Progress Energy

James Scarola
Vice President
Harris Nuclear Plant
Progress Energy Carolinas, Inc.

AUG 1 8 2005

Serial: HNP-05-063
10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
TO USE FIRE-RESISTIVE ELECTRICAL CABLE AT HARRIS NUCLEAR PLANT

Ladies and Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.90, Carolina Power and Light Company (CP&L) doing business as Progress Energy Carolinas, Inc., requests a license amendment for the Harris Nuclear Plant (HNP). Consistent with Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements," HNP requests approval to use fire-resistive electrical cable, which has been demonstrated to provide an equivalent level of protection as would be provided by three-hour and one-hour rated electrical cable raceway fire barriers, for the protection of safe shutdown electrical cables.

Attachment 1 provides the description, background, and technical analysis for the proposed change to the HNP Final Safety Analysis Report (FSAR).

Attachment 2 details, in accordance with 10 CFR 50.91(a), the basis for HNP's determination that the proposed change to the FSAR does not involve a significant hazards consideration.

Attachment 3 provides the proposed FSAR changes.

Attachment 4 provides the Meggitt Safety Systems, Inc. Fire Test Report Project Number 14980-121039.

Attachment 5 provides the Meggitt Safety Systems, Inc. Fire Test Report Project Number 14980-117047.

With respect to this proposed change there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite and there is no significant increase in individual or cumulative occupational radiation exposure. The proposed change to the Technical Specifications meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant

P.O. Box 165
New Hill, NC 27562

T > 919.362.2502
F > 919.362.2095

A006

to 10 CFR 51.22(b), no environmental assessment or environmental impact statement is required for approval of this application.

In accordance with 10 CFR 50.91(b), HNP is providing the State of North Carolina with a copy of the proposed license amendment.

HNP requests that the proposed amendment be issued prior to February 23, 2006 to support HNP Refueling Outage (RFO)-13, which is scheduled for April 8, 2006.

This document contains no new Regulatory Commitment.

Please refer any question regarding this submittal to Mr. Dave Corlett at (919) 362-3137.

I declare, under penalty of perjury, that the attached information is true and correct (Executed on AUG 1 8 2005).

Sincerely,

James Scarola

JS/jpy

Attachments:

1. Description, Background, and Technical Analysis
2. 10 CFR 50.92 No Significant Hazards Evaluation
3. Proposed FSAR Changes
4. Meggitt Safety Systems, Inc. Fire Test Report Project Number 14980-121039
5. Meggitt Safety Systems, Inc. Fire Test Report Project Number 14980-117047

c:
Mr. R. A. Musser, NRC Senior Resident Inspector
Mr. C. P. Patel, NRC Project Manager
Dr. W. D. Travers, NRC Regional Administrator

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Description

In accordance with the Code of Federal Regulations, Title 10, Part 50.90, "Application for amendment of license or construction permit," Carolina Power and Light Company (CP&L) doing business as Progress Energy Carolinas, Inc., requests a license amendment for the Harris Nuclear Plant (HNP). Consistent with NRC Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements," HNP requests approval to use fire-resistive electrical cable, which has been demonstrated to provide an equivalent level of protection as would be provided by three-hour and one-hour rated electrical cable raceway fire barriers, for the protection of safe shutdown electrical cables.

HNP proposes to use fire-resistive electrical cable to address the specific circuits associated with the volume control tank (VCT) outlet valves to the charging/safety injection pumps (CSIPs) and may use fire-resistive electrical cable in other applications conditioned upon an evaluation to demonstrate that the cable is acceptable for the specific application.

Background

The NRC triennial fire protection inspection of the Fire Protection and Safe Shutdown (SSD) program at HNP (NRC Report 50-400/02-11 dated January 31, 2003) identified findings that included postulated fires in several areas, which could result in damage to control wiring and subsequently could result in: 1) equipment mal-operation which was not identified in the Safe Shutdown Analysis (SSA), and 2) problems associated with the feasibility of manual actions prescribed in the SSA and implementing procedures. Several of these findings were related to the Safe Shutdown (SSD) functions of valves 1CS-165 and 1CS-166, VCT outlet valves to the CSIPs.

To address the identified findings of the Fire Protection and SSD program, HNP is proposing to install three-hour, fire-resistive electrical cable in lieu of the existing electrical cables which do not provide the required level of protection as specified by NUREG 0800, Section 9.5.1, Position C.5.b.2. The cables will be installed as safety-related, seismically-qualified, environmentally-qualified, Class 1E cables, which meet the three-hour fire endurance rating when tested per the requirements of GL 86-10, Supplement 1.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Background (continued)

For the circuits associated with the VCT outlet valves, 1CS-165 and 1C-166, HNP is proposing to install three-hour rated, fire-resistive electrical cable in the following six plant fire areas: 12-A-CR, 1-A-CSRA, 1-A-CSRB, 1-A-SWGRA, 1-A-SWGRB, and 1-A-BAL-B. This installation is conservative for some of the areas (i.e., 1-A-CSRA, 1-A-CSRB, and parts of 1-A-BAL-B), which have fire detectors and an automatic fire suppression system installed, since these areas only require a fire barrier with a one-hour rating as specified by NUREG 0800, Section 9.5.1, Position C.5.b.2.

Since the findings were identified, compensatory measures have been implemented and will be maintained until the proposed modifications are completed and NRC approval of the proposed amendment request is received.

Technical Analysis

10 CFR 50.48 requires that all operating nuclear power plants have a fire protection program that satisfies Criterion 3 of Appendix A to 10 CFR Part 50.

Harris Operating License NFP-63, Condition 2.F, "Fire Protection Program," specifies, in part, that Carolina Power and Light (CP&L) implement and maintain in effect all provisions of the approved fire protection program as described in the FSAR for the facility as amended and as approved in the Safety Evaluation Report (SER) dated November 1983 (through Supplement 4 dated October 1986), and the Safety Evaluation dated January 12, 1987.

Harris UFSAR Section 9.5.1.2.2, "Barriers and Access," states that fire barriers with a minimum fire resistance rating of three hours were provided such that both redundant divisions or trains of safety-related systems were not subject to damage from a single fire to the extent possible in accordance with NRC position C.5.b.2 of Branch Technical Position (BTP) Chemical Engineering Branch (CMEB) 9.5-1 (NUREG-0800), dated July 1981.

NUREG 0800, Section 9.5.1, Position C.5.b.1 states, "Fire protection features should be provided for structures, systems and components important to safe shutdown. These features should be capable of limiting fire damage so that:

(a) One train of systems necessary to achieve and maintain hot shutdown conditions (hot standby for a PWR) from either the control room or emergency control station(s) is free of fire damage; and

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Technical Analysis (continued)

(b) Systems necessary to achieve and maintain cold shutdown from either the control room or emergency station(s) can be repaired within 72 hours."

NUREG 0800, Section 9.5.1, Position C.5.b.2 provides the following three (3) methods for meeting the criteria specified by Position C.5.b.1:

(a) "Separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers should be protected to provide fire resistance equivalent to that of the barrier;

(b) Separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area; or

(c) Enclosure of cables and equipment and associated circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area."

NUREG 0800, Section C.5.b.2 provides the NRC guidance for meeting the guidelines of C.5.b.1. In the approved HNP Fire Protection Program, HNP committed to specifically utilize one of the options specified in C.5.b.2. The Meggitt Safety System cable is unique in that the system is capable of performing its intended function during and after the fire exposure prescribed by NRC Generic Letter 86-10, Supplement 1, without the use of a fire barrier system. Therefore, the use of the Meggitt cable represents a deviation from the approved HNP fire protection program, and approval from the NRC is required.

This position is reinforced by the following NRC guidance provided in GL 86-10, Question 8.4, "Future Changes," and Question 8.10, "'ASTM E-119' Design Basis":

QUESTION 8.4

Will future changes (no matter how minor) to approved configurations be required to be reviewed by the Staff in an exemption request? At what point may the process of 10 CFR 50.59 be invoked?

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Technical Analysis (continued)

RESPONSE 8.4

If a future modification involves a change to a license condition . . . a license amendment must be submitted. . . . If the [50.59] evaluation finds that there is an impact that could result in the area . . . not being in conformance . . . with some . . . aspect of the approved fire protection program . . . the licensee must . . . justify and request . . . for post-1979 plants, approval from the NRC.

QUESTION 8.10

Is an exemption/deviation required, if components are designed to withstand an "ASTM E-119" fire?

RESPONSE 8.10

Some cables are being developed for high temperature (e.g., 1700 F) applications. An exemption would be required if such cable is used in lieu of the alternatives of III.G.2 or III.G.3 in a pre-1979 plant. A deviation from the guidelines would be required for similar applications in a post[-]1979 plant.

To address the identified findings of the Fire Protection and SSD program, HNP is proposing to install three-hour, fire-resistive electrical cables in lieu of the existing electrical cables which do not provide the required level of protection as specified by NUREG 0800, Section 9.5.1, Position C.5.b.2. The cables will be installed as safety-related, seismically-qualified, environmentally-qualified, Class 1E cables, which meet the three-hour fire endurance rating when tested per the requirements of NRC GL 86-10, Supplement 1.

For the circuits associated with the VCT outlet valves, 1CS-165 and 1C-166, HNP is proposing to install three-hour, fire-resistive electrical cable in the following six plant fire areas: 12-A-CR, 1-A-CSRA, 1-A-CSRB, 1-A-SWGRA, 1-A-SWGRB, and 1-A-BAL-B. This installation is conservative for some of the areas (i.e., 1-A-CSRA, 1-A-CSRB, and parts of 1-A-BAL-B), which have fire detectors and an automatic fire suppression system installed, since these areas only require a fire barrier with a one-hour rating as specified by NUREG 0800, Section 9.5.1, Position C.5.b.2.

Test Results

Two independent, three-hour fire qualification tests specific to the HNP applications were performed, and both of these tests are used to bound the HNP applications of Meggitt cable.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Technical Analysis (continued)

Attachment 4 provides a copy of the latest test report, Meggitt Safety Systems, Inc. Fire Test Report Project Number 14980-121039, dated February 23, 2005, which demonstrates that for the specific application of this material, the proposed cable will perform in an equivalent manner when compared to a rated fire barrier for this use.

Attachment 5 provides a copy of an earlier test report, Meggitt Safety Systems, Inc. Fire Test Report Project Number 14980-117047, Revision 1, dated July 7, 2004, which provided acceptable insulation resistance data during the fire test and demonstrated the acceptability of the support designs tested.

