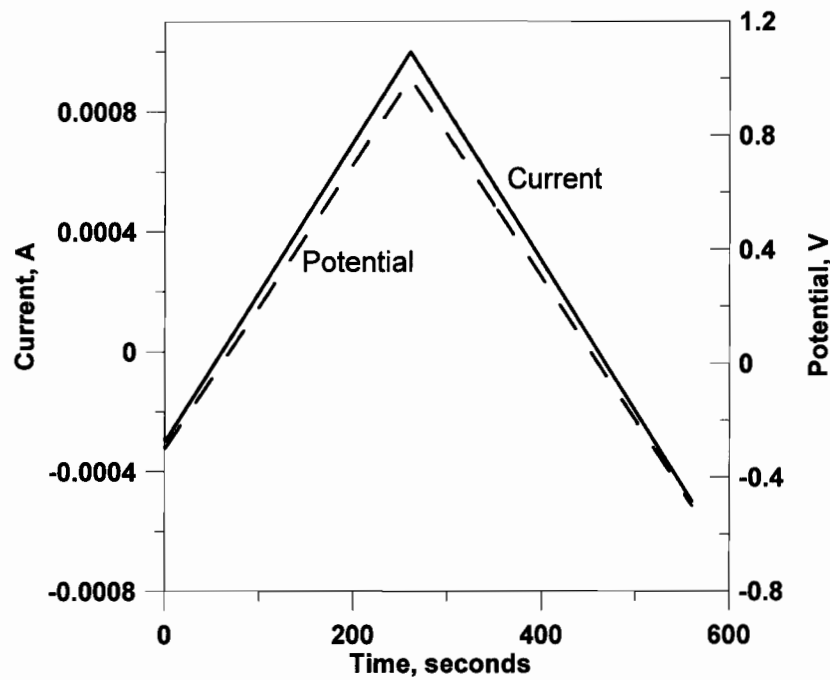
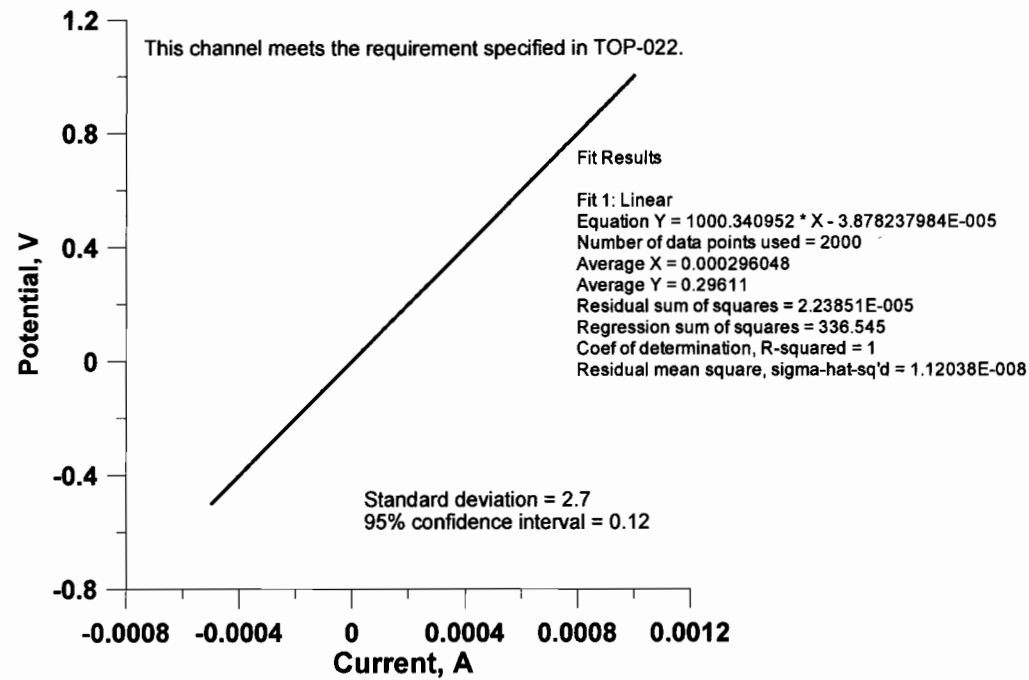
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch1  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 10/15/07*



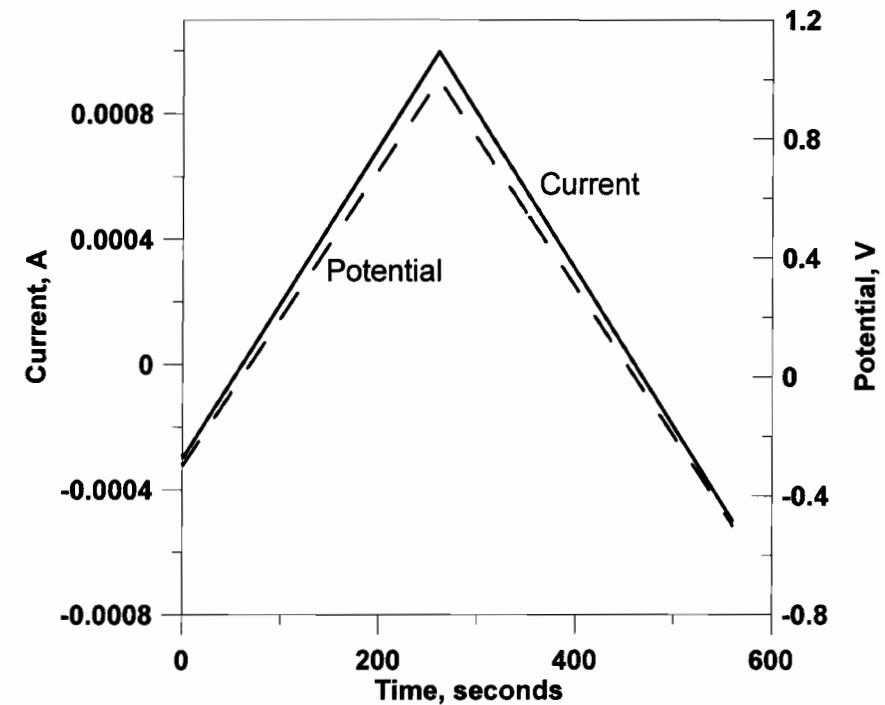
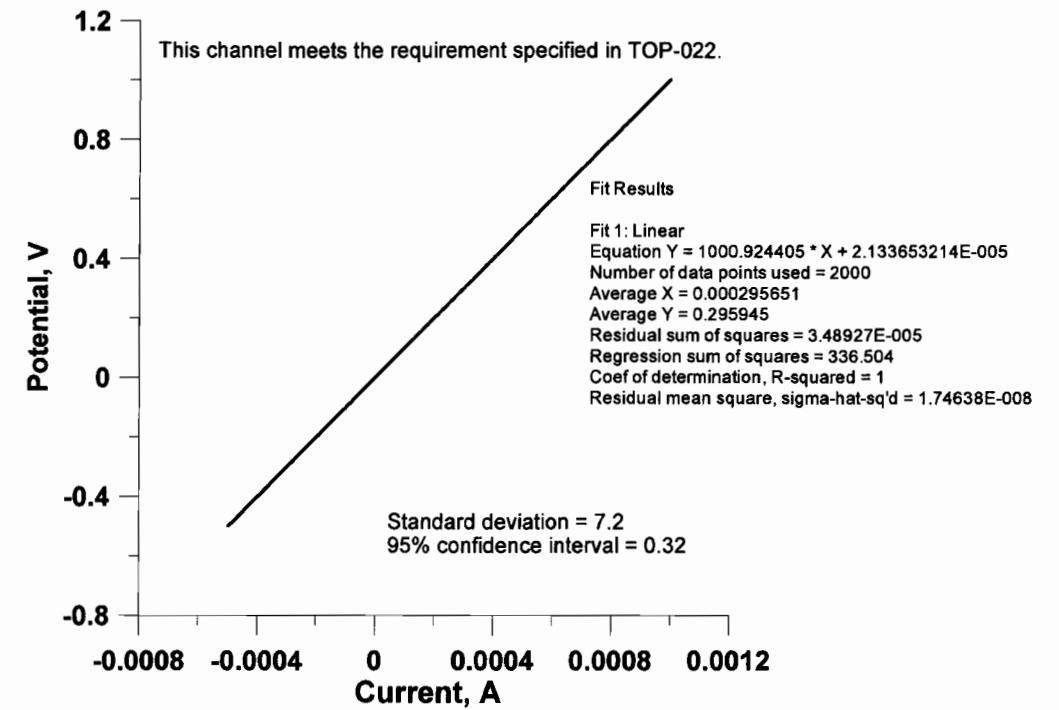
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch2  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 10/15/07*



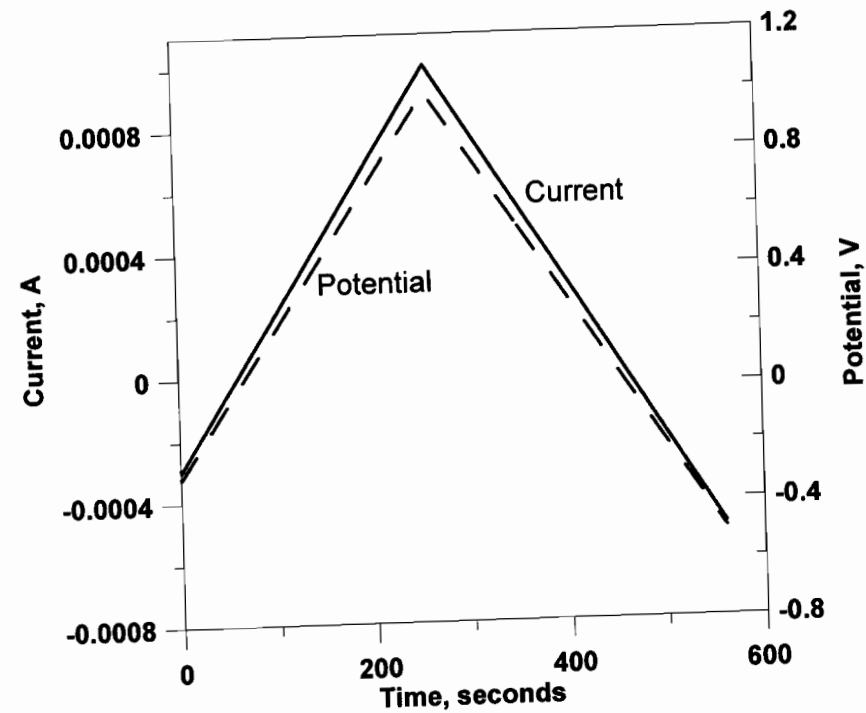
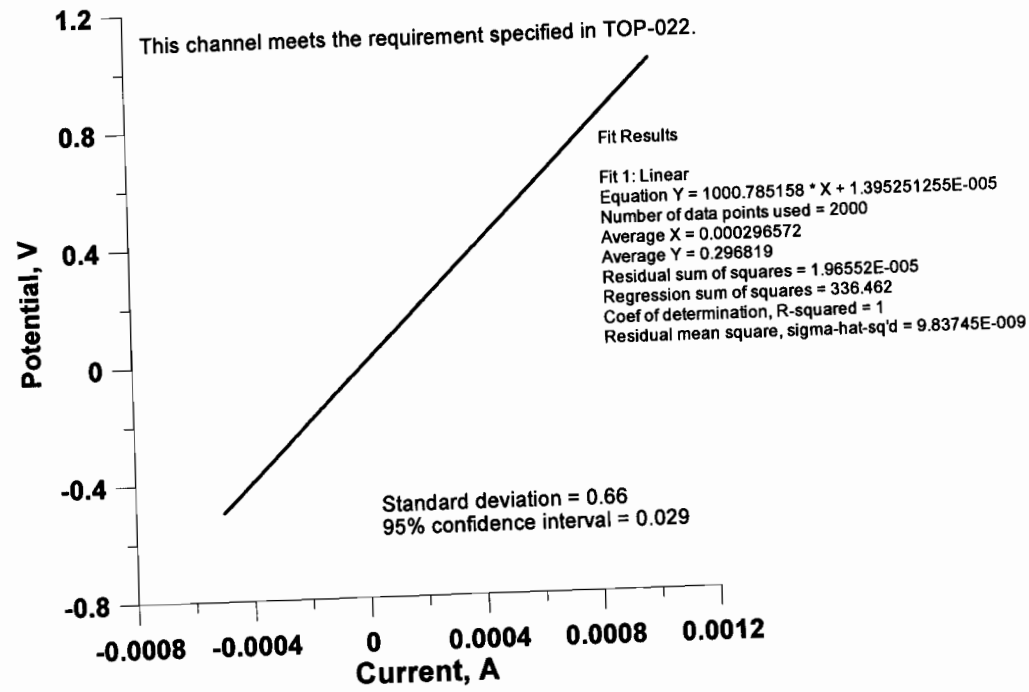
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch3  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 10/15/07*



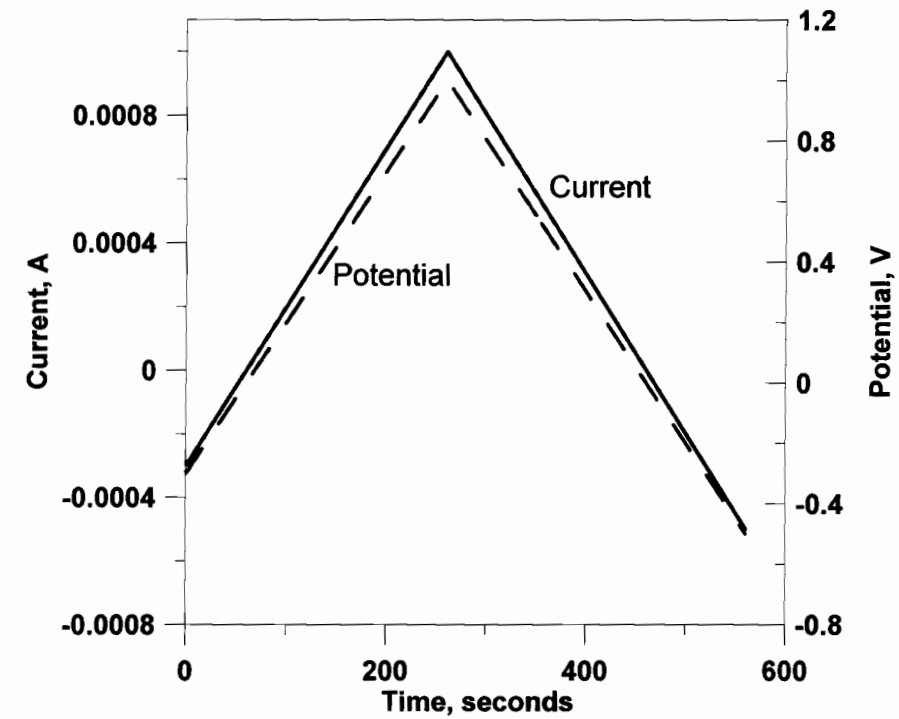
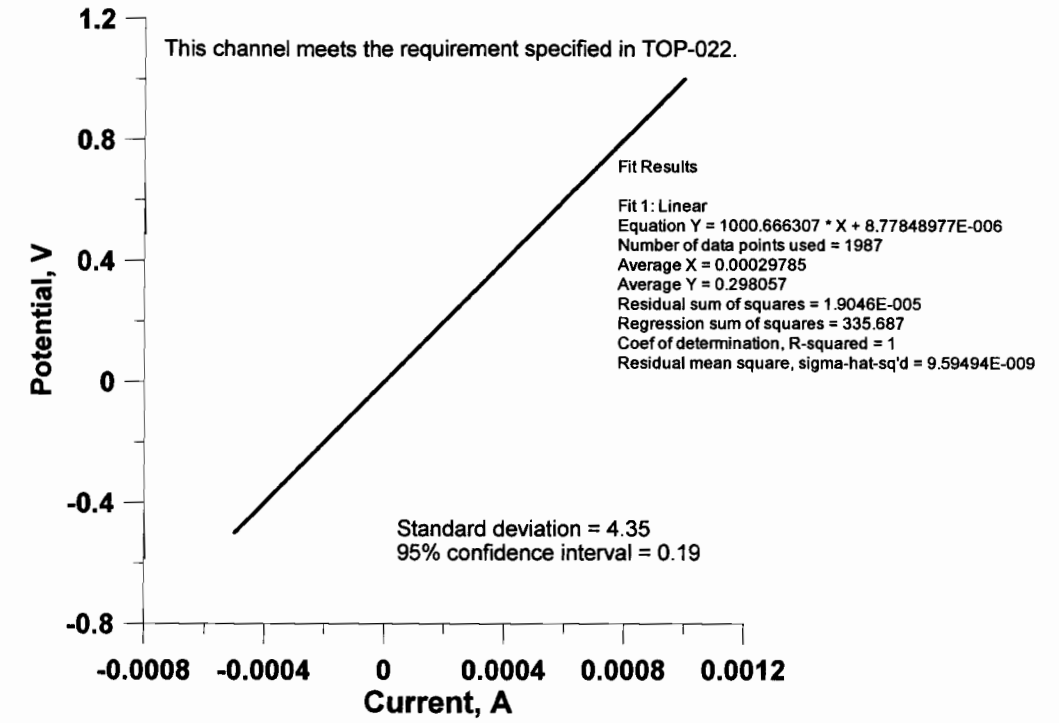
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch4  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 10/15/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch5  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

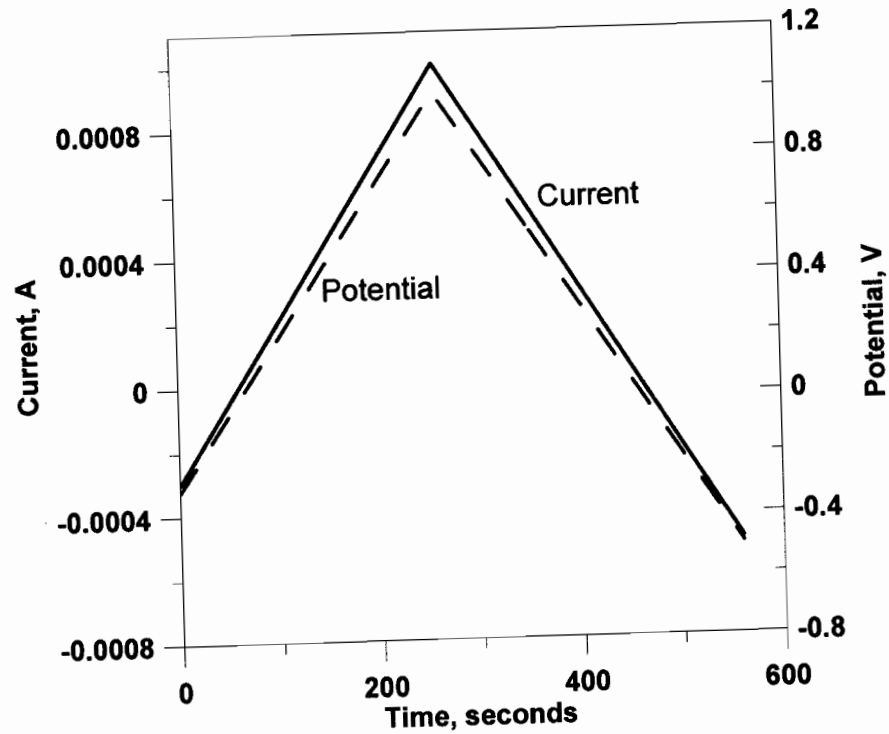
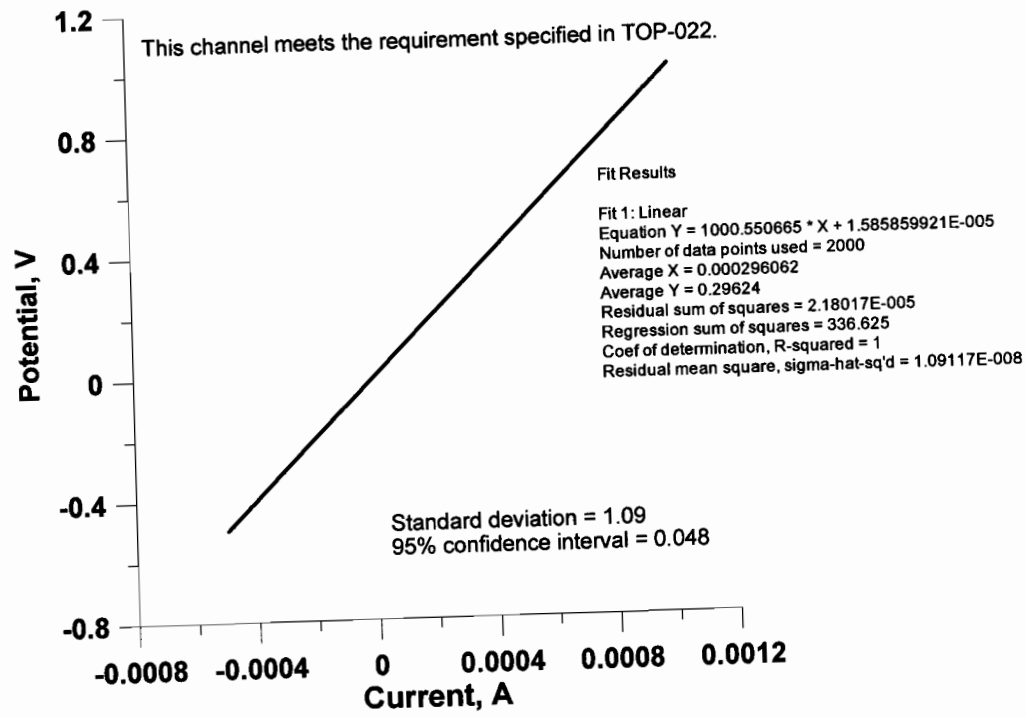
*Xi'hua He 10/15/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch6  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

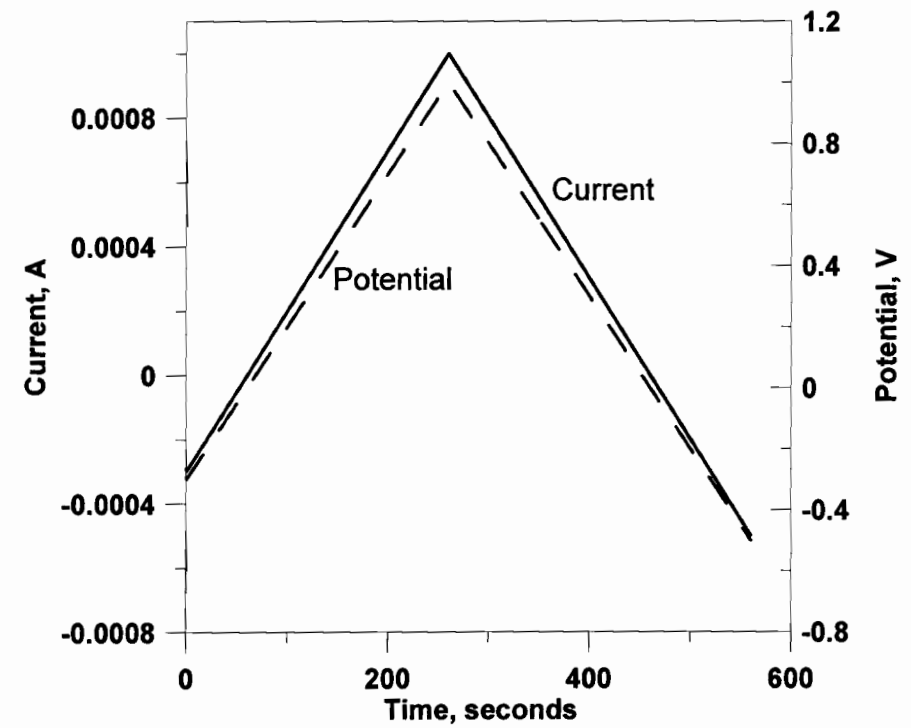
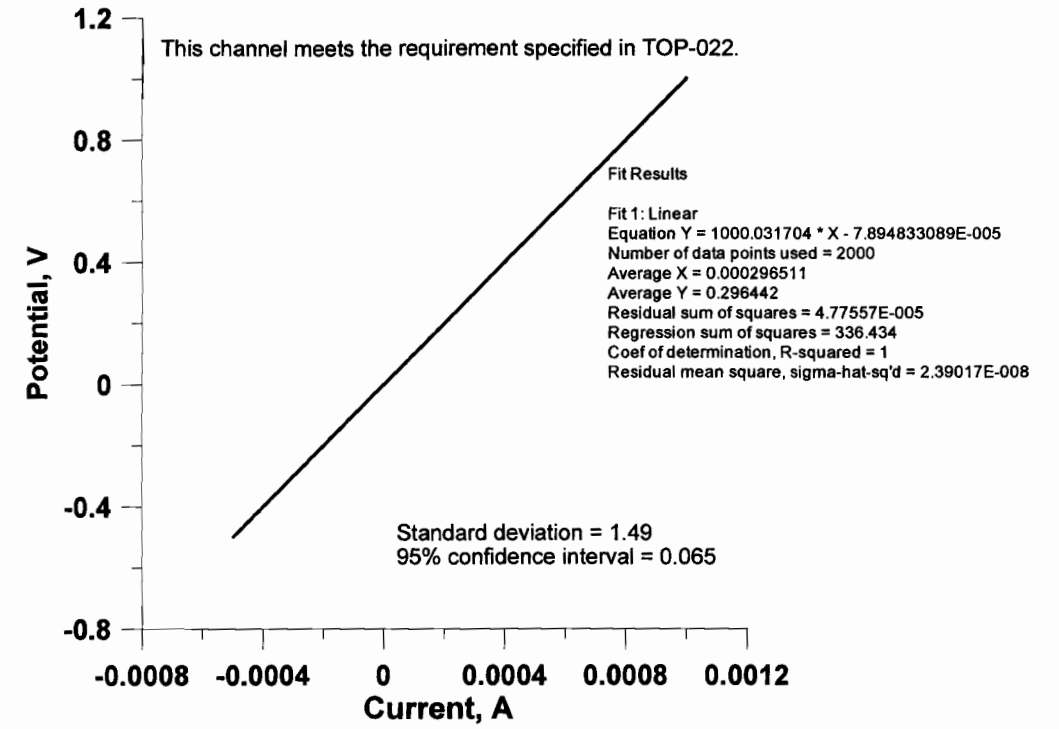
*Xi'hua He 10/15/07*





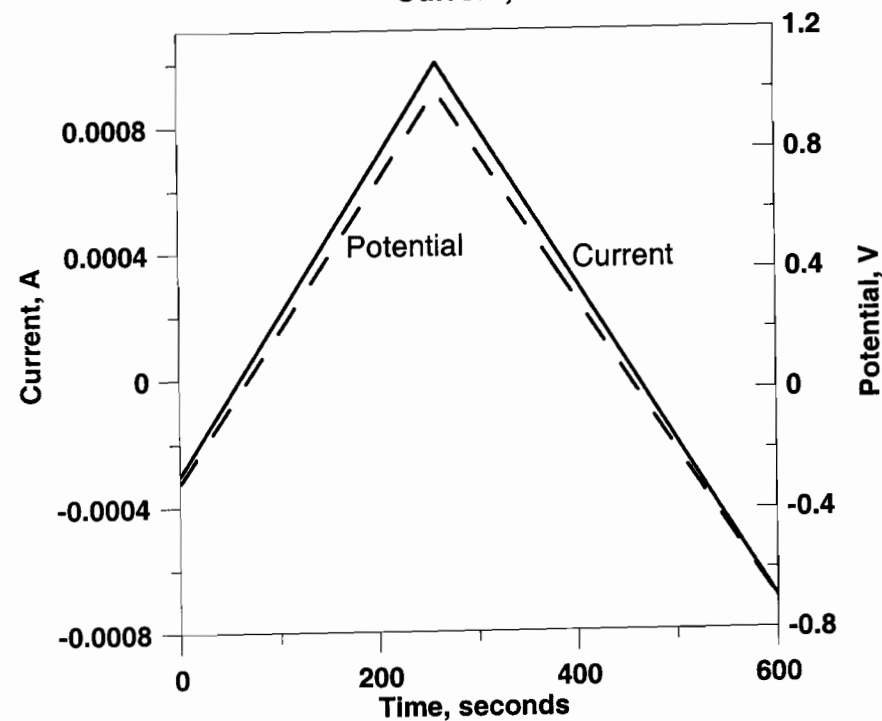
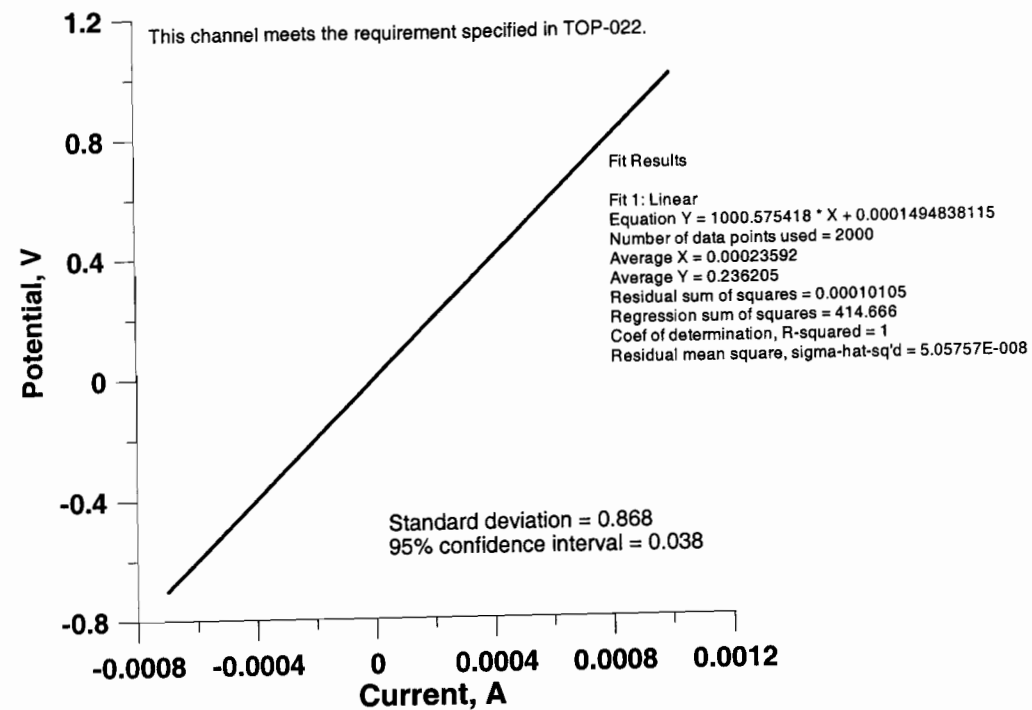
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch7  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xiuhua He 10/16/07*



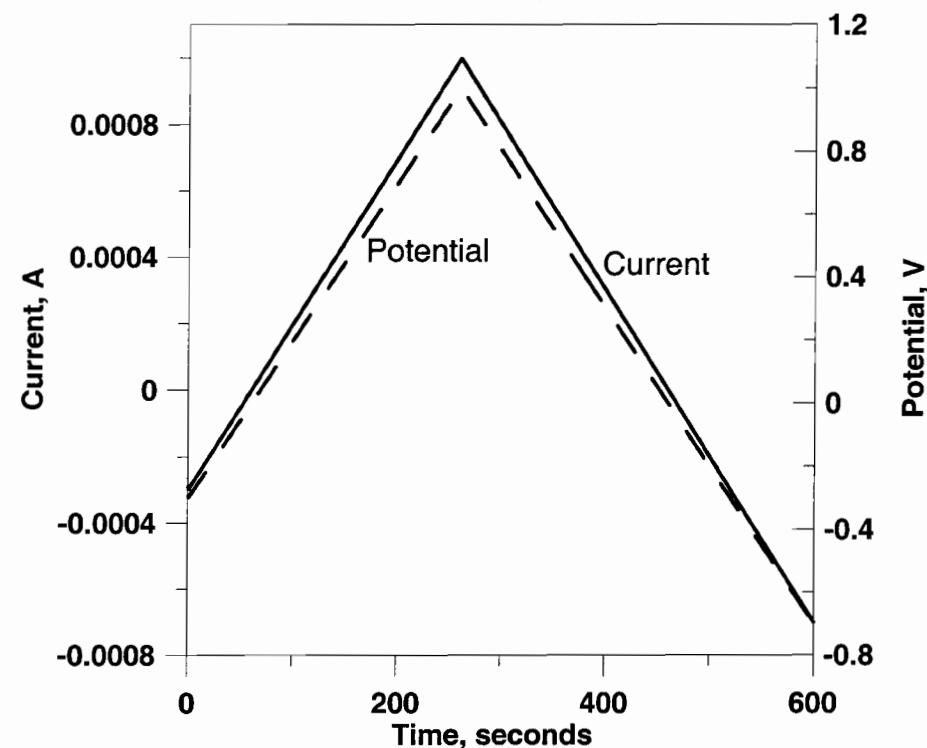
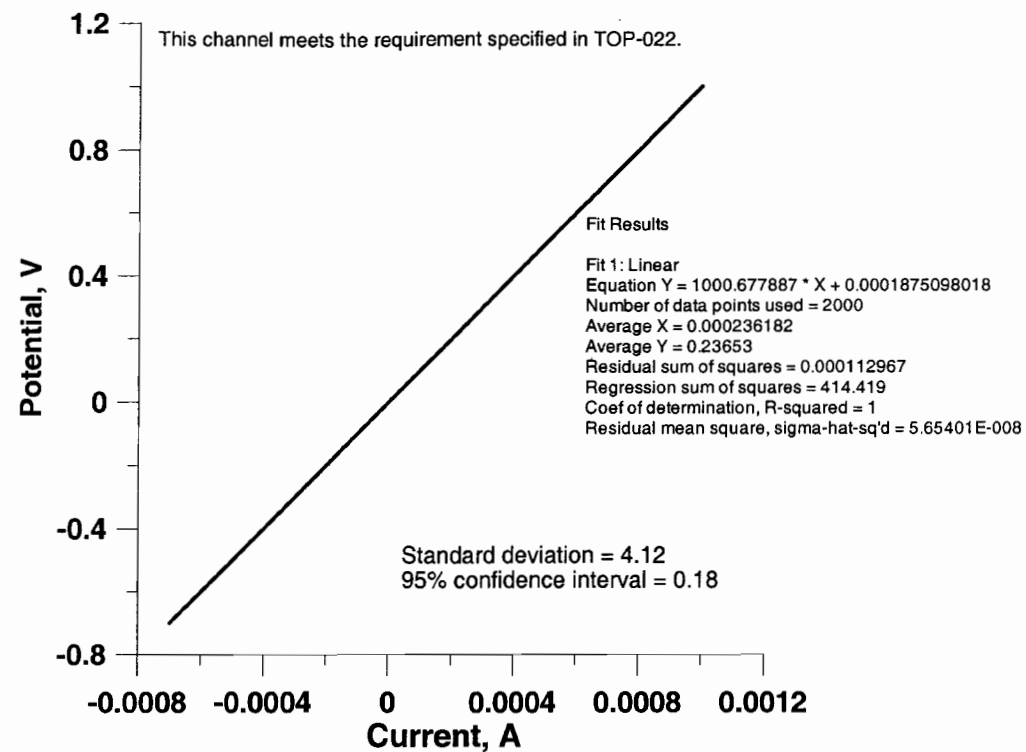
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch8  
 SN 00240053  
 9/26/07  
 Initial potential: -300 mV  
 Vertex potential: 1000 mV  
 Final potential: -500 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xiuhua He 10/15/07*



