

### OCP Tests

Objective: to measure open circuit potentials

Specimen: C22 specimen Heat# 2277-3-3266 CNWRA Drawing 20.06002.01.322.002 polished to a 600 grit finish cleaned with Acetone

Crevice washers: T:7 HT# CN2775 Washers & Hardware (small)

Torque Screwdriver: Tave Craft 75 In-lbs SN: 694000691 Cal: 7/25/06 Due: 7/25/07

Initial Weight: 23.09710g Model: Sartorius Genius SN: 12809099  
Final Weight: 23.09751g Cal: 5/9/06 Due: 11/9/06

SOLUTION: 4 M NaCl  
467.54g NaCl lot# 054711  
+ DE to 2000ml

Reagents measured with Model: OHAUS SN: 2883 Cal: 7/5/06 Due: 1/5/07

Initial pH: 6.84 Model: Orion SN: 2330  
Final pH: 7.08 CAL: 7/6/06 DUE: 7/6/07  
pH Probe: #13-620-296 SN: 5003095

TEST TEMPERATURE: 95°C Measured with Hg Thermometer SN: H98-182 Cal: 5/11/06 Due: 5/11/07

Counter Electrode: Platinum Flag  
Reference Electrode: Fisher SCE SN: 3329075

Gas: 99.999% Nitrogen Zero Air  
Ecorr: -190 mV vs SCE Model: Keithley 614 SN: 0704934  
Ept: +265 mV vs SCE Cal: 6/6/06 Due: 6/6/07

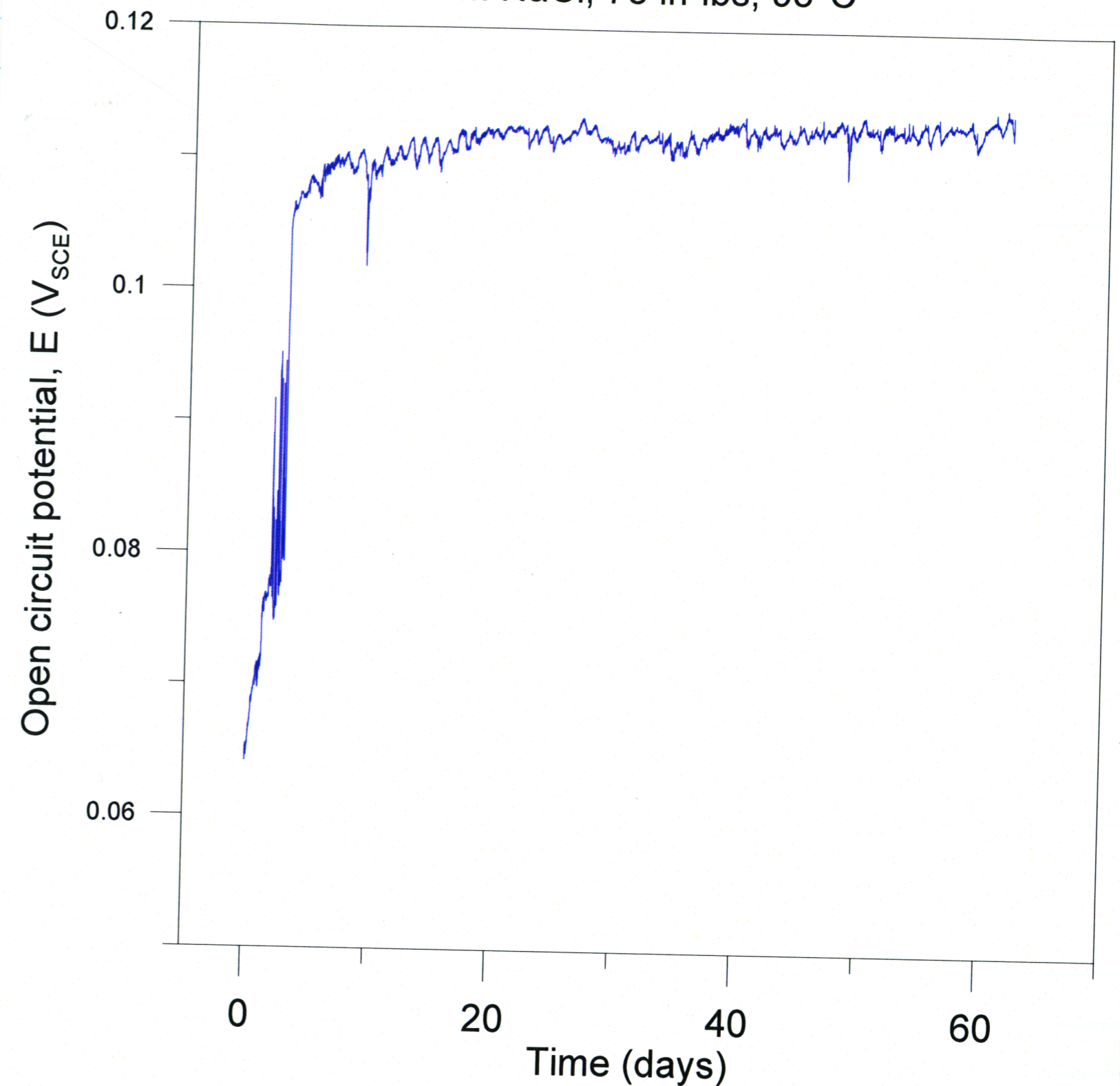
Potentiostat: Solartron 1480 SN# 00240551 cal 11/7/06  
Test ID: C22Ti7OCP03 Due 5/7/07

Specimen Examination: started 11/7/06 Ended 1/8/07  
No crevice corrosion - dull tint staining on all surfaces  
No corrosion on T:7 washers and hardware

Data files: ocpC22Ti71107-unldh2, ocpC22Ti71114,  
ocpC22Ti71121, ocpC22Ti71128, 1205, 1212, 1219, 1226, 1-207, 1-209

*[Signature]* 11/7/06

Test ID: C22Ti7OCP03  
C22 crevice specimen-Ti Grade 7 crevice washers,  
4 M NaCl, 75 in-lbs, 95°C



*[Signature]* He 11/11/07

XH 3/25/08

Objective: SEE PAGE #1

SPECIMENS: Crevice Specimen drawing # 20.06002.01.322.002 polished to 600 Grit finish then cleaned in acetone