However, this earlier test did not successfully demonstrate continued electrical functionality for the complete duration of the fire test. During this fire test, the cable samples were installed on galvanized supports. At each location in which the cables came in contact with a horizontal support, the cable jacket was degraded as a result of liquid metal embrittlement of the stainless steel cable jacket from direct contact with galvanized material at high temperatures. The cable jacket failure did not reveal itself until the cables were subjected to the hose stream test at the end of the test, which subsequently resulted in water intrusion into the cables.

Later testing (reference Attachment 4 of this letter) used stainless steel support materials so that none of the cable samples were in direct contact with any galvanized material. No cable jacket degradation issues were encountered during this fire test.

Unlike the existing plant cables, the proposed cables of this amendment are designed to function during a fire exposure. For the circuits associated with the VCT outlet valves, 1CS-165 and 1C-166, the proposed cables are Type Si2400 manufactured by Meggitt Safety Systems, Inc. This cable has demonstrated that it is capable of operating continuously for three hours during a fire, and it satisfies the other design considerations such as environmental qualification, seismic, and electrical characteristics. Testing of this fire-resistive cable has been conducted in accordance with the GL 86-10, Supplement 1 and the American Society for Testing and Materials (ASTM) E-119, "Standard Test Methods for Fire Tests of Building Construction Materials." This testing demonstrated that the cable is capable of providing an equivalent level of protection as would be provided by a three-hour and one-hour rated fire barrier as described by NUREG 0800, Section 9.5.1, Position C.5.b.2.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Technical Analysis (continued)

Cable Routing and Supports

The fire testing performed on the fire-resistive cable (reference Attachments 4 and 5 of this letter, Meggitt Safety Systems, Inc. Fire Test Report Project Numbers 14980-121039 dated February 23, 2005 and 14980-117047 dated July 7, 2004, respectively) also tested the support systems and attachment methods that would be used during installation. All supports and connections were successful during the testing and remained firm and secure.

Installation requirements for the cable and supports are bounded by the tested configurations. These installation requirements include such details as follows: minimum bend radius, clamp torque force, maximum support span, minimum seismic clearance, minimum electrical separation, routing to protect against mechanical damage from other equipment, restrictions on contact with galvanized material, grounding of the cable, and application-specific evaluations to demonstrate that the cable is acceptable for its tested insulation resistance values.

Specifically, to protect against mechanical damage from other equipment in three-hour rated fire rated areas, routing of the fire-resistive cable will be located at or near the ceiling above any equipment (such as conduits, cable trays or other structures). This installation requirement protects the fire-resistive cable from possible mechanical damage resulting from equipment that may fail and fall or become dislodged in the event of a fire in the area. In order for fire-resistive cable to be routed under existing conduit, the existing conduit must be supported in such a manner that the conduit will not degrade fire-resistive cable during a fire (i.e., new supports must be added to the existing conduit and minimum separation distances between the fire-resistive cable and the existing conduit must be maintained). The support systems and attachment methods will be bounded by the tested configurations.

For applications in one-hour fire rated areas, the fire-resistive cable will be routed in accordance with safety-related cable installation standards since fire detectors and automatic fire suppression systems are installed in these areas, which mitigate possible mechanical damage from other equipment falling or becoming dislodged in the event of a fire. The support systems and attachment methods will be bounded by the tested configurations.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
DESCRIPTION, BACKGROUND, AND TECHNICAL ANALYSIS

Technical Analysis (continued)

For the circuits associated with the VCT outlet valves, 1CS-165 and 1C-166, the fire-resistive cable will be routed in the reactor auxiliary building (RAB) in rooms such as the control cabinet room, cable spreading rooms, switchgear rooms, and the electrical penetration room. These areas are primarily electrical equipment rooms which do not pose any adverse material issues with the new cable. The proposed cable installation will be limited to direct contact with stainless steel support material to eliminate any susceptibility to liquid metal embrittlement of the stainless steel cable jacket from direct contact with galvanized material at high temperatures. The support systems and attachment methods will be bounded by the tested configurations.

The Meggitt Safety Systems, Inc. cable is installed as a fire-resistive cable in two other nuclear plants, Columbia and McGuire. In addition, Joseph M. Farley Nuclear Plant has requested recently NRC approval to use fire-resistive cable[1].

Conclusion

HNP has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

[1] Letter (NL-04-2361) from L. M. Stinson (SNOC) to NRC, dated January 19, 2005 (Ascension No. ML050240365); and letter (NL-05-0960) from L. M. Stinson (SNOC) to NRC, dated June 9, 2005 (Ascension No. ML051640368).

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
10 CFR 50.92 NO SIGNFICANT HAZARDS EVALUATION.

10 CFR 50.92 NO SIGNIFICANT HAZARDS EVALUATION

A written evaluation of the significant hazards consideration of a proposed license amendment is required by 10 CFR 50.92. Harris Nuclear Plant (HNP) has evaluated the proposed amendment and determined that it involves no significant hazards consideration. According to 10 CFR 50.92, a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or

3. Involve a significant reduction in a margin of safety

The basis for this determination is presented below.

Proposed Change

In accordance with the 10 CFR 50.90, Carolina Power and Light Company (CP&L) doing business as Progress Energy Carolinas, Inc., requests a license amendment for the Harris Nuclear Plant (HNP). Consistent with Generic Letter (GL) 86-10, "Implementation of Fire Protection Requirements," HNP requests approval to use three-hour fire-resistive electrical cable, which has been demonstrated to provide an equivalent level of protection as would be provided by three-hour and one-hour rated electrical cable raceway fire barriers, for the protection of safe shutdown (SSD) electrical cables.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
10 CFR 50.92 NO SIGNFICANT HAZARDS EVALUATION.

Basis

This amendment does not involve a significant hazards consideration for the following reasons:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   Operation of HNP in accordance with the proposed amendment does not increase the probability or consequences of accidents previously evaluated. The Final Safety Analysis Report (FSAR) documents the analyses of design basis accidents (DBA) at HNP. Any scenario or previously analyzed accidents that result in offsite dose were evaluated as part of this analysis. The proposed amendment does not adversely affect accident initiators nor alter design assumptions, conditions, or configurations of the facility. The proposed amendment does not adversely affect the ability of structures, systems, or components (SSCs) to perform their design function. SSCs required to safely shut down the reactor and to maintain it in a safe shutdown condition remain capable of performing their design functions.

   The purpose of this amendment is to assure that redundant trains of safe shutdown (SSD) control circuits remain protected from damage in the event of a postulated fire. The proposed amendment revises the Final Safety Analysis Report (FSAR) to use three-hour fire-resistive electrical cable, which has been demonstrated to provide an equivalent level of protection as would be provided by three-hour and one-hour rated electrical cable raceway fire barriers, for the protection of SSD electrical cables. Based on the above, SSD control circuit protection is maintained by this amendment.

   Therefore, this amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
10 CFR 50.92 NO SIGNFICANT HAZARDS EVALUATION.

Basis (Continued)

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   Operation of HNP in accordance with the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated. The FSAR documents the analyses of design basis accidents (DBA) at HNP. Any scenario or previously analyzed accidents that result in offsite dose were evaluated as part of this analysis. The proposed amendment does not change or affect any accident previously evaluated in the FSAR, and no new or different scenarios are created by the proposed amendment. The proposed amendment does not adversely affect accident initiators nor alter design assumptions, conditions, or configurations of the facility. The proposed amendment does not adversely affect the ability of SSCs to perform their design function. SSCs required to safely shut down the reactor and to maintain it in a safe shutdown condition remain capable of performing their design functions.

   The purpose of this amendment is to assure that redundant trains of Safe Shutdown (SSD) control circuits remain protected from damage in the event of a postulated fire. The proposed amendment revises the Final Safety Analysis Report (FSAR) to use three-hour fire-resistive electrical cable, which has been demonstrated to provide an equivalent level of protection as would be provided by three-hour and one-hour rated electrical cable raceway fire barriers, for the protection of SSD electrical cables. Based on the above, SSD control circuit protection is maintained by this amendment.

   Therefore, this amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
10 CFR 50.92 NO SIGNFICANT HAZARDS EVALUATION.

Basis (Continued)

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   Operation of HNP in accordance with the proposed amendment does not involve a significant reduction in a margin of safety. The proposed amendment does not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not affected by this change. The proposed amendment does not adversely affect existing plant safety margins or the reliability of equipment assumed to mitigate accidents in the FSAR. The proposed amendment does not adversely affect the ability of SSCs to perform their design function. SSCs required to safely shut down the reactor and to maintain it in a safe shutdown condition remain capable of performing their design functions.

   The purpose of this amendment is to assure that redundant trains of Safe Shutdown (SSD) control circuits remain protected from damage in the event of a postulated fire. The proposed amendment revises the Final Safety Analysis Report (FSAR) to use three-hour fire-resistive electrical cable, which has been demonstrated to provide an equivalent level of protection as would be provided by three-hour and one-hour rated electrical cable raceway fire barriers, for the protection of SSD electrical cables. Based on the above, SSD control circuit protection is maintained by this amendment.

   Therefore, this amendment does not involve a significant reduction in a margin of safety.

Based on the above, HNP concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
PROPOSED FSAR CHANGES

PROPOSED FSAR CHANGES

SHNPP FSAR

TABLE 3.10.1-2

NON-NSSS SEISMIC CATEGORY I ELECTRICAL AND INSTRUMENTATION EQUIPMENT QUALIFICATION

Equipment	Manufacturer	Function	Conformance to IEEE 344 (1971 or 1975)	Qualification by Test or Analysis or Both[1]	Summary of Results/ Comments[1]
6900 Volt Class IE Switchgear	Siemens-Allis	Supply of 6900 Volt AC power	1975		
480 Volt Class IE Switchgear and Station Services Transformers	Gould (ITE)	Supply of 480 Volt AC power	1975		
480 Volt Class IE Motor Control Centers	Gould (ITE)	Supply of 480 Volt AC power to small loads	1975		
125 Volt Class IE Batteries and Racks	C & D	Supply of 125 Volt DC power	1975		
125 Volt DC Distribution Panels	Gould (ITE)	Supply of 125 Volt DC power	1975		

ADD FIRE RATED CABLE
SEE NEXT PAGE

FSAR Mark-up for Page 3.10.1-8

Equipment	Manufacturer	Function	Conformance To IEEE 344 (1971 or 1975)	Qualification by Test or Analysis or Both [1]	Summary of Results/ Comments [1]
Fire Rated Cable	Meggitt Safety System, Inc.	Power and Control Circuits	1975	Test	

ADD

MCCs consist of metal enclosed groups of motor starters, contactors, feeder circuit-breakers, 208/120V dry type distribution transformers, power panels, and control devices, assembled in a common structure with horizontal and vertical buses. Incoming feeder reactors are used where necessary to limit the available short circuit current to an acceptable level.