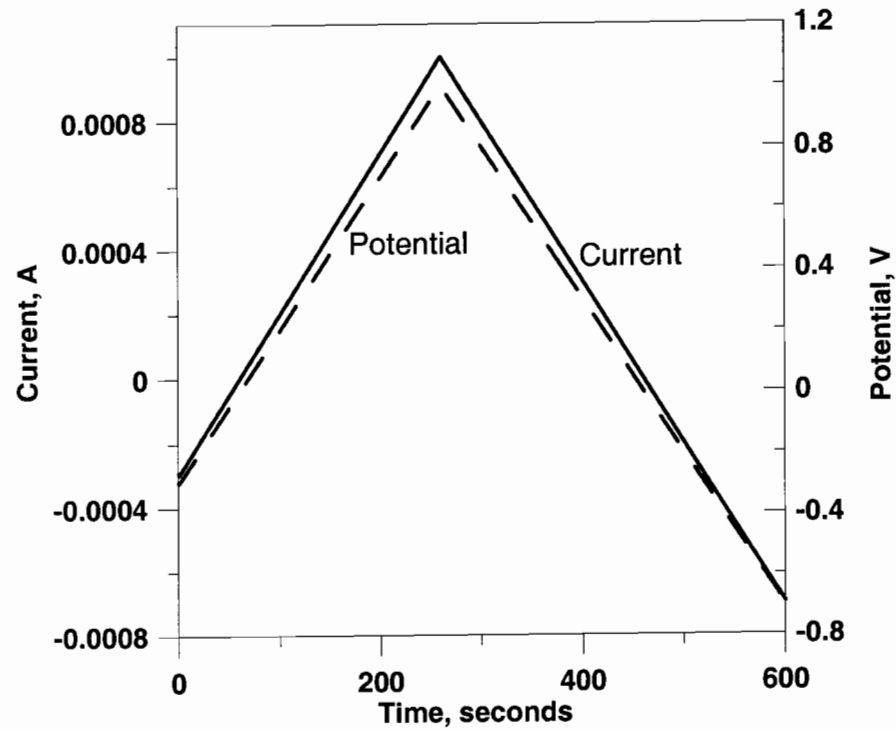
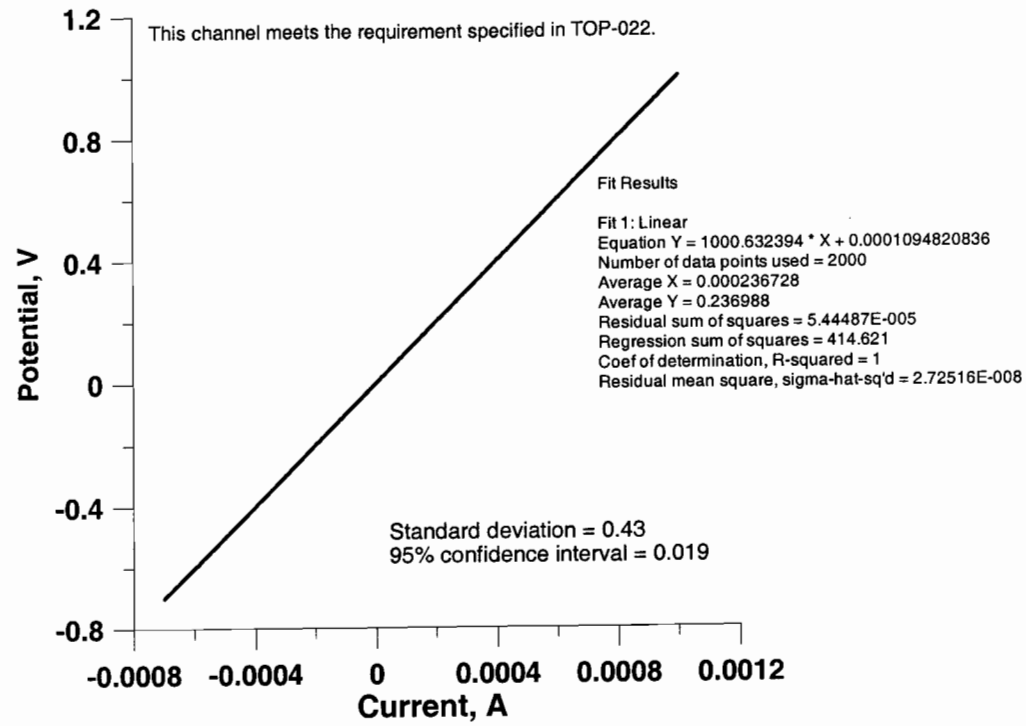
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch1, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 10/15/07*



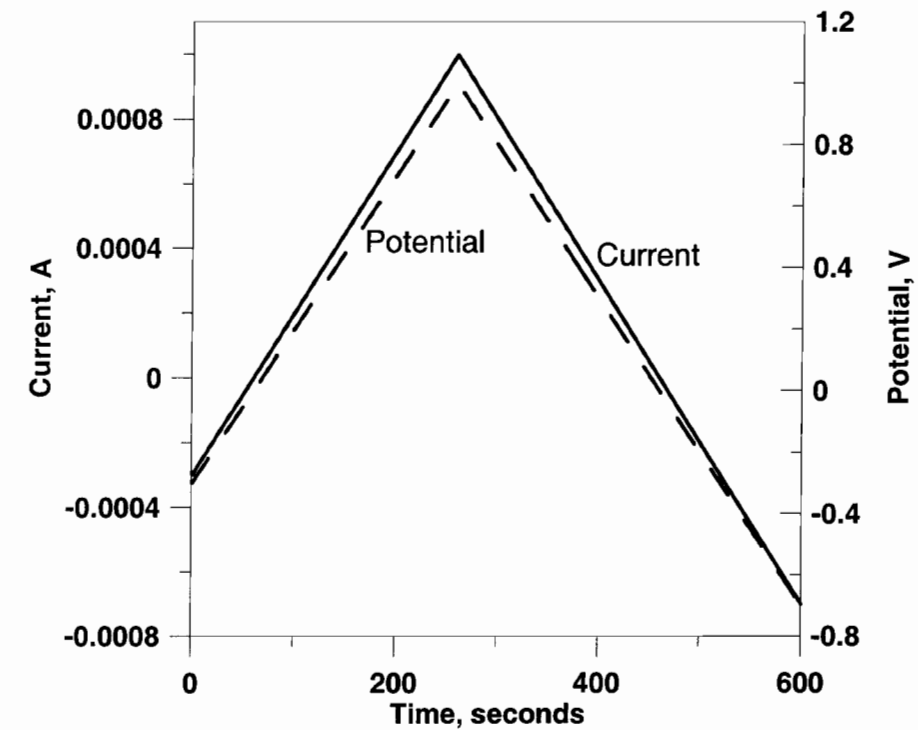
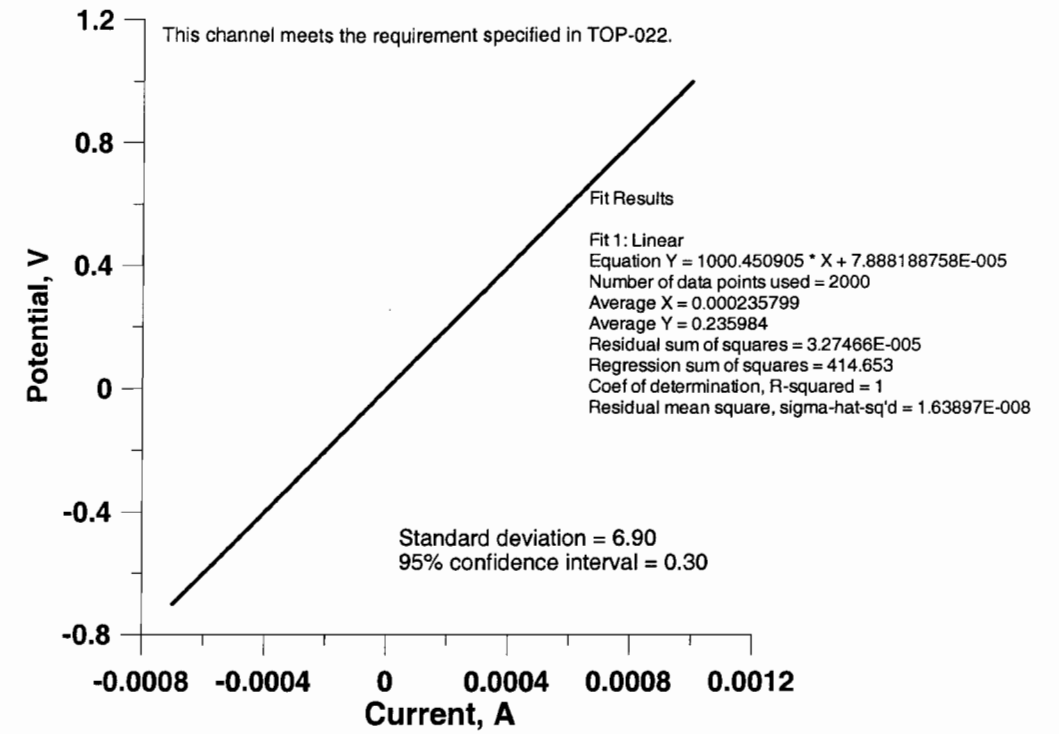
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch2, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 10/15/07*



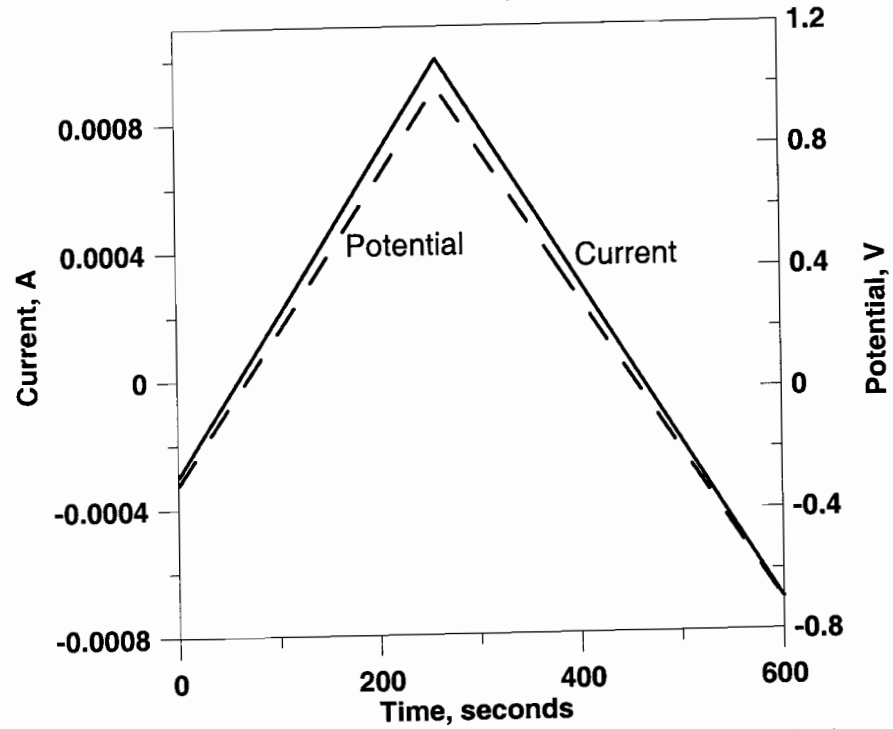
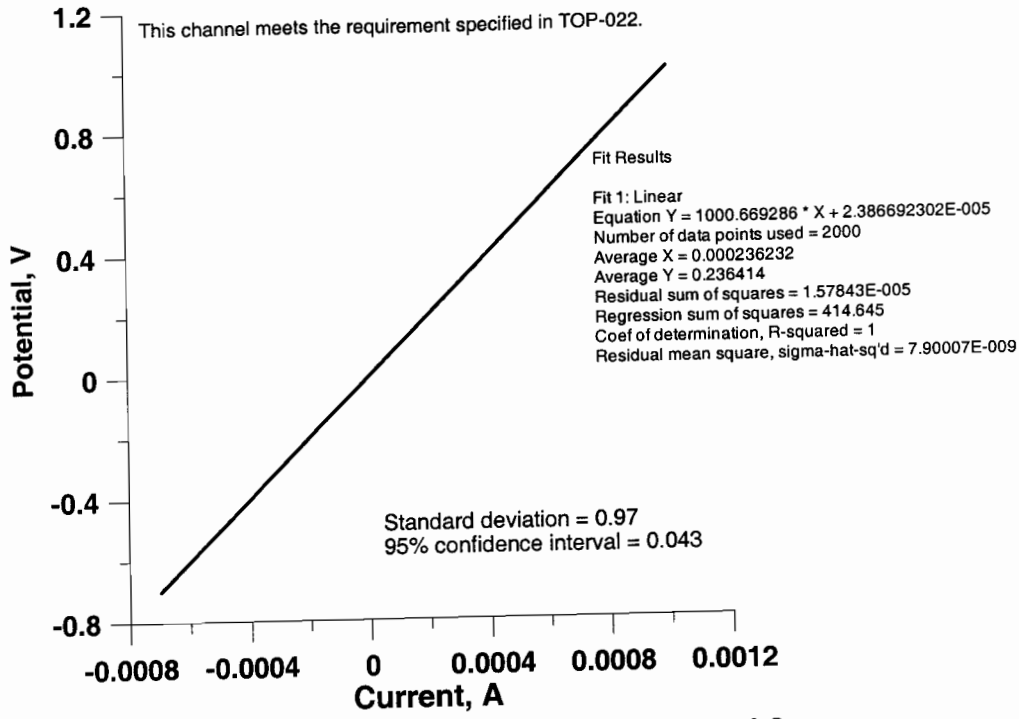
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch3, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 10/15/07*



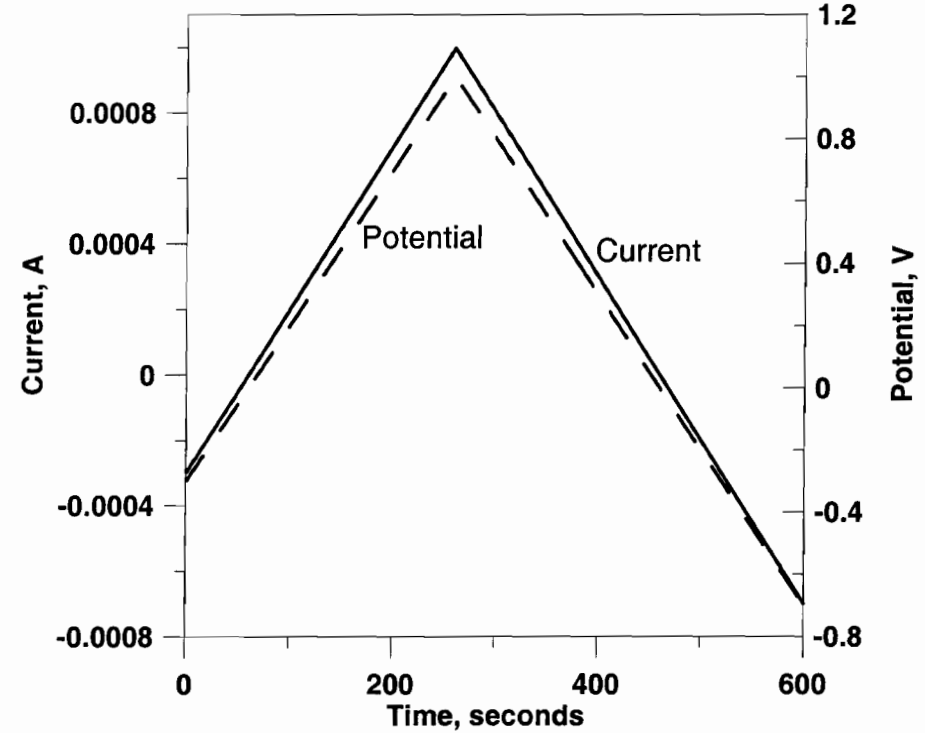
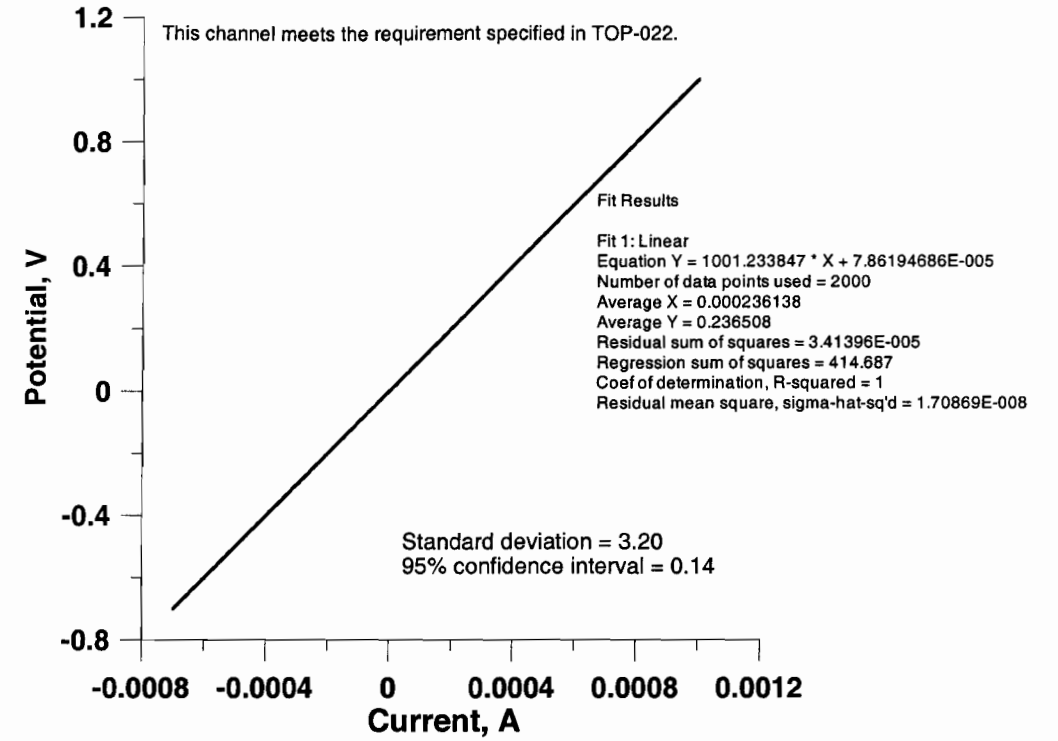
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch4, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xi'hua He 10/15/07*



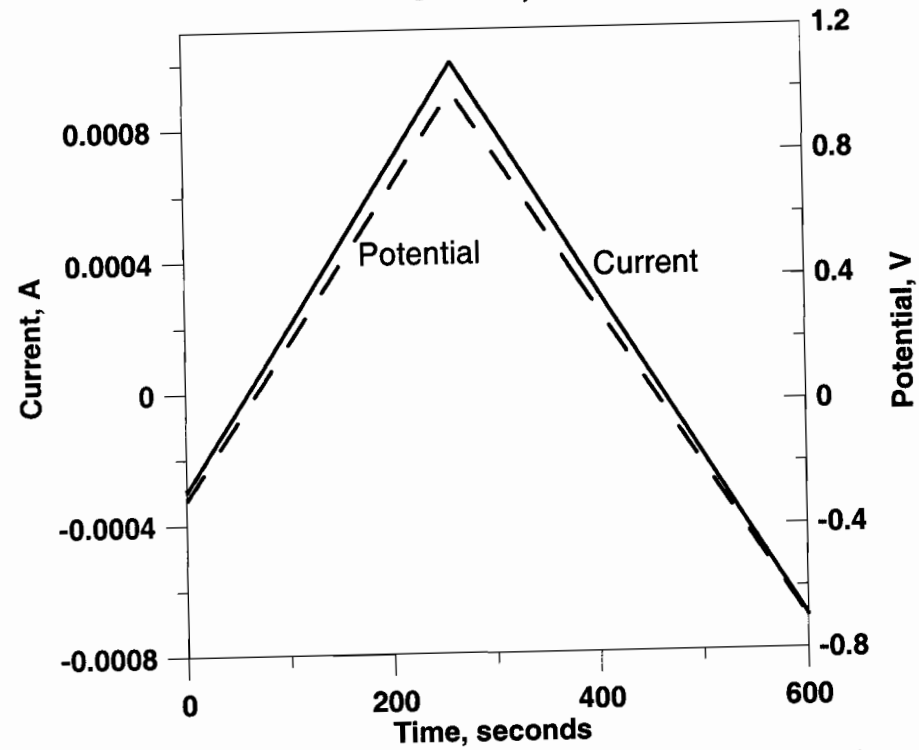
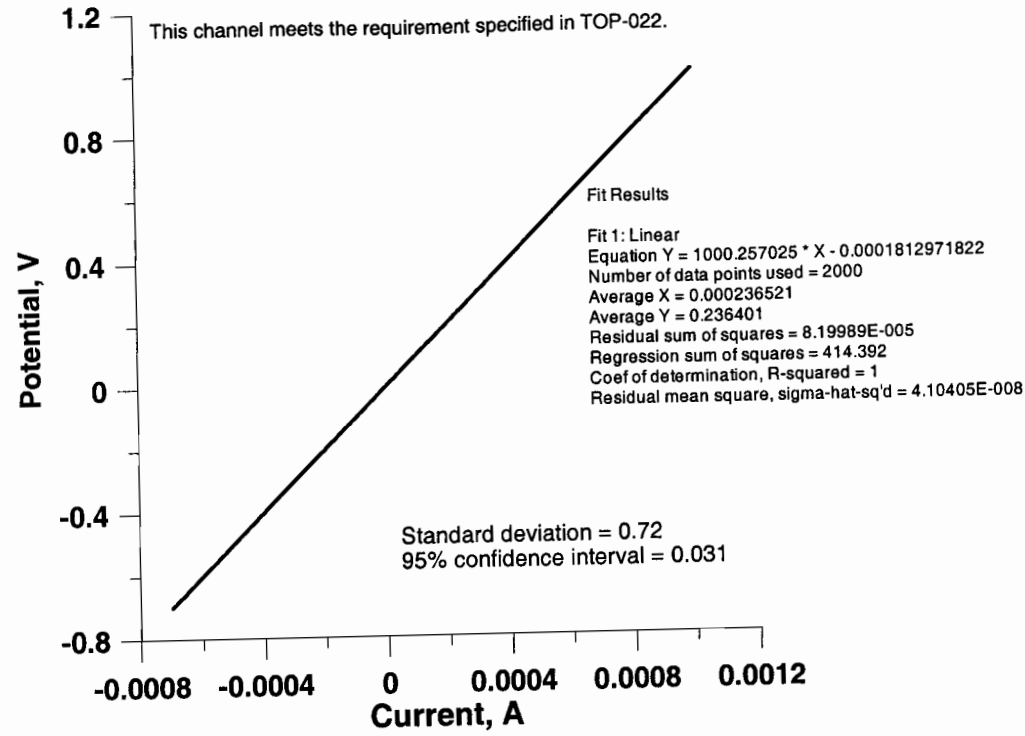
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch5, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 10/15/07*



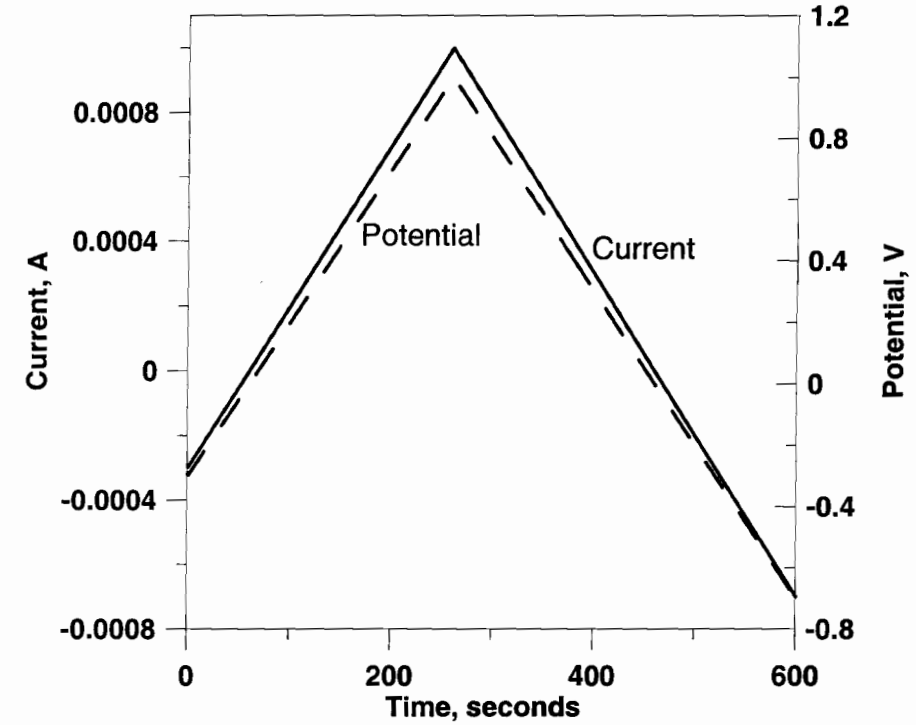
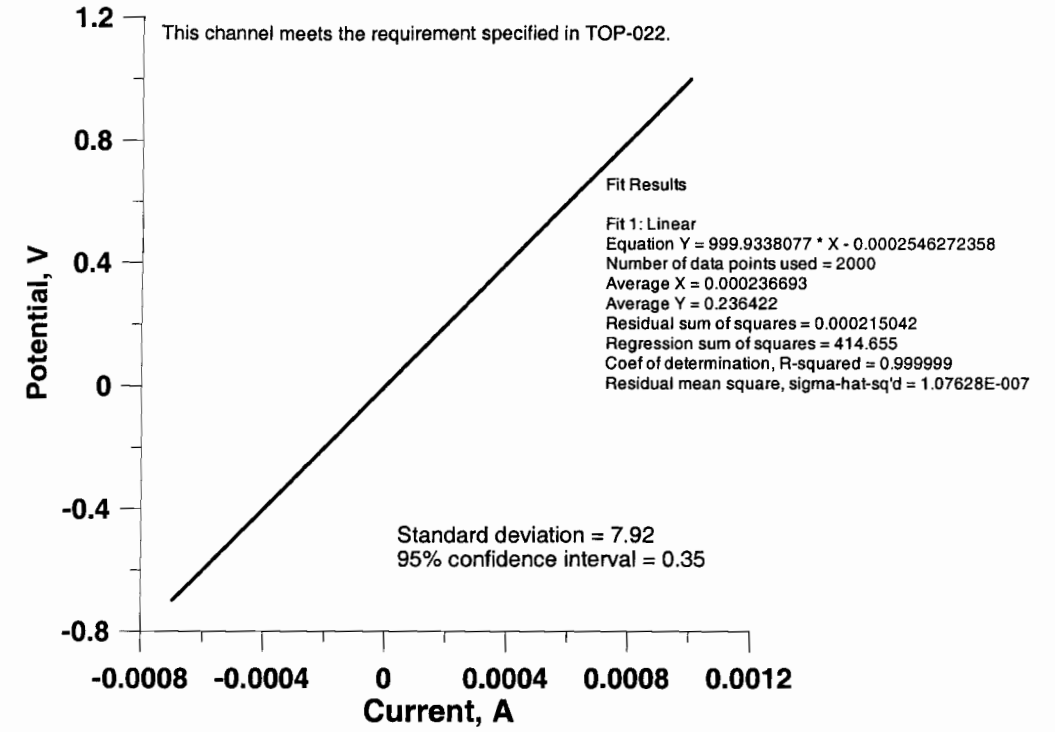
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch6, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

*Xihua He 10/15/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch7, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

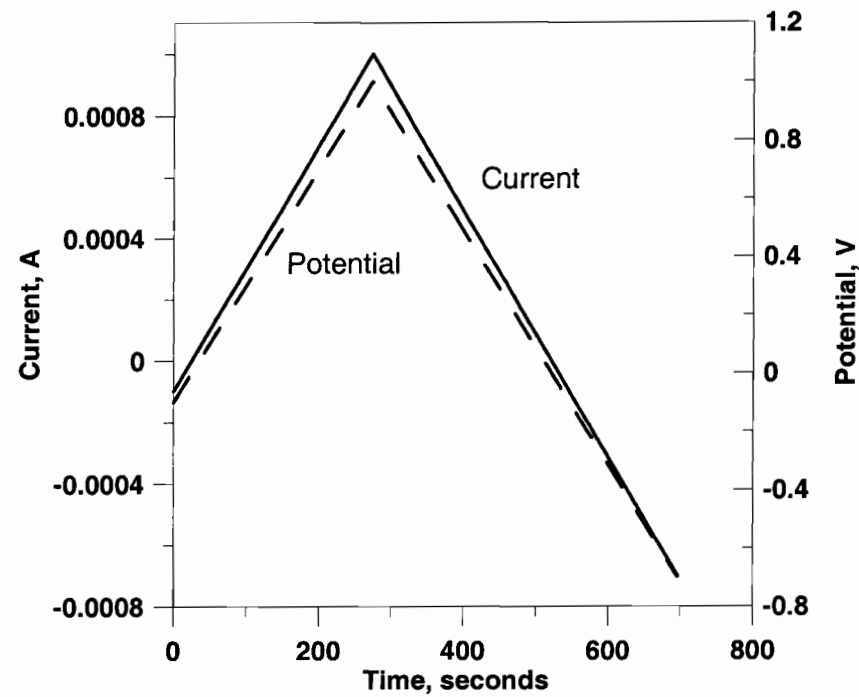
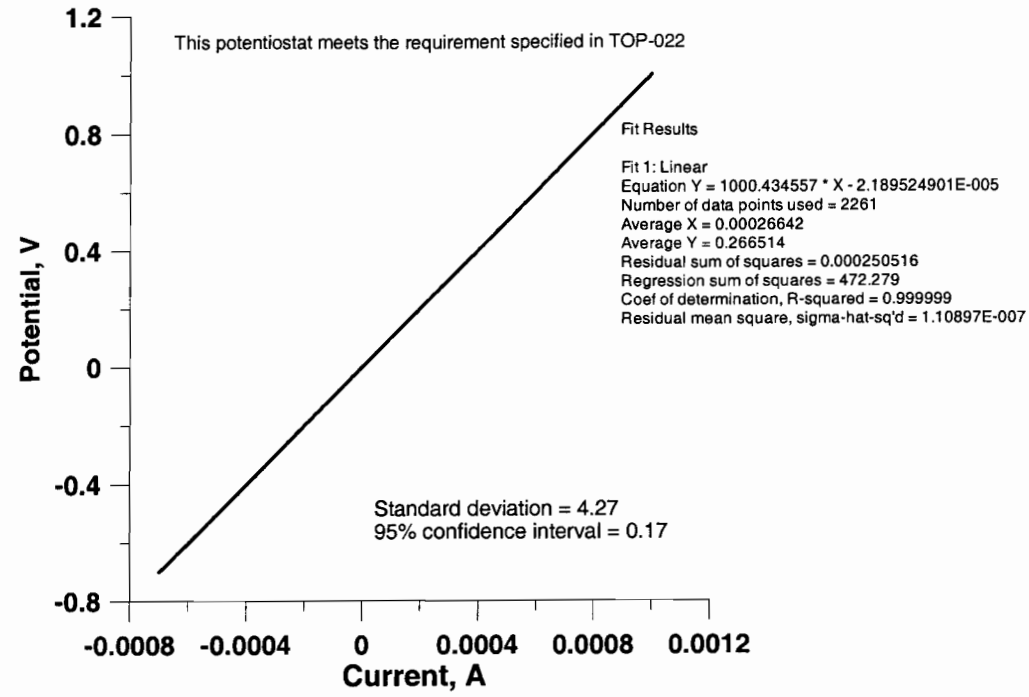
*Xihua He 10/15/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 10/26/07  
 Solartron 1480 Ch8, SN 00240551  
 10/2/07  
 Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds

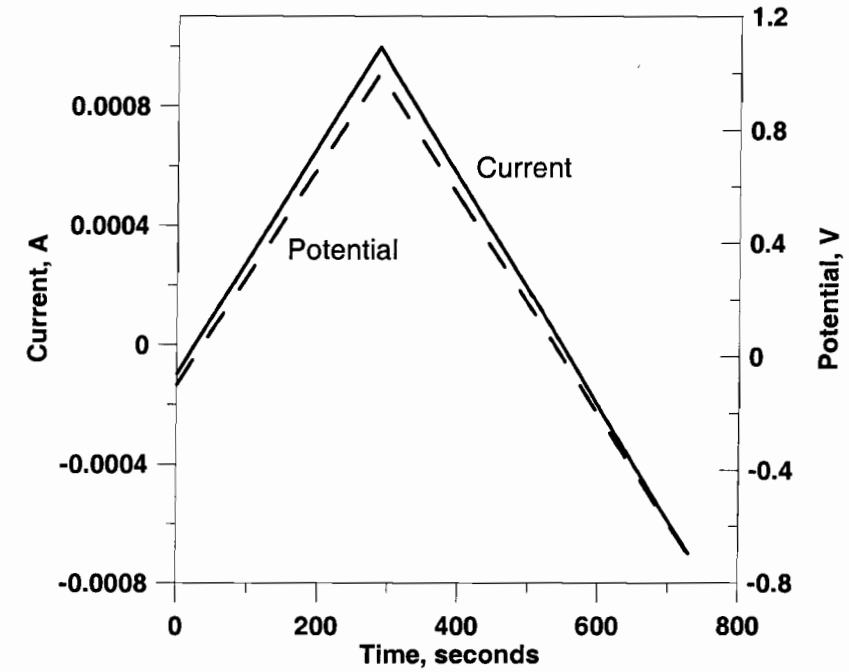
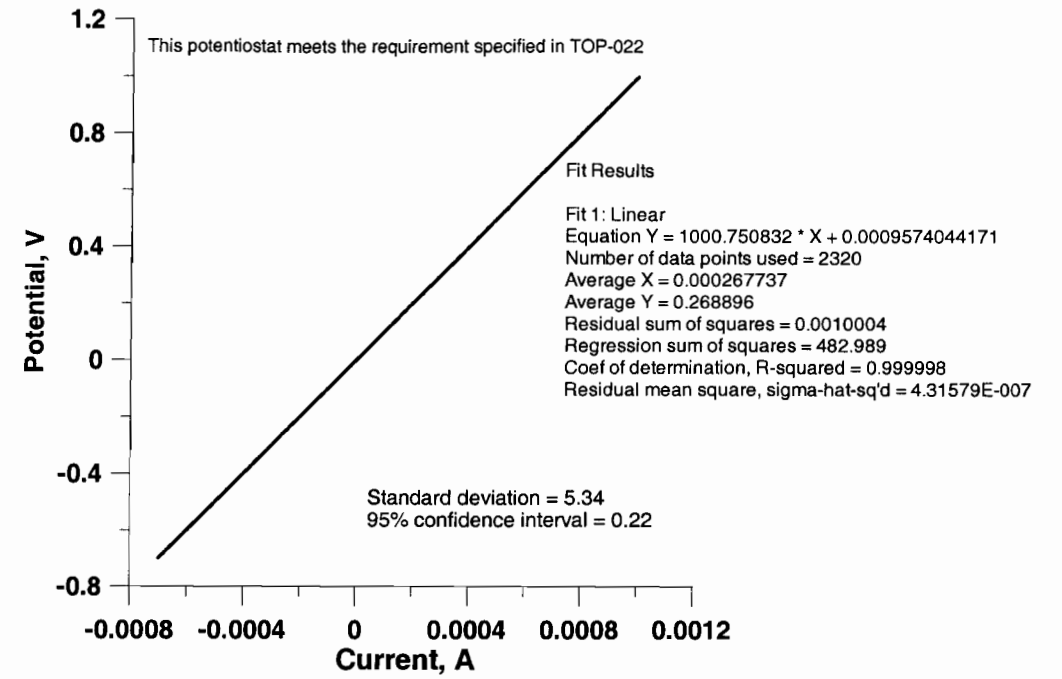
*Xihua He 10/15/07*