C-22 HT# 2277-3-3266  
Specimen Base Alloy

C-22 HT# 2277-3-3266  
Plate

C-22 HT# 2277-3-3266  
Crevice Washers/Hardware

Torque Screwdriver: Torc Craft 75 In-lbs  
Cal: 7/25/06

SN: 694000691  
Due: 7/25/07

Initial Weight: ~~23.09710g~~ 23.75540g  
Model: Sartorius Genius

SN: 12809099

Final Weight: 23.75313g  
Cal: 5/9/06

Due: 11/9/06

SOLUTION:

4 m CaCl<sub>2</sub> · 2H<sub>2</sub>O  
1176.16g CaCl<sub>2</sub> · 2H<sub>2</sub>O Lot # 061720  
+ DI To 2000 ml

Reagents measured with

Model: OHAUS  
Cal: 7/5/06

SN: 2883  
Due: 1/5/07

Initial pH: 3.84

Model: Orion EA 940

SN: 2330

Final pH: 3.54

Cal: 7/6/06

Due: 7/6/07

pH Probe: #13-620-296

SN: 5003095

TEST TEMPERATURE: 95°C Thermometer: Fisher

SN: 4418

Cal: 6/1/06

Due: 6/1/07

Reference Electrode: Fisher SCE # 13-620-52

SN: 3300328

GAS: Zero Air

( CREVICE )

Ecorr: -375 mV vs SCE

( PLATE )

Ecorr: -334 mV vs SCE

Model: Keithley 614

SN#: 0704934

Cal: 6/6/06

Due: 6/6/07

Potentiostat: Solartron 1480

sn# 00240551

cal: 11/7/06 Due: 6/7/07

TEST ID: MA22CaCl2c X-11 2/28/07

DATA FILES: C22Call21107I - UniCh5, C22Call21107E - UniCh6, 1114, 1121,

1128, 1205, 1211, 1212, 1219, 1226, D102, 0109, 0116, 0123, 0130, 0206, 0213

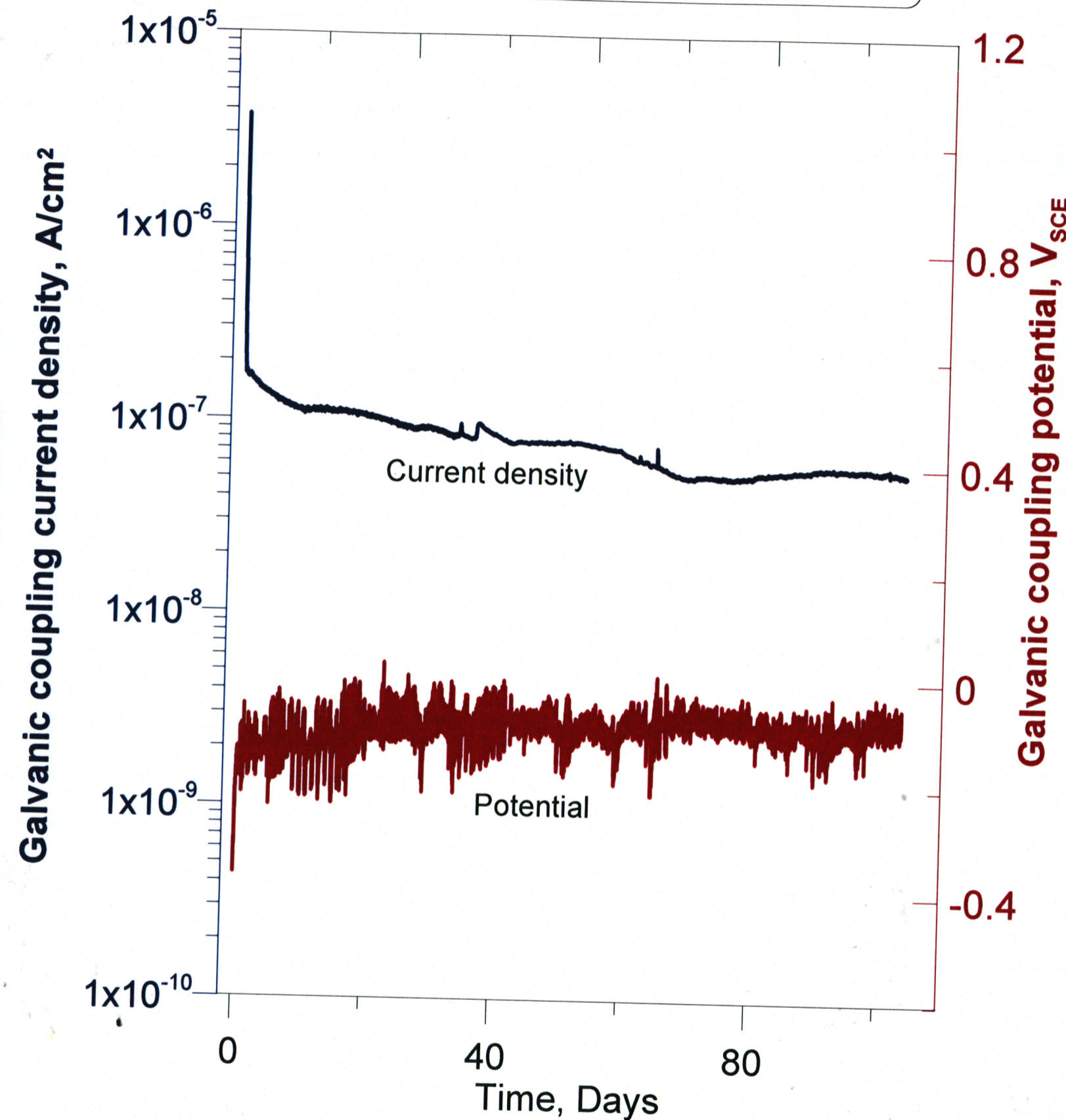
Specimen Examination: started 11/7/06 ended 2/19/07 Total time: 8.9 x 10<sup>6</sup> s = 103.7 days