Feeder circuit breakers in MCCs are manual, thermal magnetic trip, molded case units in 100 A frame size or larger as required.

Motor starters located in MCCs are combination type, consisting of a three pole disconnecting device, a magnetic contactor (or contactors if for reversing service), a three-pole thermal overload relay, a 480-120V control transformer and the necessary control devices for remote manual and automatic operation. MCC contactors, used in heater circuits and other non-motor circuits requiring remote and/or automatic operation, are also combination type, consisting of the same components as motor starters, however, the thermal overload relays are excluded from the circuit. The disconnecting device is either a thermal-magnetic breaker, a magnetic breaker-current limiting fuses combination or magnetic breaker with adjustable instantaneous trip settings in lieu of current limiting fuses. In some cases, where back-up protection is required (i.e., penetration circuits), or for emergency lighting circuits an additional breaker, thermal-magnetic type, is included in the feeder circuit. Refer to Sections 8.3.1.1.2.11 and 8.3.1.1.2.15 for additional details.

Motor starters and/or heater contactors located outside the MCC, local to the serviced system, are generally provided by the system vendor and are designed to meet the necessary electrical requirements for the system operation and for connection to the ESF electrical distribution system.

Power and control cables for the 480V auxiliary system are rated 600V, 90C with ethylene-propylene rubber type or cross-linked polyethylene insulation, flame resistant jacketing and copper conductors sized to carry the maximum available short circuit current for the time required for the circuit breaker or fuse to clear a fault.

All power center transformers, power center buses, and MCC buses have adequate capacity to supply the momentary and continuous loads connected to the 480V buses. The ratings of all electrical distribution equipment are listed in Table 8.3.1-1.

The ESF power centers of each division are located within separate switchgear rooms in the Reactor Auxiliary Building which is a Seismic Category I structure and are protected from potential missile hazards. Physical separation and fire walls are provided between redundant components. MCCs are separated from their redundant counterparts by physical separation or fire walls. Electrical and physical separation is detailed in Section 8.3.1.2.

8.3.1.1.1.3 208/120V AC system. Certain loads for which 480V three-phase supply is either impractical or undesirable are supplied from 208/120V distribution panels. In general, these panels are connected to 480-208/120V three-phase transformers. Panels and their transformers are either located in MCCs or wall-mounted. Loads may be supplied at 208V or 120V.

REPLACE, SEE NEXT PAGE

FSAR Mark-up for Page 8.3.1-3

Power and control cables for the 480V auxiliary system are either rated 600V, 90C with ethylene-propylene rubber type or cross-linked polyethylene insulation with flame resistant jacketing or they are rated 600V, 3 hour, steel jacketed, fire rated cables. Cables conductors are sized to carry the maximum available short circuit current for the time required for the circuit breaker or fuse to clear a fault.

Insert the paragraph as shown on the previous page

has met the flame test requirement of IEEE-383. Lighting branch circuit cable has been assigned to a dedicated raceway system and is not routed with other plant cable.

Raceway systems consist of rigid steel conduits for exposed and embedded applications, PVC conduit for safety related power and control cable in underground duct banks, PVC coated steel conduits for safety related instrumentation cable in underground duct banks, and solid bottom and ladder type steel trays in all indoor plant areas. Flexible metal conduit is used where raceway connections are made to vibrating equipment.

All raceways are supported securely and at intervals governed by the span loading.

The underground raceway system for safety related cables utilizes directly buried ducts, adequately protected by earth cover and/or a concrete slab where required. The specific design criteria for the safety related underground cable system are analyzed in Section 8.3.1.2.37.

8.3.1.1.2.17 Lifted leads and jumpers. Where the use of jumpers or other temporary bypass mechanisms cannot be avoided, this is controlled in approved procedures or by use of a temporary modification. The control of jumpers and lifted leads for trouble shooting purposes will be documented by the associated work ticket and/or a temporary modification. The control of jumpers and lifted leads used to satisfy required testing will be documented in the associated approved procedure. Independent verification will be used to ensure proper restoration. The guidelines used for controlling lifted leads and jumpers is similar to the guidance of INPO Good Practice TS-412.

8.3.1.1.3 Design criteria and bases for safety related electric equipment. Design criteria and bases for specific types of Class IE equipment are discussed below:

a) Motors - Motor size has been determined by the characteristic of the driven equipment so that the motor develops sufficient torque to drive the load under maximum expected flow and pressure.

Class IE motors are designed to start their respective driven equipment with 75 percent of rated motor terminal voltage. The motor starting torque is sufficient to start and accelerate the connected load to normal speed within specified time to permit its safety function for all expected operating conditions. On the basis of these capabilities, CP&L has evaluated that all such motors will operate for one minute at 75 percent of rated voltage without suffering any damage.

Motor insulation systems have been selected based on the particular ambient conditions to which the insulation will be exposed. For Class IE motors, the insulation system has been qualified as described in Section 3.11. All Class IE motors have Class B, or better, rated insulation.

REPLACE, SEE NEXT PAGE

FSAR Mark-up for Page 8.3.1-23

Steel jacketed fire rated cables are not required to be supported by any of the described raceway systems.

All raceways and steel jacketed fire rated cables are supported securely and at intervals governed by the span loading.

REPLACE EXISTING, WITH ABOVE

8.3.1.2.24 IEEE Standard 317-1976

Electrical containment penetrations are designed in accordance with this standard. For a description of the penetration design, and for discussion on protection, refer to Sections 8.3.1.1.2.15 and 8.3.1.2.11.

Seismic and environmental qualifications are discussed in Sections 3.10 and 3.11, respectively.

8.3.1.2.25 IEEE Standards 323-1971 and 1974, 334-1974, 344-1975 and 382-1972

For discussion of compliance with these standards, refer to Sections 3.10 and 3.11.

8.3.1.2.26 IEEE Standard 336-1971

For discussion of compliance with this standard, refer to Section 1.8 and Chapter 14.

8.3.1.2.27 IEEE Standard 338-1975

Because of the separation of all safety related electrical equipment into two redundant groups, it is possible to test the power equipment while testing the signal and control systems (also refer to Table 7.1.0-1). Compliance with this standard is further discussed in Sections 13.5.1.3.e, and 1.8 (Regulatory Guide 1.118). | 11

8.3.1.2.28 IEEE Standard 379-1977

The single failure criterion has been applied to all Class IE systems. Refer to Tables 8.3.1-3 through 8.3.1-7 and 8.3.2-5 for single failure analyses as described in Section 3.11.

8.3.1.2.29 IEEE Standard 383-1974

All Class 1E cables and connector assemblies have been qualified in accordance with this standard for normal operating and design basis event conditions.

The flame tests covered by Section 2.5 of this standard have been performed with the ribbon-type gas burner, rated 70,000 Btu/hr for its total width. It has been recognized that the objective of the flame test is to provide guidance for the selection of fire-resistant cables rather than to establish

REPLACE, SEE NEXT PAGE

FSAR Mark-up for Page 8.3.1-35

Class 1E cables and connector assemblies have been either qualified in accordance with this standard for normal operating and design basis event conditions or have been 3 hour fire rated and tested in accordance with NRC Generic Letter 86-10 Supplement 1. The fire testing requirements of NRC Generic Letter 86-10 Supplement 1 exceed the flame test requirements of IEEE Standard 383-1974.

Replace Existing Paragraph With the Paragraph Above

c. Test Results

The test results are detailed in Wyle Test Report No. 47879-02. The minimum separation distances based on the test results are detailed in Table 8.3.1-10.

Where conduit separation distances are detailed in Table 8.3.1-10. it applies to any enclosed raceway (i.e., conduit, box, equipment enclosure, condulet, fitting, etc.).

(2) Analysis - Where the damage potential is contained within a conduit, and the Class 1E cable(s) are in tray or are free air drop out cable, an analysis has been performed in accordance with the recommendations of Section 5.1.1.2 of IEEE-384-1974 to justify a minimum separation distance of one inch. The results of the analysis indicate that provided one-inch separation is maintained, any damage potential associated with the conduit will have no adverse affects on the Class 1E circuits.

(3) Installation of Barriers - Where the separation distances could not be justified by test or analysis suitable barriers/or approved protective coatings have been utilized, or cables have been installed in enclosed raceways which are suitable for protecting the cables. The minimum separation distance between enclosed raceways or between barriers and the raceway/cable(s) is one inch. The following are suitable barriers to meet the intent of IEEE-384:

a. Steel Tray Covers - Tray covers are utilized to protect any raceway/cable which converges within the separation window of the tray. A top cover is used to protect above the tray and/or a bottom cover is used to protect below the tray.

b. Thermal Barrier Wrap System - A cable is wrapped to protect any raceway/cable which converges within the separation window of the cable.

c. One-Hour and Three-Hour Firewrap Systems - One-hour and three-hour firewrap are installed to meet the requirements of Section 9.5.1. These firewraps are acceptable barriers.

Also, 1 inch of firewrap is also equivalent to 1 inch of air. Since one-hour and three-hour wrap systems are greater than 1 inch thick, separation is not required between these wraps and protected raceways.

(b) Cable and Raceway Hazard Areas - Analyses of the effects of pipe whip, jet impingement, missiles, fire, and flooding demonstrate that safety related electrical circuits, raceways, and equipment are not degraded beyond an acceptable level.

INSERT d. SEE NEXT PAGE

FSAR Mark-up for Page 8.3.1-40

d. Steel Jacketed Fire Rated Cable – One-hour and three-hour, steel jacketed, fire rated cables are installed to meet the requirements of Section 9.5.1. The cable itself includes an acceptable barrier as part of the cable construction.

INSERT AS SHOWN ON PREVIOUS PAGE

SHNPP FSAR

9.5.1.2.2 Fire prevention (passive systems). Fire prevention is achieved in the design of the plant through the provision of:

1. features which reduce the incidents of fires and limit the extent and damage from fires, such as plant arrangement, building and structural design (including fire barriers, construction material, drainage, and penetration seals), ventilation systems, lighting, and communication systems.

2. control features of other plant systems to minimize the effects of fire, and

3. precaution and design features considered for the adequate protection of identified special hazards such as charcoal.