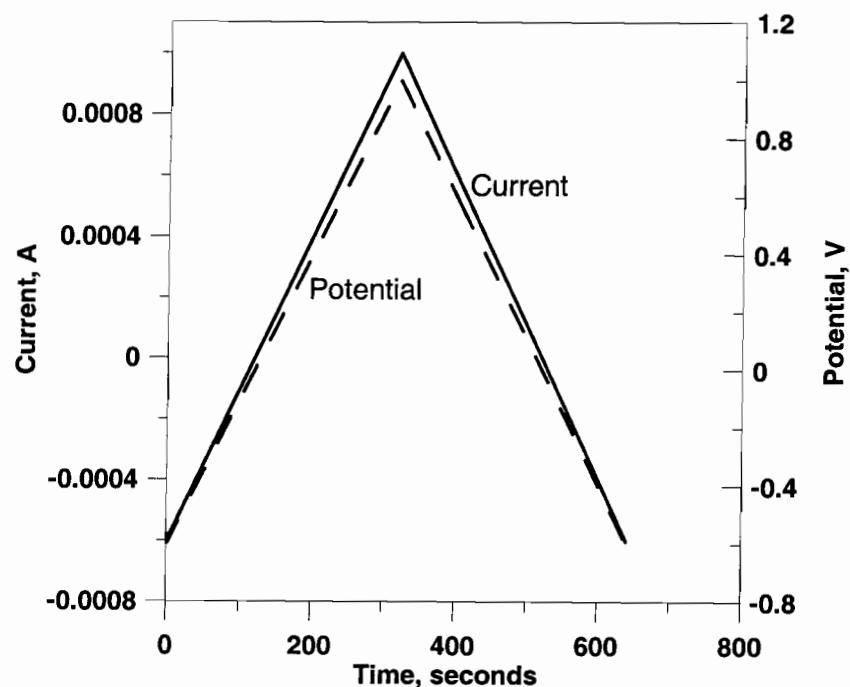
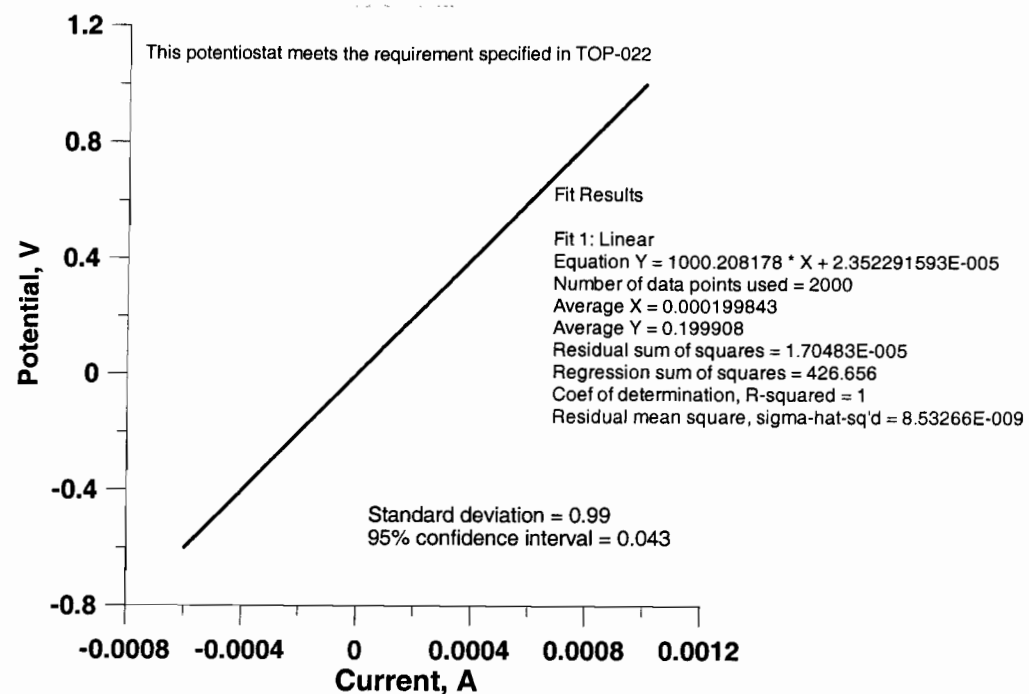
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00148500  
 10/30/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 696 seconds

*Xi'hua He 11/5/07*



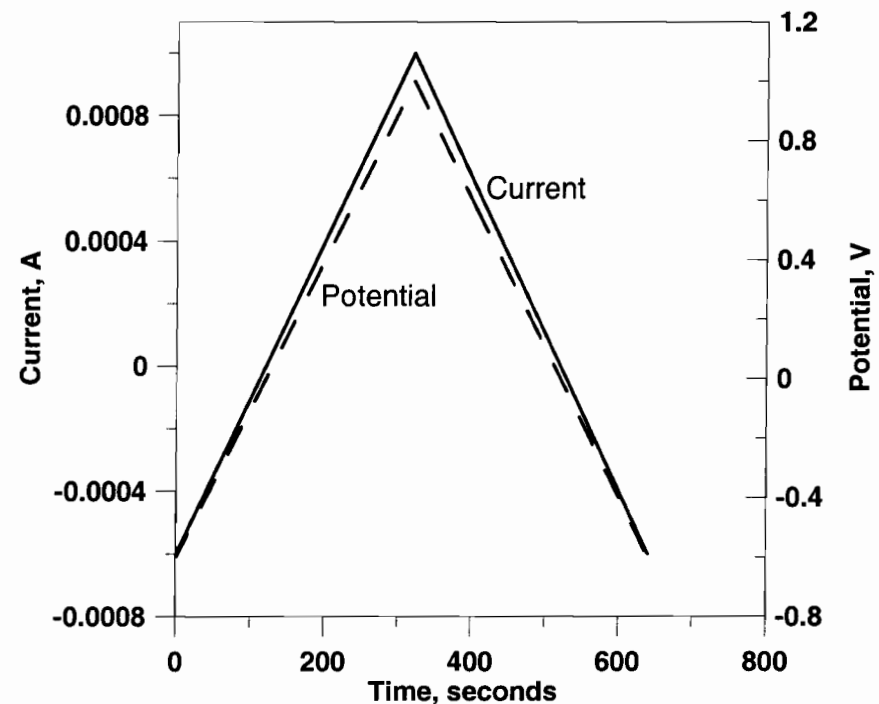
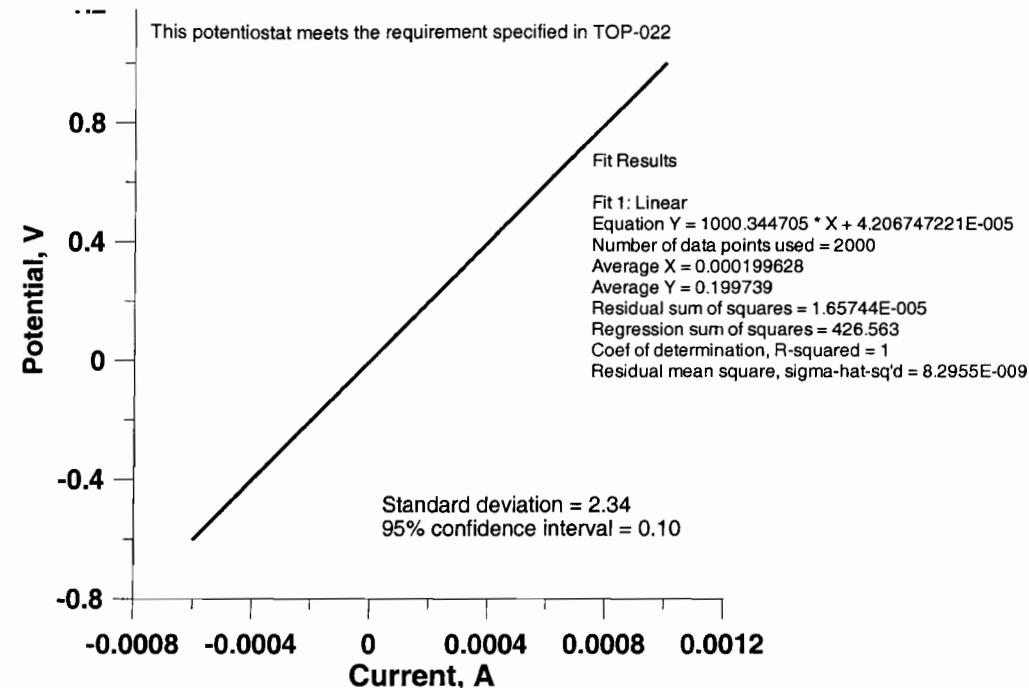
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#001535500  
 11/8/07  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 730 seconds

*Xi'hua He 11/12/07*



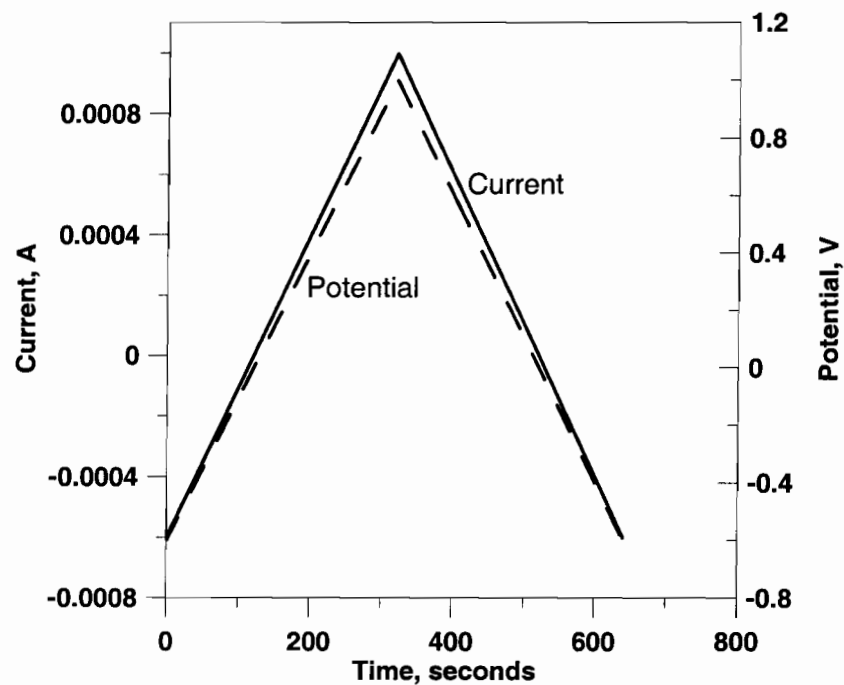
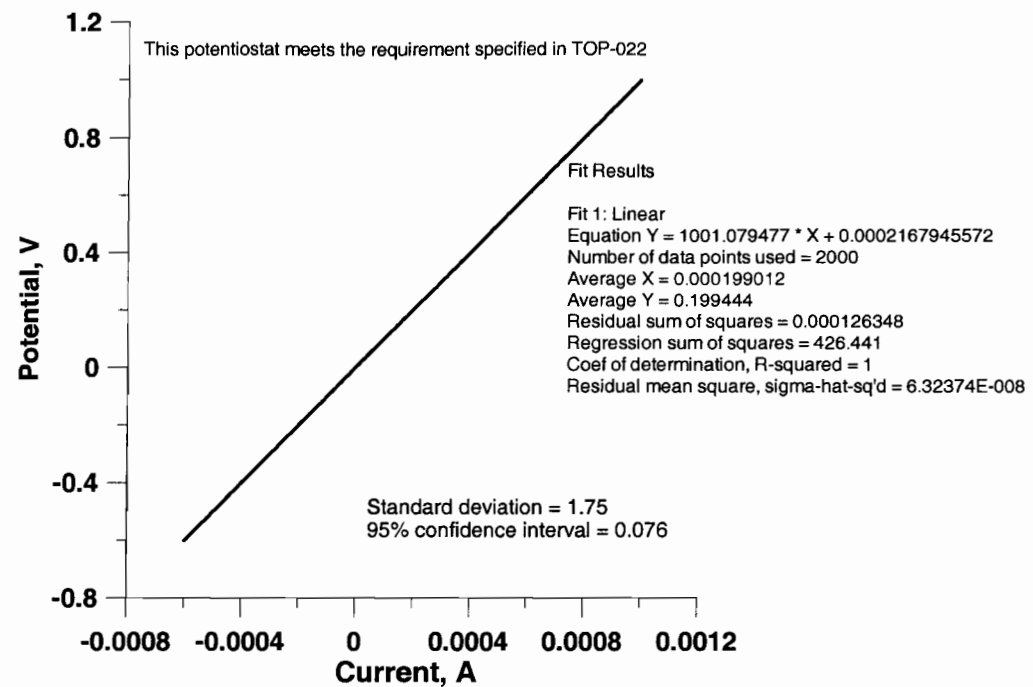
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch1  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

*Xi Hua He 11/12/07*



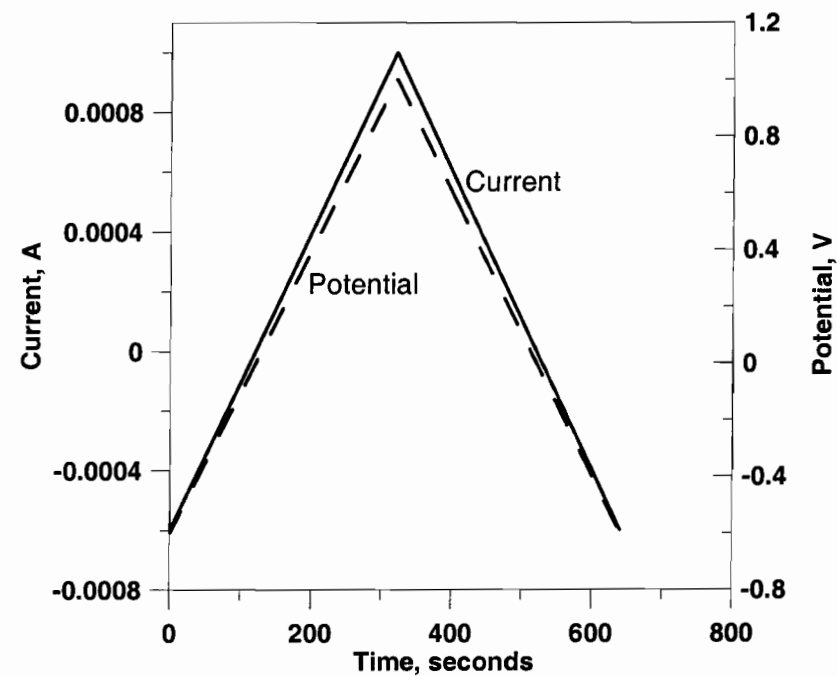
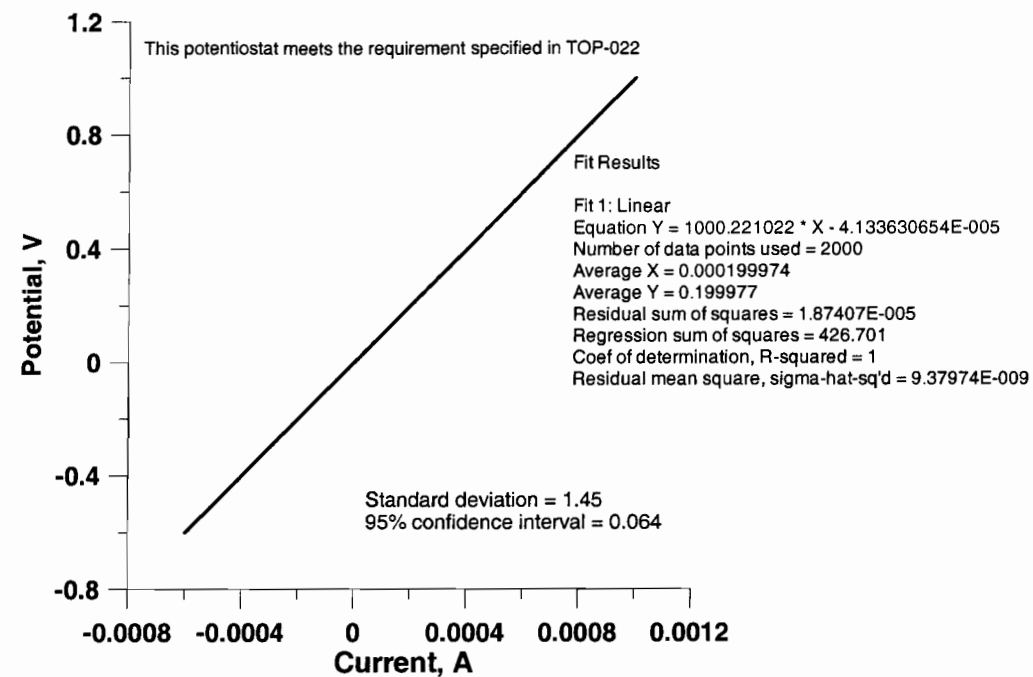
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch2  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

*Xi Hua He 11/12/07*



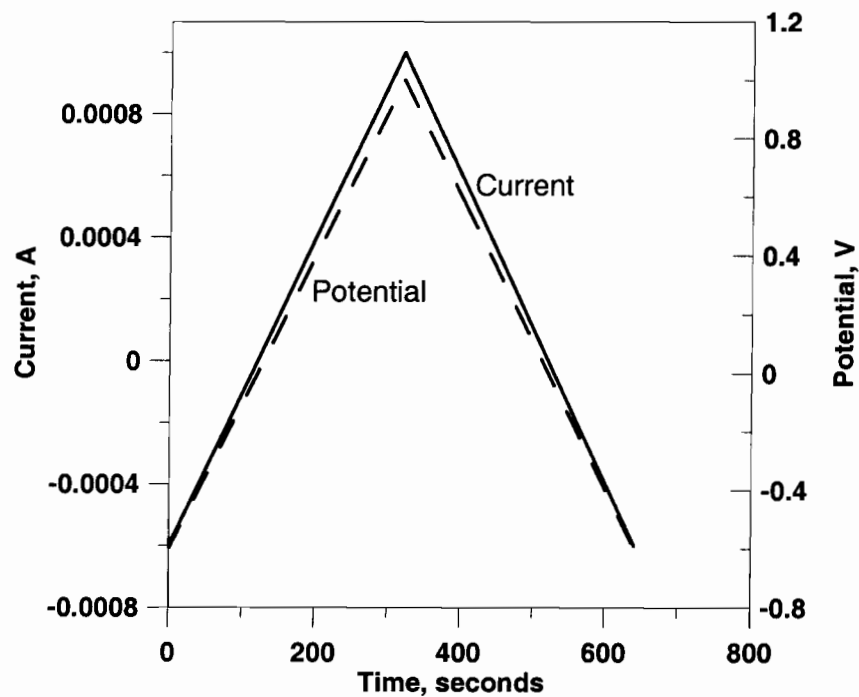
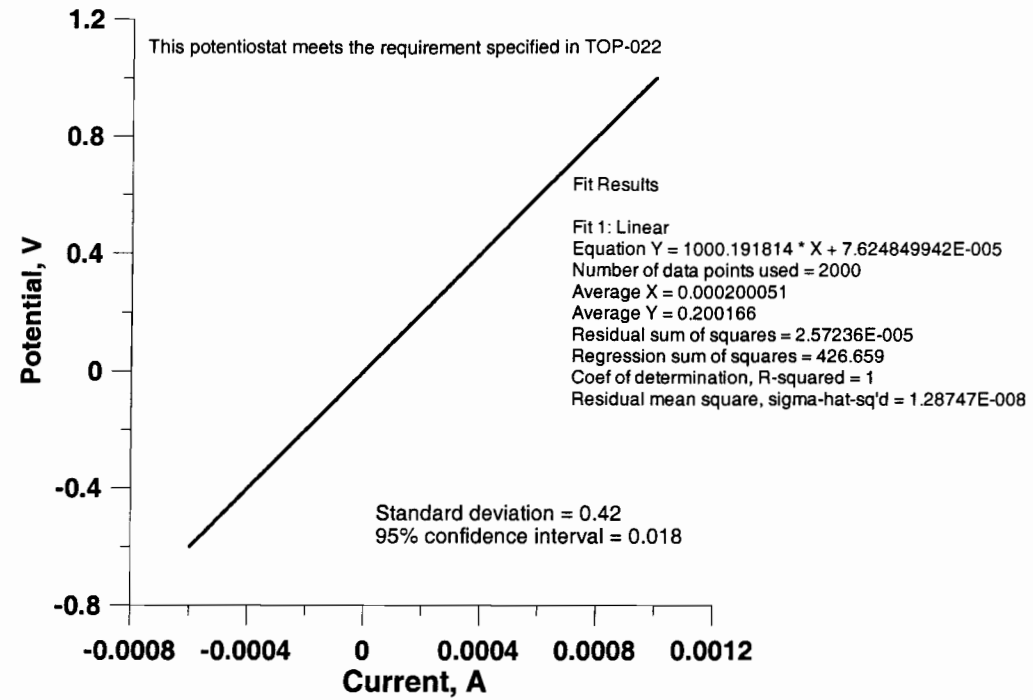
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch3  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

Xichua He 11/12/07



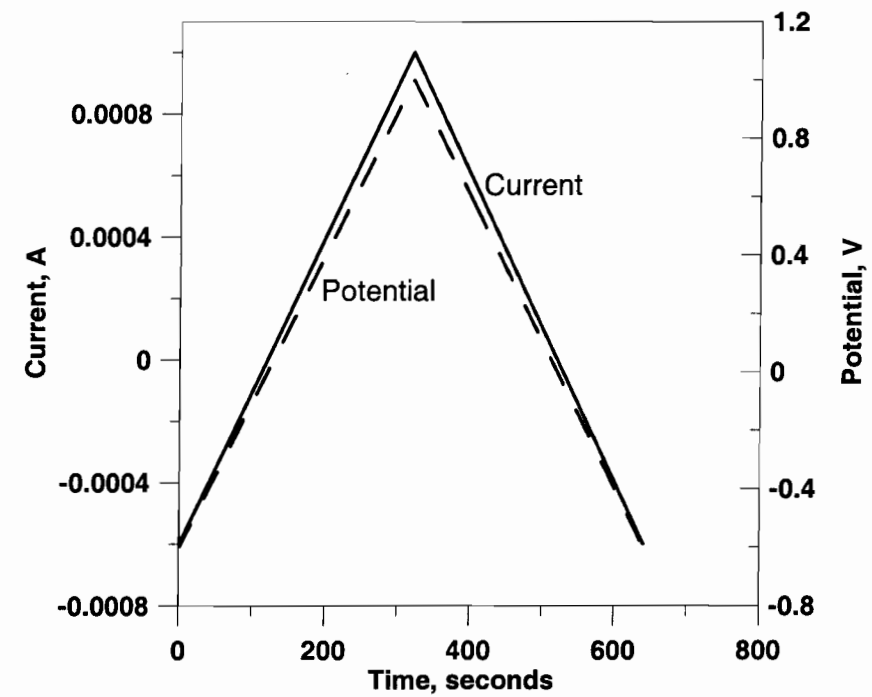
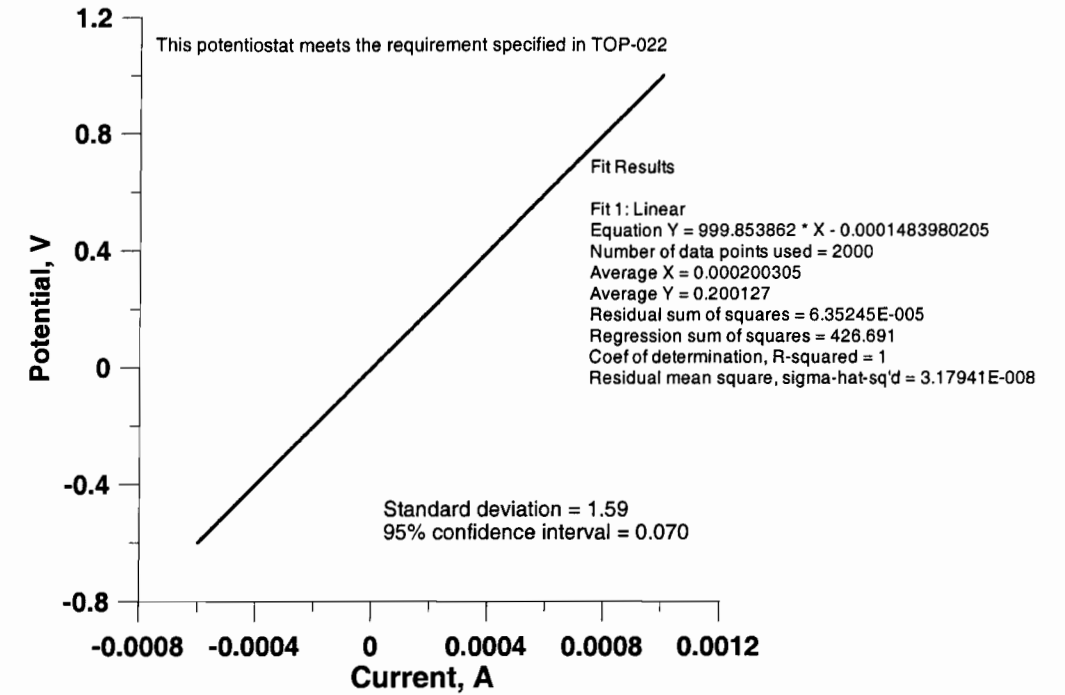
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch4  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

Xichua He 11/12/07



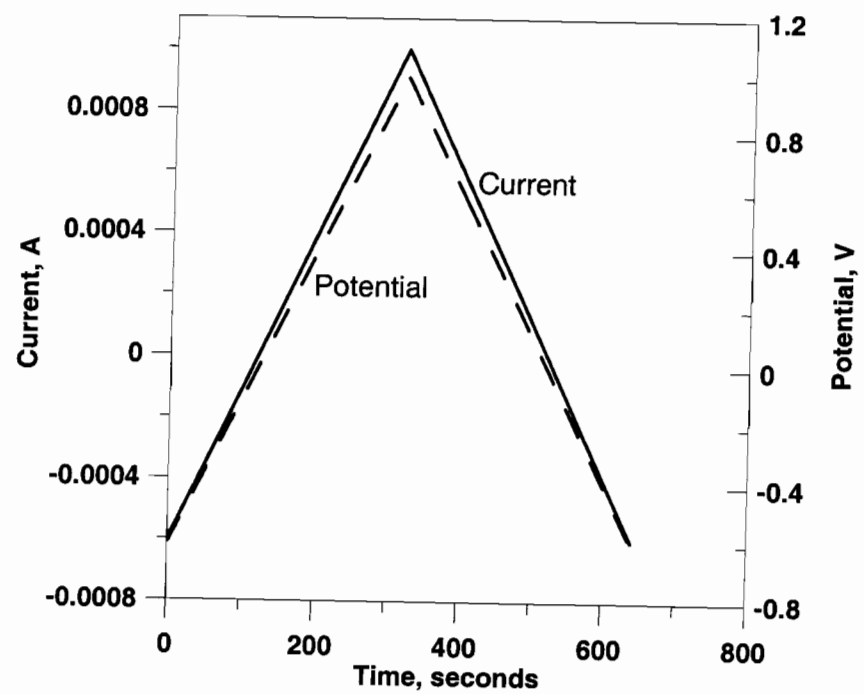
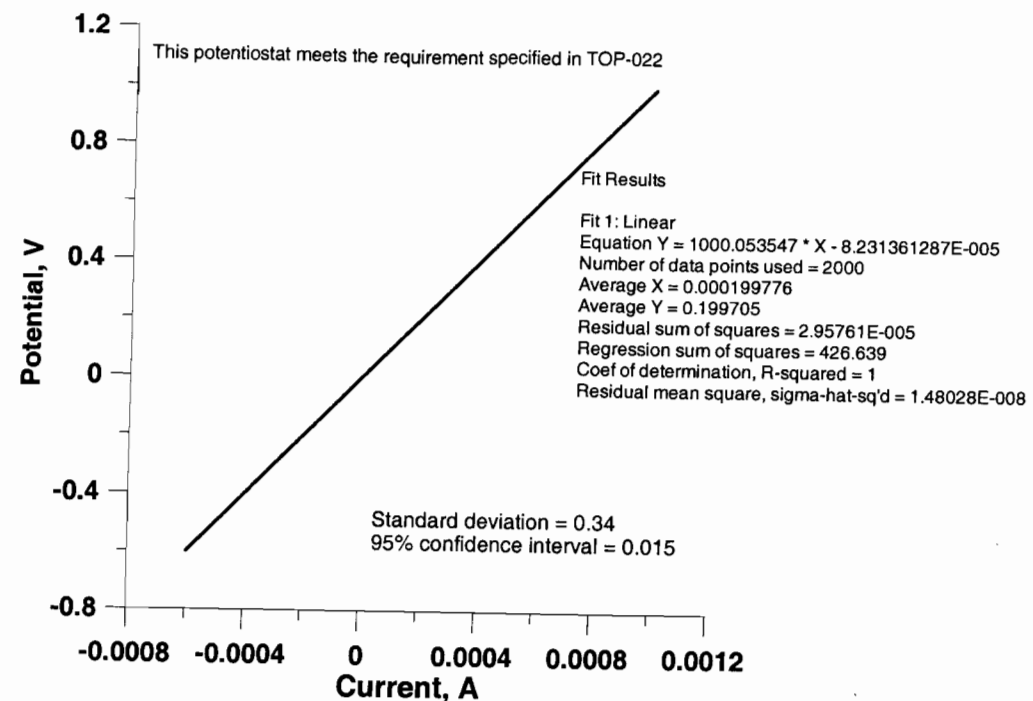
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch5  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

*Xihua He 11/12/07*



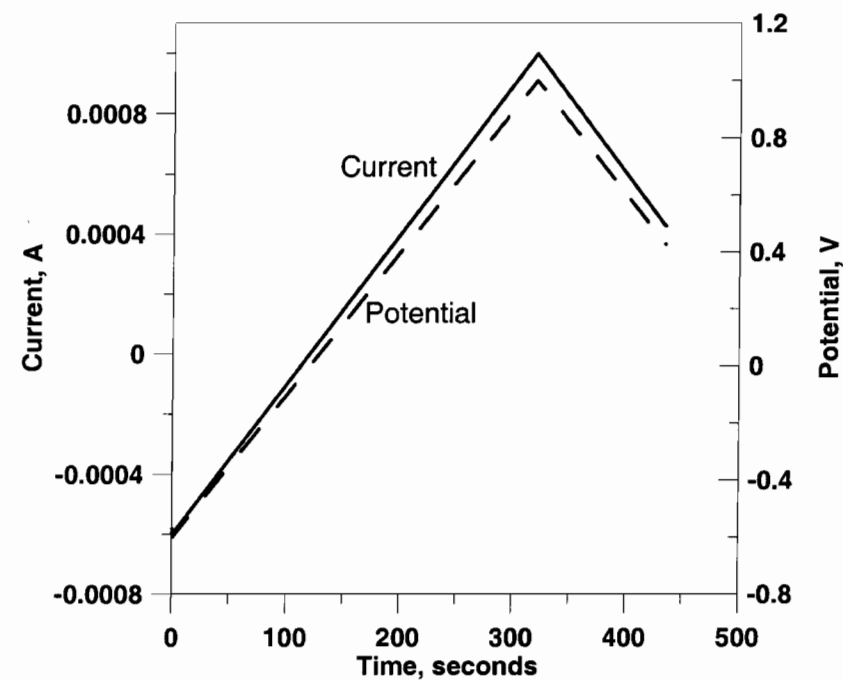
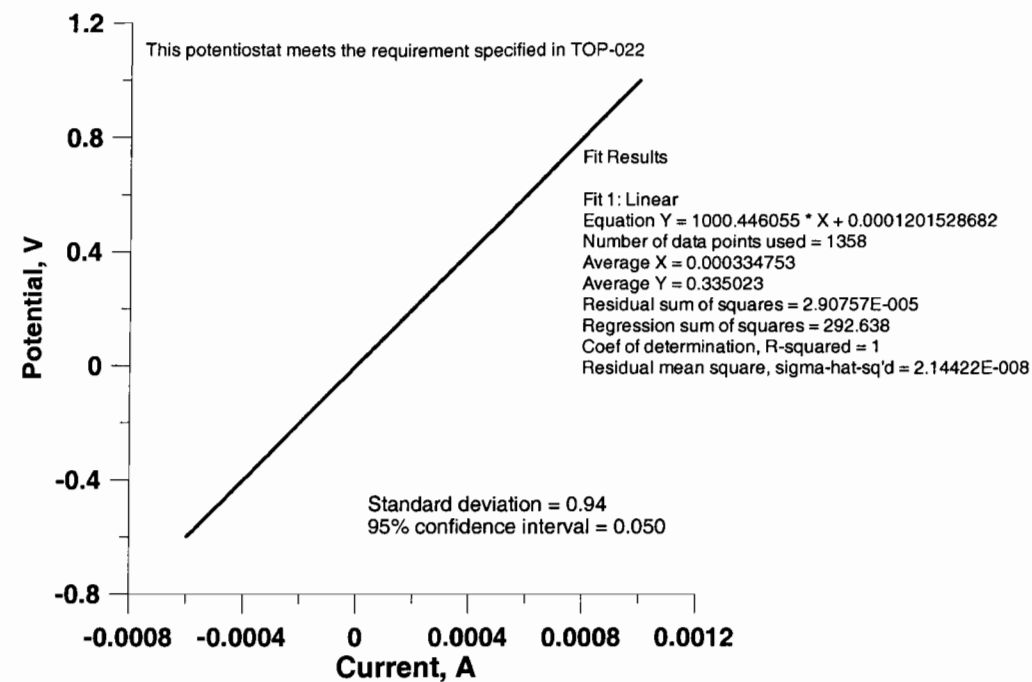
1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch6  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