Crevice Corrosion 1/4 feet of C-22 crevice washers - 3 other sites appear to have surface etching? or could be related to the torque of 75 In lbs C-22 crevice washers have corrosion on one side - Etching on outside of other C-22 crevice washer between nut and outside of washer C-22 plate No Corrosion - m.l.o surface staining on all material

*[Signature]*  
11/7/06

Test ID: MA22CaCl2c

4 M CaCl<sub>2</sub>, 95°C, Alloy 22/Alloy 22 (75 in-lbs)  
Coupled to Alloy 22 Plate



Penetration depth: 212 um on crevice specimen

108 um on washer

Measured with Olympus metallurgical microscope PME3

Cal: 12/21/06 Due: 6/21/07

*[Signature]*  
3/26/07

*[Signature]*  
3/21/07

### OCP Tests

Objective: to measure open circuit potentials

Specimen: C22 specimen Heat# 2277-3-3266 CNWRA Drawing 20.06002.01.322.002 polished to a 600 grit finish cleaned with Acetone

Crevice washers: Ti 7 HT# CN2775 Crevice Washers And Hardware  
*Small*

Torque Screwdriver: *Tec Craft 75 In-lbs* SN: 694000691  
Cal: 7/25/06 Due: 7/25/07

Initial Weight: 23.73207g Model: Sartorius Genius SN: 12809099  
Final Weight: 23.73198g Cal: 5/9/06 Due: 11/9/06

SOLUTION: 4 M NaCl  
467.56g NaCl Lot# 05471  
+ DI To 2000ml

Reagents measured with Model: OHAUS SN: 2883  
Cal: 7/5/06 Due: 1/5/07

Initial pH: 8.82 Model: Orion SN: 2330  
Final pH: 7.36 Cal: 7/6/06 Due: 7/6/07  
pH Probe: #13-620-296 SN: 5603095

TEST TEMPERATURE: 95°C Measured with Hg Thermometer SN: 1498-179  
Cal: 5/11/06 Due: 5/11/07

Counter Electrode: Platinum Flag

Reference Electrode: Fisher SCE SN: 3328225  
*see 11/8/06*

Gas: 99.999% Nitrogen Zero Air  
Ecorr: -312 mV vs SCE Model: Keithley 614 SN: 0704934  
Ept: +213 mV vs SCE Cal: 6/6/06 Due: 6/6/07

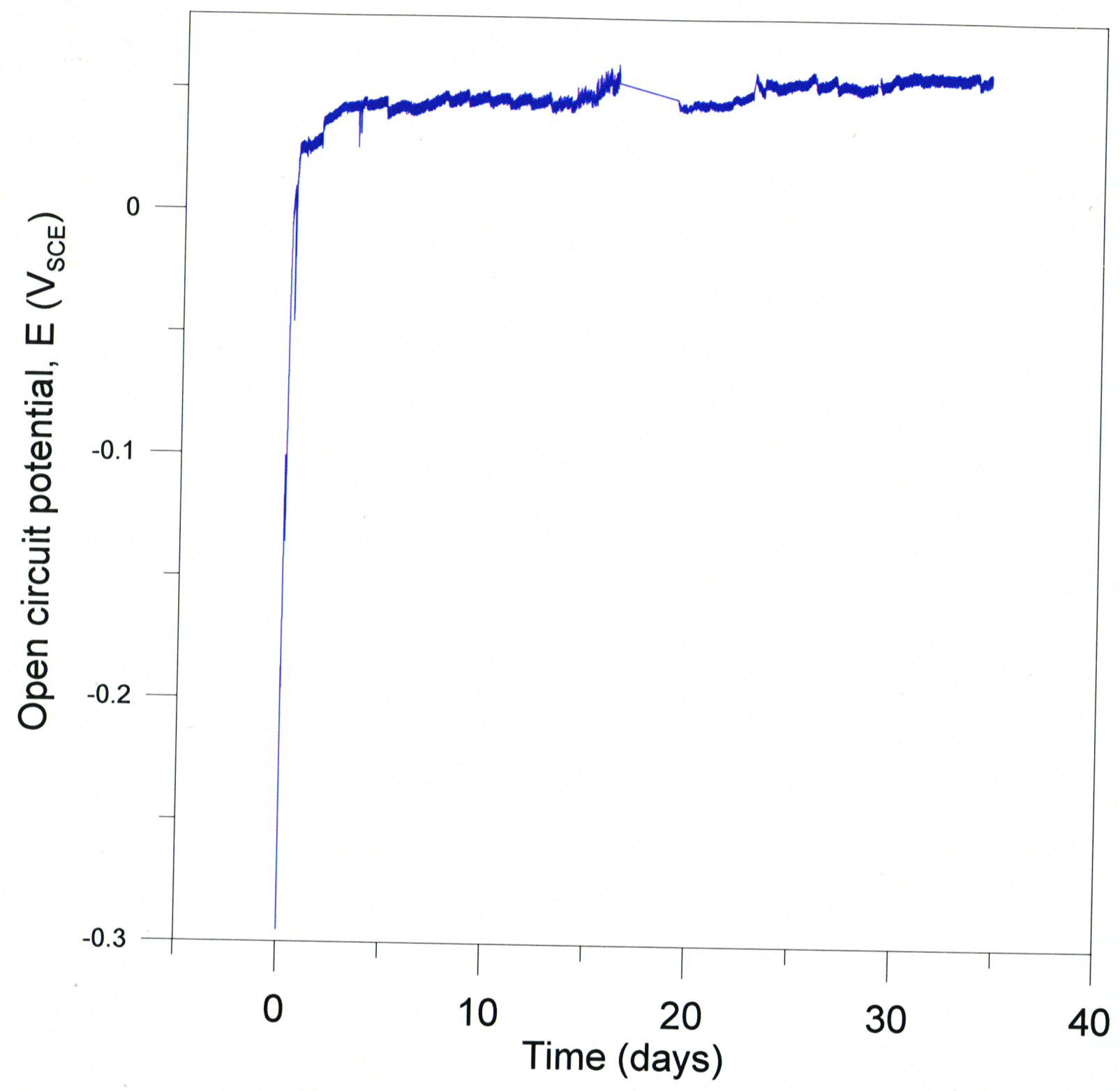
Potentiostat: Solatron 1480 SN# 00240053 Cal: 8/23/06  
Test ID: *C22 Ti 7 OCP 04* Due: 2/23/07