INSERT

use of fire rated cable,

PLANT LAYOUT AND ARCHITECTURAL FEATURES

Separation and Isolation - The involvement of safety-related equipment in fires which may occur in the plant is minimized by separation of components of safety-related systems from exposing fire hazards. This separation and protection provide the degree of isolation required to minimize the effects of the fires postulated in the fire hazard analysis. Examples of separation isolation and protection of equipment containing significant quantities of combustible materials are:

1. Safety related systems are isolated from fire hazards through the use of physical barriers, spatial separation, noncombustible fire retardant or fire resistive coverings applied to fire exposed or exposing surfaces, provision of automatic fire suppression systems for damage limitation considered in the design of plant structures, or combinations of the above.

2. Systems required for safe shutdown are physically separated from each other in most plant areas to the extent that redundant trains are not exposed to a common fire hazard. In areas where adequate spatial separation could not be provided, protection against damage from a common fire hazard is achieved by the provision in the plant design of fire rated enclosures, fire rated barriers, fire detection and extinguishing systems, or combination of these means or a deviation (if identified prior to issuance of the plant operating license) was requested, based on equivalent protection as described in the SSA. Following issuance of the plant operating license, changes to the Fire Protection Program are made in accordance with Section 2.F of the operating license.

3. To verify the effectiveness of separation and isolation of critical equipment components, the fire hazards analysis and the SSA identifies and locates, throughout the plant, safety-related systems and associated fire hazards and evaluates the effects of the postulated fires on the continued operability of this equipment. Should future plant design changes occur, the fire hazards analysis and SSA will be reviewed and updated as necessary to reflect actual conditions.

4. Fire hazards presented by flammable or combustible liquids and gases are reduced by separation, confinement, and system design features.

SHNPP FSAR

1) Outside containment, where cables or equipment (including associated non-essential circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or short to ground) of redundant safe shutdown divisions of systems necessary to achieve and maintain cold shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant divisions is free of fire damage is provided:

(a) Separation of cables and equipment and associated circuits of redundant safe shutdown divisions by a fire barrier having a 3-hour rating except as described in Section 9.5.1.2.4. Structural steel forming a part of or supporting such fire barriers is protected to provide fire resistance equivalent to that required of the barrier.

(b) Separation of cables and equipment and associated circuits of redundant safe shutdown divisions by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system is installed in the fire area.

(c) Enclosure of cable and equipment and associated circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system are installed in the fire area.

INSERT

2) One of the fire protection means specified above or one of the following fire protection means below provided for inside containment:

(a) Separation of cables and equipment and associated non-essential circuits of redundant safe shutdown divisions by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards.

(b) Installation of fire detectors and automatic fire suppression system in the fire area; or

(c) Separation of cables and equipment and associated non-essential circuits of redundant safe shutdown divisions by a noncombustible radiant energy shield.

Specific design details are provided in the Safe Shutdown Analysis in Case of Fire.

c) Fire Protection of Cables and Circuitry - Safety related cable trays and circuits are isolated or protected from the effects of fire through enclosure with fire resisting barriers, physical isolation, spatial separation, non-combustible covering, fire prevention through provision of automatic sprinkler systems or any combination of these methods, to ensure the integrity of essential electric circuitry needed during the fire for safe shutdown of the plant and for fire control. Generally wiring runs outside of cable trays are enclosed in metallic conduit to reduce the exposure of the cable to ignition and combustible loading of the area. However, occasionally,

use of fire rated cable,

Fire rated cable is utilized to meet the requirement of 3-hour or 1-hour cable protection described in 1(a) and 1(c) above.

valve or operated by manual alarm stations located outside the room located at elevation 286'. Inadvertent operation is precluded by the two-step discharge cycle of the preaction system which requires both the operation of the preaction valve and fusing of the sprinkler head.

Smoke venting is accomplished manually through a smoke purge operation via control room operator, as described in Section 9.4.5. However, should sufficient heat be generated by a fire to close the automatic fire dampers, smoke removal capacity will be reduced.

Ionization type smoke detectors, are installed for early warning of the presence of products of combustion. Alarm and annunciation is provided both locally and in the Control Room via the MFDIC in the Communications Room. Located outside of the Cable Spreading Room is a graphic display which shows the cable spreading room layout and the location of each ionization detector. The graphic display is designed to indicate the location of the detector which alarmed first, to direct the manual fire response to the origin of the fire.

Electric cables used are of a construction which passes the flame test required by IEEE-383 (except for lighting and communication circuits enclosed in metallic conduit), and which will not fault electrically when exposed to fire suppression water discharge. There are however exposed communication cables that meet the requirements of UL-910 that have been evaluated to meet or exceed the requirements of IEEE 383. These cables are specifically associated with the wireless telephone system base stations.

INSERT NEW PARAGRAPH HERE. SEE NEXT PAGE

Manual hose stations, a 2 1/2" valve, and appropriate portable extinguishers provide backup fire protection for the automatic pre-action sprinkler system. Floor drainage is designed to handle the design sprinkler system discharge with minimal surcharge, overflow to adjacent areas, and discharge to storm drain system (refer to Section 9.3.3).

Multiple doors are provided for each Cable Spreading Room, as detailed in the fire hazards analysis, to insure access to and egress from these rooms for effective fire control. Aisles to facilitate access within Cable Spreading Rooms were provided based on necessity for service and maintenance for each cable tray. Due to plant redesign to provide redundant cable spreading rooms, the existing aisles vary in size from dimensions in excess of 3 feet wide by 8 feet high to a minimum of 1-1/2 to 2 feet wide by 5 feet high. In general, the tight aisle locations occur toward extremities of each area and not in the center of the rooms. Trained fire fighters can access the area with their equipment, provided that they are familiar with the layout of each cable spreading room. The visual display of smoke detectors provides the fire fighters with a more definite location of the fire, facilitating the access and the fire attack strategy.

Inside safety related Cable Spreading Rooms (RAB, Elevation 286 ft.), the cable trays are stacked from floor to ceiling, having a space of 12 in. measured from bottom to bottom of each stacked tray.

4. Computer Room (drawing CPL-2166-S-2108) - The SHNPP computer is non-safety related and does not perform any safety function. The non-safety computer and the radiation monitoring computer are located outside the Control Room and are provided with 3-hour fire resistance rated barriers on each side, except those separating it from the Auxiliary Relay Panels Room and the Process Instruments and Control Racks Room. No fire loading is present in the space above the suspended ceiling.

FSAR Mark-up for Page 9.5.1-40

Additionally there are exposed, stainless steel jacketed, three hour fire rated cables which have been qualified per the requirements of Generic Letter 86-10, Supplement 1. This testing associated with this qualification exceeds the requirements of the IEEE-383 flame test.

INSERT

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
MEGGITT SAFETY SYSTEMS, INC. FIRE TEST REPORT
PROJECT NO. 14980-121039

MEGGITT SAFETY SYSTEMS, INC. FIRE TEST REPORT
PROJECT NO. 14980-121039

TEST REPORT

OMEGA POINT
LABORATORIES, INC.
16015 Shady Falls Road
Elmendorf, TX 78112
(v) 210-635-8100
(f) 210-635-8101
800-966-5253
www.opl.com

ASTM E119-00a

Fire Tests of Building Construction and Materials*

MEGGITT SAFETY SYSTEMS, INC. CABLE TEST

Project No. 14980-121039

AREVA	Framatome ANP, Inc., *an AREVA and Siemens company*
58-5057306-00	

*Modified in that the test specimen was not one that is described in the standard, but the exposure was in accordance with the E119 time-temperature curve.

February 23, 2005

Prepared for:
AREVA
(Formerly Framatome ANP DE&S)
6100 Southwest Blvd., Suite 400
Fort Worth, Texas 76109

Abstract

This document describes the evaluation of four sizes of Meggitt Safety Systems Inc. electrical cable and several support systems and attachment methods, when exposed to the ASTM E119 time-temperature heating curve. All supports and connections remained firm and secure. Electrical testing was performed on each cable before, during and after the testing, the results of which are contained herein.

The details, procedures and observations reported herein are correct and true within the limits of sound engineering practice. All specimens and test sample assemblies were produced, installed and tested under the surveillance of either the manufacturer's or the testing laboratory's in-house Quality Assurance Program. This report describes the analysis of a distinct assembly and includes descriptions of the test procedure followed, the assembly tested, and all results obtained. All test data are on file and remain available for review by authorized persons.

Deggary N. Priest, President

February 23, 2005
Date

Reviewed and approved:

Constance A. Humphrey
QA Director

Date: February 23, 2005

Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas 78112-9784
210-635-8100 / FAX: 210-635-8101 / 800-966-5253
www.opl.com / e-mail: dnpriest@ix.netcom.com

ACCREDITED
No. 0689-01

TABLE OF CONTENTS

ITEM		PAGE
INTRODUCTION		4
TEST PROCEDURE		4
Horizontal Test Furnace		4
Furnace Pressure		5
Thermocouple Locations		6
Data Acquisition Systems		6
Correction Factor		6
Hose Stream Test		7
Acceptance Criteria		7
TEST SPECIMEN CONSTRUCTION		8
Test Slab		8
Changes to the Test Plan and Drawings		8
Meggitt Safety Systems, Inc. Cable Installation		9
Calibration of Data Acquisition System		14
CONDUCT OF TEST		16
TEST RESULTS		17
Determining Insulation Resistance per Foot		20
Observations After the Fire and Hose Stream Tests		24
Observations Made During the Megger Conductor Resistance and (if appropriate) Hip-Pot Tests		25
CONCLUSIONS		27
APPENDICES		
Appendix A:	TEST PLAN & CONSTRUCTION DRAWINGS	28
Appendix B:	MEGGERING & CONDUCTOR RESISTANCE RESULTS	59
Appendix C1:	TEST DATA - PRE-TEST CURRENT LEAKAGE	104
Appendix C2:	TEST DATA - FIRE EXPOSURE	113
Appendix C3:	TEST DATA - POST HOSE STREAM CURRENT LEAKAGE	198
Appendix D:	QUALITY ASSURANCE	207
Appendix E:	PHOTOGRAPHS	281
LAST PAGE OF REPORT		289

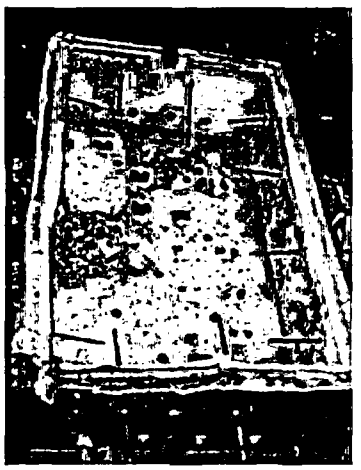
INTRODUCTION

The objective of this test program was to demonstrate the performance of Meggitt Safety Systems, Inc. fire resistive cables and cable support designs during a 3-hour fire exposure and following exposure to a hose stream test. The furnace temperatures, furnace thermocouples, Megger testing and hose stream testing were conducted in accordance with Generic Letter 86-10 Supplement 1. The test also collected electrical characteristic data (leakage current, conductor resistance) for each of the Meggitt Safety Systems, Inc. (MSSI) cable test specimens.