*Xihua He 11/12/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch7  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -600 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 640 seconds  
 Actual time to finish scan: 640 seconds

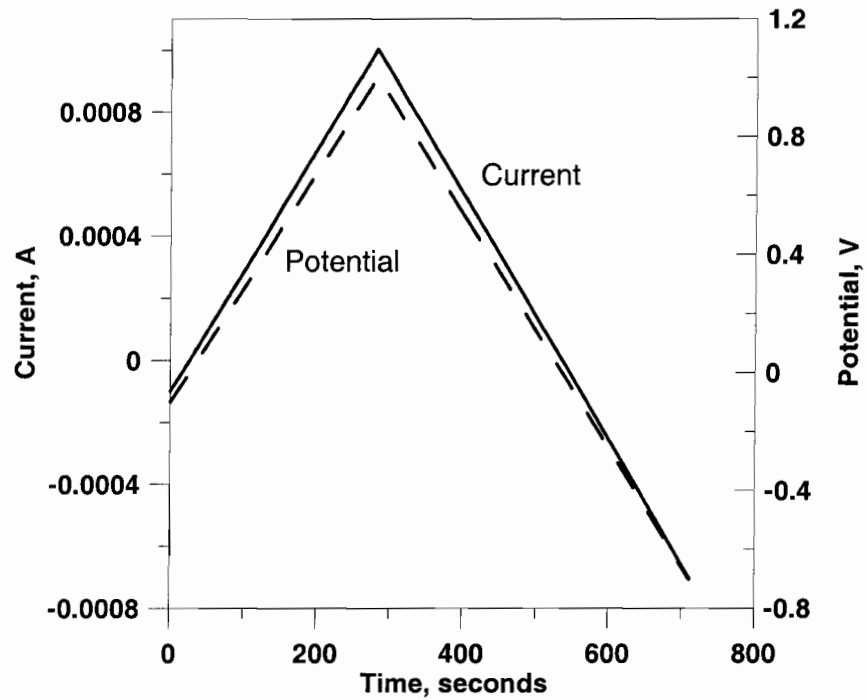
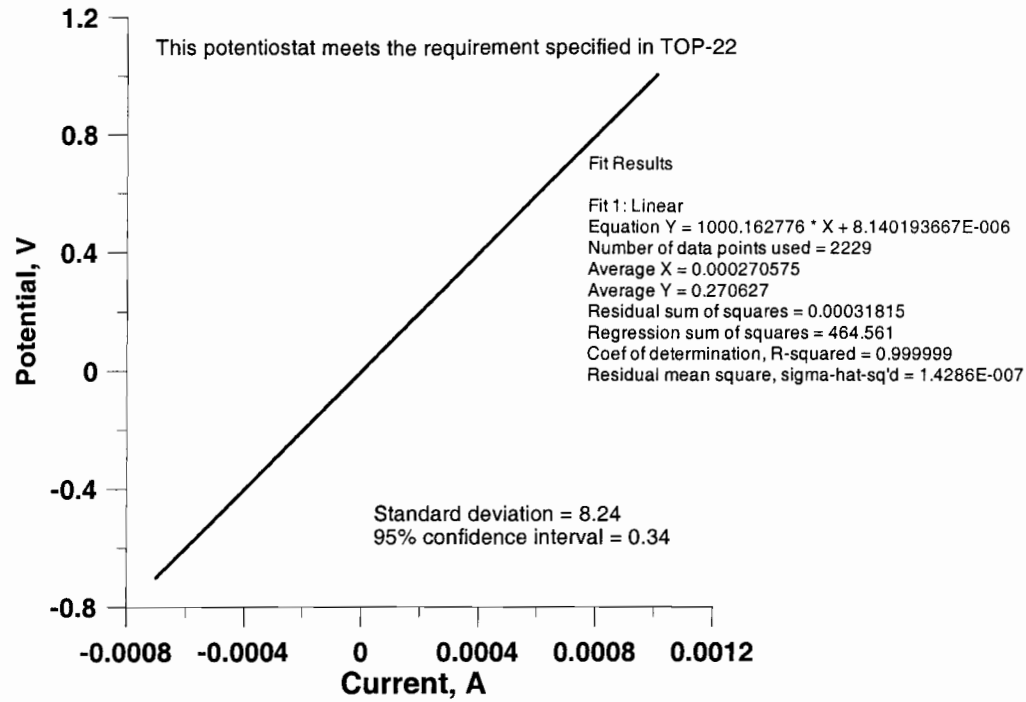
*Xichun He 11/12/07*



1000 Ohm resistor, SN 171001, Cal 4/26/07, Due 11/26/07  
 Solartron 1287 SN#00238265  
 11/12/07  
 Ch8  
 Initial potential: -600 mV  
 Vertex potential: 1000 mV  
 Final potential: -360 mV  
 Scan rate: 5 mV/s  
 Calculated time to finish scan: 447 seconds  
 Actual time to finish scan: 447 seconds

*Xichun He 11/12/07*



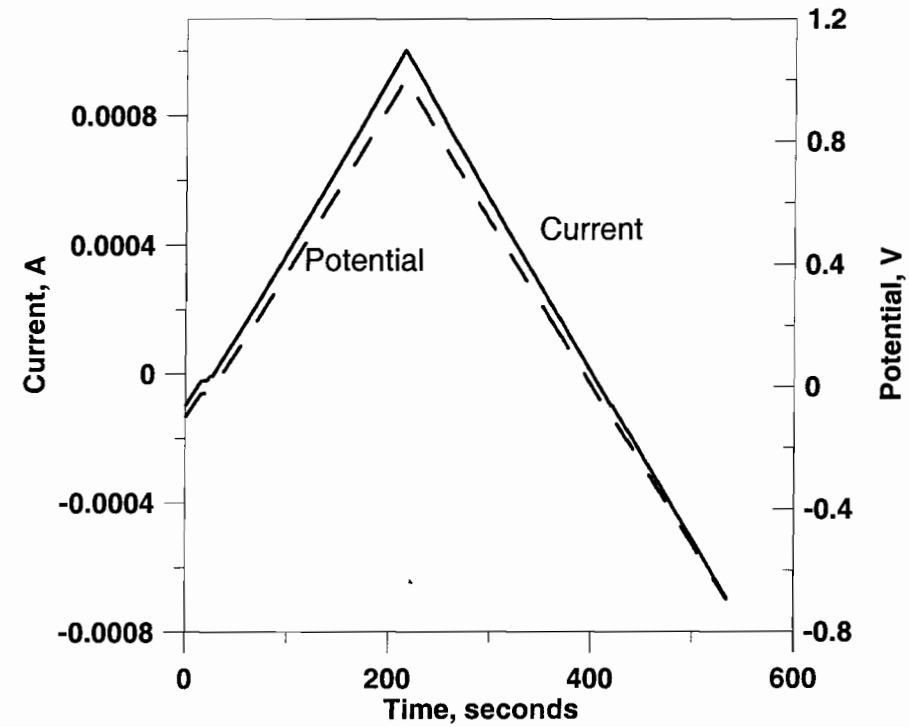
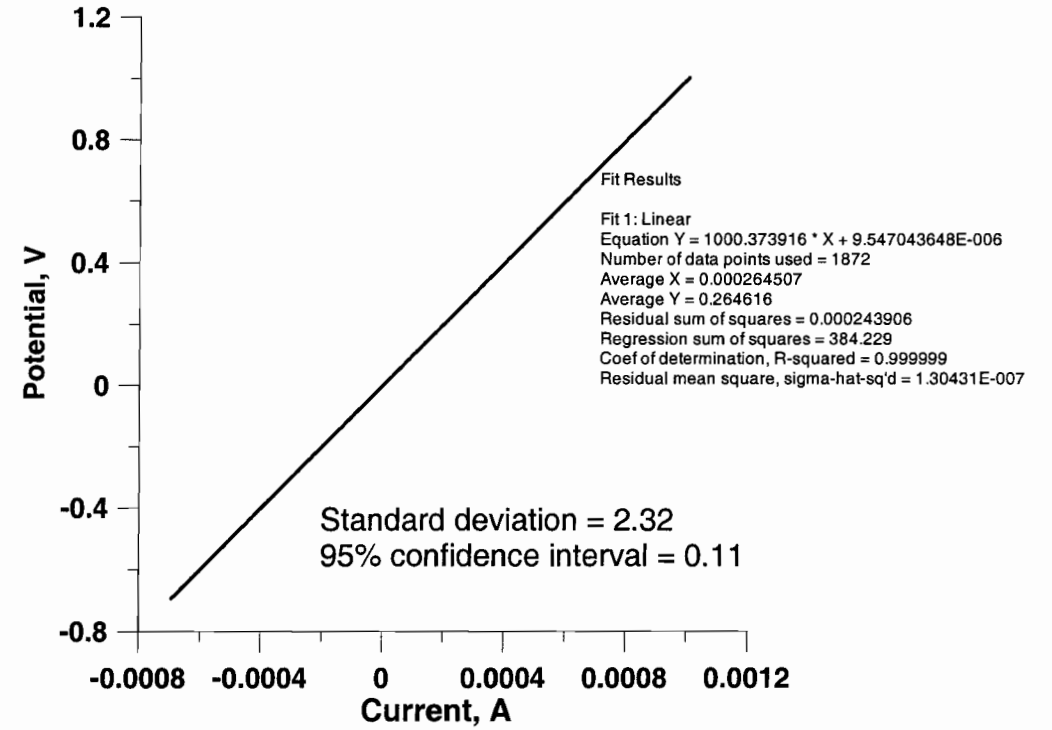


1000 Ohm resistor, SN 171001, Cal 10/17/07, Due 4/17/08  
 Solartron 1287 SN#00186634  
 1/03/08  
 Initial potential: -100 mV  
 Vertex potential: 1000 mV  
 Final potential: -700 mV  
 Scan rate: 5 mV/s

*Xi Hua He 1/4/07*

Instrument calibration on 4/30/08: **SI1287**, SN 00148500  
 Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
 Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds.



Conclusion: This channel meets the requirement specified in TOP-22

*Xi Hua He 4/30/08*

Continued from Pg # 136  
 weekly pH calibrations of EA 940 SN# 2330  
 cal: 7/6/07 due: 7/6/08 pH probe 13-620-296 SN# 500395

Date	Buffers Used	Int.
3/17/08	4-7-10	OK
3/24/08	4-7-10	OK
4/7/08	4-7-10	OK
5/19/08	4-7-10	gB
6/2/08	4-7-10	gB
6/9/08	4-7-10	gB
6/16/08	4-7-10	gB
6/24/08	4-7-10	gB
6/25/08	4-7-10	OK
6/30/08	4-7-10	gB
8/6/08	4-7-10	gB
8/13/08	4-7-10	gB
8/26/08	4-7-10	gB
9/8/08	4-7-10	gB
9/15/08	4-7-10	gB
9/22/08	4-7-10	gB
9/29/08	4-7-10	gB
10/6/08	4-7-10	gB
10/13/08	4-7-10	gB
10/20/08	4-7-10	gB

OK 3/10/08

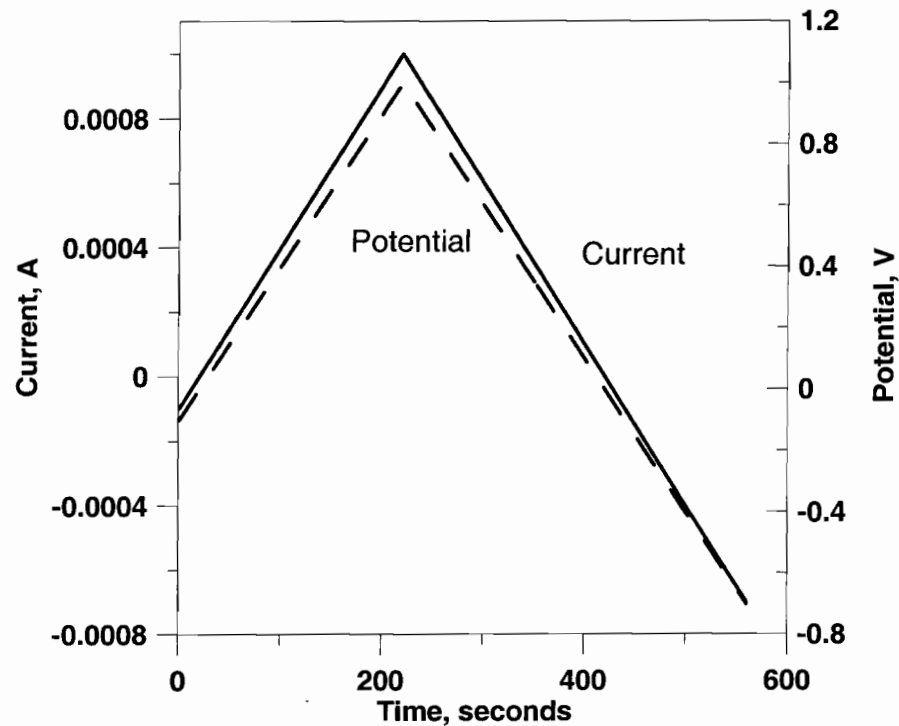
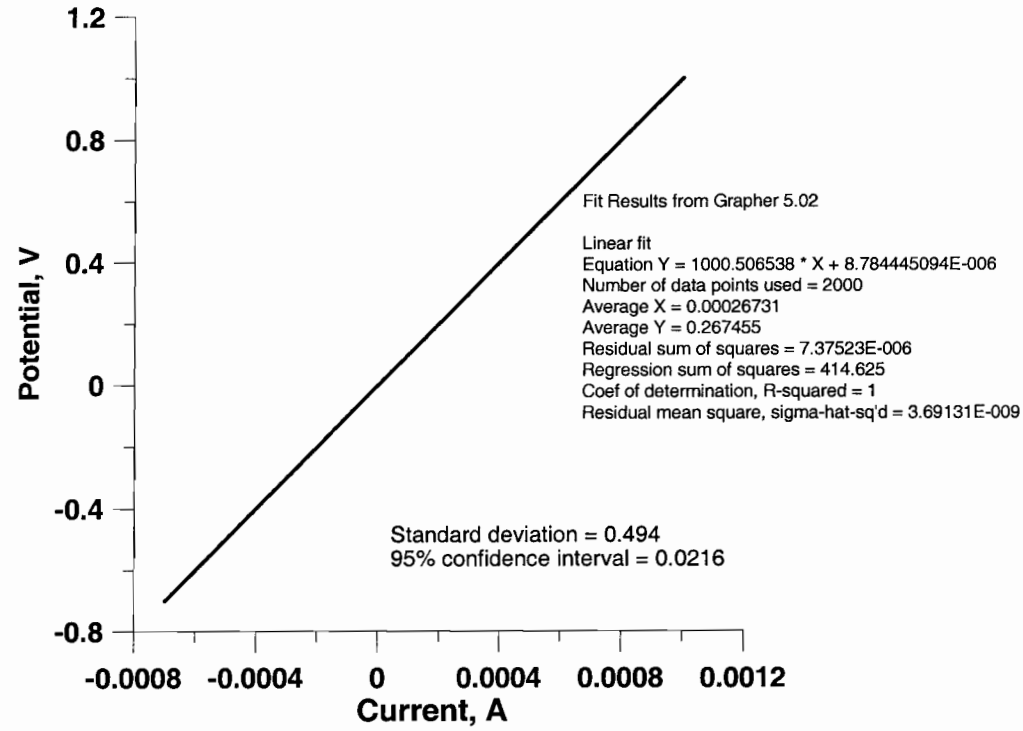
Continued from Pg # 137  
 weekly pH calibrations of EA 940 SN# 4274  
 cal: 10/30/07 due: 4/30/08 pH probe 13-620-296 SN# 5146019

Date	Buffers Used	Int.
3/17/08	4-7-10	OK
3/24/08	4-7-10	OK
4/7/08	4-7-10	OK
5/19/08	4-7-10	gB
6/2/08	4-7-10	gB
6/9/08	4-7-10	gB
6/16/08	4-7-10	gB
6/24/08	4-7-10	gB
6/25/08	4-7-10	OK
6/30/08	4-7-10	gB
7/14/08	4-7-10	gB
7/21/08	4-7-10	gB
7/28/08	4-7-10	gB
8/6/08	4-7-10	gB
8/13/08	4-7-10	gB
8/19/08	4-7-10	gB
8/26/08	4-7-10	gB
9/8/08	4-7-10	gB
9/15/08	4-7-10	gB
9/22/08	4-7-10	gB
9/29/08	4-7-10	gB
10/6/08	4-7-10	gB
10/13/08	4-7-10	gB

OK 3/10/08

Instrument calibration on 4/29/08: Solartron 1480 Ch1, SN 00240551  
 Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
 Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds.

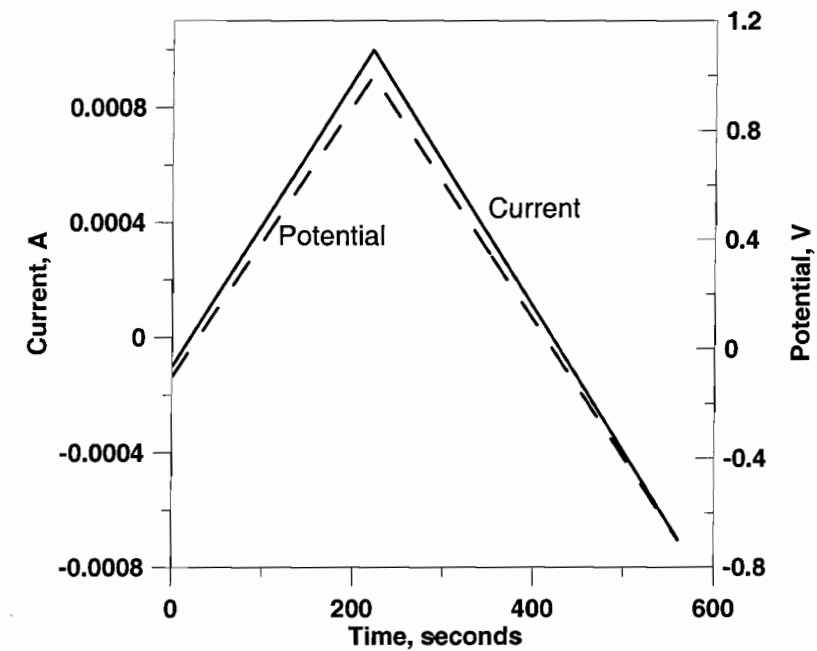
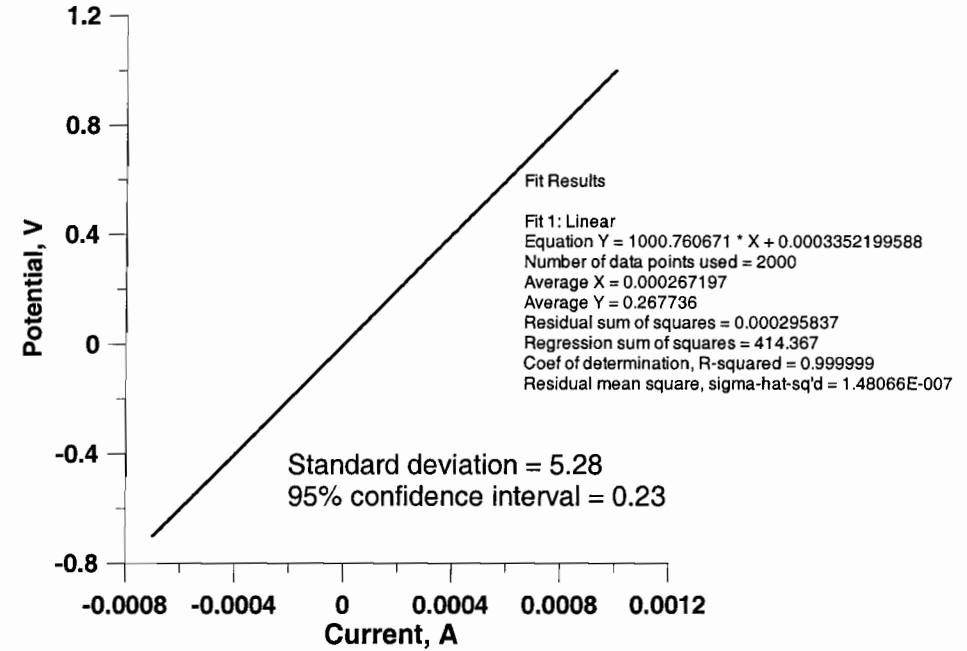


Conclusion: This channel meets the requirement specified in TOP-22

*Xitua He 5/1/08*

Instrument calibration on 4/29/08: Solartron 1480 Ch2, SN 00240551  
 Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
 Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds.



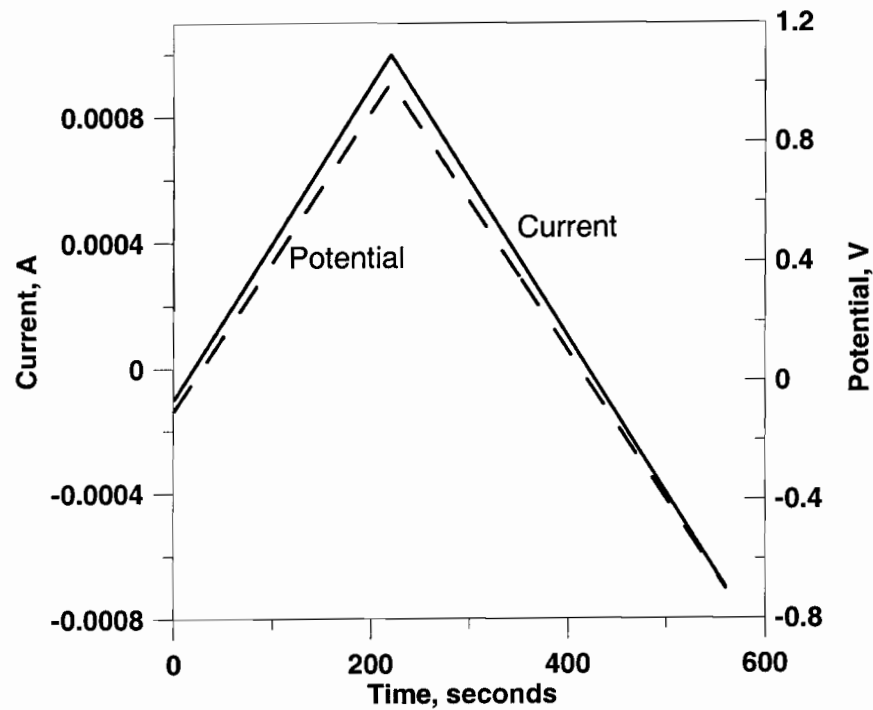
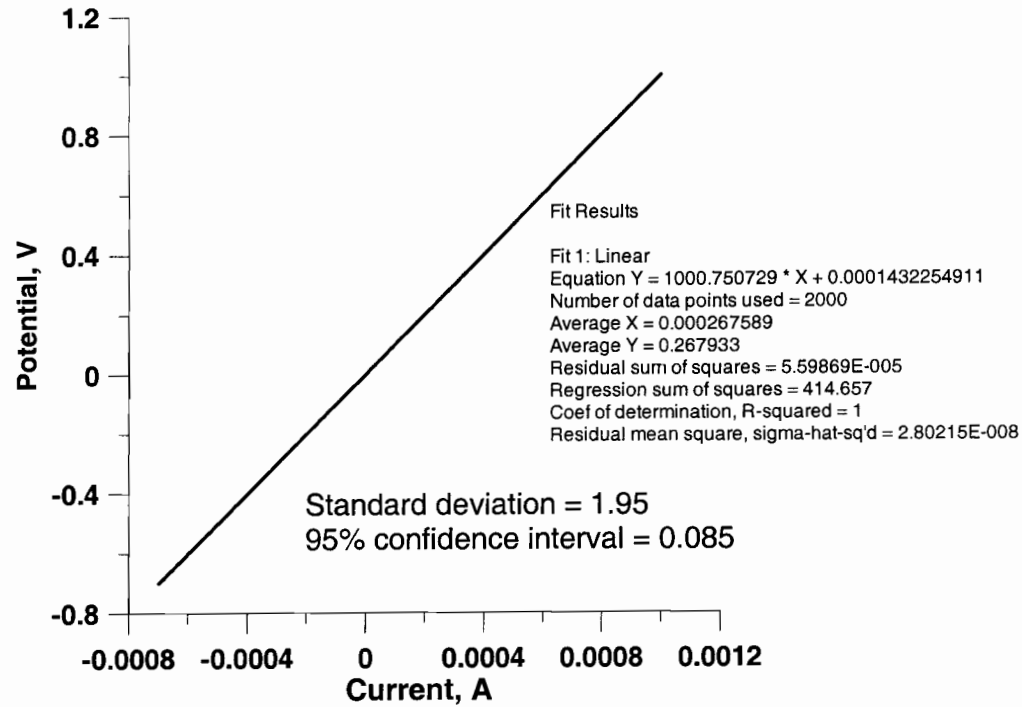
Conclusion: This channel meets the requirement specified in TOP-22

*Xitua He 5/1/08*

*X.H 5/1/08*

Instrument calibration on 4/29/08: Solartron 1480 Ch3, SN 00240551  
Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
Final potential: -700 mV; Scan rate: 5 mV/s  
Calculated time to finish scan: 560 seconds  
Actual time to finish scan: 560 seconds.

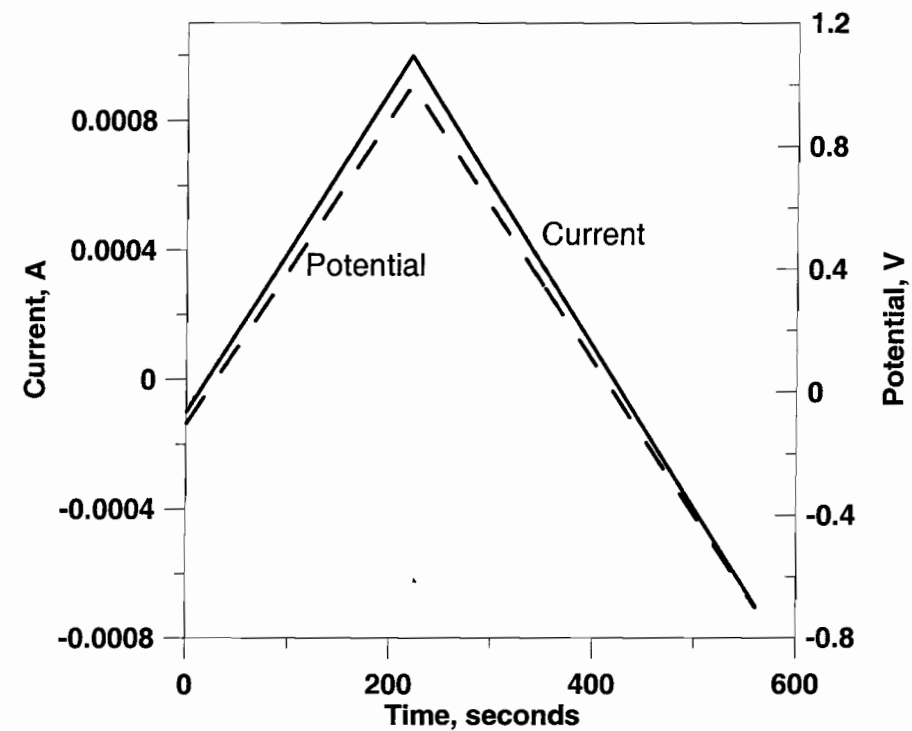
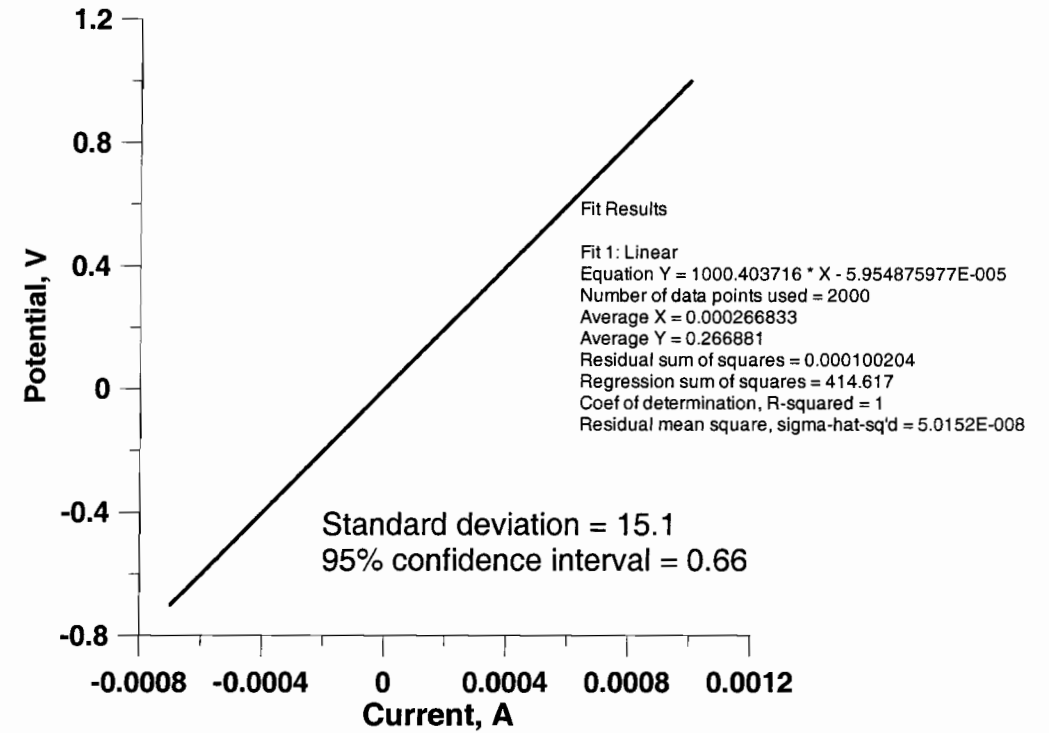


Conclusion: This channel meets the requirement specified in TOP-22

*Xihua He 5/1/08*

Instrument calibration on 4/29/08: Solartron 1480 Ch4, SN 00240551  
Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
Final potential: -700 mV; Scan rate: 5 mV/s  
Calculated time to finish scan: 560 seconds  
Actual time to finish scan: 560 seconds.

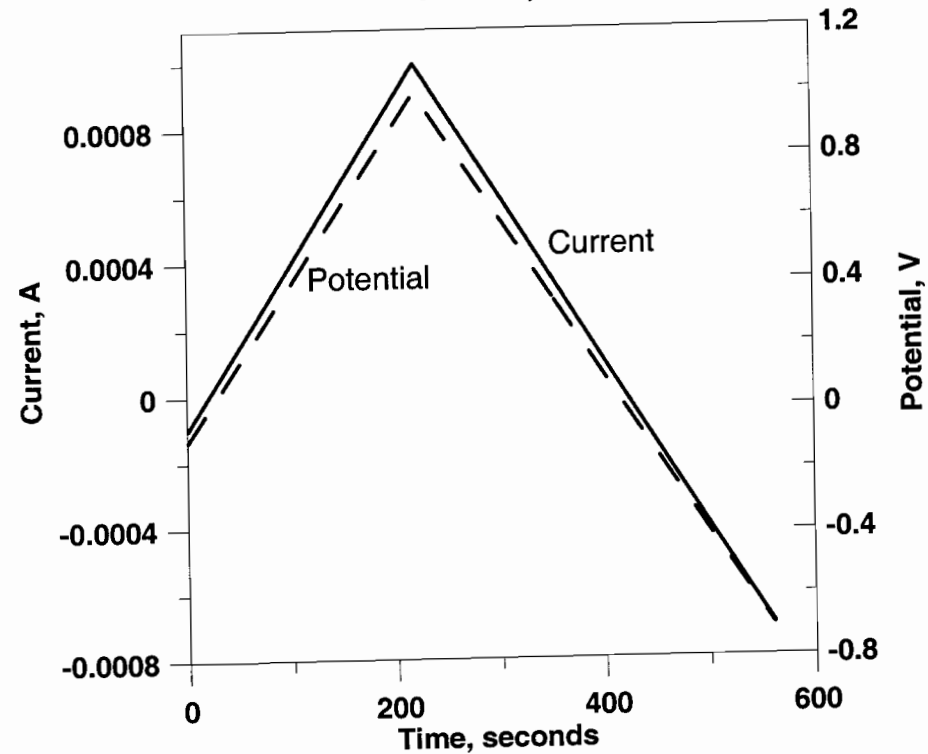
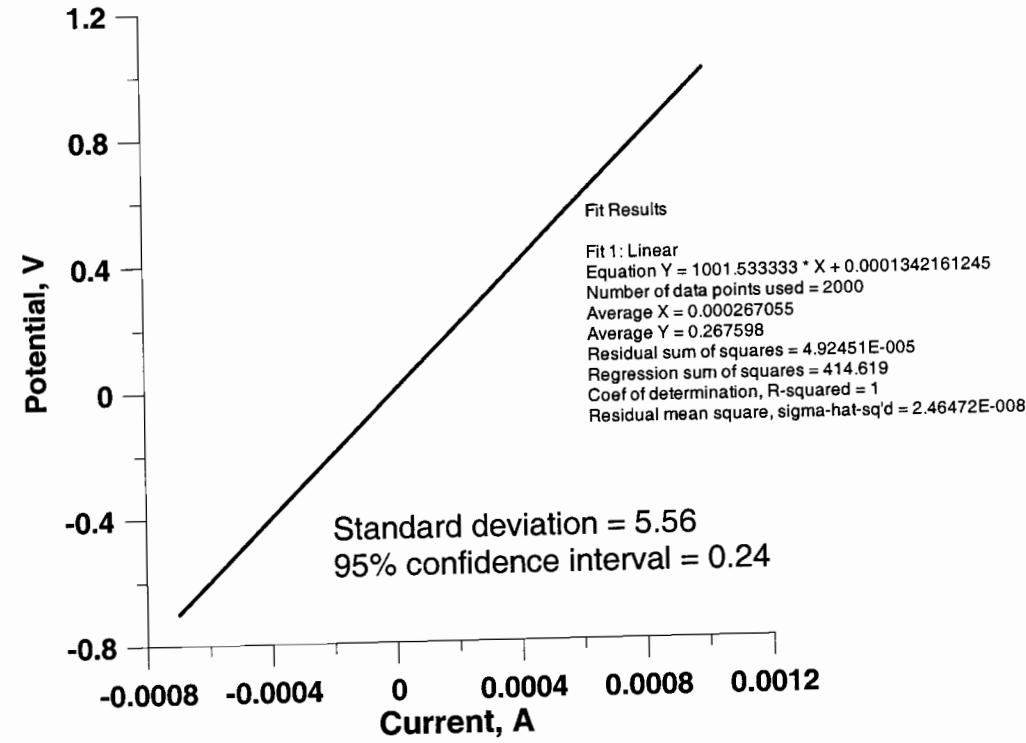


Conclusion: This channel meets the requirement specified in TOP-22

*Xihua He 5/1/08*

Instrument calibration on 4/29/08: **Solartron 1480 Ch5**, SN 00240551  
Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
Final potential: -700 mV; Scan rate: 5 mV/s  
Calculated time to finish scan: 560 seconds  
Actual time to finish scan: 560 seconds.