Specimen Examination: Started 11/8/06

No Crevice Corrosion on C-22 Specimen  
No Corrosion on Ti 7 Crevice Washers or Hardware  
Mild Blue tint staining on Specimen - Dull Tint  
Staining on Ti 7 Material

*[Signature]* 11/8/06

Test ID: C22Ti7OCP04  
C22 crevice specimen-Ti Grade 7 crevice washers,  
4 M NaCl, 75 in-lbs, 95°C



*Kulman He 11/11/06*

*X.r.t 3/26/07*

### OCP Tests

Objective: to measure open circuit potentials

Specimen: C22 specimen Heat# 2277-3-3266 CNWRA Drawing 20.06002.01.322.002 polished to a 600 grit finish cleaned with Acetone

Crevice washers: C-22 HT# 2277-3-3266 Crevice Washers And Hardware (Large)

Torque Screwdriver: True Craft 75 In-lbs SN: 694000691 Cal: 7/25/06 Due: 7/25/07

Initial Weight: 23.47410g Model: Sartorius Genius SN: 12809099  
Final Weight: 23.47341g Cal: 11/8/06 Due: 5/8/07

SOLUTION: 4.0 m NaCl  
467.56 NaCl Lot# 05417  
+ DI To 2000mls

Reagents measured with Model: OHAUS SN: 2883 Cal: 1/2/07 Due: 7/2/07

Initial pH: 6.79 Model: Orion SN: 2330  
Final pH: 6.53 CAL: 7/6/06 DUE: 7/6/07  
pH Probe: #13-620-296 SN: 4065196

TEST TEMPERATURE: 95°C Measured with Hg Thermometer SN: 4279 Cal: 6/1/06 Due: 6/1/07

Counter Electrode: Platinum Flag

Reference Electrode: Fisher SCE SN: 8131157

Gas: Zero Air

Ecorr: -320 mV vs SCE Model: Keithley 614 SN: 0704936  
Ept: +240 mV vs SCE Cal: 5/17/06 Due: 5/17/07

Potentiostat: solatron 1480 SN# 00240551  
Test ID: C22C22OCP03 Cal: 11/7/06 Due: 5/7/07

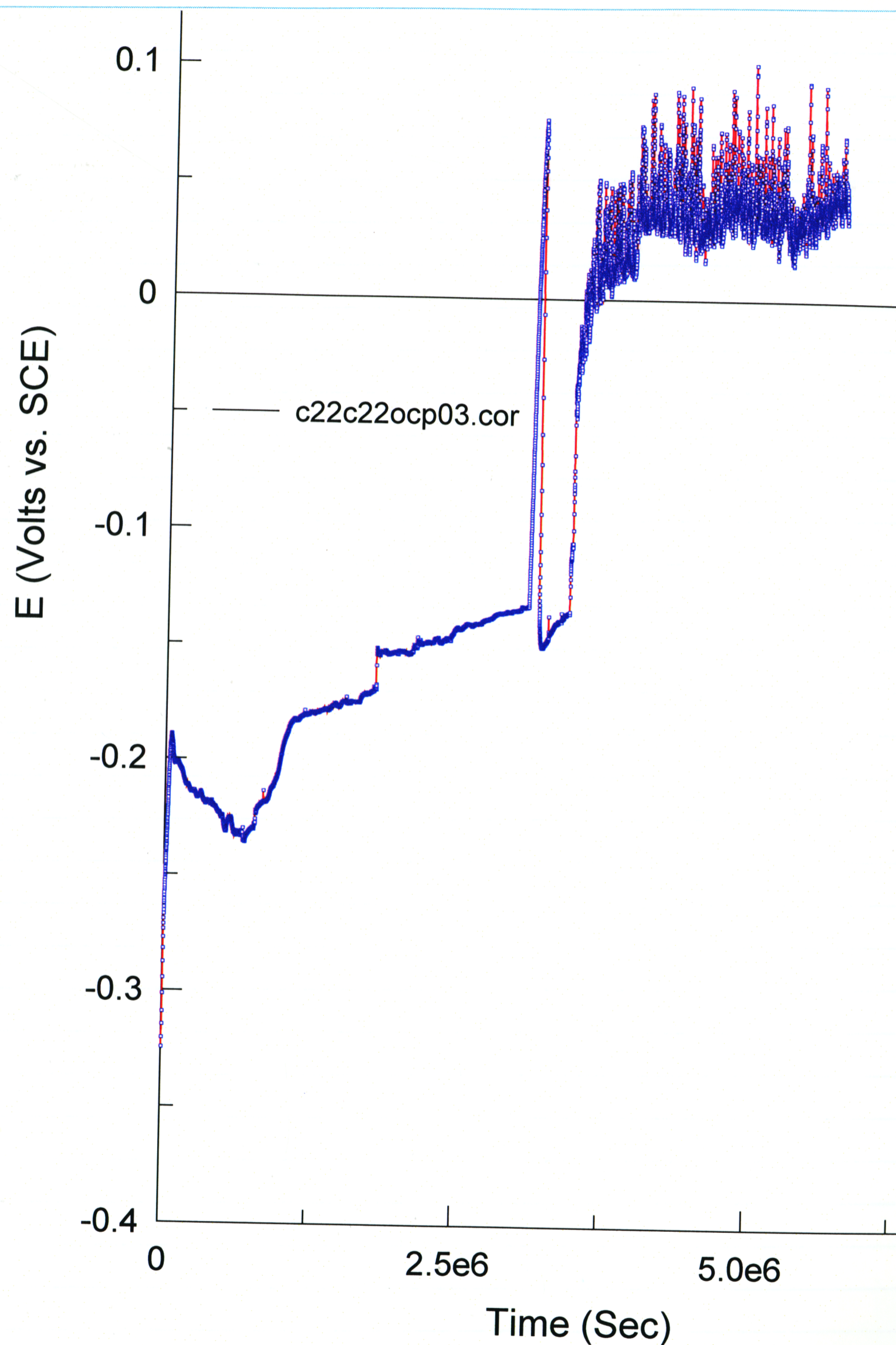
Specimen Examination: started 1/8/07 - 3/16/07