TEST PROCEDURE

Horizontal Test Furnace

The 7' x 12' x 40" deep horizontal test furnace is designed to allow the specimen to be uniformly exposed to the specified time-temperature conditions. It is fitted with 26 symmetrically-located diffuse-flame natural gas pipe burners designed to allow an even heat flux distribution across the under surface of a horizontal test specimen. Furnace pressures may be maintained at any value from +0.03" W.C. to -0.05" W.C. The furnace has been constructed so that the front (40" x 12') wall section can be removed to allow the evaluations of wall/ceiling interfaces and other specific applications.

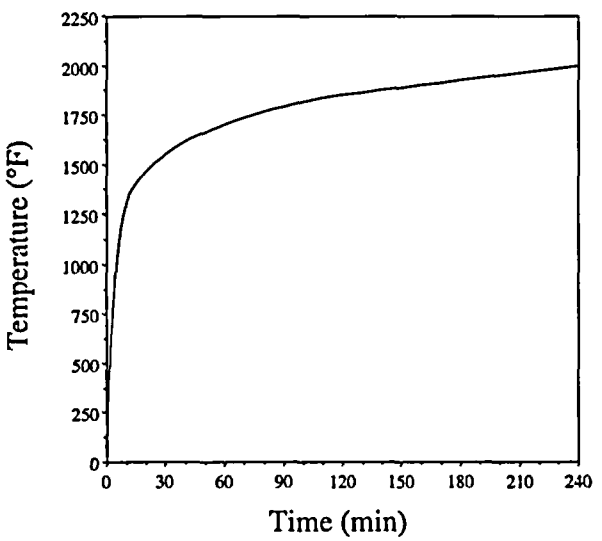


7' x 12' Horizontal Furnace (Plan View)

The temperature within the furnace is determined to be the mathematical average of thermocouples located symmetrically within the furnace and positioned twelve inches away from

the horizontal face of the test specimen. The materials used in the construction of these thermocouples are those suggested in the test standard. During the performance of a fire exposure test, the furnace temperatures are recorded every 15 seconds and displayed for the furnace operator to allow control along the specified temperature curve. For report presentation purposes, the data is saved once per minute.

The fire exposure is controlled to conform with the standard time-temperature curve shown in Figure 1, as determined by the table below:



Time (min)	Temperature (°F)
0	68
5	1000
10	1300
20	1462
30	1550
60	1700
90	1792
120	1850
180	1925
240	2000

Figure 1

The furnace interior temperature during a test is controlled such that the area under the time-temperature curve is within 10% of the corresponding area under the standard time-temperature curve for 1 hour or less tests, 7.5% for those less than 2 hours and 5% for those tests of 2 hours or more duration.

Furnace Pressure

The pressure differential between the inside of the furnace (as measured approximately 3/4" below the exposed surface of the test slab) and the laboratory ambient air was maintained at +0.01 inches of water column for the duration of the fire exposure test (after the first five minutes, during which furnace stabilization was achieved).

Thermocouple Locations

No temperatures were monitored within the heated area except for those used to monitor and control the furnace interior temperature.

Data Acquisition Systems

The outputs of the voltmeters and ammeters were monitored by a 350 channel Yokogawa, Inc., Model Darwin Data Acquisition Unit, and a Macintosh computer. The furnace control thermocouples were monitored by a 100 channel Yokogawa, Inc. Model Darwin Data Acquisition Unit and a Macintosh computer. The computers were programmed in LabVIEW 5.0 to send the commands to the data acquisition systems to sample the data input lines and to convert the raw data into a usable format for display on screen and storage as an ASCII tab-delimited text file. Those files were then, after the test, imported into MS Excel for conversion to user units for tabular and graphical display.

Correction Factor

When the indicated resistance period is $^1/_2$ h or over, determined by the average or maximum temperature rise on the unexposed surface or within the test sample, or by failure under load, a correction shall be applied for variation of the furnace exposure from that prescribed, where it will affect the classification, by multiplying the indicated period by two thirds of the difference in area between the curve of average furnace temperature and the standard curve for the first three fourths of the period and dividing the product by the area between the standard curve and a base line of 68°F (20°C) for the same part of the indicated period, the latter area increased by 3240°F • min to compensate for the thermal lag of the furnace thermocouples during the first part of the test. For a fire exposure in the test higher than standard, the indicated resistance period shall be increased by the amount of the correction. For a fire exposure in the test lower than standard, the indicated resistance period shall be similarly decreased for fire exposure below standard. The correction is accomplished by mathematically adding the correction factor, C, to the indicated resistance period.

The correction can be expressed by the following equation:

$$C = \frac{2I(A - A_s)}{3(A_s + L)}$$

where:

C = correction in the same units as *I*,
I = indicated fire-resistance period,
A = area under the curve of indicated average furnace temperature for the first three fourths of the indicated period,
A_s = area under the standard furnace curve for the same part of the indicated period, and
L = lag correction in the same units as *A* and A_s (54°F•h or 30°C•h (3240°F•min or 1800°C•min))

Hose Stream Test

Immediately following the fire endurance test, a hose stream test was performed in accordance with USNRC Generic Letter 86-10, Supplement 1, Enclosure 1, Section VI. The hose stream was "applied at random to all exposed surfaces of the test specimen through a 1-1/2" fog nozzle set at a discharge angle of 30 degrees with a nozzle pressure of not less than 75 psi and a minimum discharge pressure of 75 gpm with the tip of the nozzle at a maximum of 5 feet from the test specimen. Duration of the hose stream application is 5 minutes." Prior to the hose stream application, the laboratory ensured the correct angle spray pattern, pressure and flow was achieved through calibrated gauges and other equipment as required.

Acceptance Criteria

The acceptance criteria for the supports which are supporting Meggitt Safety Systems, Inc. cables, is that they remain attached to the test slab and that the cable remain attached to the support, during the fire endurance test and the hose stream test.

The seals used for closure of the openings in the test slab are not being tested or considered part of the test assembly.

TEST SPECIMEN CONSTRUCTION

Test Slab

A concrete slab used previously was in excellent condition and hence was re-dried at 350°F for four days, cooled and utilized in this project.

Changes to the Test Plan and Drawings

The following changes were made to the test assembly installation drawings during the installation of the test assembly. The drawings have been revised to incorporate these changes:

1. The factory splice for the cables was specified to be located 12 feet from one end of the cable and the splice was to be installed at the midpoint between the Section A-A and Section B-B supports. Meggitt Safety Systems, Inc. actually installed the splices in the middle of the cables. As a result, the location of the splice for the 4C #8 and the 7C #14 cables had to be moved from the midpoint between the Section A-A and Section B-B supports in order for these cables to extend up through the test slab. The new location for the splices for the 4C #8 and the 7C #14 cables is still between the Section A-A and Section B-B supports, but are 12" from the Section B-B support instead of at the midpoint. See FANP drawings 02-5050103A and 02-5050109A.

2. The 4C #8 cable had been mostly installed when it was discovered that locating the splice at the midpoint between the Section A-A and Section B-B did not allow sufficient length of cable to extend up through the slab. As a result the 4C #8 cable was bent to a radius of approximately 6" and then straightened out in two places between the Section C-C and Section D-D supports. Also, instead of having the 4C #8 and the 7C #14 cables go up through one 5" hole in the test slab and the 7C #10 and the 8C #12 go up through another 5" hole in the slab, all four cables extended through the same hole in the test slab. See FANP drawings 02-5050103A and 02-5050109A.

3. The B-Line B2088 SS4 single hole tubing clamps were provided with ¼" diameter by 1" long stainless steel screws for attaching the clamps to the channel utilizing stainless steel channel nuts. These clamps were attached to B-Line B54 stainless steel channel on the Section A-A, Section C-C and Section D-D supports. The B-54 channel is not deep enough to accommodate a 1" long screw and the screws. These screws had to be cut-off to make them ¾" long in order to install these clamps correctly and obtain the correct torque. The

resulting ¾" length still allowed the screw to be fully engaged in the threads of the channel nut. See FANP drawings 02-5050104A, 02-5050106A, 02-5050107A and 02-5050110A.

4. The test drawings required that 7/16" hole be drilled in the stainless steel plates utilized in the Section A-A so that the plates could be installed between two channels utilizing 3/8" cap screws and spring nuts. These holes were to be located such that the plate overlapped the ends of the 4" channel installed below the plate by ½" on both ends. Also, the distance from the centerline of the 3/8" cap screw to the end of the 4" channel on both sides was to be ¾". These dimensions could not be obtained exactly due to the width of the plates being slightly less than the 5" specified and the difficulty in drilling the holes in the plate. As a result, the holes had to be drilled with a tolerance. The overlap of the ends of the 4" channel was ½" ± 1/8" and the distance from the centerline of the 3/8" cap screw to the end of the channel was ¾" ± 1/16". See FANP drawings 02-5050104A and 02-5050108A.

Meggitt Safety Systems, Inc. Cable Installation

The support slab was cored and prepared as described in the drawings supplied by Framatome-ANP (see Appendix A Test Plan), including the installation of the required supports. Four Meggitt Safety Systems Inc. (MSSI) cables were installed, as indicated in the drawings. The cables, and their lengths exposed to the furnace heat were as follows:

CABLE NO.	CABLE	EXPOSED LENGTH Inches (ft)	MSSI PART NO.
1	4/C #8	283 (23.6)	300217-5
2	8/C #12	276 (23.0)	300283-5
3	7/C #14	300.5 (25.0)	300286-5
4	7/C #10	265 (22.1)	300208-5

The cables passed through 5" diameter holes in an 8" thick concrete slab, entering the heated area of the assembly. After a series of 90° bends, the cable exited the heated area of the furnace by passing once again through a 5" diameter hole in the concrete slab. Once the cables were installed, the 8" depth of the holes were sealed with ceramic fiber. Each cable end was identified as "in" or "out," to differentiate between ends. The "in" ends were those that entered the heated area and traveled along close to the slab. The "out" ends were those that were running horizontally 36" below the slab and then passing up and out. . Of the four "in" cables, two passed through one hole

and two passed through another, while the four outgoing ends of the cables were routed through a single hole.