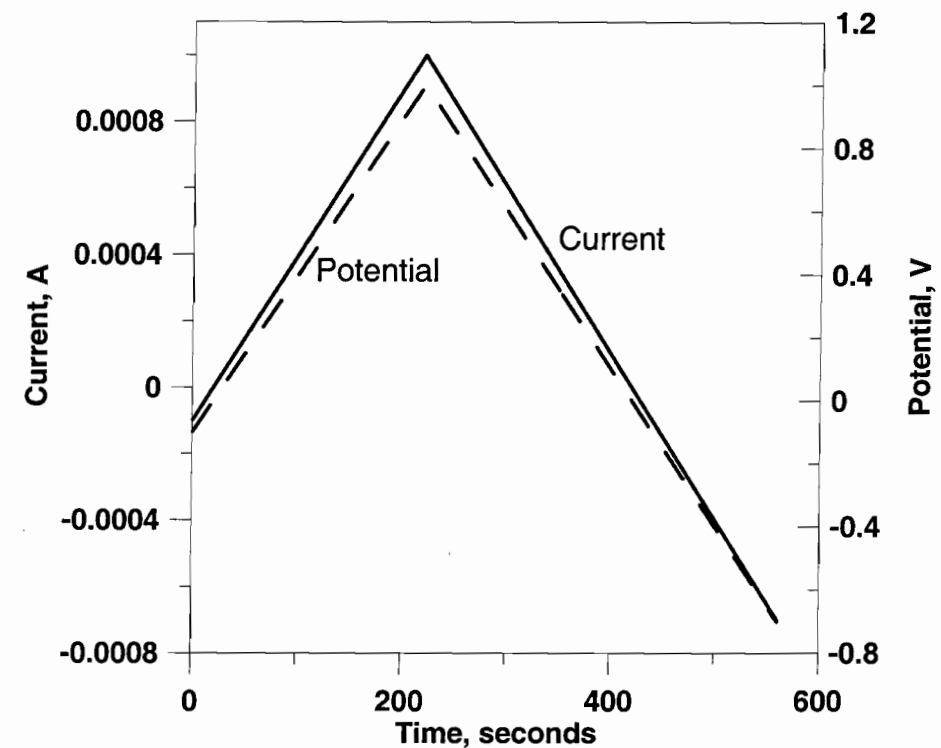
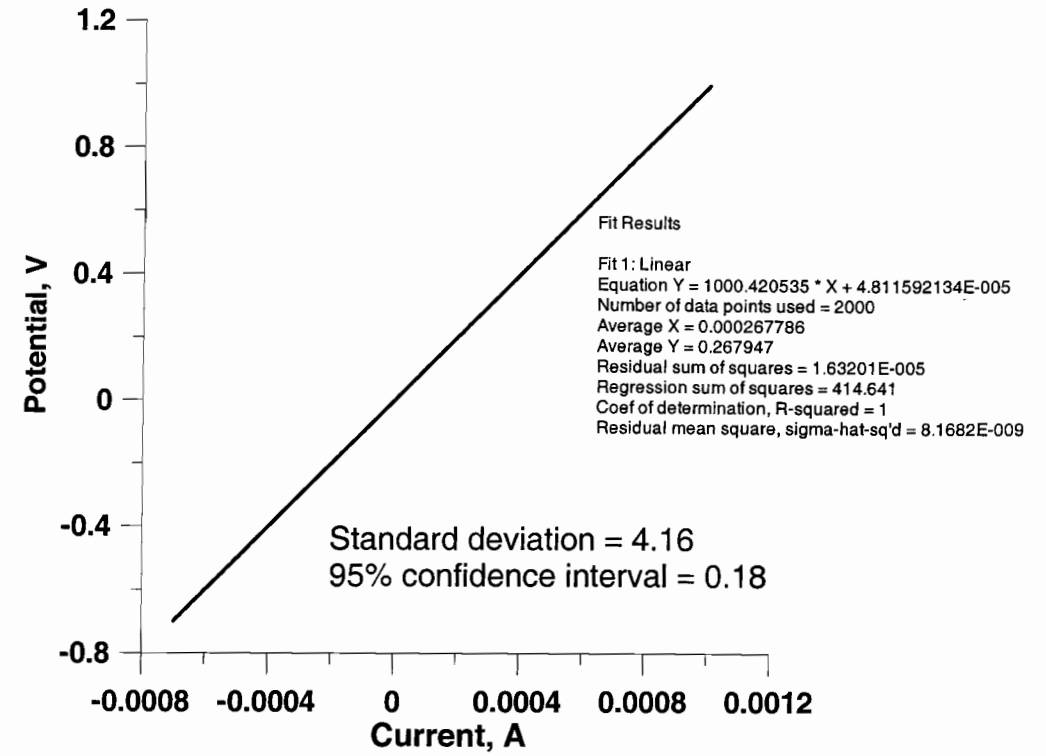


Conclusion: This channel meets the requirement specified in TOP-22

*Xilma He 5/1/08*

Instrument calibration on 4/29/08: **Solartron 1480 Ch6**, SN 00240551  
Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
Final potential: -700 mV; Scan rate: 5 mV/s  
Calculated time to finish scan: 560 seconds  
Actual time to finish scan: 560 seconds.



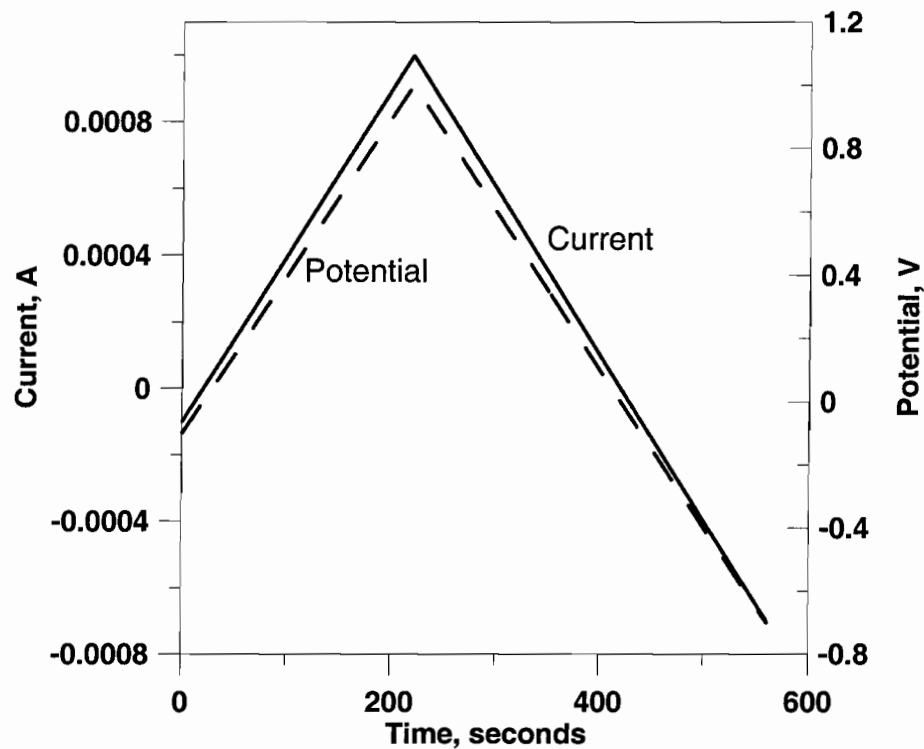
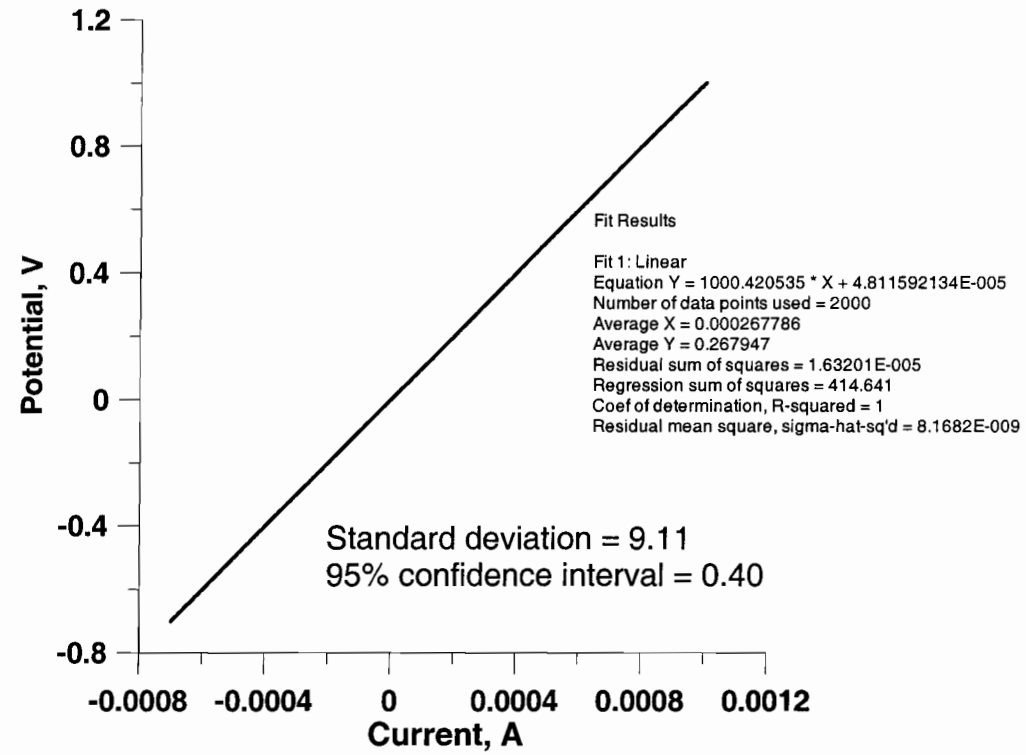
Conclusion: This channel meets the requirement specified in TOP-22

*Xilma He 5/1/08*



Instrument calibration on 4/29/08: **Solartron 1480 Ch7**, SN 00240551  
 Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
 Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds.

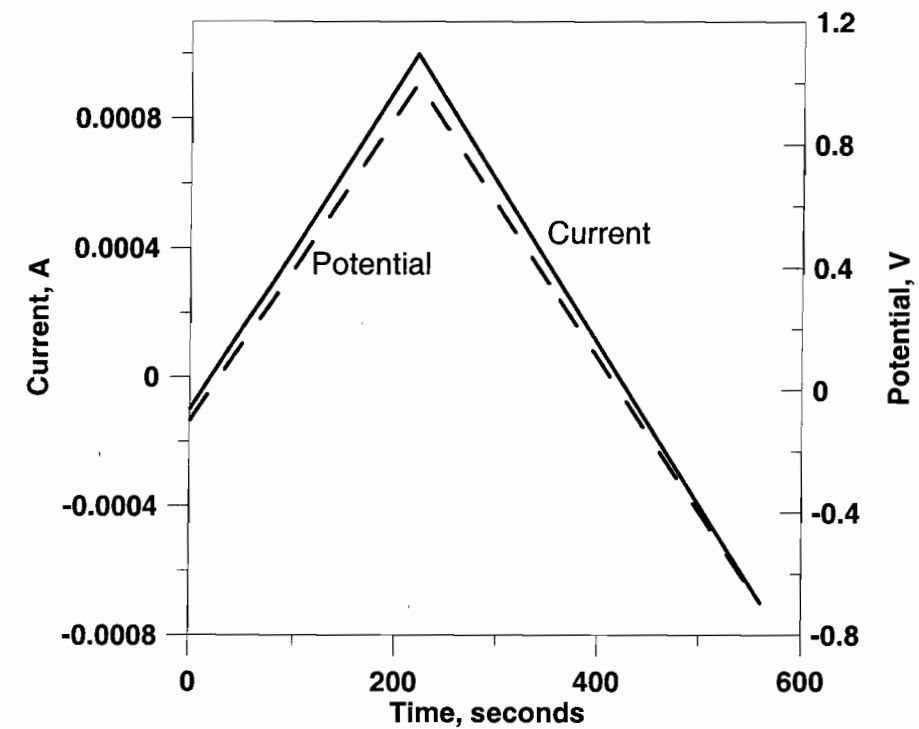
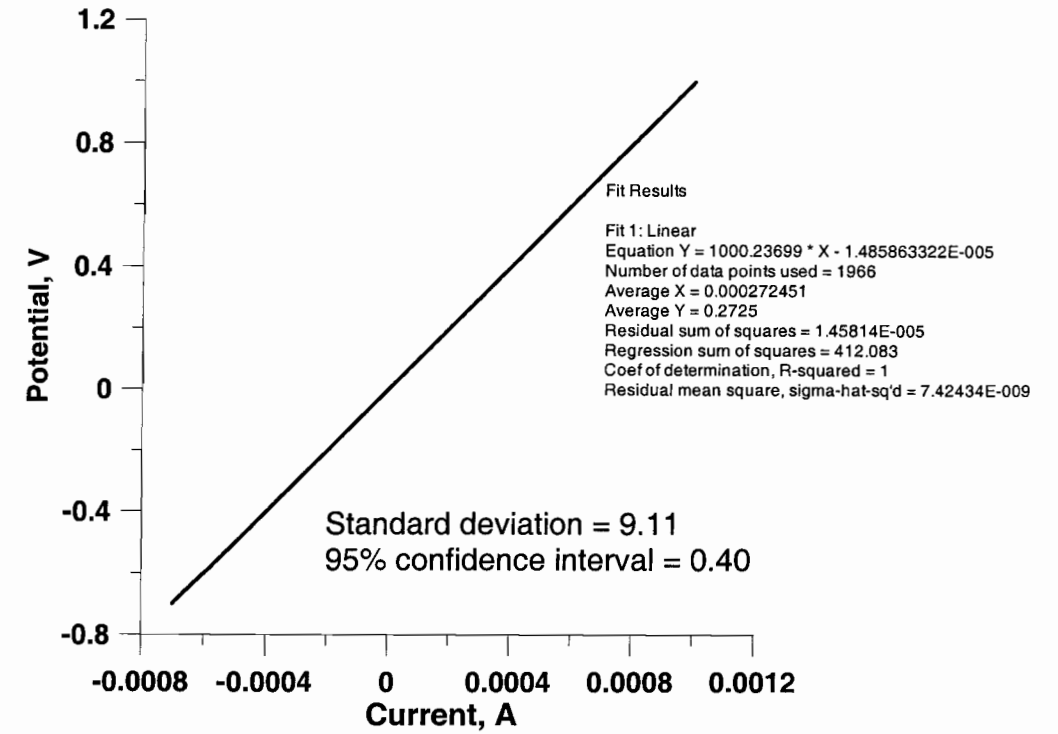


Conclusion: This channel meets the requirement specified in TOP-22

*Xihua He 5/1/08*

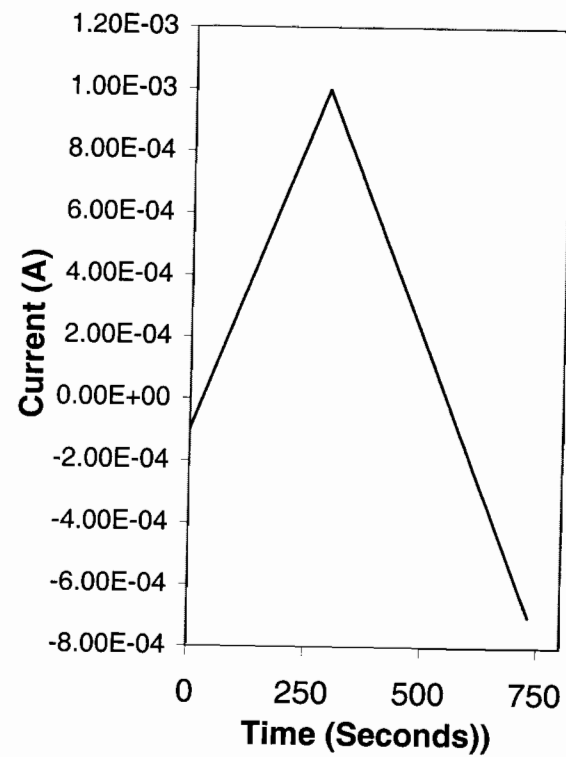
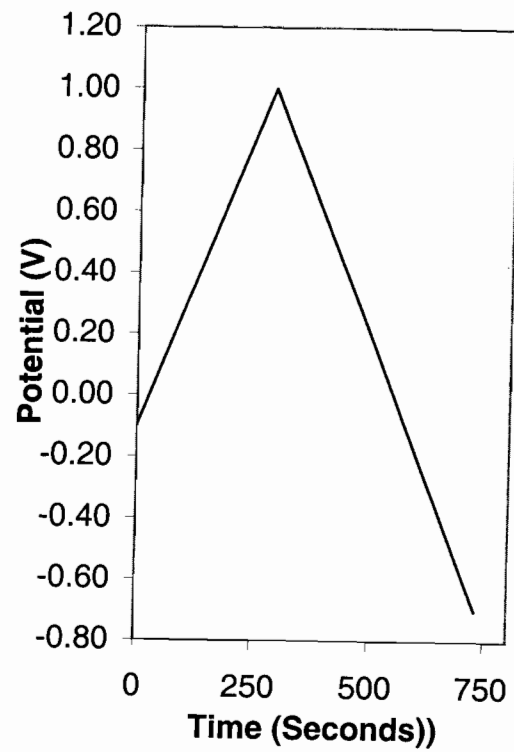
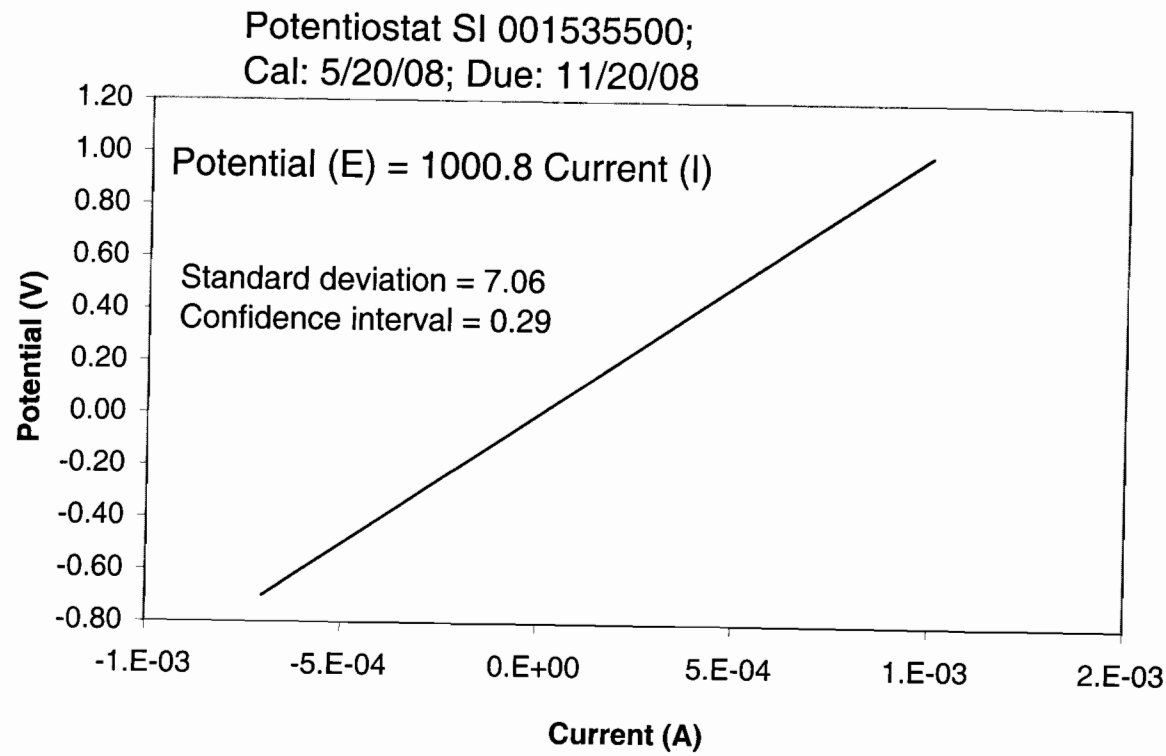
Instrument calibration on 4/29/08: **Solartron 1480 Ch8**, SN 00240551  
 Calibration is based on TOP-22 using a calibrated 1000 Ohm resistor box,  
 Resistor box: SN 171001, Cal 4/17/08, Due 10/17/08

Initial potential: -100 mV; Vertex potential: 1000 mV  
 Final potential: -700 mV; Scan rate: 5 mV/s  
 Calculated time to finish scan: 560 seconds  
 Actual time to finish scan: 560 seconds.



Conclusion: This channel meets the requirement specified in TOP-22

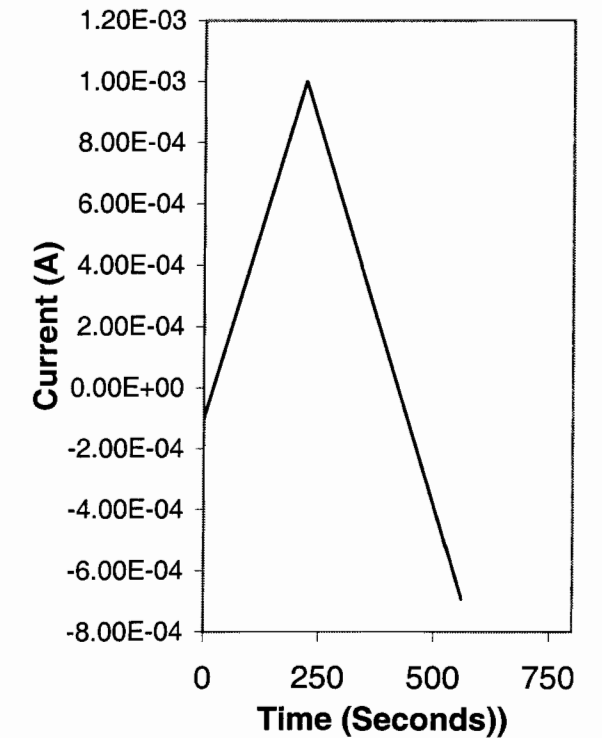
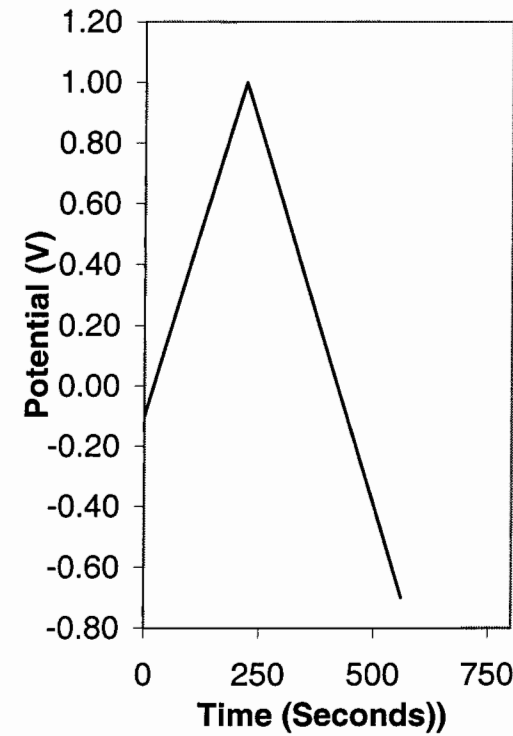
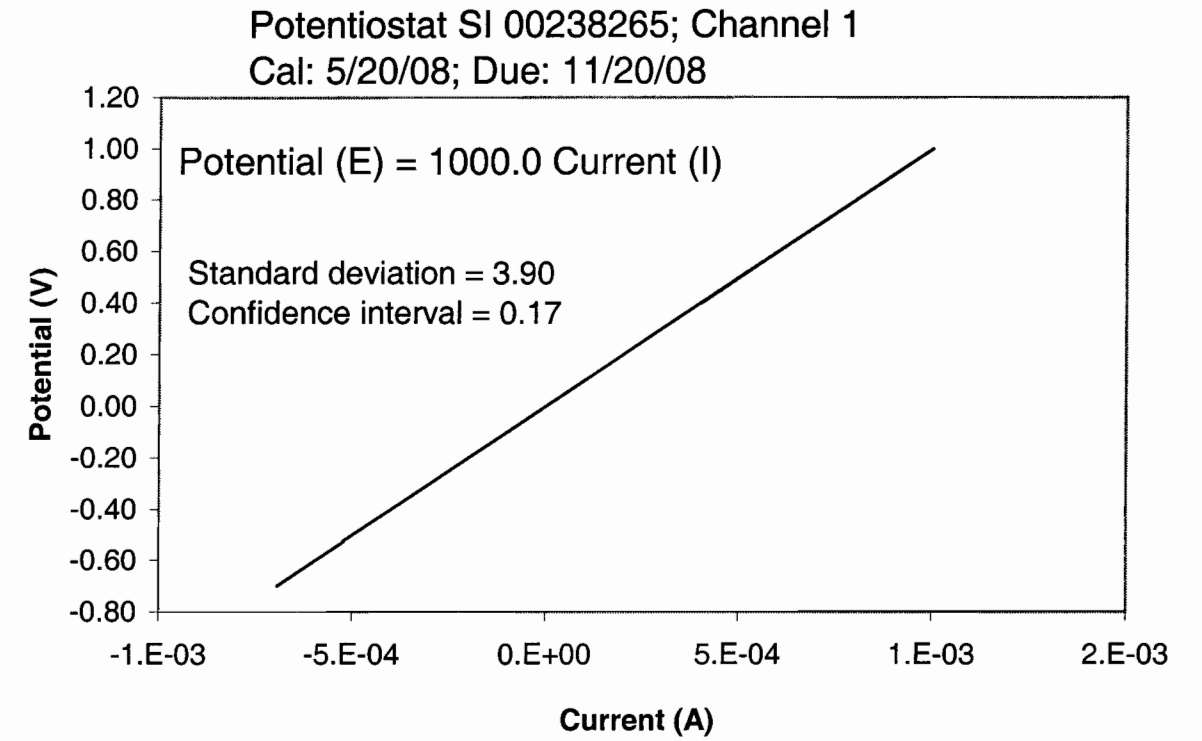
*Xihua He 5/1/08*



Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This potentiostat meets the requirement specified in TOP-22.

6/2/08 Greg Bird

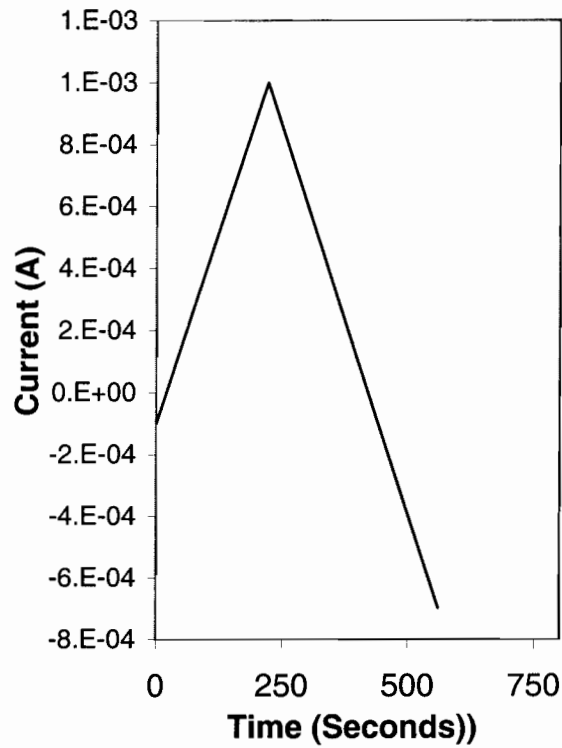
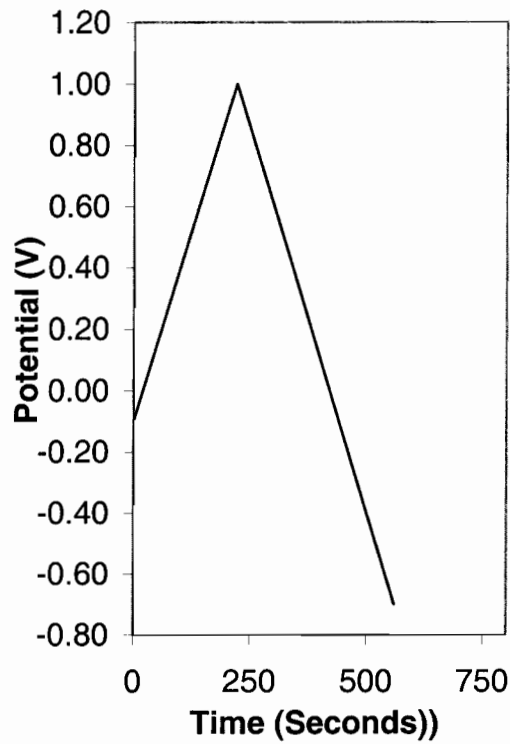
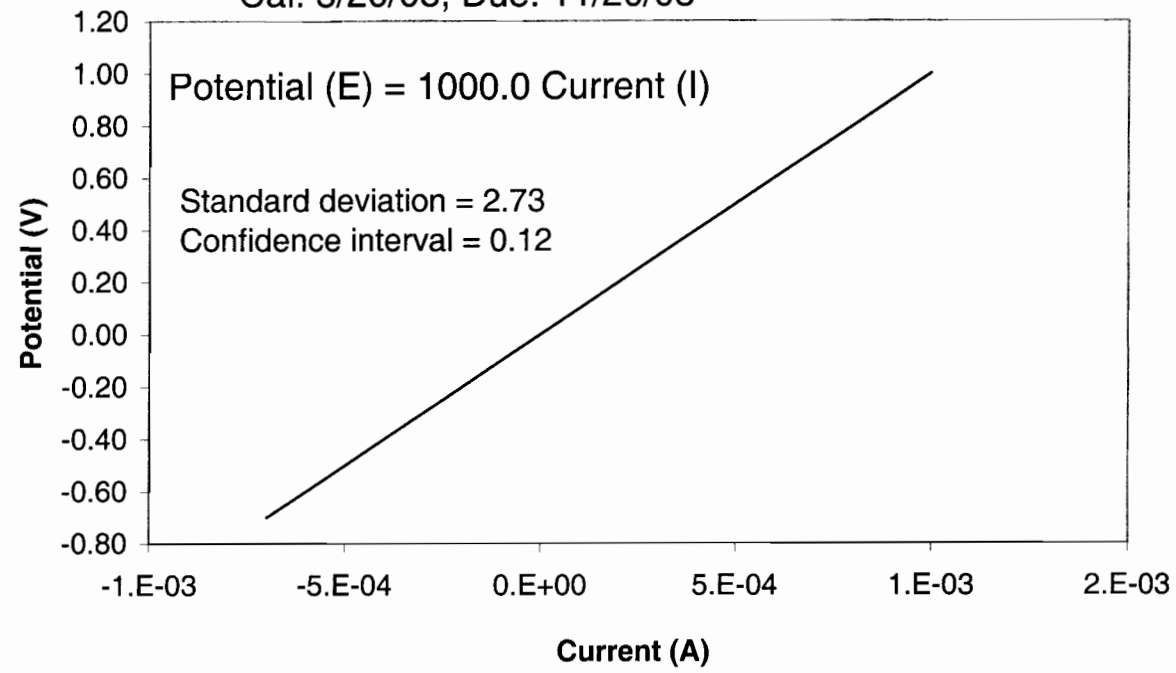


Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This channel meets the requirement specified in TOP-22.