File names: ocp22c220108#3 - undisch, (end)  
Test time: 667 days 0115, 0122, 0129, 0205, 0212, 0219, 0220, 0222, 0226, 0305, 0312

Crevice Corrosion on 1/24 feet of C-22 crevice washers  
No corrosion on washer side just to the C-22 specimen  
Mild surface staining on all surfaces of specimen  
And crevice washers

X.H.  
5/15/07

*[Signature]* 1/8/07



X.H. He 3/26/07

OCP Tests

Objective: to measure open circuit potentials

Specimen: C22 specimen Heat# 2277-3-3266 CNWRA Drawing 20.06002.01.322.002 polished to a 600 grit finish cleaned with Acetone

Crevice washers: T17 H<sup>#</sup> CN 2775 Crevice washers And Haroursac (Large)

Torque Screwdriver: True Craft 75 In-lb SN: 694000691  
Cal: 7/25/06 Due: 7/25/07

Initial Weight: 23.5899g Model: Sartorius Genius SN: 12809099  
Final Weight: 23.59031g Cal: 11/8/06 Due: 5/8/07

SOLUTION: 4.0 m NaCl  
467.54g NaCl Lot# 05417  
+ DI H<sub>2</sub>O 2000mls

Reagents measured with Model: OHAUS SN: 2883  
Cal: 1/2/07 Due: 7/2/07

Initial pH: 7.39 Model: Orion SN: 2320  
Final pH: 7.57 Cal: 7/6/06 Due: 7/6/07  
pH Probe: #13-620-296 SN: 4065196

TEST TEMPERATURE: 95°C Measured with Hg Thermometer SN: 5283  
v.m. 6/5/07 Cal: 6/27/06 Due: 6/27/07

Counter Electrode: Platinum Flag

Reference Electrode: Fisher SCE SN: 0066119

Gas: Zero Air

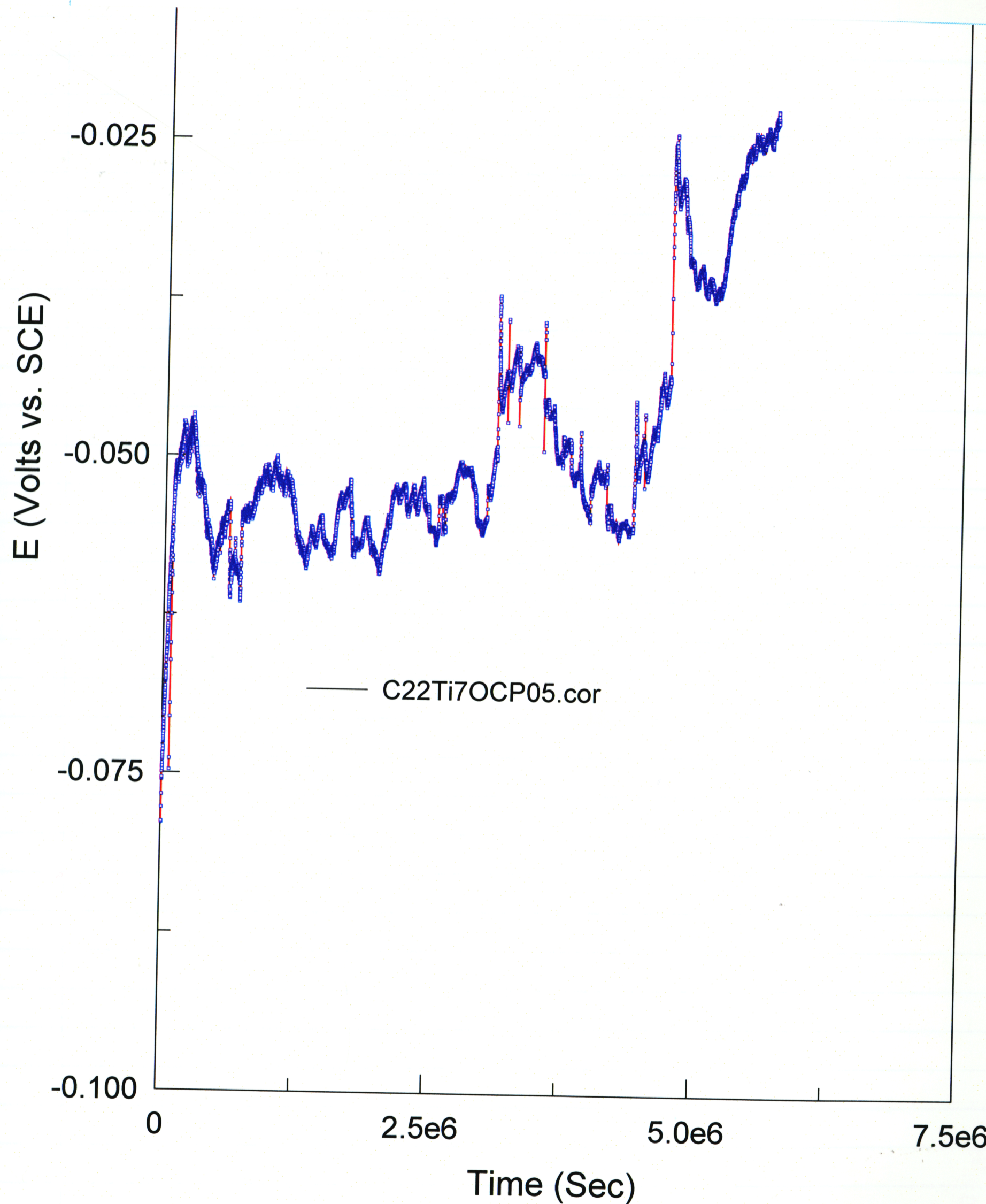
Ecorr: -81mV vs SCE Model: Keithley 614 SN: 0704936  
Ept: +233mV vs SCE Cal: 5/17/06 Due: 5/17/07

Potentiostat: Solartron 1480 SN# 00240551  
Test ID: C22Ti7OCP05 Cal: 11/7/06 Due: 5/7/07

Specimen Examination: started 1/8/07 — 3/16/07 end

No Corrosion 1/4 feet of T17 crevice washers  
some surface scratches and compression marks  
on C-22 surface from the 75 In lb torque  
Dull tint staining on C22 specimen and T17  
material