CABLE #1 - 4/C #8 AWG

The electrical connections shown in Fig. 7.1 of Appendix A 4/C #8 Wiring Diagram were completed. A random conductor was selected to be energized with 480 volts ac and labeled Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #1), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 600 volts ac in. The signal then passed through Relay #1 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #1 (normally open), through Load Switch #1 (which allowed the circuit to be loaded, if desired), through a load resistor of 576 Ω (consisting of four 120 volts ac, 100 watt light bulbs connected in series) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 600 vac signal in.

The remainder of the conductors were numbered 2 - 4 in clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 480 vac input power. Since all other conductors were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #1 (normally open) and to load resistors and voltage transducers similar to conductor #1. See Fig. 7.1 in Appendix A for a layout of the electrical schematic for this cable.

CABLE #2 - 8/C #12 AWG

The electrical connections shown in Fig. 7.2 in Appendix A 8/C #12 Wiring Diagram were completed. A random conductor was selected to be energized with 120 volts ac and labeled Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #2), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 150 volts ac in. The signal then passed through Relay #2 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #2 (normally open), through Load Switch #2 (which

allowed the circuit to be loaded, if desired), through a load resistor of 144 Ω (consisting of a single 120 volt ac, 100 watt light bulb) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 150 vac signal in.

The remainder of the conductors were numbered 2 - 8 in a clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 120 vac input power. Since conductors #2, 7 & 8 were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #2 (normally open) and to load resistors and voltage transducers similar to conductor #1. The conductors which were not adjacent to conductor #1 were connected together and the combination was then wired to a single load resistor/voltage transducer circuit similar to the ones used on each adjacent conductor. See Fig. 7.2 in Appendix A for a layout of the electrical schematic for this cable.

CABLE #3 - 7/C #14 AWG

The electrical connections shown in Fig. 7.3 in Appendix A 7/C #14 Wiring Diagram were completed. A random conductor was selected to be energized with 120 volts ac and labeled Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #3), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 150 volts ac in. The signal then passed through Relay #3 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #3 (normally open), through Load Switch #3 (which allowed the circuit to be loaded, if desired), through a load resistor of 144 Ω (consisting of a single 120 volt ac, 100 watt light bulb) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 150 vac signal in.

The remainder of the conductors were numbered 2 - 7 in a clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 120 vac input power. Since conductors #2, 6 & 7 were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #3 (normally open) and to load resistors and voltage transducers similar to conductor #1. The conductors which were not adjacent to conductor #1 were connected together and the combination was then wired to a single load resistor/voltage

transducer circuit similar to the ones used on each adjacent conductor. See Fig. 7.3 in Appendix A for a layout of the electrical schematic for this cable.

CABLE #4 - 7/C #10 AWG

The electrical connections shown in Fig. 7.4 in Appendix A 7/C #10 Wiring Diagram were completed. A random conductor was selected to be energized with 120 volts ac and labeled Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #4), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 150 volts ac in. The signal then passed through Relay #4 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #4 (normally open), through Load Switch #4 (which allowed the circuit to be loaded, if desired), through a load resistor of 144 Ω (consisting of a single 120 volt ac, 100 watt light bulb) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 150 vac signal in.

The remainder of the conductors were numbered 2 - 7 in a clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 120 vac input power. Since conductors #2, 6 & 7 were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #4 (normally open) and to load resistors and voltage transducers similar to conductor #1. The conductors which were not adjacent to conductor #1 were connected together and the combination was then wired to a single load resistor/voltage transducer circuit similar to the ones used on each adjacent conductor. See Fig. 7.4 in Appendix A for a layout of the electrical schematic for this cable.

GENERAL

Each cable was grounded to the slab through its metallic connections at all supports. Also, the electrical neutral signal was grounded (common for all voltages) and the cable outer stainless steel shields were all grounded together on the unexposed surface of the slab. The support systems that were held in place by all-thread rods passing through the slab were all added to the ground circuit on the cold side of the slab.

The purpose of Relay Switches #1 - #4 was to allow the cables to be switched from a circuit wherein the computer monitored for current leakage between conductors or conductors and shield, to an open circuit where the conductors were not connected to anything, so that meggering tests could be performed. These relays were operated by a 120 vac power, each relay being powered through individual switches, labeled, for example, "120 VAC Control Switch #1."

During megger and conductor resistance testing, the test circuits consisted of the Meggitt cables only. The connections to the current leakage device were disconnected prior to megger and conductor resistance tests being conducted. Consequently, the results obtained apply completely to the Meggitt cables and to no degree are affected by the additional circuitry used to determine current leakage.

The Load Switches were included in the circuits for conductor #1 in each cable to allow the functionality of the circuits to be tested prior to and after the fire and hose stream exposures. During the current leakage tests, these switches were left in the open position.

All connections between the circuit board (containing all switches, relays, transducers, etc) and the "in" and "out" ends of the conductors were made using #12 AWG electrical wires with attachments by alligator clip connectors. The length of the connecting wires was nominally 40 feet, to allow the circuit board to be brought along with the test slab for performance of the hose stream test without disconnecting the circuits. The signals from the voltage and current transducers were connected to the computer with standard plugs which were disconnected for the hose stream test and re-connected after the slab had cooled and dried.

A piece of plywood was mounted on top of the slab to serve as a panel for making connections when performing megger or conductor resistance testing. The actual conductors from each end of each cable were inserted from the back of the panel and stuck out several inches for the operators to make connections. The signals to and from the electrical panel board (containing all relays, switches, etc) were connected to these conductors using alligator clip connectors, which made connection and disconnection easy and fast.

Each test circuit contained transducers to monitor the AC amperage and AC voltage at specific locations. These transducers were as follows:

Manufacturer: Ohio Semitronics, Inc.

Transducer Model 3VT-3940C	Input: 0 - 600 volts AC	Output: 0 - 10 volts DC
Transducer Model MVT-150A	Input: 0 - 150 volts AC	Output: 0 - 10 volts DC
Transducer Model MCT5-005A	Input: 0 - 5 Amps AC	Output: 0 - 10 volts DC

These transducers were not calibrated, since their outputs were measured in both switch states prior to the test, and those outputs used to monitor the electrical performance of each circuit. During the test, data was monitored and stored to disk at a minimum frequency of once per 30 seconds.

CALIBRATION OF DATA ACQUISITION SYSTEM

October 6, 2004

Following the connection of all electrical circuits (as indicated in Appendix A, Figures 7.1 - 7.4), the outputs of the transducers were connected to the data acquisition system. The circuits were then energized (one at a time) with Safety Power Switches 1 - 4 closed, Relays #1 - 4 closed, and Load Switches #1 - 4 closed. The signal into each transducer was then measured with a calibrated current or voltage meter and the corresponding output for that channel was noted from the computer screen. In this manner, the entire system was verified and calibrated (against NIST-traceable devices), including the data acquisition program, since the software used to perform this calibration was the same used to perform the fire test.

The calculated Calibration Constants were then placed into Excel spreadsheets containing the data collected during the fire exposure and used to convert from machine units to user units for the data presented herein.

CHANNEL	A/C INPUT SIGNAL (units A/C)	DATA ACQUISITION OUTPUT (volts dc)	CALIBRATION CONSTANT (units/volt)
1	0.7707 amps	1.585	0.4862
2	470.1 volts	7.745	60.697
3	478.1 volts	7.876	60.703
4	471.8 volts	7.769	60.729
5	471.9 volts	7.781	60.648
6	471.8 volts	7.773	60.697
7	0.7828 amps	1.624	0.4820
8	120.8 volts	7.928	15.237
9	121.5 volts	7.964	15.256
10	121.4 volts	7.963	15.246
11	121.4 volts	7.960	15.251
12	121.3 volts	7.961	15.237
13	121.3 volts	7.974	15.212
14	0.7849 amps	1.621	0.4842
15	120.9 volts	7.913	15.279
16	121.9 volts	7.998	15.241
17	121.7 volts	7.993	15.226
18	121.8 volts	7.986	15.252
19	121.7 volts	7.979	15.253
20	121.7 volts	7.977	15.256
21	0.7721 amps	1.586	0.4868
22	121.5 volts	7.95	15.283
23	121.9 volts	7.985	15.266
24	121.8 volts	7.972	15.278
25	121.5 volts	7.961	15.262
26	121.6 volts	7.965	15.267
27	121.6 volts	7.976	15.246

Following the calibration procedures described above, all power was dropped from the cables and all switches and relays placed in their "open" position. Representatives of Grubb Engineering, Inc. then arrived and performed Megger Testing (verified by OPL personnel) in accordance with the test plan. On this day before the test, Conductor Resistance Testing was also conducted on each conductor in each cable. These results are presented in Appendix B Meggering & Conductor Resistance Results.

Approximately five minutes prior to the fire exposure test, the current leakage circuitry was connected to the test cables, and the computer data acquisition system operated to verify that the system was working correctly, and to re-establish the baseline values (see Appendix C1). Following the completion of the fire and hose stream tests, the system was once again verified in a similar manner (see Appendix C3).

CONDUCT OF TEST

Preburn Inspections

As required in the Test Plan (FANP Document 51-5050368), prior to the commencement of the fire endurance test, a thorough check of the test assembly and associated equipment (including data recording equipment, megohmeter for Megger testing, High Potential test equipment, leakage current testing equipment and conductor resistance testing equipment) and completion of applicable Laboratory QA/QC checklists were performed and documented by the testing laboratory. This included the completion of the Test Article Attribute Checklist (FANP Drawing 02-5050112A).

Written approval of the construction, assembly, installation and instrumentation was supplied by FANP and OPL prior to performance of the fire exposure test (a sign-off sheet for this purpose was supplied by the Laboratory).

Testing Sequence

After construction and connection of the test assembly and prior to the start of the fire endurance test, megger testing data collection, leakage current monitoring and data collection and conductor resistance data collection were performed on all cables. High Potential data collection was performed on the 4C #8 cable. All testing was done in accordance with the Test Plan. See Appendix B and Appendix C-1 for test results.