6/2/08 Greg Bird

Potentiostat SI 00238265; Channel 2  
Cal: 5/20/08; Due: 11/20/08

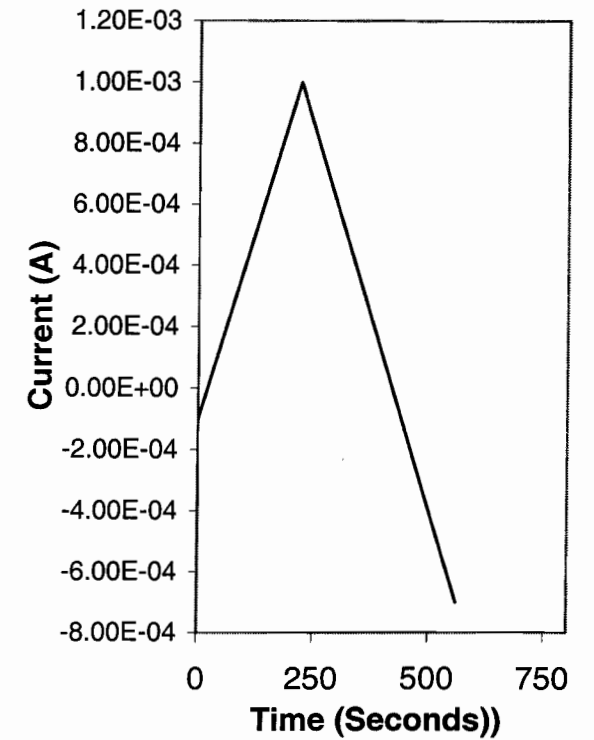
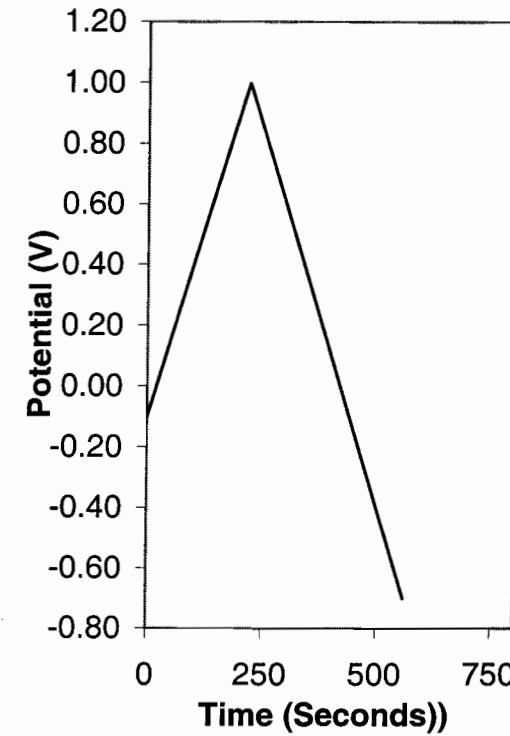
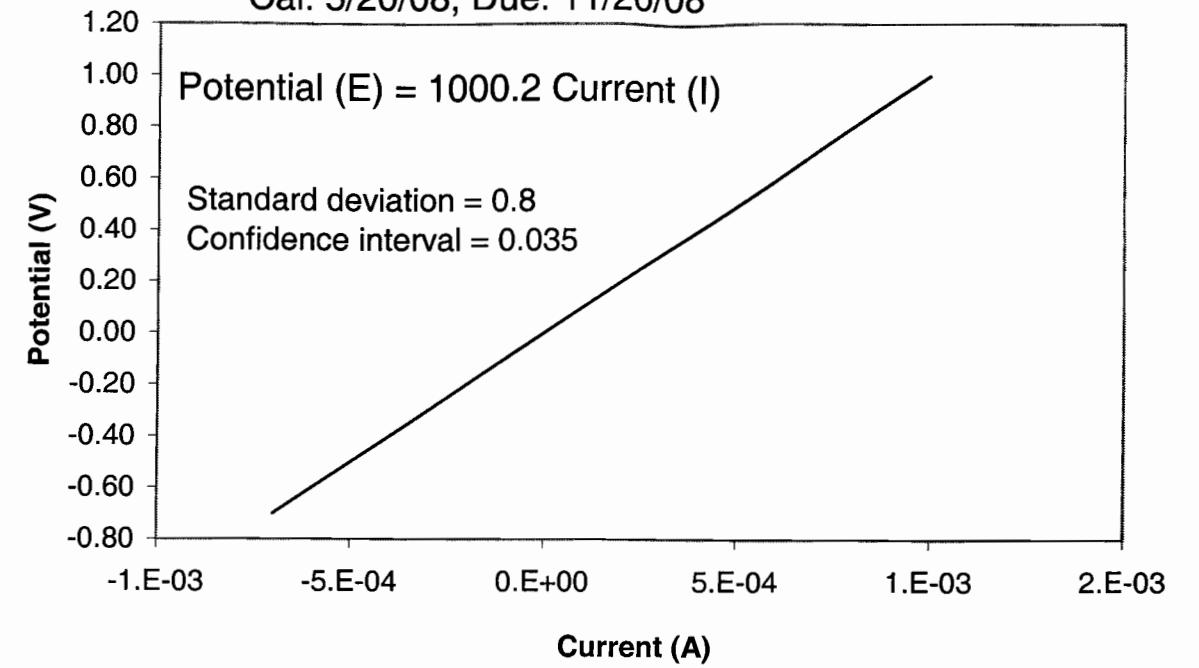


Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This channel meets the requirement specified in TOP-22.

6/2/08 Greg Bird

Potentiostat SI 00238265; Channel 3  
Cal: 5/20/08; Due: 11/20/08

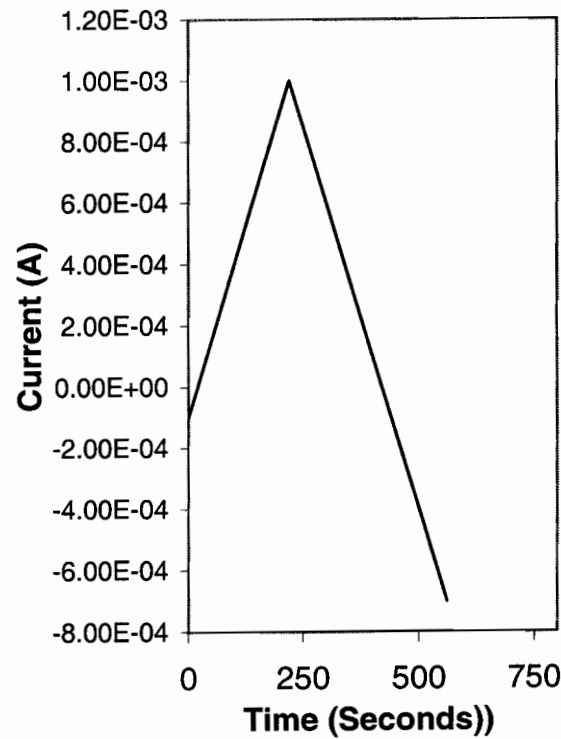
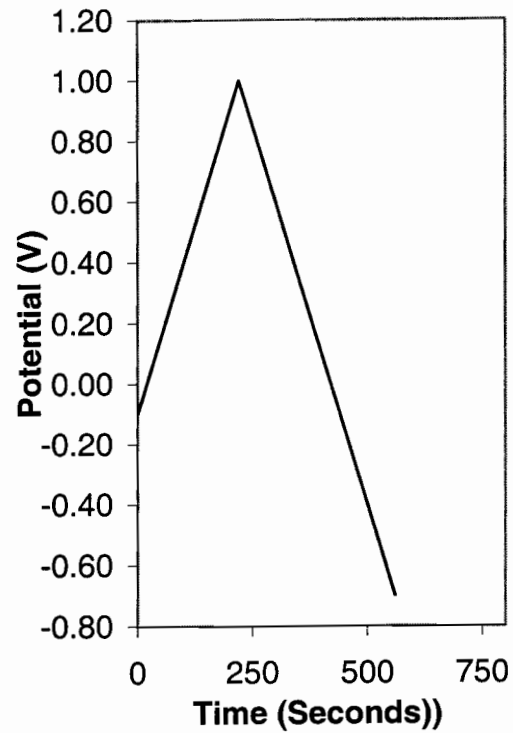
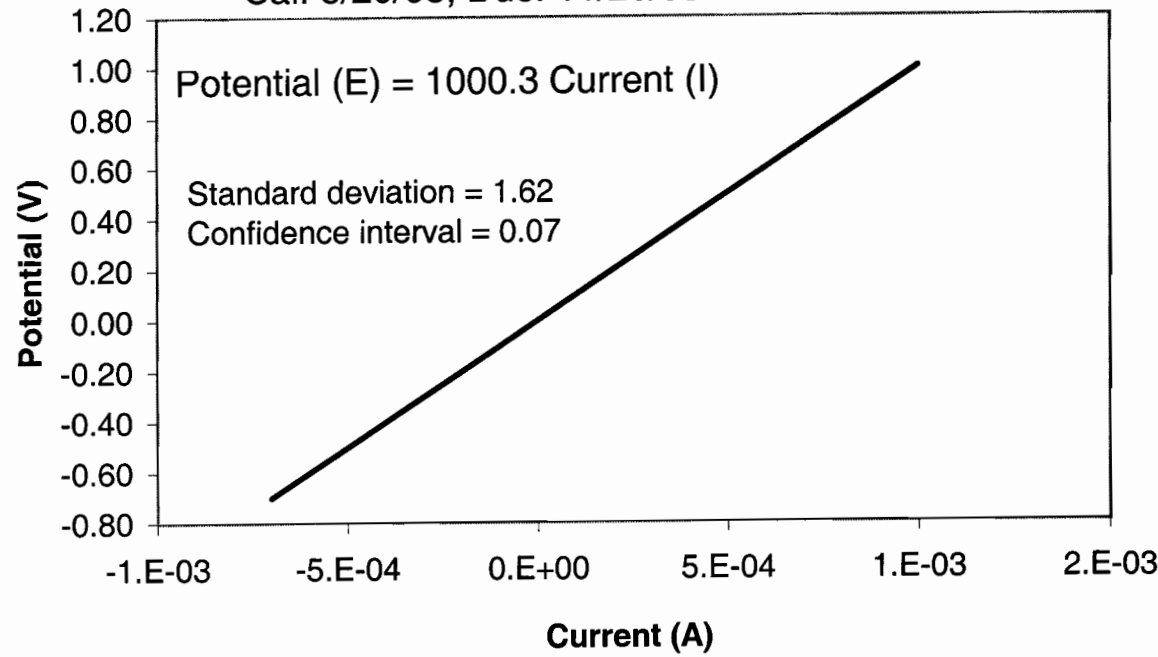


Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This channel meets the requirement specified in TOP-22.

6/2/08 Greg Bird

Potentiostat SI 00238265; Channel 5  
Cal: 5/20/08; Due: 11/20/08

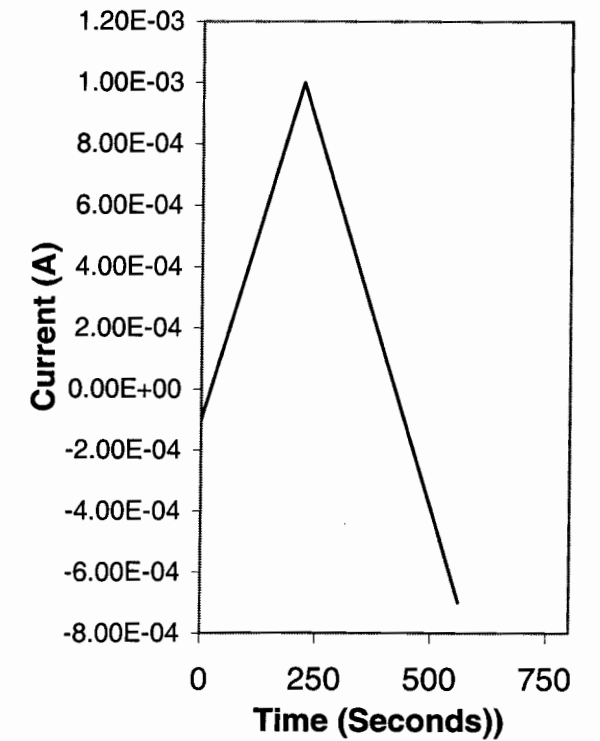
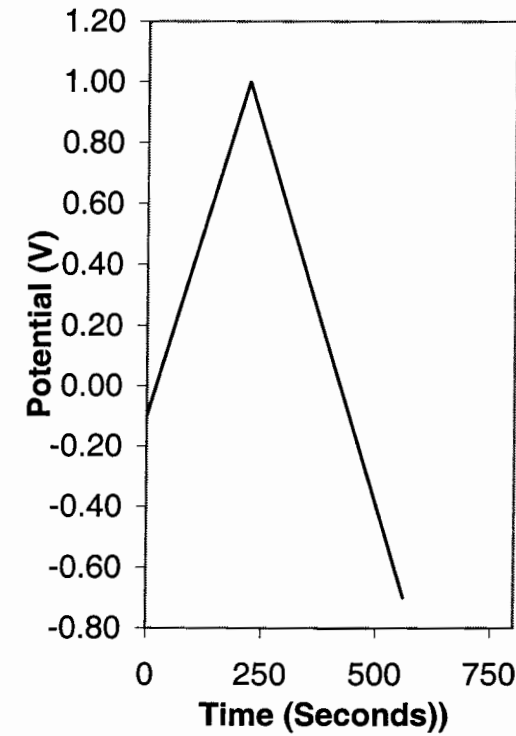
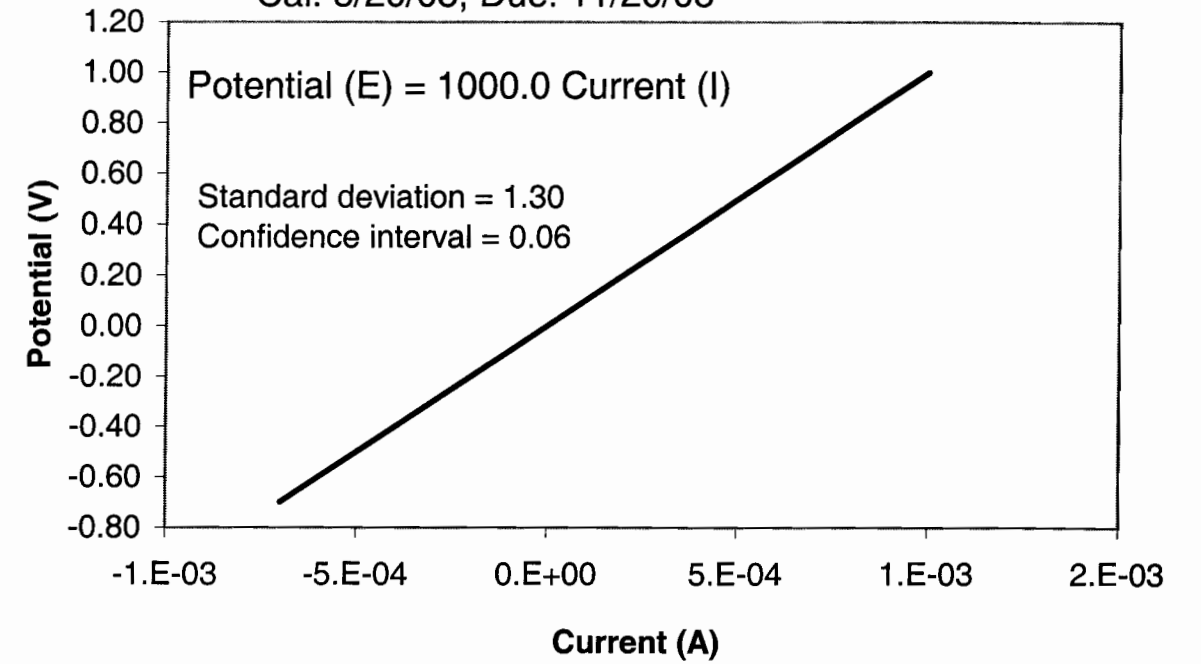


Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This channel meets the requirement specified in TOP-22.

6/2/08 *Greg Bird*

Potentiostat SI 00238265; Channel 6  
Cal: 5/20/08; Due: 11/20/08

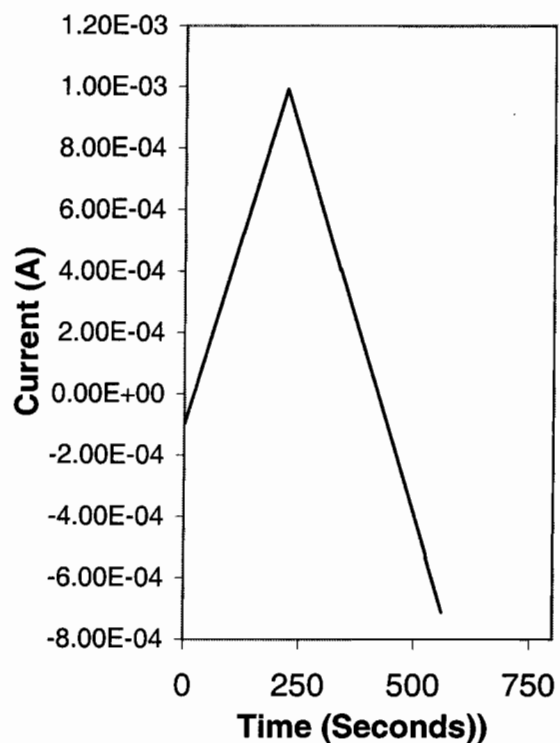
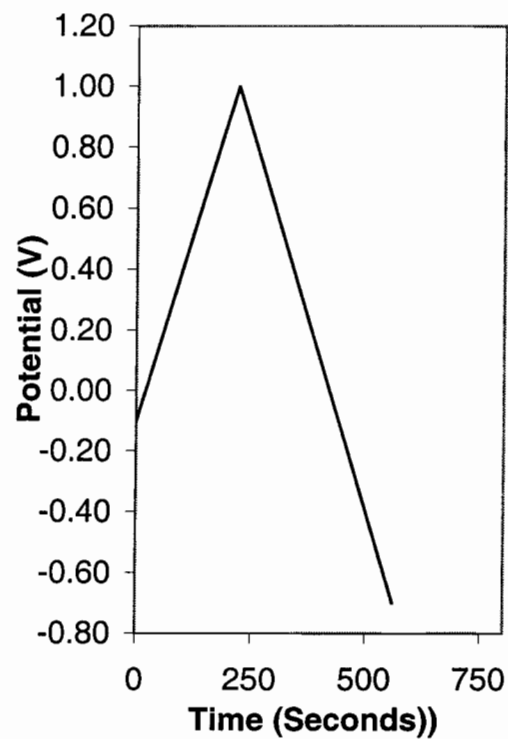
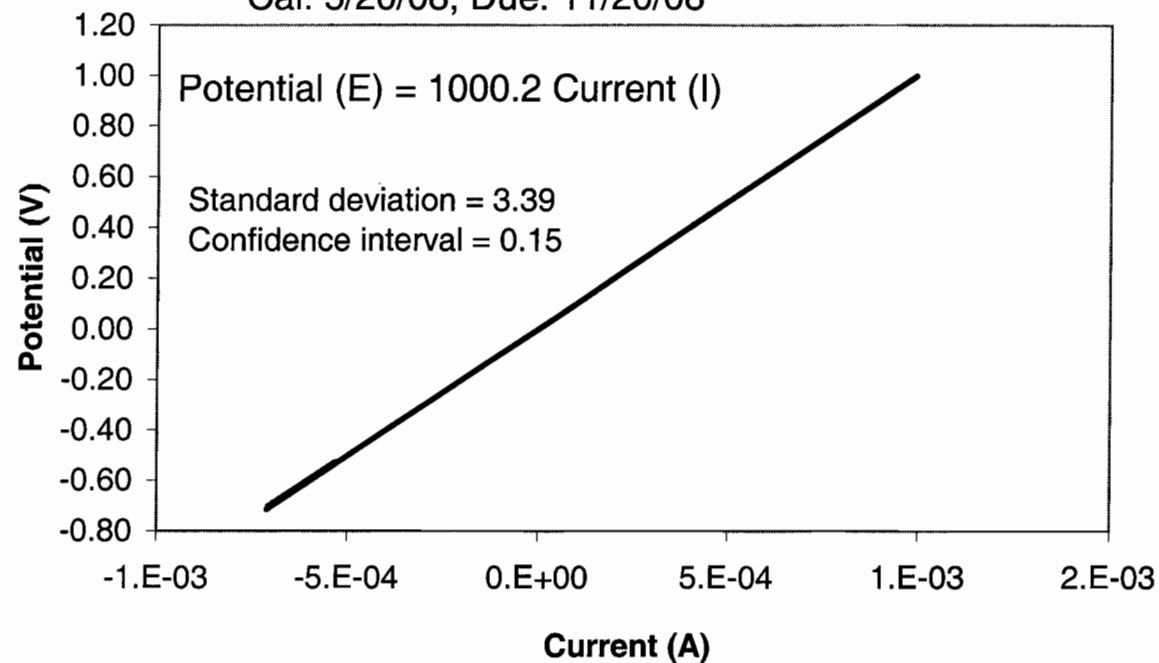


Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This channel meets the requirement specified in TOP-22.

6/2/08 *Greg Bird*

Potentiostat SI 00238265; Channel 7  
Cal: 5/20/08; Due: 11/20/08

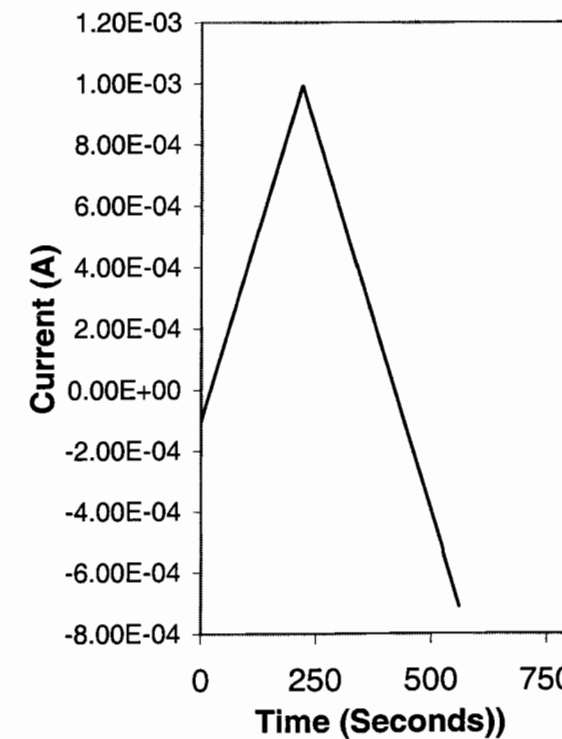
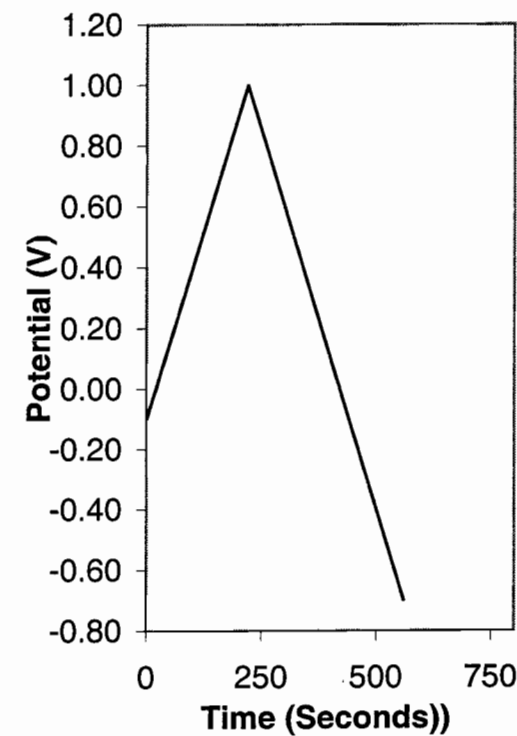
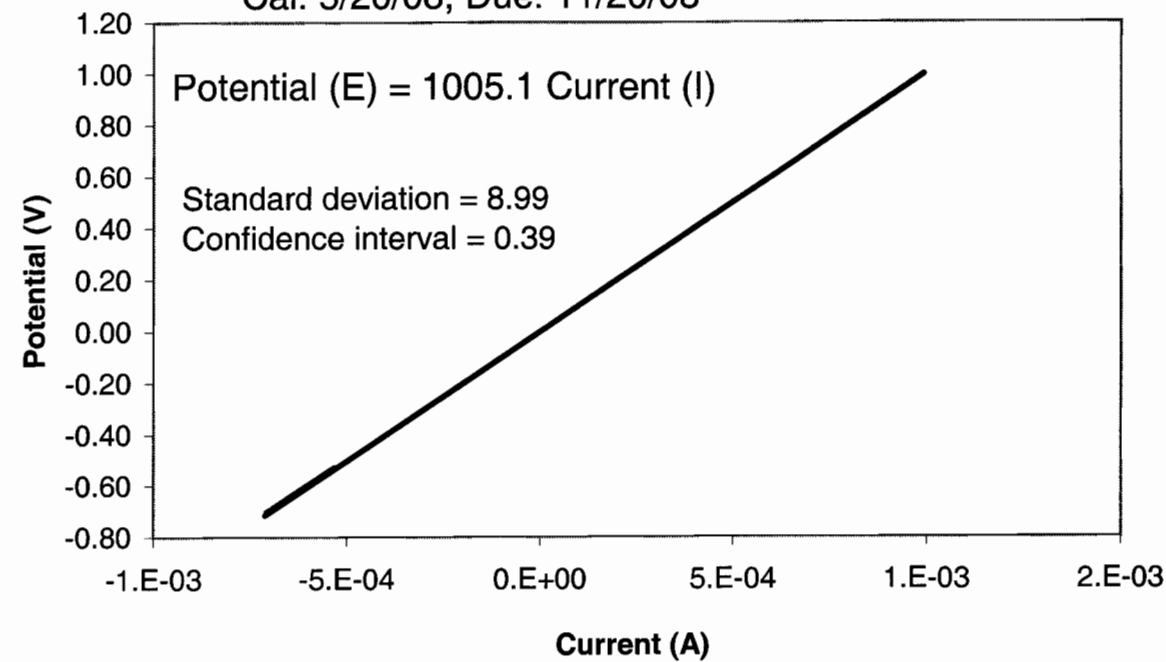


Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This channel meets the requirement specified in TOP-22.

6/2/08 Greg Bird

Potentiostat SI 00238265; Channel 8  
Cal: 5/20/08; Due: 11/20/08



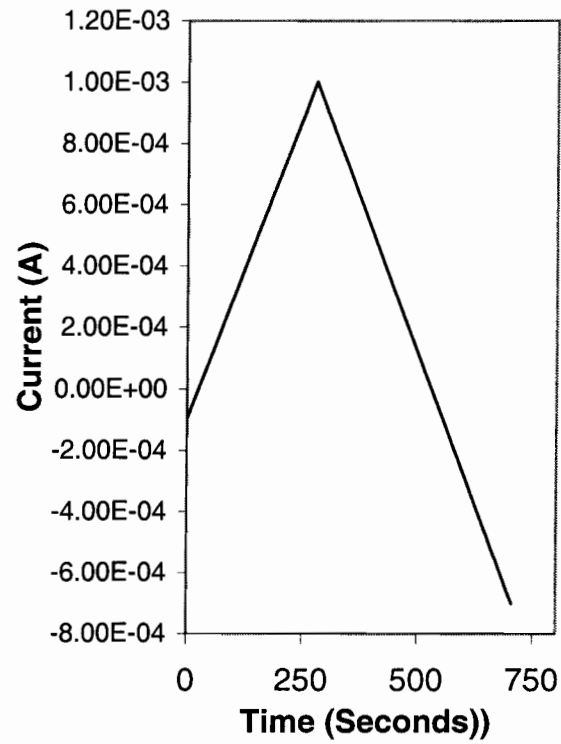
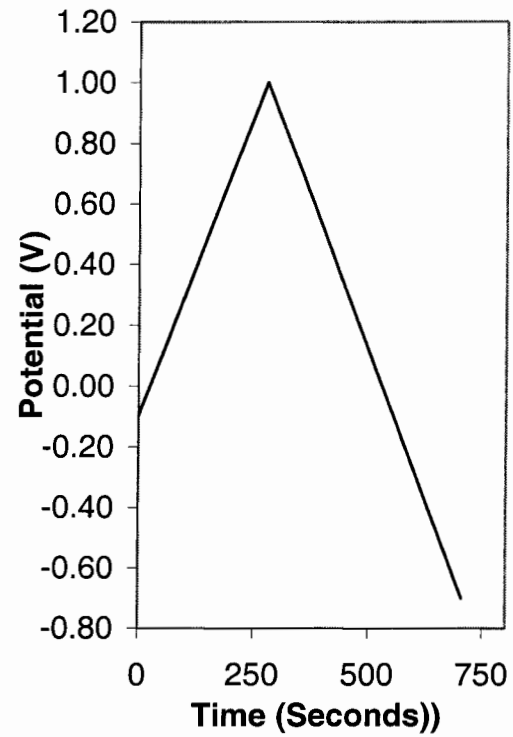
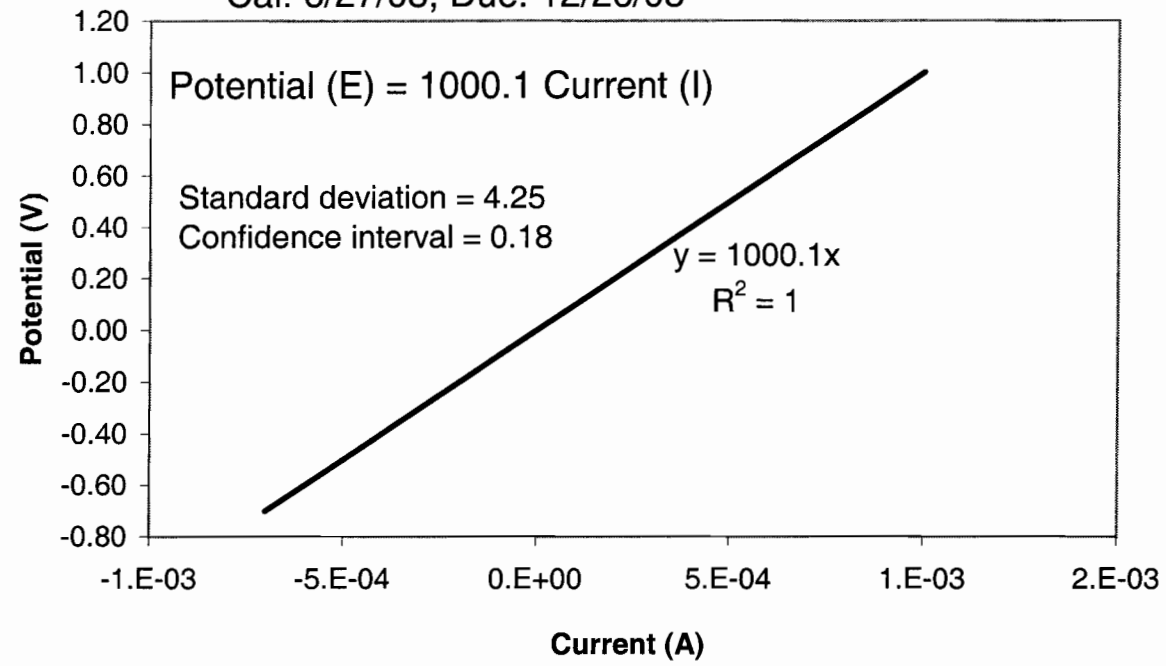
Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This channel meets the requirement specified in TOP-22.

6/2/08 Greg Bird



Potentiostat SI 00186634;  
Cal: 6/27/08; Due: 12/26/08

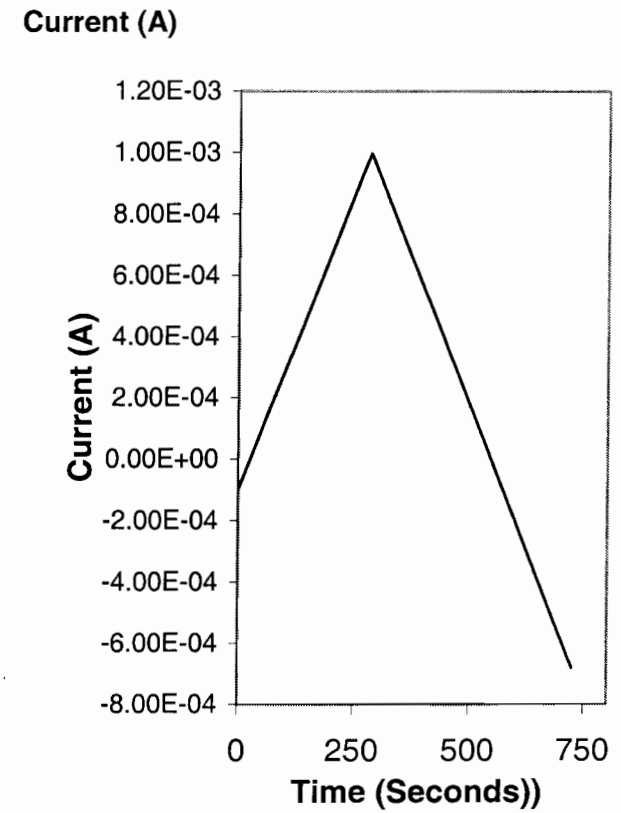
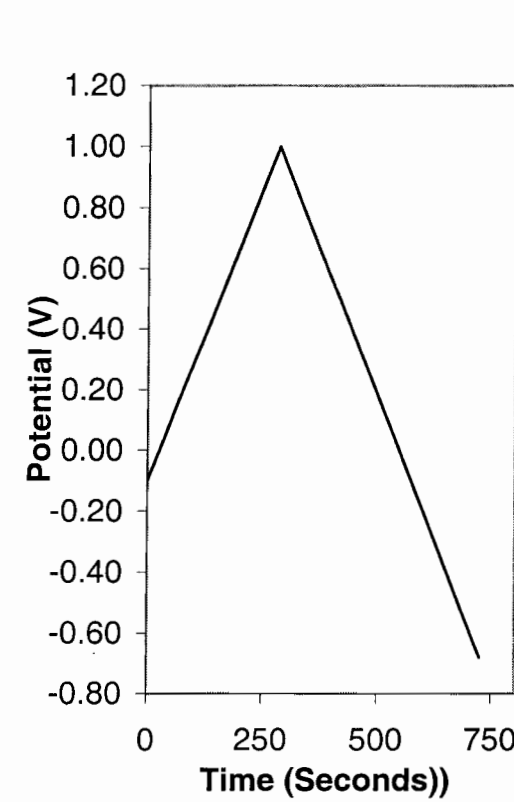
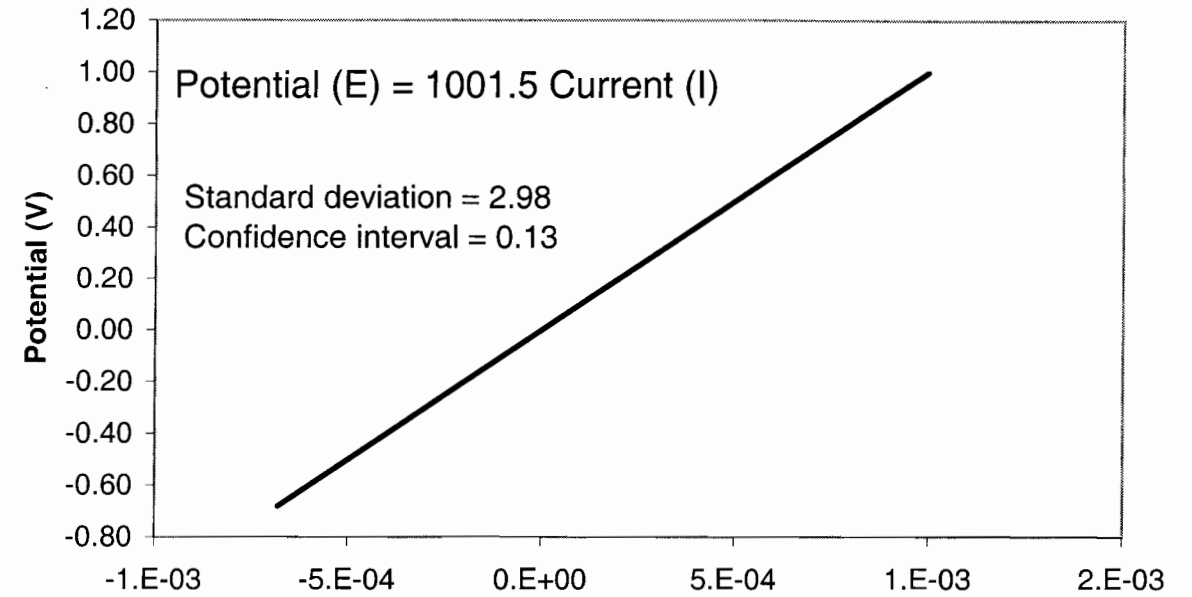


Calibrated with resistor box SN: 171001, Cal: 4/17/08; Due: 10/17/08

Conclusion: This potentiostat meets the requirement specified in TOP-22.