*[Signature]* 1/8/07



Xichun He 3/26/07

### OCP Tests

Objective: to measure open circuit potentials

Specimen: C22 specimen Heat# 2277-3-3266 CNWRA Drawing 20.06002.01.322.002 polished to a 600 grit finish cleaned with Acetone

Crevice washers: Ti7 HT# CN 2775 Crevice Washers And Hardware (Ly)

Torque Screwdriver: True Craft 75 In-lbs SN: 694000691 Cal: 7/25/06 Due: 7/25/07

Initial Weight: 23.46387g Model: Sartorius Genius SN: 12809099 Final Weight: 23.46363g Cal: 11/8/06 Due: 5/8/07

SOLUTION: SCW - Simulates Concentrated Water + DI water to 2000 ml  
KCl = 12.963g Lot# 043820 Na<sub>2</sub>SO<sub>4</sub> = 41.41g Lot# 035461  
NaCl = 10.865g Lot# 054171 NaHCO<sub>3</sub> = 192.69g Lot# 054010  
NaNO<sub>3</sub> = 17.502g Lot# 050093 NaF = 6.191g Lot# 006679  
Reagents measured with Model: OHAUS SN: 2883 Cal: 1/2/07 Due: 7/2/07

Initial pH: 7.96 Model: Orion SN: 2330 Final pH: 10.45 Cal: 7/6/06 Due: 7/6/07 pH Probe: #13-620-296 SN: 4065196

Adjusted pH to 10.3 with 10M NaOH Lot# 037972

TEST TEMPERATURE: 95°C Measured with Hg Thermometer SN: H98-162 Cal: 4/7/06 Due: 4/6/07

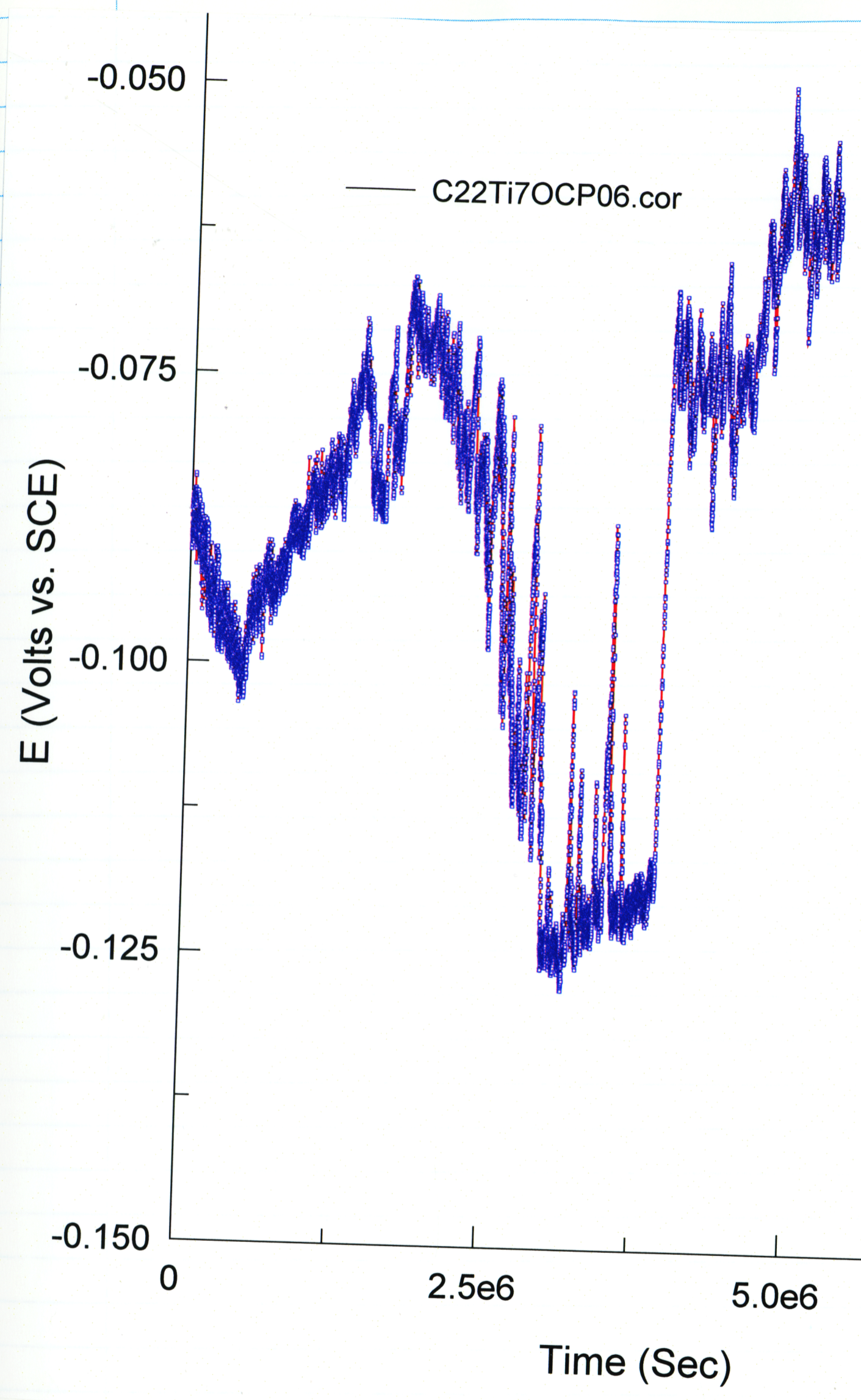
Counter Electrode: Platinum Flag Reference Electrode: Fisher SCE 13-620-52 SN: 4029031

Gas: Zero Air Model: Keithley 614 SN: 0704936 Ecorr: -767 Vs SCE Cal: 5/17/06 Due: 5/17/07 Ept: -71 Vs SCE

Potentiostat: Solatron 1400 SN# 00238265 Test ID: C22Ti7OCP06 Cal: 9/11/06 Due: 3/11/07

Specimen Examination: Test time: 61.6 days v. r. 3/26/07  
No Corrosion on C-22 Specimen or Ti7 Crevice Washers  
Dull Tint film looking stain on All Surfaces of C-22 specimen And Ti7 material  
\* will Repolish Specimen for further Testing