During the conduct of the 3-hour fire endurance test, megger testing data collection was performed starting at 23 minutes into the fire test and concluded at 2 hours and 54 minutes into the test. The megger testing data collection was performed in accordance with the Test Plan. One complete set of megger readings were obtained for the 4C #8 cable. Most of the megger readings were obtained for the other three cables, but it was not possible to obtain a complete a set of megger readings for these cables due to the number of conductors in the cables and the length of time required to achieve a steady megger reading. The Test Plan called for High Potential testing data collection immediately following the megger testing data collection. Due to the difficulties in obtaining the megger testing data collection and the fact that the High Potential testing is performed at 3200 VDC as opposed to the 1000 VDC for the megger testing, it was decided that it would not be possible to perform the High Potential testing data collection. Leakage current monitoring and data collection was performed at the beginning of the test (first 20 minutes) until the megger testing started and at 2 hours and 55 minutes into the test after the completion of the megger testing in accordance with the Test Plan. See Appendix B and Appendix C-2 for test results.

At the completion of the fire endurance test and after the cables were de-energized, the test assembly was subjected to a hose stream test in accordance with the Test Plan.

Immediately following the hose stream test, megger testing data collection was conducted on all cables in accordance with the Test Plan. The Test Plan called for High Potential testing data collection on the 4C #8 cable immediately following the megger testing data collection. High Potential testing was not performed since it was not performed during the fire test. See Appendix B for test results.

The next day, after the test assembly had been allowed time to cool and dry, megger testing data collection, leakage current monitoring and data collection and conductor resistance data collection were performed on all cables in accordance with the Test Plan. High Potential testing was not performed since it was not performed during the fire test and immediately after the hose stream test. See Appendix B and Appendix C-3 for test results.

TEST RESULTS

The thermocouples and voltage measurement channels were connected to the data acquisition system and their outputs verified on October 6, 2004 (see previous discussion). The furnace was fired on October 7, 2004, and computer data collection on the energized cables (current leakage

testing) continued for 20 minutes. The load switches were maintained open during the current leakage testing. The cables were then de-energized and disconnected by opening all switches and relays and removing line power to the device. Meggering was then performed between all conductors of each cable by two teams of operators. Each megger operator read his results to a representative of the OPL QA/QC Department, who verified and noted the reading and the time at which that reading was taken. When the megger teams had disconnected and left the slab, the power was turned back on and computerized current leakage testing continued. Again, the load switches were maintained open The original plan was to megger the cables through as many cycles as possible. However, as the test continued, some cables took longer to achieve a steady megger reading than anticipated. Consequently, only a single series of megger tests were accomplished during the fire exposure period. The results are given below and in Appendix B Meggering and Conductor Resistance Results.

The ambient temperature at the start of the test was 77°F, with 89% relative humidity. The furnace was fired at 9:10 AM and the standard time-temperature curve followed for 180 minutes. The pressure differential between the inside of the furnace (as measured approximately 3/4" below the exposed surface of the test slab) and the laboratory ambient air was maintained at +0.01 inches of water column for the duration of the fire exposure test (after the first five minutes, during which furnace stabilization was achieved).

Persons present to perform or witness the test were as follows:

Cal Banning	-	Framatome ANP
John Crowther	-	Framatome ANP
Mike Fletcher	-	Progress Energy
Alan Morisi	-	Progress Energy
Tony Maness	-	Progress Energy
Jim Thomsen	-	Meggitt Safety Systems
Mike Ranton	-	Grubb Engineering
Jeff Piel	-	Grubb Engineering
Deggary Priest	-	Omega Point Laboratories, Inc.
Connie Humphrey	-	Omega Point Laboratories, Inc.
Mike Dey	-	Omega Point Laboratories, Inc.
Cleda Patton	-	Omega Point Laboratories, Inc.
Troy Bronstad	-	Omega Point Laboratories, Inc.
Oscar Estrada	-	Omega Point Laboratories, Inc.
Richard Beasley	-	Omega Point Laboratories, Inc.

Observations made during the test were as follows:

TIME (h:min:s)	OBSERVATIONS
0:00	Furnace ignited at 9:10 AM.
5:00	Furnace interior pressure adjusted to +0.01" WC at a point 3/4" below the slab, resulting in a neutral pressure plane position approximately 12" below the underside of the slab. Flames within the furnace were well distributed.
10:00	No change. Cables darkening slightly.
20:00	Power off, all switches and relays open.
~23:00	Megger testing began.
60:00	Meggering continues.
2:54:00	Megger teams down off the slab.
2:55:00	All circuits energized and current leakage testing continued.
3:00:00	Furnace extinguished. Power to all cables dropped. Connectors to computer system unplugged. Slab lifted from the furnace and moved to the hose stream location. All Meggitt cables are visually solid and in place. All supports are in position, although some deformation and sagging exists along rebar and cables. All steel is red hot.
3:04:55	Hose stream began at a nozzle spray angle of 30°, pressure at 75 psi and from a distance of 5 ft. Since the test assembly remained connected to the electrical circuit panel, the test assembly was held stationary and the hose stream nozzle moved around below to ensure good water coverage.
3:09:55	Hose stream stopped. The test assembly was then placed on 8' tall 24" ø pipe stands and readied for the meggering tests.
3:27:00	Meggering began (time between end of hose stream and start of Meggering = 17:05 min:sec).

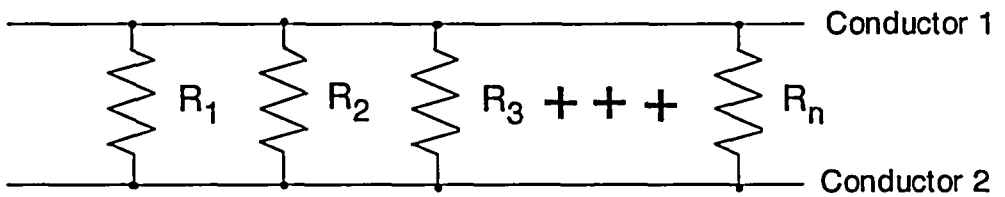
Other than bits of calcined concrete falling to the laboratory floor, the test assembly showed no visible effect due to the hose stream test. Much steam and dripping hot water remained after the hose stream was stopped.

The next day (October 8, 2004), after the test assembly had been allowed to cool and dry off, the megger teams returned and performed the megger and conductor resistance tests on each cable in

the same way they were done on the pre-test testing on October 6, 2004. All megger and conductor resistance test results can be found in Appendix B. Once again, the circuits were energized, and current leakage testing conducted on all cables.

DETERMINING INSULATION RESISTANCE PER FOOT

For simplification, define the combined system insulation resistance to shield or another conductor as indicated. The overall resistance (R_T) can be considered to be the sum of the resistances per each foot of cable, as shown in the circuit below.



The total resistance of an electrical circuit made up of a number of resistances in parallel is represented by:

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots + \frac{1}{R_n}$$

Where:

R_T	=	Total resistance between conductor and shield or conductor and another conductor.
n	=	Number of feet of cable
R_1	=	Resistance between conductor and shield or conductor and another conductor over the first foot of heated cable.
R_n	=	Resistance between conductor and shield or conductor and another conductor over the n^{th} foot of heated cable.

Assuming that all resistance per foot values are equivalent (when they are all at the same temperature), this equation reduces to:

$$\frac{1}{R_T} = n\left(\frac{1}{R_{ft}}\right) = \frac{n}{R_{ft}}$$

Rearranging and solving for the resistance per foot:

$$R_{ft} = nR_T \qquad \text{(Equation 1)}$$

Using this equation, the resistance per foot under "pre- and post-test (i.e. cold) conditions" can be determined. However, under "test conditions, including post-hose stream test," only a section of the cable is heated or remains warm. It is assumed that the resistance per foot determined under pretest conditions will not change for the section of cable that is not heated, and that all of the heated section of the cable will have the same resistance per foot.

Under heating conditions, the equation for total resistance becomes dependent on two values: the resistance of the cold section and for the heated section.

$$\frac{1}{R_T} = \frac{n_c}{R_c} + \frac{n_h}{R_h}$$

where,

R_c = Insulation resistance per foot of cold portion of cable (Ω)
R_h = Insulation resistance per foot of heated portion of cable (Ω)
n_c = Length of cold portion of cable (ft)
n_h = Length of heated portion of cable (ft)

Solving for the resistance per foot of the heated portion:

$$R_h = \frac{n_h}{\left(\frac{1}{R_T} + \frac{n_c}{R_c}\right)} \qquad \text{(Equation 2)}$$

These calculations have been performed on all four cables and the results are given in the tables below. They represent the lowest (worst case) insulation resistance values determined during each meggering period.

Minimum Insulation Resistance Values

4/C #8 AWG $n_{(total)}$ = 40 ft $n_{(heated)}$ = 23.6 feet		
TEST TIME	R_T (min)	R_{ft} (min)
Pre-Fire Test	4.4 GΩ	176 GΩ*
Fire Test	0.13 MΩ	3.1 MΩ**
Post Hose Stream Test	3.82 GΩ	90 GΩ**
Post Test (cold)	13.2 GΩ	528 GΩ*

* By Eqn. 1 ** By Eqn. 2

8/C #12 AWG $n_{(total)}$ = 40 ft $n_{(heated)}$ = 23.0 feet		
TEST TIME	R_T (min)	R_{ft} (min)
Pre-Fire Test	2.76 GΩ	110 GΩ*
Fire Test	0.34 MΩ	7.8 MΩ**
Post Hose Stream Test	1.07 GΩ	43 GΩ**
Post Test (cold)	7.48 GΩ	299 GΩ*

* By Eqn. 1 ** By Eqn. 2

7/C #14 AWG $n_{(total)}$ = 40 ft $n_{(heated)}$ = 25.0 feet		
TEST TIME	R_T (min)	R_{ft} (min)
Pre-Fire Test	>2 GΩ	>80 GΩ*
Fire Test	0.65 MΩ	16.2 MΩ**
Post Hose Stream Test	150 MΩ	3.3 GΩ**
Post Test (cold)	>2 GΩ	>80 GΩ*

* By Eqn. 1 ** By Eqn. 2

7/C #10 AWG $n_{(total)}$ = 40 ft $n_{(heated)}$ = 22.1 feet		
TEST TIME	R_T (min)	R_{ft} (min)
Pre-Fire Test	>2 GΩ	>80 GΩ*
Fire Test	0.19 MΩ	4.2 MΩ**
Post Hose Stream Test	>2 GΩ	>80 GΩ**
Post Test (cold)	>2 GΩ	>80 GΩ*

* By Eqn. 1 ** By Eqn. 2

In accordance with the E119 test standard, a calculation for any correction to the indicated fire resistance period was done. The difference between the area under the E119 time-temperature curve and the area under the furnace average was 0.00%, so no correction factor was needed.

Listings and plots of all temperatures and electrical signals may be found in Appendices C1 - C3. A photographic documentation of the test has been included in Appendix E.