*Xihua He 7/14/08*

Potentiostat SI 00153550  
Cal: 11/24/08  
Due: 5/24/09



Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 1/5/09*

Continued from page 166  
Weekly pH calibration of EA 940 SN# ~~2330~~ 4274  
XH 3/23/09

Cal: 11/4/08 Due: 5/4/09  
pH probe 13-620-296 SN# 5146004P

Date	Buffers used	Initials
12/4/08	4 7 10	XB
12/8/08	4 7 10	XB
12/15/08	4 7 10	XB
01/05/09	4 7 10	XB
01/13/09	4 7 10	XB
01/19/09	4 7 10	XB
02/02/09	4 7 10	XB
02/02/09	4 7	XB
2/17/09	4 7 10	XB
2/23/09	Not calibrated per Xihua	

X.H 3/23/09

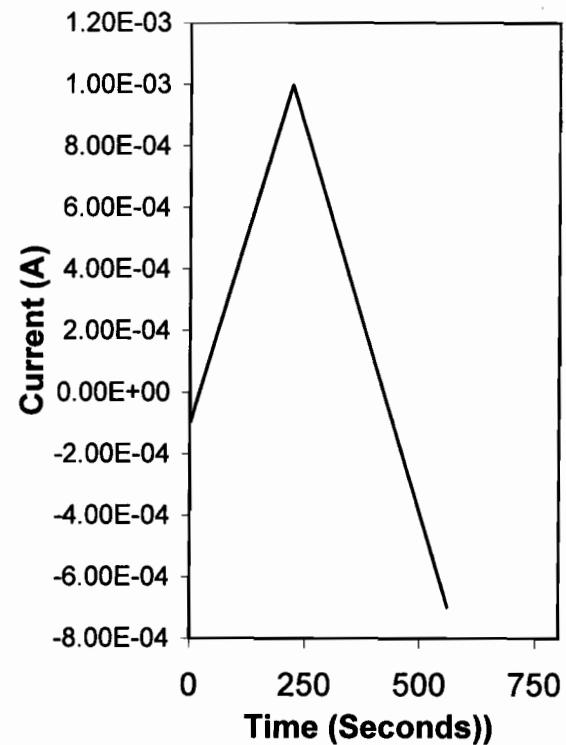
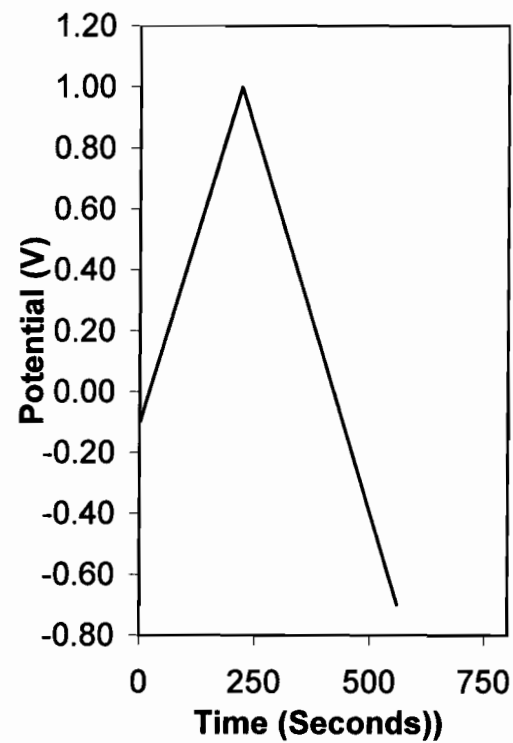
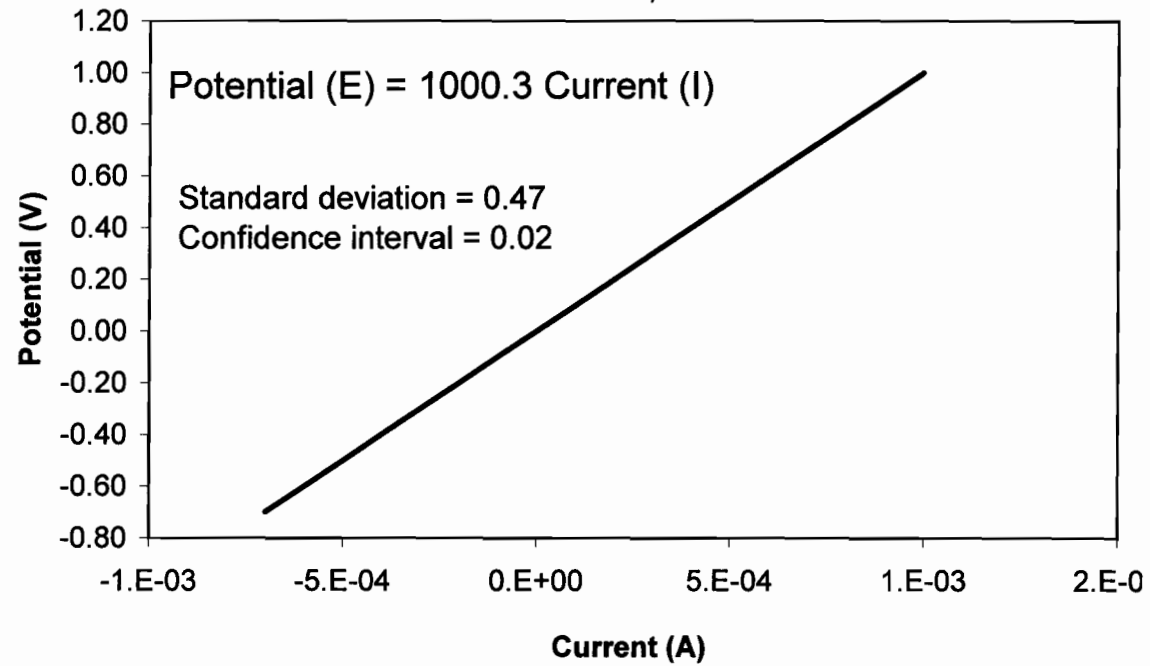
Continued from page 167 <sup>XH 3/23/09</sup> 940  
Weekly pH calibration of EA ~~940~~ SN# 2330  
Cal 7/28/08 Due 7/28/09 AIN 001948

pH probe 13-620-296 SN: 5003095P

Date	Buffers used	Initials
10/20/08	4 7 10	XB
10/27/08	4 7 10	XB
11/3/08	4 7 10	XB
11/10/08	4 7 10	XB
11/19/08	4 7 10	XB
11/24/08	4 7 10	XB
12/01/08	4 7 10	XB
12/08/08	4 7 10	XB
12/15/08	4 7 10	XB
01/05/09	4 7 10	XB
01/25/09 <sup>13 XB 1/19/09</sup>	4 7 10	XB
01/19/09	4 7 10	XB
02/02/09	4 7 10	XB
02/09/09	4 7 10	XB
2/17/09	4 7 10	XB
2/23/09	4 7 10	XB
3/21/09	4 7 10	XB
3/12/09	4 7 10	XB
3/19/09	4 7 10	XB

X.H 3/23/09

Potentiostat SI 00240051; Channel 1

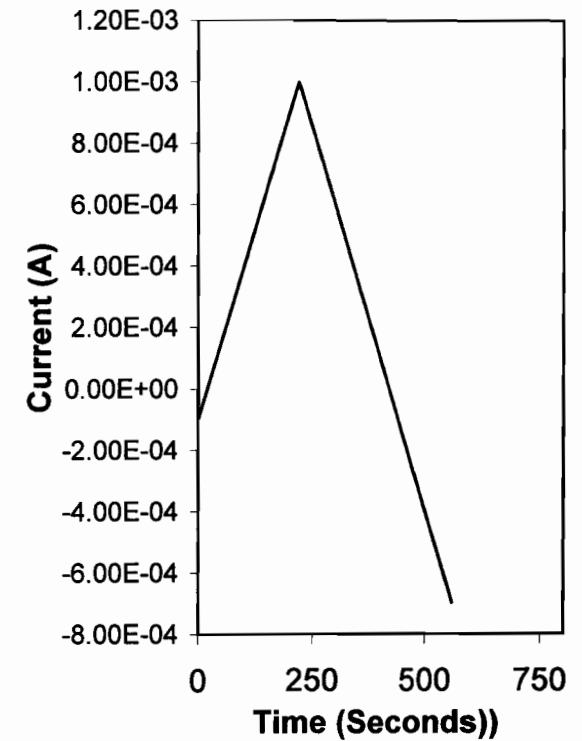
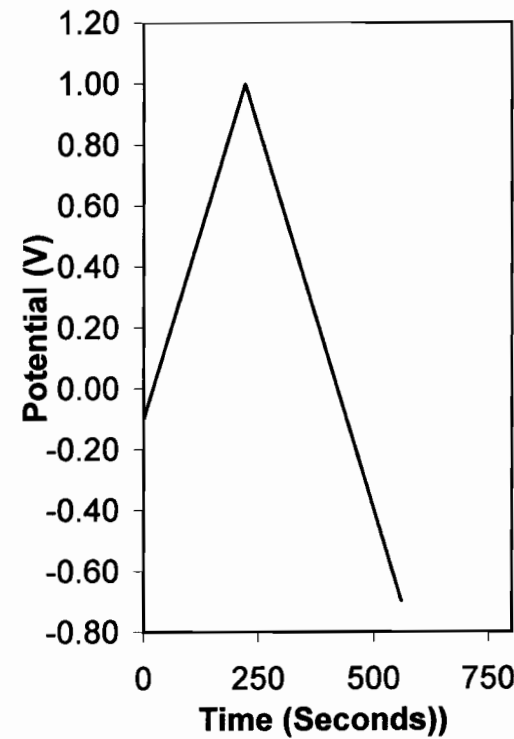
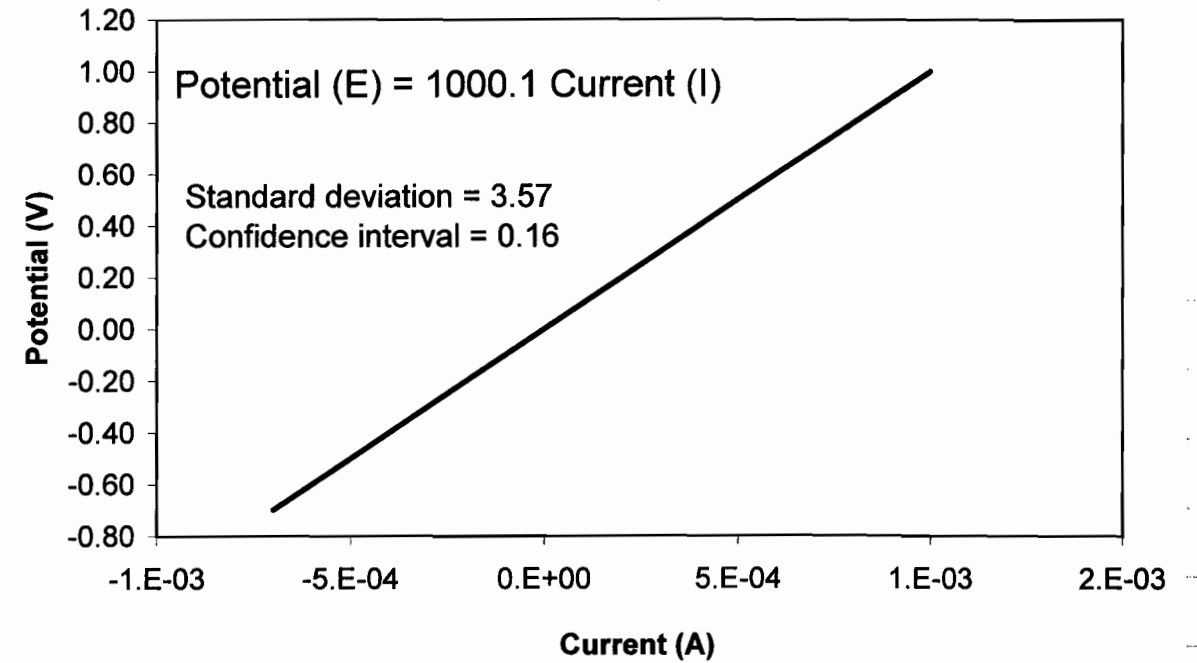


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xiuhua He 10/24/08*

Potentiostat SI 00240051; Channel 2

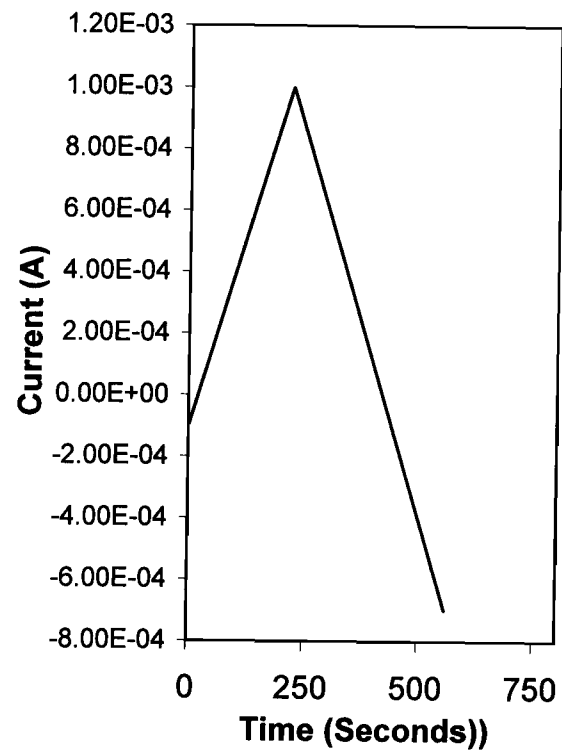
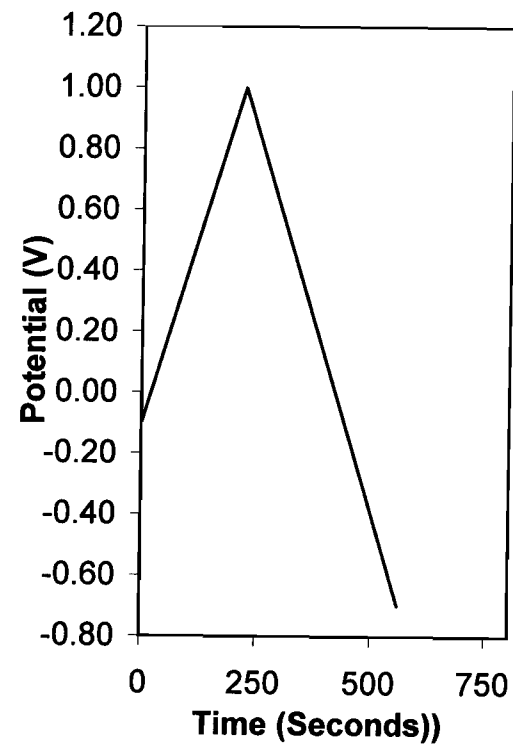
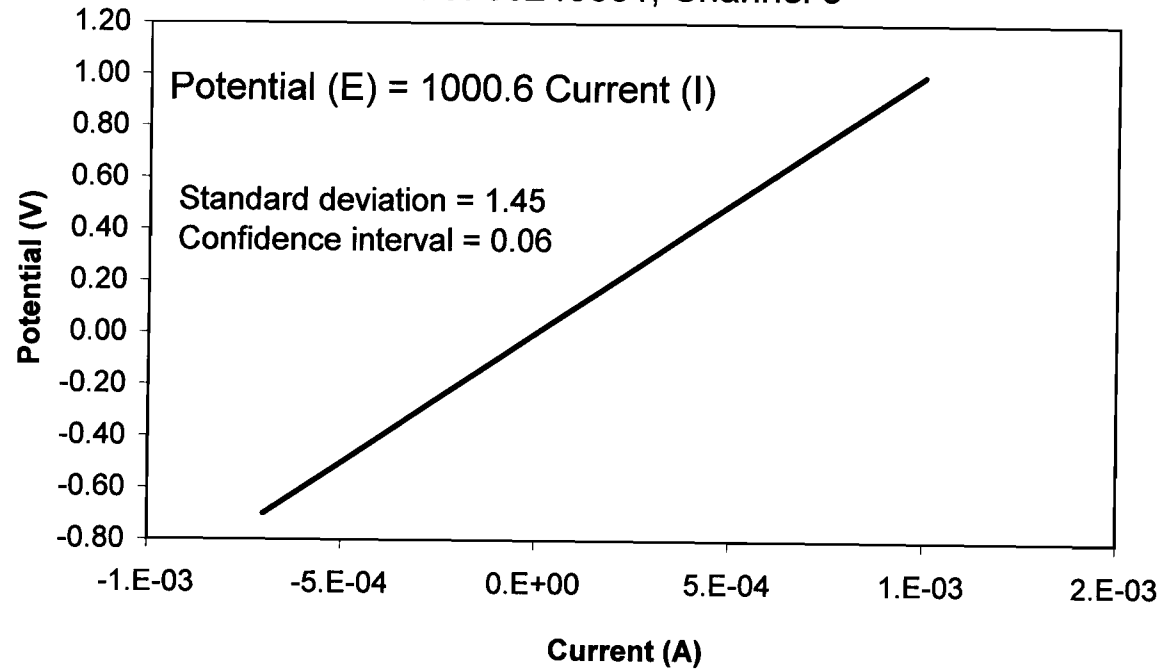


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xiuhua He 10/24/08*

Potentiostat SI 00240051; Channel 3

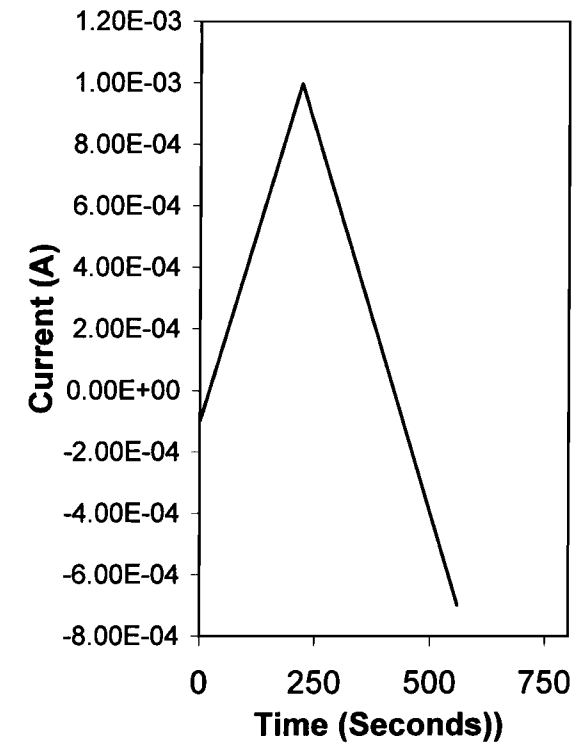
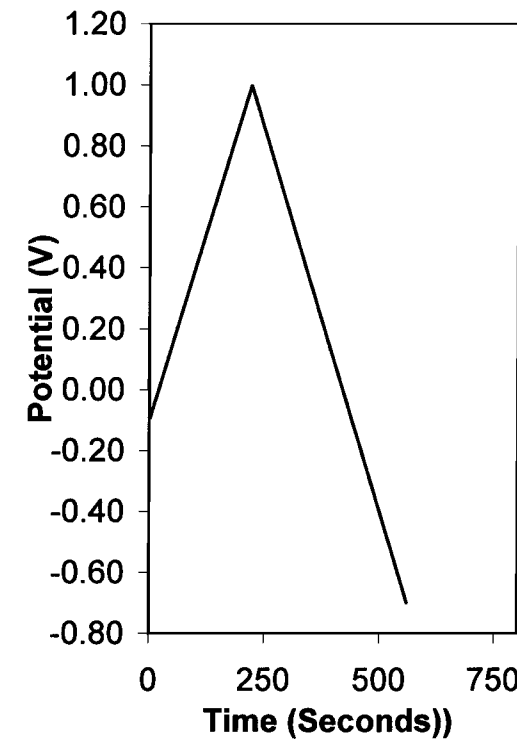
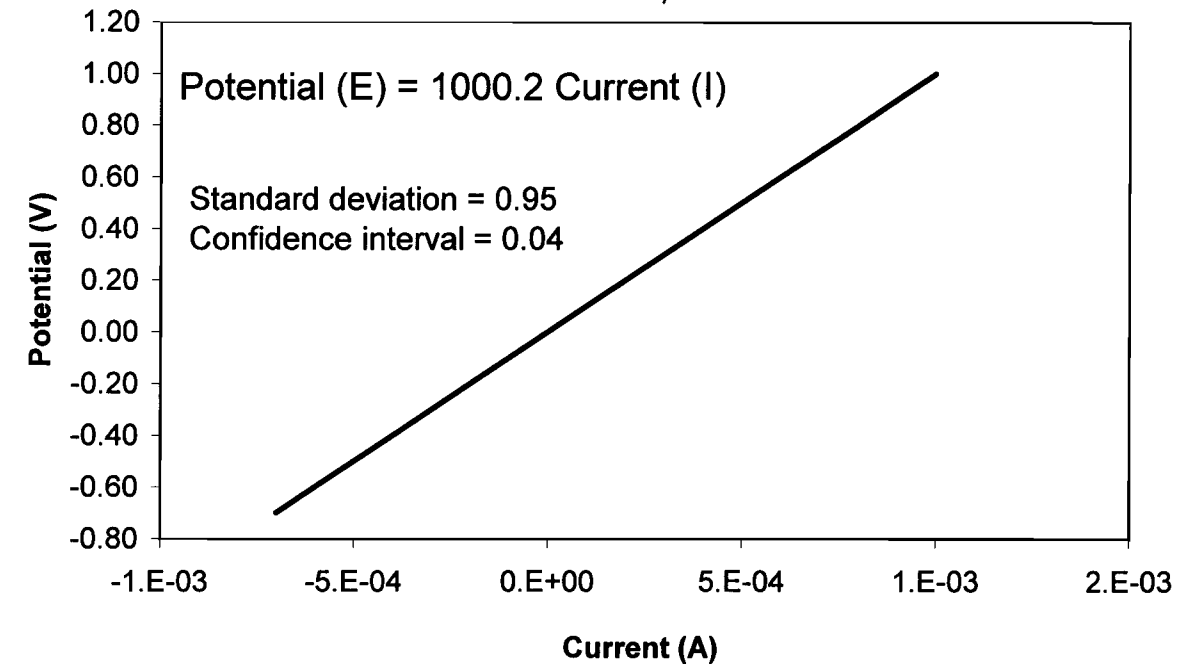


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 10/20/08*

Potentiostat SI 00240051; Channel 4

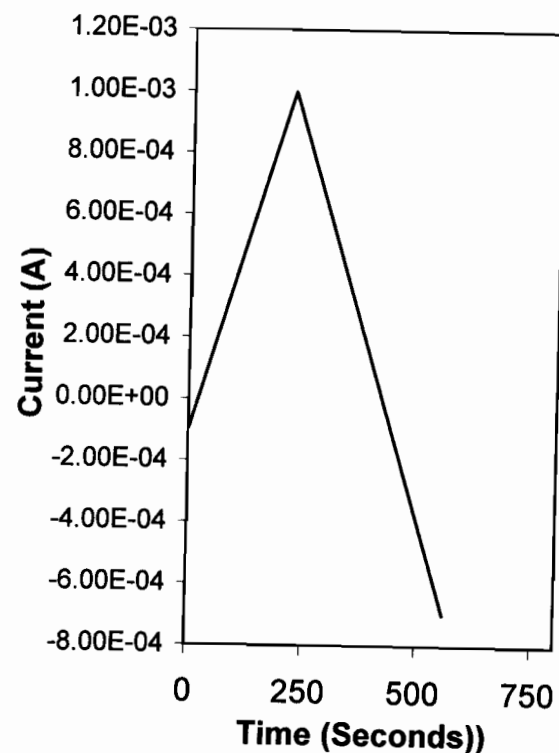
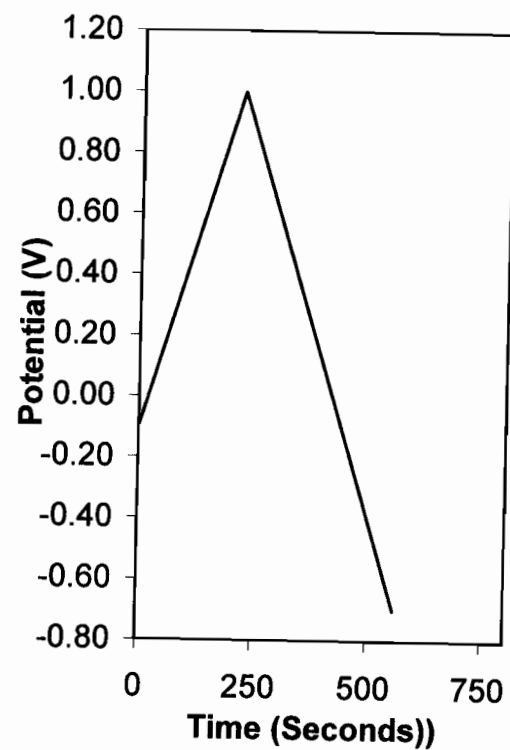
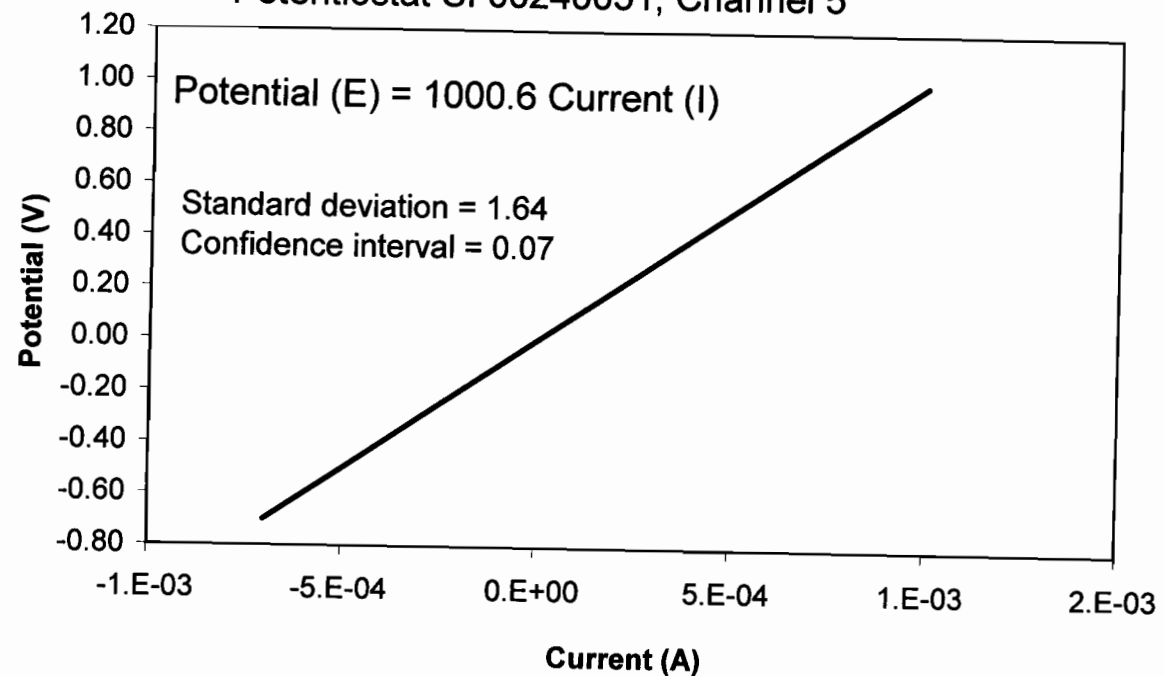


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 10/20/08*

Potentiostat SI 00240051; Channel 5

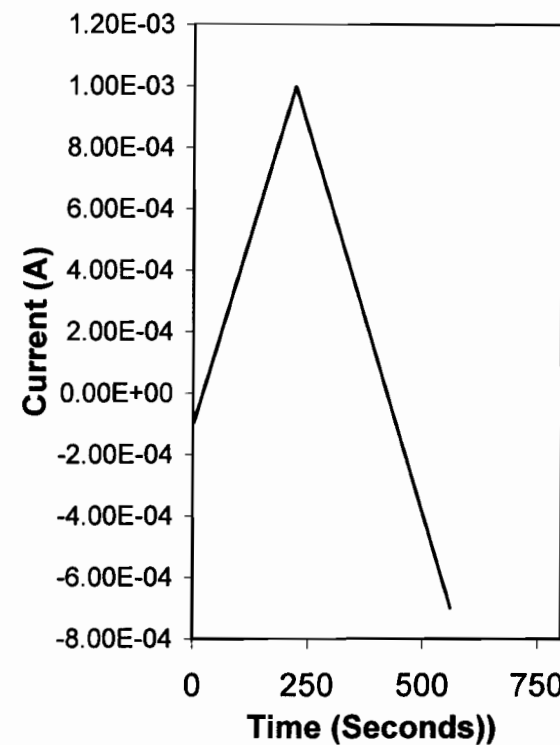
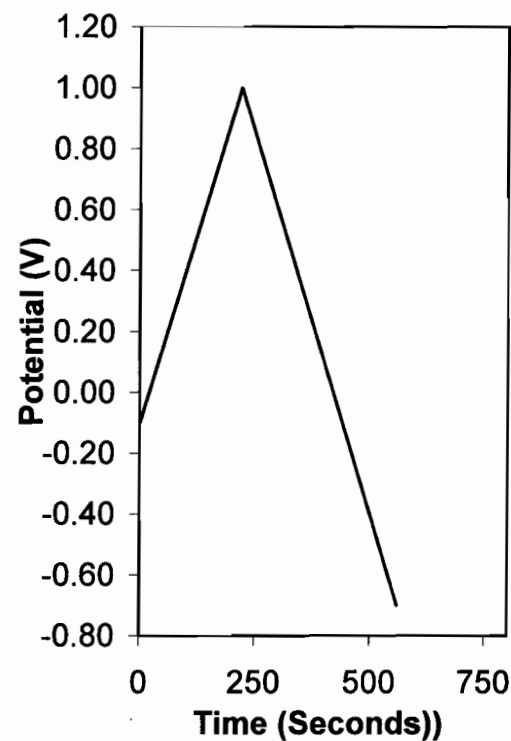
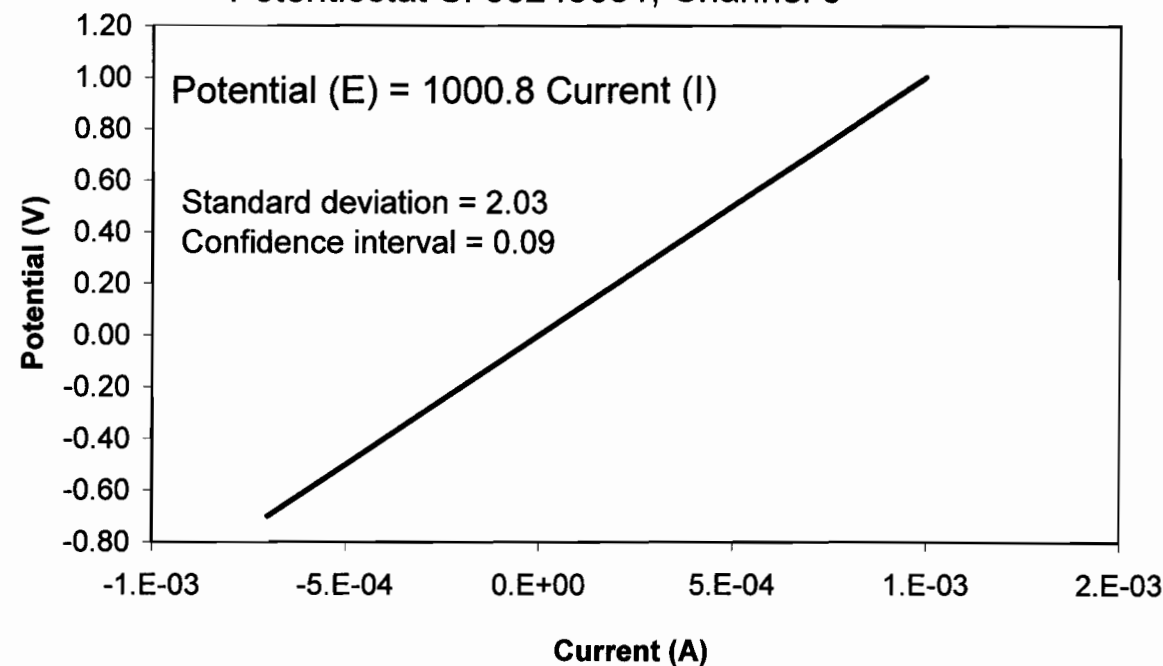