*[Signature]* 1/10/07



~~1/10/07~~  
Xichen He  
3/26/07

### OCP Tests

Objective: to measure open circuit potentials

Specimen: C22 specimen Heat# 2277-3-3266 CNWRA Drawing 20.06002.01.322.002 polished to a 600 grit finish cleaned with Acetone

Crevice washers: C-22 HT# 2277-3-3266 Crevice Washers And Hardware (large)

Torque Screwdriver: *Tave Crest 75 In-lbs* SN: 694000 691  
Cal: 7/25/06 Due: 7/25/07

Initial Weight: 23.5592 g Model: Sartorius Genius SN: 12809099  
Final Weight: 23.55587 g Cal: 11/8/06 Due: 5/8/07

SOLUTION: SCW - Simulated Concentrated H<sub>2</sub>O  
KCl = 12.962 lot# 043820 Na<sub>2</sub>SO<sub>4</sub> = 41.39 lot# 035461  
NaCl = 10.866 lot# 054171 NaHCO<sub>3</sub> = 192.70 lot# 034010  
NaNO<sub>3</sub> = 17.508 lot# 050093 NaF = 6.190 lot# 006679  
Reagents measured with Model: OHAUS SN: 2883  
Cal: 1/2/07 Due: 7/2/07

Initial pH: 7.76 Model: Orion SN: 2330  
Final pH: 10.19 Cal: 7/6/06 Due: 7/6/07  
pH Probe: #13-620-296 SN: 4065196

*Adjusted pH to 10.27 with 10m NaOH lot# 037972 csc0335mls*

TEST TEMPERATURE: Measured with Hg Thermometer SN: E98-191  
Cal: 11/28/07 Due: 5/28/07

Counter Electrode: Platinum Flag

Reference Electrode: Fisher SCE 13-620-52 SN: 9252105

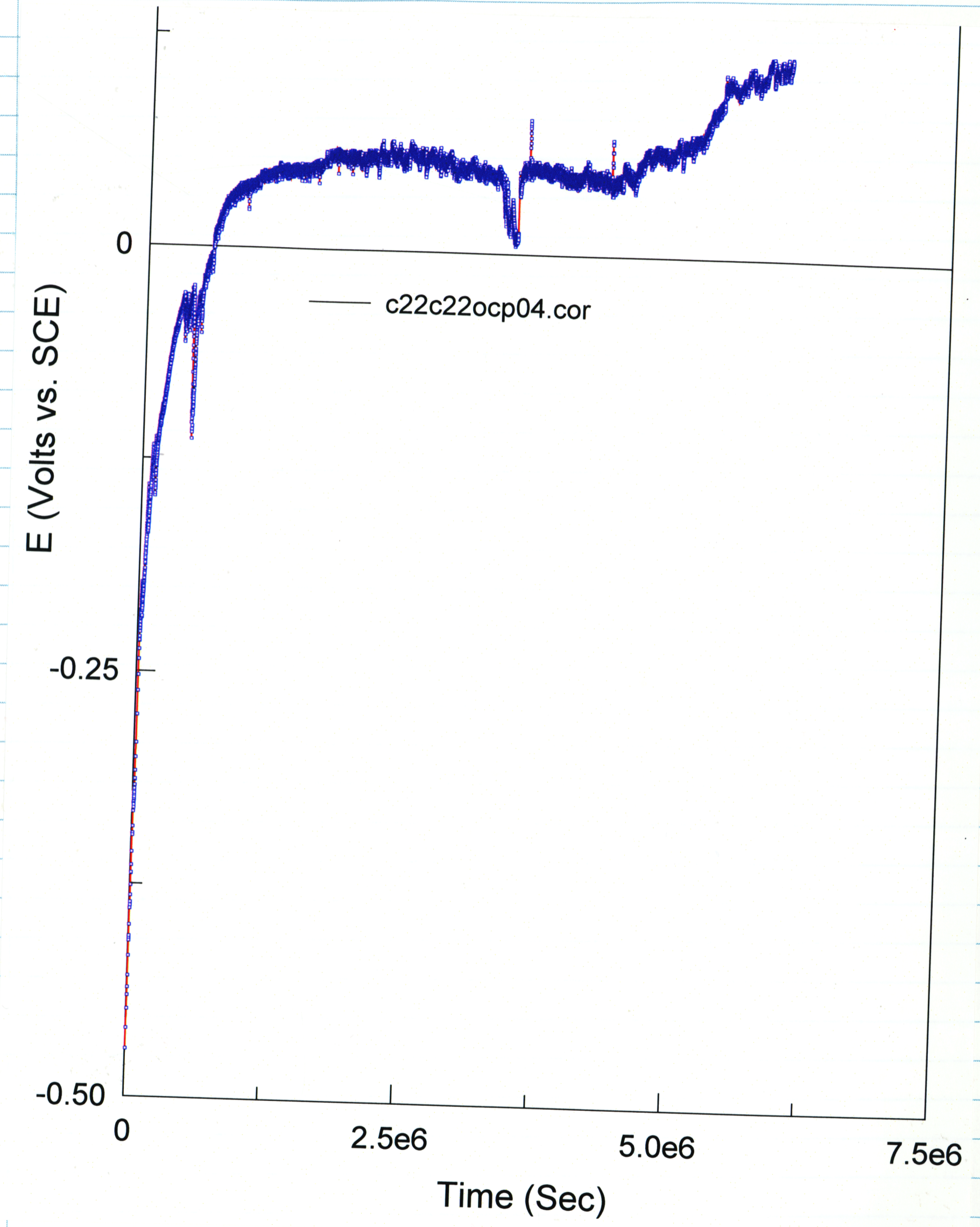
Gas: Zero Air  
Ecorr: -485 Vs SCE Model: Keithley 614 SN: 0704936  
Ept: -227 Vs SCE Cal: 5/17/06 Due: 5/17/07

Test time: *69.0 days end on 3/21/07 x.m 3/26/07*  
Potentiostat: Solarton 1480 SN# 00238265  
Test ID: *C22C22OCP04* cal: 9/11/06 Due: 3/11/07

Specimen Examination: *No Crevice Corrosion on C22 Specimen on C-22 Crevice Hardware - Dull dirt surface staining looks like A film coating.*

\* Note: will Repolish Specimen for further Testing

*Sc Pof 1/10/07*



*x.m 3/26/07*

### OCP Tests

Objective: to measure open circuit potentials

Specimen: C22 specimen Heat# 2277-3-3266 CNWRA Drawing 20.06002.01.322.002 polished to a 600 grit finish cleaned with Acetone

Crevice washers: C-22 HT# 2277-3-3266 Crevice Washers; Hardware (Small)

Torque Screwdriver: True Craft 75 In-lbs  
Cal: 7/25/06 SN: 694600691 Due: 7/25/07

Initial Weight: 23.53727g Model: Sartorius Genius SN: 12809099  
Final Weight: 23.53604g Cal: 11/8/06 Due: 5/8/07

SOLUTION: 4.0 M NaCl  
467.53g NaCl Lot# 05417  
+ DI to 2000mls

Reagents measured with Model: OHAUS SN: 2883  
Cal: 1/2/07 Due: 7/2/07

Initial pH: 6.53 Model: Orion SN: 2330  
Final pH: 6.93 Cal: 7/6/06 Due: 7/6/07  
pH Probe: #13-620-296 SN: 4065196

TEST TEMPERATURE: 95°C Measured with Hg Thermometer SN: C98-132  
Cal: 9/13/06 Due: 9/13/07

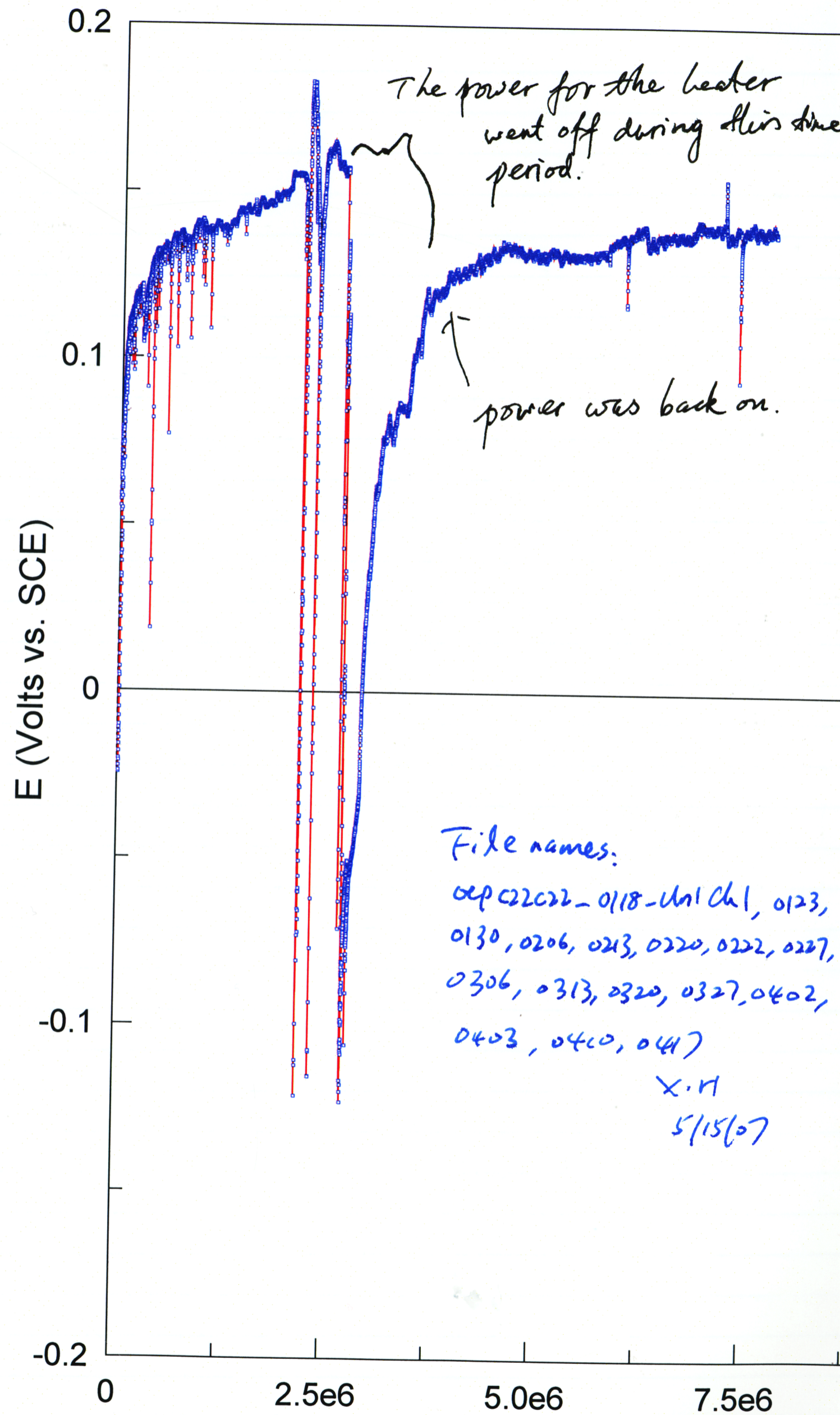
Counter Electrode: Platinum Flag  
Reference Electrode: Fisher SCE SN: 4028035

Gas: Zero Air  
Ecorr: -332 mV vs SCE Model: Keithley 614 SN: 6704936  
Ept: +265 mV vs SCE Cal: 5/17/06 Due: 5/17/07

Potentiostat: Silatron 1450 SN# 00240551  
Test ID: C220220425 Cal: 11/7/06 Due: 5/7/07

Specimen Examination: started 1/16/07 Ended 4/18/07  
No Corrosion 24 feet of C-22 crevice washer  
Dull Blue tint staining on All C-22 material  
No Corrosion on crevice washers. m.l.o surface  
Scratches for 75 In-lb Torque

*[Signature]* 1/16/07



File names:  
 ocp c22022-0118-Unl Ch1, 0123,  
 0130, 0206, 0213, 0220, 0222, 0227,  
 0306, 0313, 0320, 0327, 0402,  
 0403, 0410, 0417  
 X.H  
 5/15/07

The data is invalid.  
 Please refer to NCR 2007-14  
 X.H 6/4/07

Time (Sec)

X.Hua REC 4/24/07