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 10/28/08*

Potentiostat SI 00240051; Channel 6



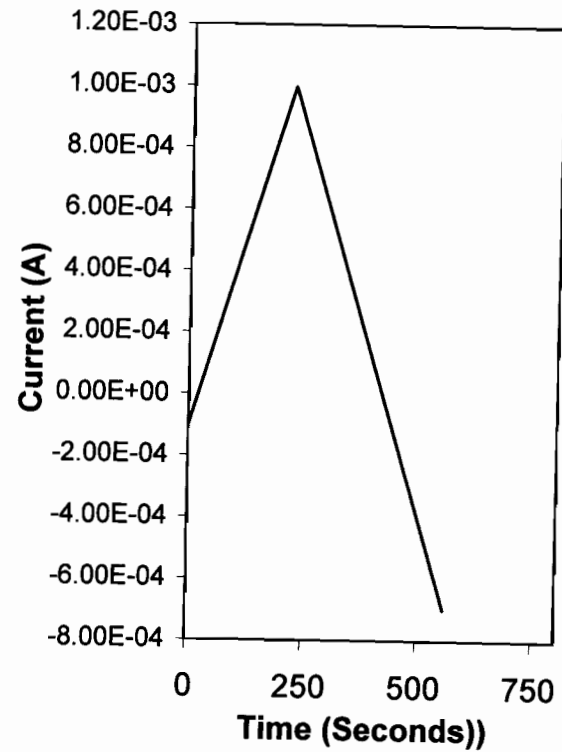
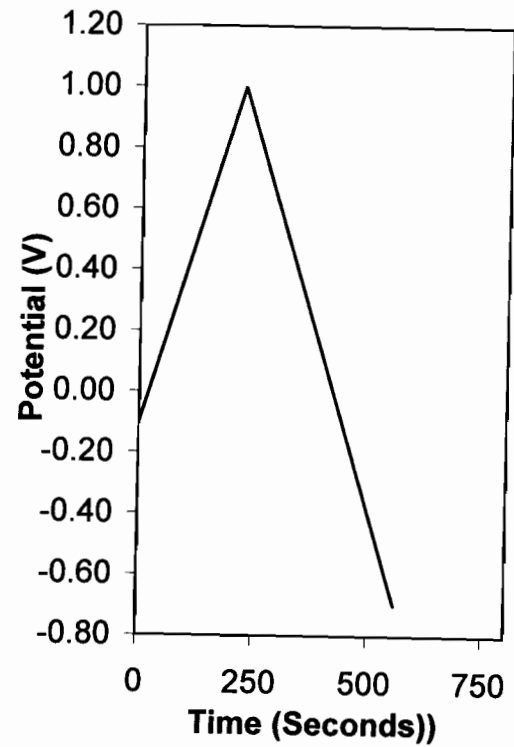
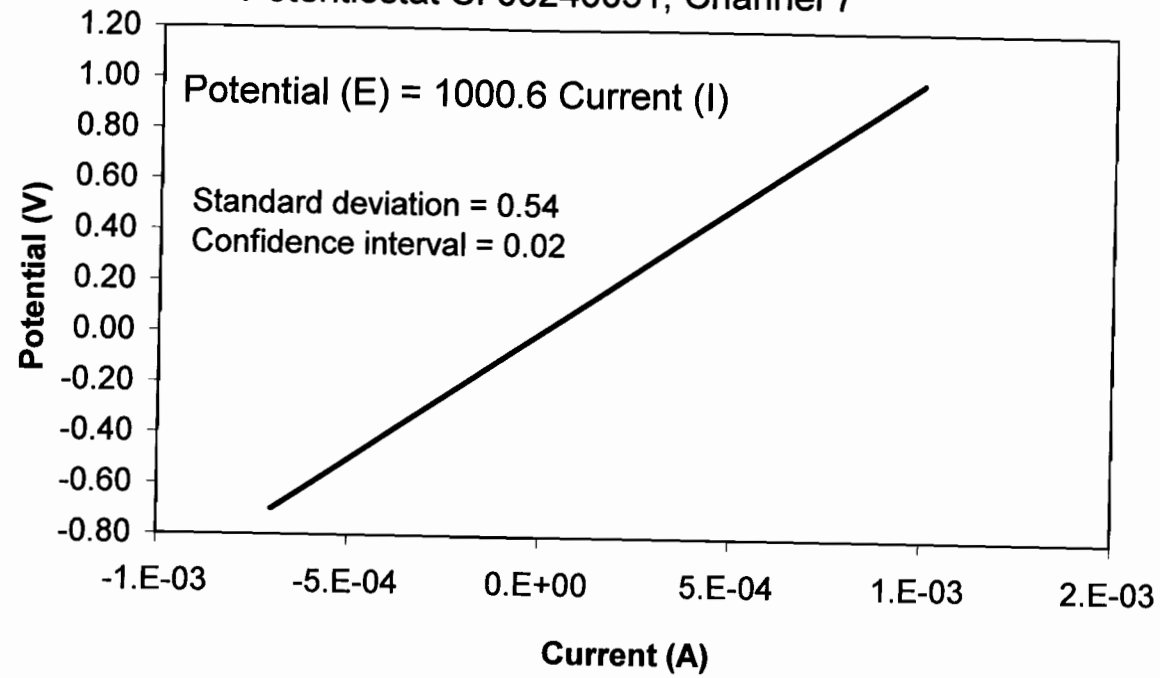
Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 10/28/08*



Potentiostat SI 00240051; Channel 7

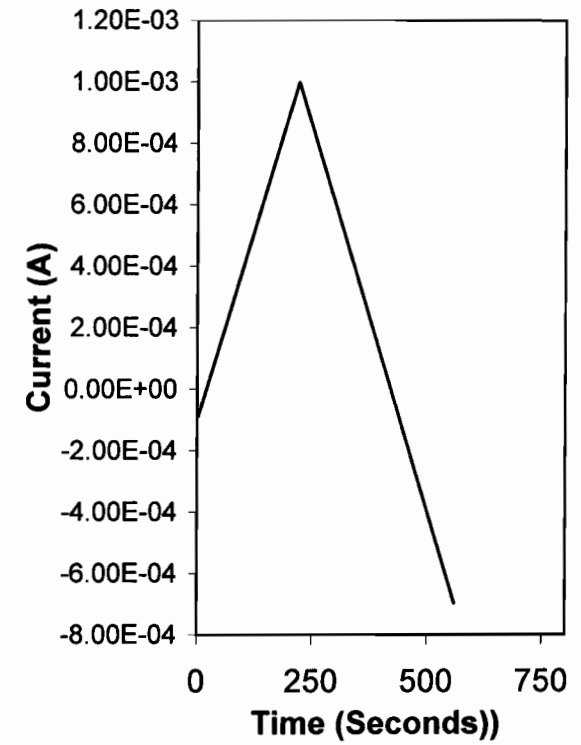
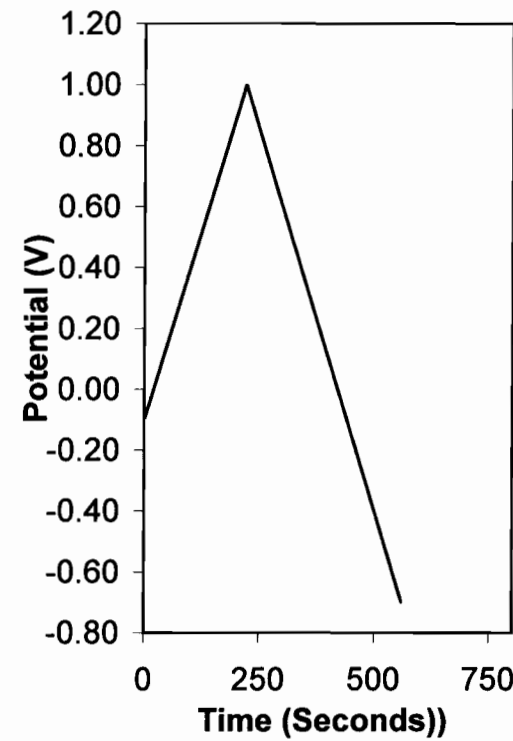
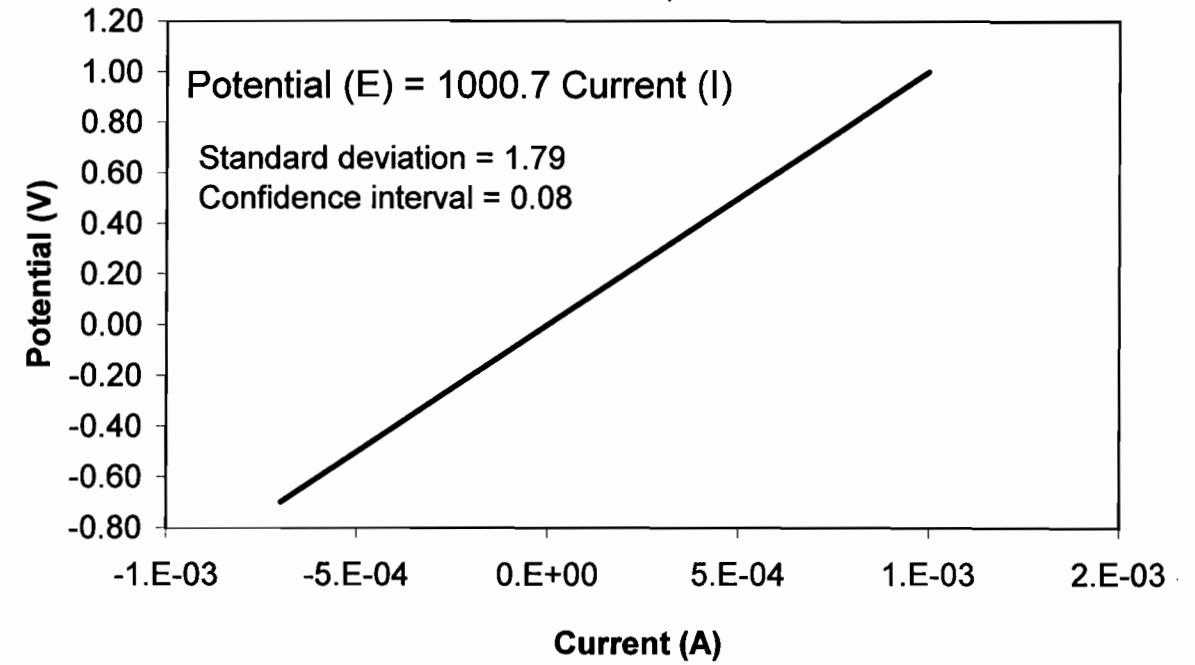


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 10/24/08*

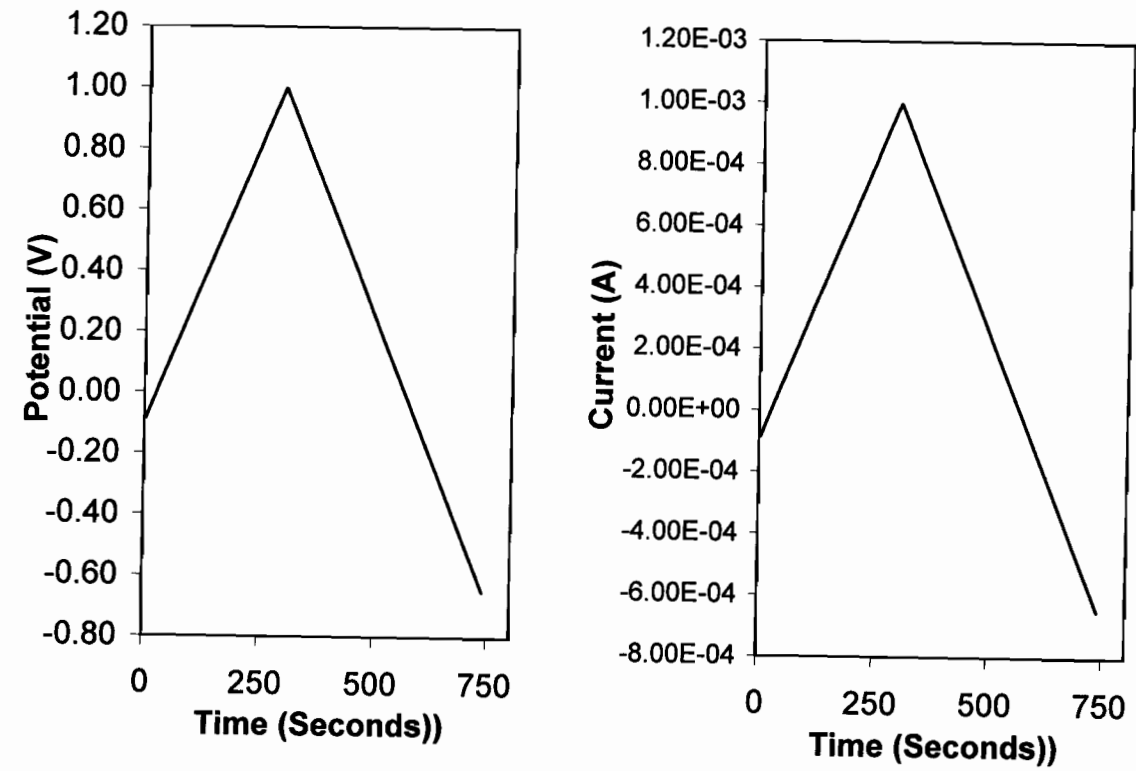
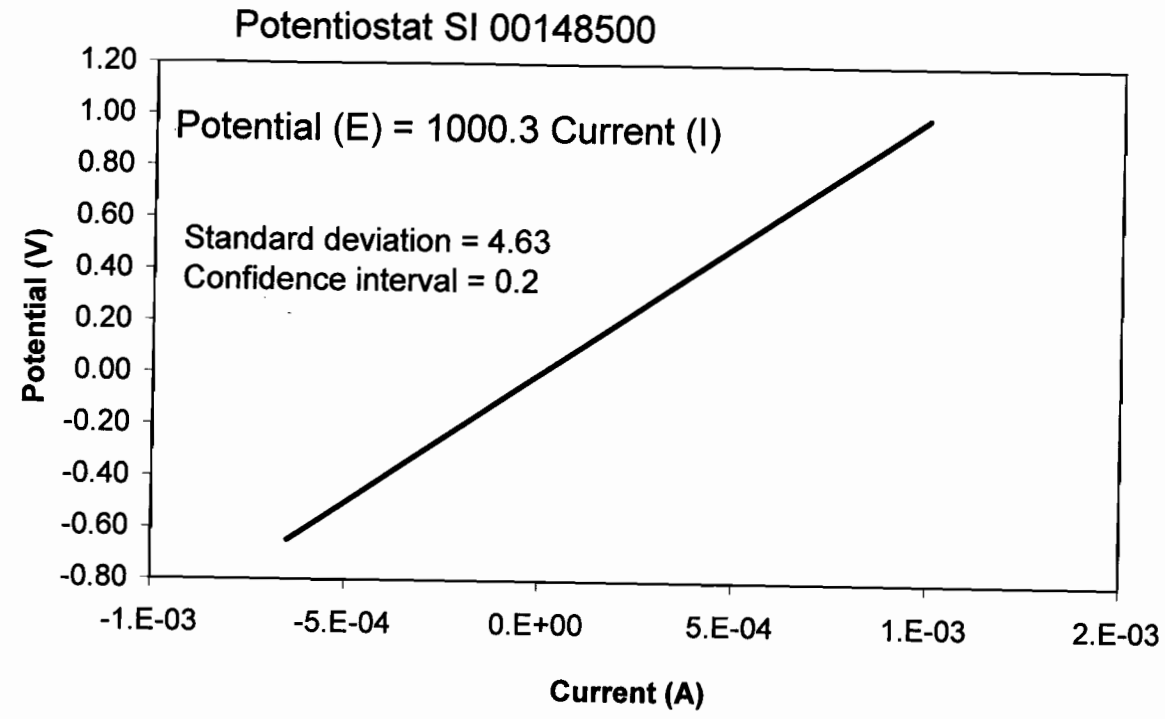
Potentiostat SI 00240051; Channel 8



Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

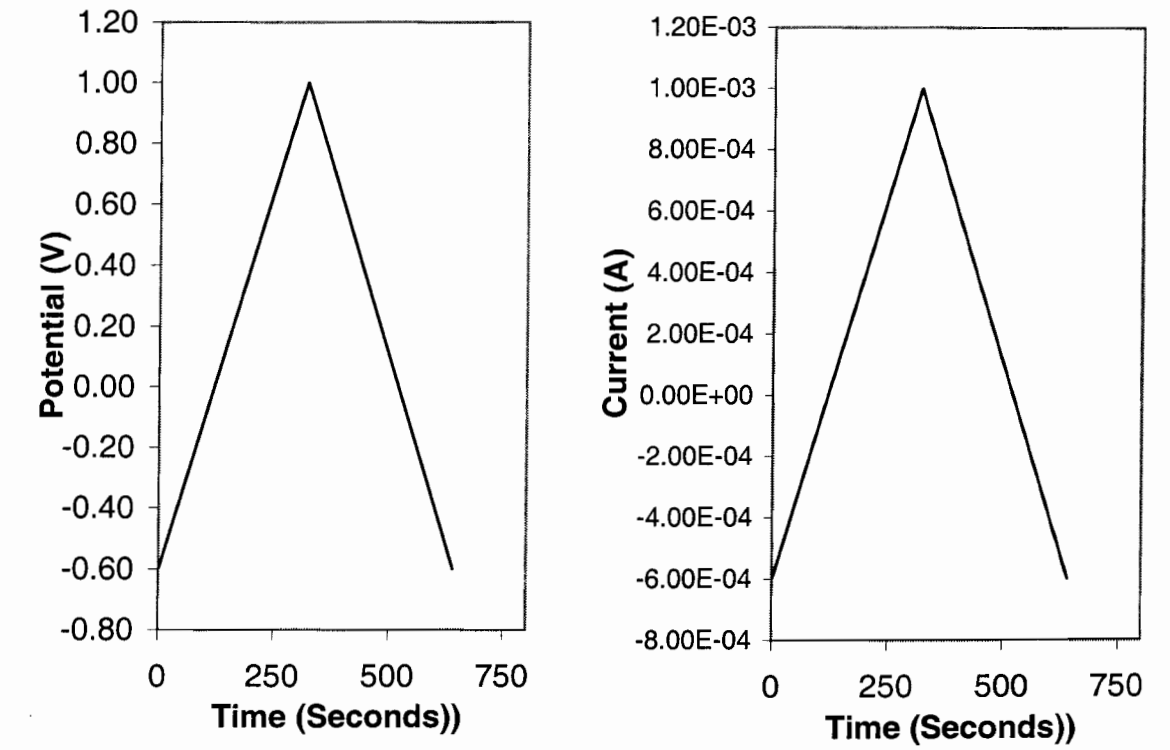
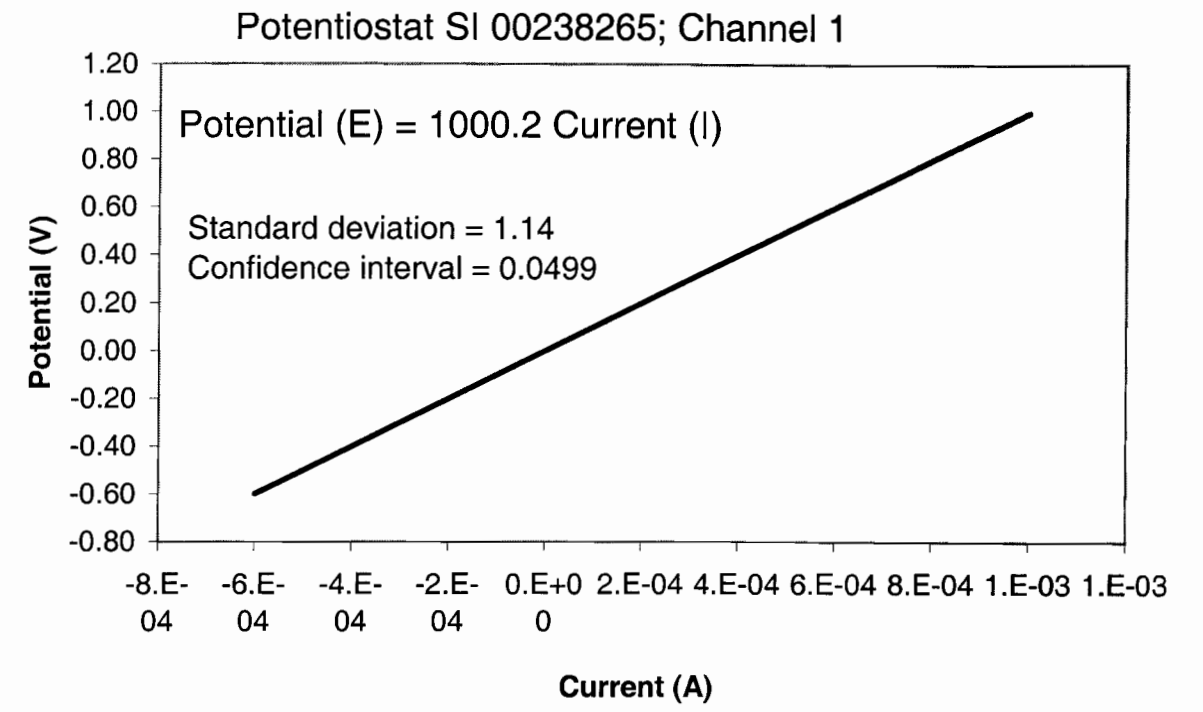
*Xihua He 10/24/08*



Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xi'hua He 10/24/08*

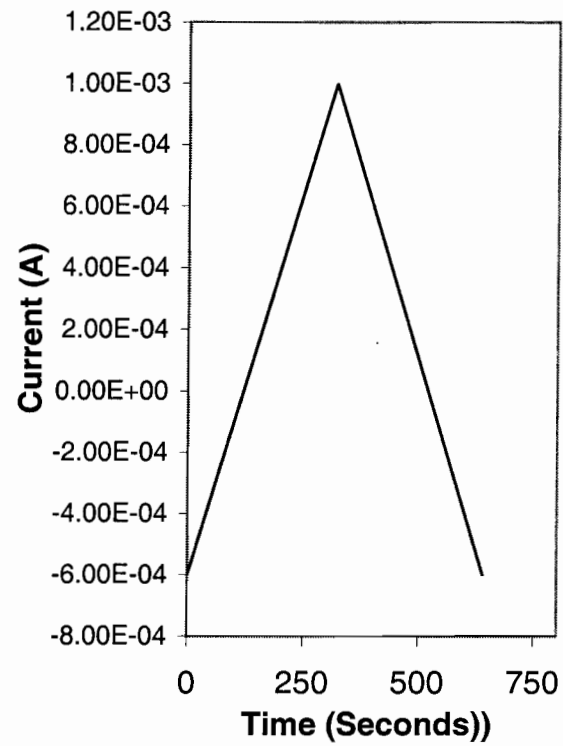
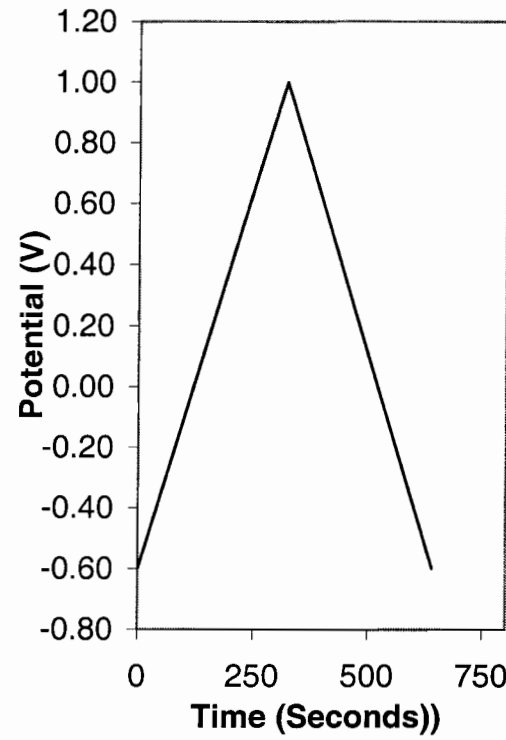
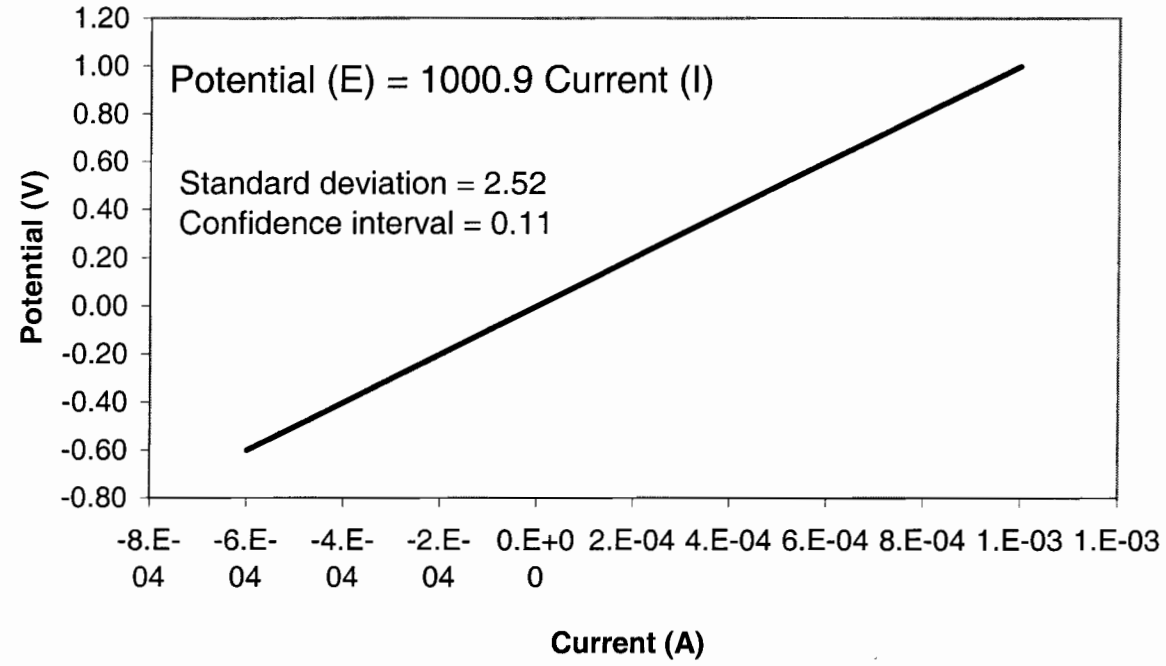


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xi'hua He 11/26/08*

Potentiostat SI 00238265; Channel 2

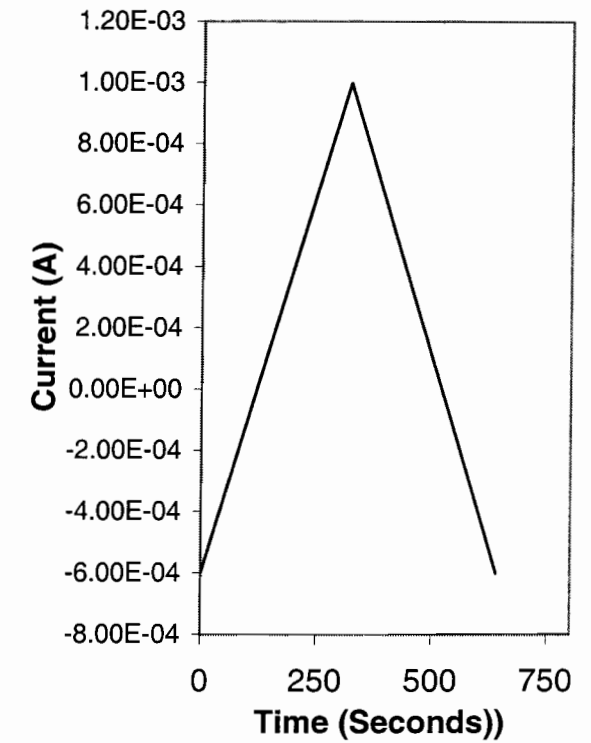
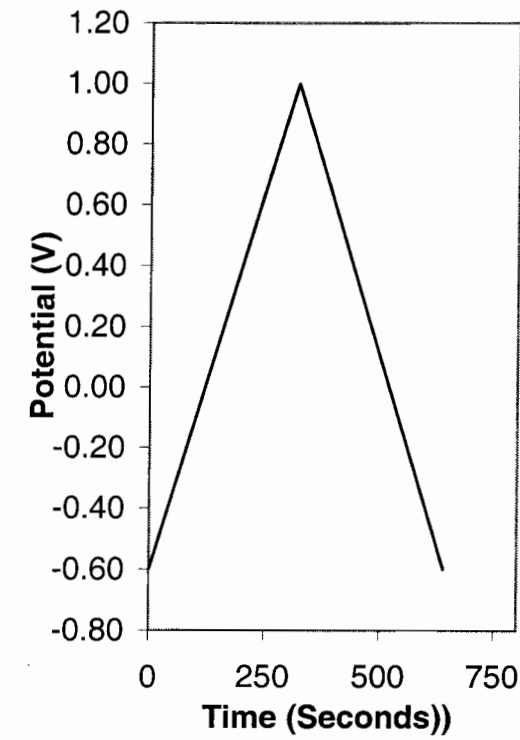
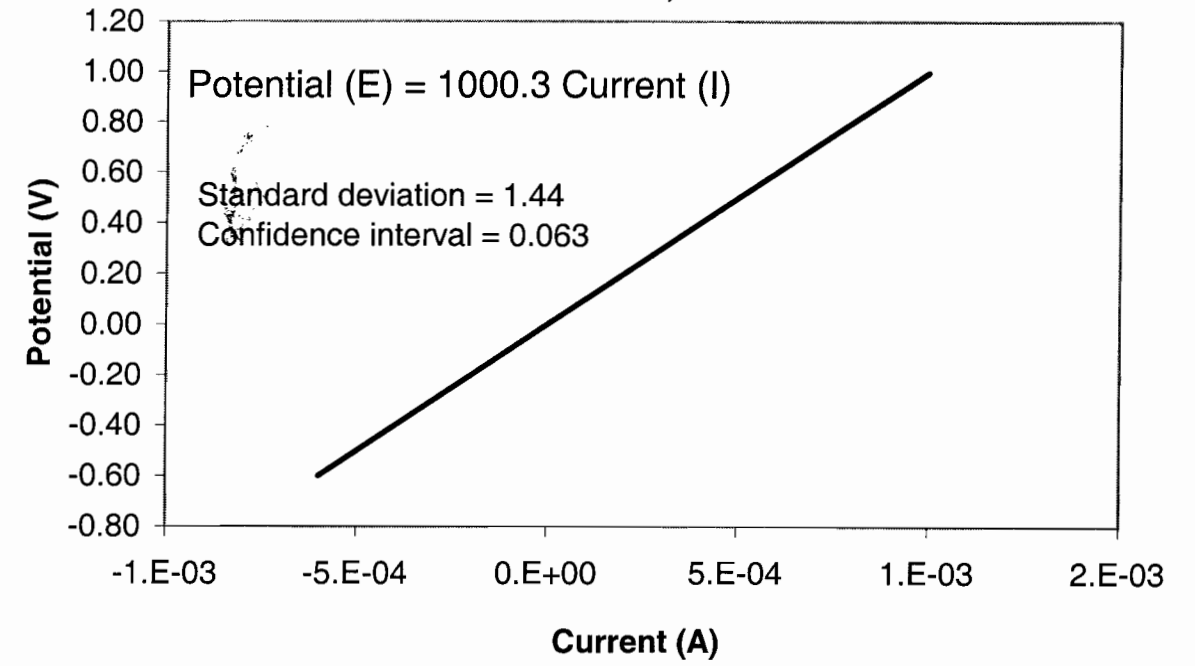


Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 11/26/08*

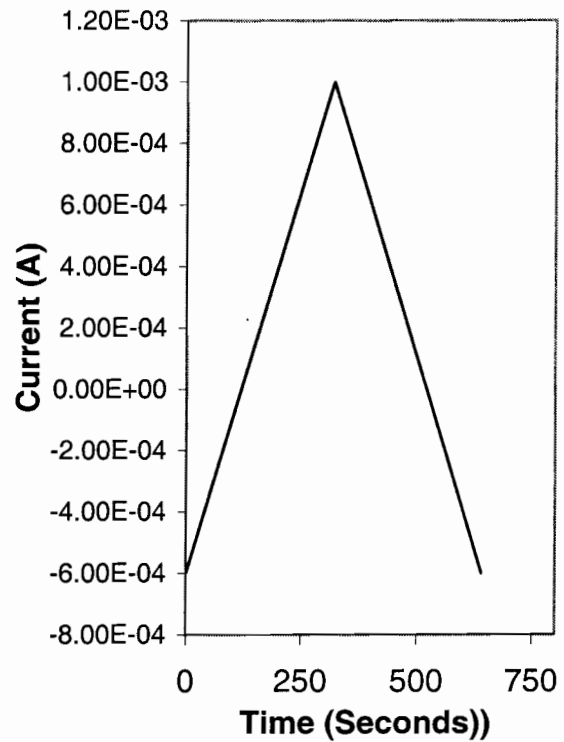
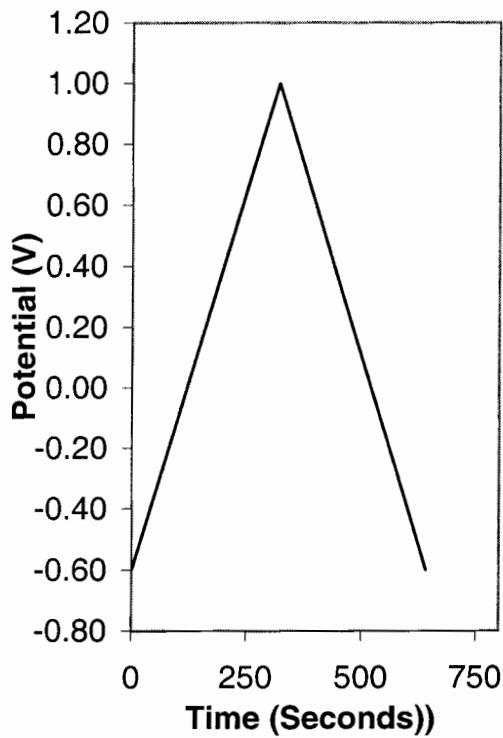
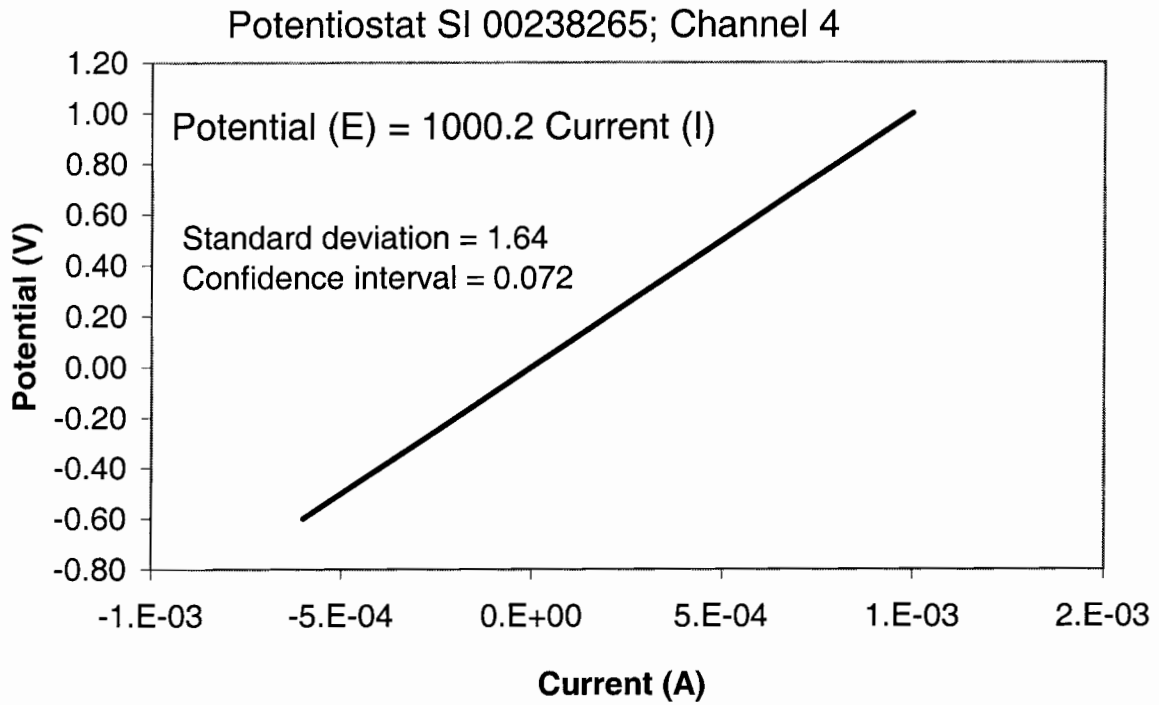
Potentiostat SI 00238265; Channel 3



Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xihua He 11/26/08*



Calibrated with resistor box SN: 171001, Cal: 10/13/08; Due: 4/13/09

Conclusion: This channel meets the requirement specified in TOP-22.

*Xuhua He 11/26/08*