OBSERVATIONS AFTER THE FIRE AND HOSE STREAM TESTS

ITEM	POST FIRE TEST	POST HOSE STREAM TEST
Meggitt Cables & Supports	Upon removal from the furnace, the Meggitt cables all cooled to below red heat within seconds. The more massive steel supports remained bright red. All Meggitt cable supports remained straight and firmly attached, with no obvious effect of the heat. The Meggitt cables remained firmly in position, with slight sagging over their longest horizontal runs.	All Meggitt cable supports remained straight and firmly attached, with no obvious effects from the heat. The Meggitt cables remained firmly in position, with slight sagging over their longest horizontal runs. All items below the slab were covered with wet, calcined concrete (a common occurrence when hot concrete slabs are wetted). All clamps holding Meggitt cables to the supports remained firmly in place. Removal of the (stainless steel) clamps from several locations showed only slight indentations in the cable. There were no apparent holes in the cable shield.

Following the completion of all testing, the ceramic fiber was removed from the holes in the slab and all Meggitt cables were removed in one piece and in their tested configuration. Several of the clamp/support systems were removed from the slab without disconnecting them from the Meggitt cables. The cable assembly was then carefully boxed and shipped to Meggitt Safety Systems, Inc. for examination by them.

OBSERVATIONS MADE DURING THE MEGGER, CONDUCTOR RESISTANCE AND (IF APPROPRIATE) HI-POT TESTS

The results indicated below do not represent a full and precise analysis of the meggering and conductor resistance data obtained. The actual test data sheets have been included in Appendix B for analysis by qualified and authorized persons.

CABLE #1 - 4/C #8 AWG

Pre-Test

The cable's conductors were tested with a megger (megohmeter) between all possible combinations of conductors and shield at a voltage of 1000 VDC. The results were obtained in less then 20 seconds for each reading with the resistances running from 4.41 GΩ (giga ohms) to 8.0 GΩ. The high pot (high potentiometer) readings were all around 1 μA (micro amp = 1×10^{-6} amp). Conductor resistances were centered around 36.5 mΩ.

During Fire Test

The megger readings dropped to a minimum of 0.13 MΩ and a maximum of 0.8 MΩ.

Post Hose Stream Test

The megger readings ranged from a minimum of 3.82 GΩ to a maximum of 6.96 GΩ.

Post Test (Cold)

The megger readings ranged from a minimum of 13.2 GΩ to a maximum of 26 GΩ. No high pot readings were taken. Conductor resistances were centered around 37 mΩ.

CABLE #2 - 8/C #12 AWG

Pre-Test

The cable's conductors were tested with a megger between all possible combinations of conductors and shield at a voltage of 500 VDC. The results were obtained in less then 20 seconds for each reading with the resistances running from 2.76 GΩ to 164 GΩ. Conductor resistances were centered around 96 mΩ.

During Fire Test

The megger readings dropped to a minimum of 0.34 MΩ and a maximum of 1.13 MΩ.

Post Hose Stream Test

The megger readings ranged from a minimum of 1.07 GΩ to a maximum of 22.1 GΩ.

Post Test (Cold)

The megger readings ranged from a minimum of 7.48 GΩ to a maximum of 86.7 GΩ. Conductor resistances were centered around 99 mΩ.

CABLE #3 – 7/C #14 AWG

Pre-Test

The cable's conductors were tested with a megger between all possible combinations of conductors and shield at a voltage of 500 VDC. The results were obtained in less then 20 seconds for each reading with all resistances running greater than 2 GΩ. Conductor resistances were centered around 150 mΩ.

During Fire Test

The megger readings dropped to a minimum of 0.65 MΩ and a maximum of 2.0 MΩ.

Post Hose Stream Test

The megger readings were all >2 GΩ except for one reading, which was 150 MΩ.

Post Test (Cold)

The megger readings all exceeded 2 GΩ. Conductor resistances were centered around 156 mΩ.

CABLE #4 – 7/C #10 AWG

Pre-Test

The cable's conductors were tested with a megger between all possible combinations of conductors and shield at a voltage of 500 VDC. The results were obtained in less then 20 seconds for each reading with the resistances all >2 GΩ. Conductor resistances were centered around 61 mΩ.

During Fire Test

The megger readings dropped to a minimum of 0.19 MΩ and a maximum of 0.49 MΩ.

Post Hose Stream Test

The megger readings all exceeded 2 GΩ.

Post Test (Cold)

The megger readings all exceeded 2 GΩ. Conductor resistances were centered around 62 mΩ.

CONCLUSIONS

In accordance with the acceptance criteria listed in the Test Plan, all supports were successful and met the requirements of the Test Plan. None failed to hold up its load and all remained firmly attached to the concrete slab.

Omega Point Laboratories, Inc. has not been requested to analyze the Megger, Conductor Resistance nor Current Leakage data. These data have, therefore, been presented as collected, for review and analysis by authorized, qualified persons.

Appendix A

TEST PLAN & CONSTRUCTION DRAWINGS

AREVA

ENGINEERING INFORMATION RECORD

Document Identifier 51 5050368 - 01

Title PROGRESS ENERGY MEGGITT CABLE TEST PLAN – TEST 3

PREPARED BY:	REVIEWED BY:
Name John G. Crowther	Name RICHARD L. DIBLE
Signature [signature] Date 2/10/2005	Signature [signature] Date 2/10/2005

Technical Manager Statement: Initials [initials]

Reviewer is Independent.

Remarks:

This test plan documents the scope of this test, the objectives, the acceptance criteria, the responsibilities of the client (Progress Energy), Framatome ANP and the test laboratory (Omega Point Laboratories), the prerequisites for the test, the procedure to be followed in conducting the test and the preparation of the test report.

This test plan is being revised to show as-built conditions.

TABLE OF CONTENTS

ITEM		PAGE
Cover Sheet		1
Table of Contents		2
1.0	Scope	3
2.0	Objective	3
3.0	Acceptance Criteria	3
4.0	Definitions	4
5.0	Responsibilities	4
6.0	Prerequisites	7
7.0	Procedure	10
8.0	Fire Test Report	19

1.0 SCOPE

This test plan describes the methods and guidelines to be utilized for the preparation of test specimens, performance of fire and hose stream tests, temperature monitoring, Megger testing (insulation resistance) data collection, High Potential data collection, leakage current data collection, conductor resistance data collection and all applicable documentation of these tasks and the test results. Management responsibility for all aspects of this program will be performed under the auspices of Framatome ANP (FANP), on behalf of Progress Energy (PE).

2.0 OBJECTIVE

The objective of this test program is to demonstrate the performance of Meggitt Safety Systems, Inc. fire resistive cables and cable support designs during a 3-hour fire exposure and subsequent exposure to a hose stream test. The furnace temperatures, furnace thermocouples, Megger testing, High Potential testing and hose stream testing will be conducted in accordance with Generic Letter 86-10, Supplement 1. The test will also collect electrical characteristic data (leakage current, conductor resistance) for each of the Meggitt Safety Systems, Inc. cable test specimens.

3.0 ACCEPTANCE CRITERIA

3.1 The acceptance criteria for the supports which are supporting Meggitt Safety Systems, Inc. cables, is that they remain attached to the test slab and that the cable remain attached to the support, during the fire endurance test and the hose stream test.

3.2 The seals used for closure of the openings in the test slab are not being tested or considered part of the test assembly.

4.0 DEFINITIONS

4.1 Test Slab / Deck – An 8' x 13' assembly designed to support the test items in position within the test furnace.

4.2 Test Item – All materials associated with Meggitt Safety Systems, Inc. Cables, including supports.

4.3 Test Assembly – The combination of the test item(s), thermocouples and test deck.

4.4 Thermocouple – An electrical assembly used to measure temperature, consisting of an electrically-welded, fused junction of dissimilar metals and their respective leads to the data acquisition system. The thermocouple leads are insulated with materials capable of withstanding the moisture and heat requirements of the test environment.

5.0 RESPONSIBILITIES

5.1 Progress Energy (PE)

5.1.1 Assume, through its contractor, total management responsibility of this test program.

5.1.2 Coordinate with FANP to provide designs for the specific test items. PE to provide designs for supports.

5.1.3 PE must approve any changes in the test methodology.

5.1.4 Provide the Meggitt Safety Systems, Inc. Cable to be tested and the support materials as detailed on Bill of Materials (Drawing 02-5050111A).

5.1.5 Provide a representative to be present for installation and to witness the fire endurance and hose stream tests.

5.1.6 Provide review of DRAFT test report including one set of "consolidated" comments.

5.2 Framatome ANP (FANP)

5.2.1 In coordination with PE, establish the criteria, guidelines, drawings, bill of materials, recommendations, etc., to govern the construction of the Test Assembly.

5.2.2 Provide the test item installation drawings / instructions and QC instructions.

5.2.3 Provide scheduling of personnel, equipment and material necessary to perform the installation.

5.2.4 Coordinate all phases of the fire test preparation with the testing organization including approval of any changes to the test methodology described herein.

5.2.5 Contract testing laboratory services.

5.3 Omega Point Laboratories, Inc. (OPL)

5.3.1 OPL shall coordinate with FANP for the development of the Test Plan.

5.3.2 Provide and prepare the test furnace, test slab, test items and provide required test instrumentation in accordance with the Laboratory's Quality Assurance Program and Quality Control Program.

5.3.3 Provide furnace thermocouples and thermocouple calibration and instrumentation.

5.3.4 Provide all test equipment necessary to provide Megger testing data collection, High Potential data collection, leakage current data collection and conductor resistance data collection. Megger testing and High Potential testing shall be conducted in accordance with GL 86-10, Supplement 1 and as specified herein.

5.3.5 Procure the support materials as specified by FANP as required to construct the test assemblies. Such materials may include, but are not limited to, tools and equipment, fasteners, supports, structural steel, etc., as shown on FANP test assembly drawings.

5.3.6 Assemble, install and document the installation of all Meggitt Safety Systems, Inc. Cable, supports, etc. This includes installing the post applied attachment plates sufficient to hold the test articles during the test.

5.3.7 Provide computer-generated drawing showing location of furnace thermocouples.

5.3.8 Record and overview, using the Laboratory Event Log, the QC documentation for the installation of all test items.

5.3.9 Conduct the fire endurance and hose stream test including performing all Megger testing data collection, High Potential data collection, leakage current data collection and conductor resistance data collection in accordance with this test plan.

5.3.10 Inspect and document the physical condition of all test items following completion of the post-hose stream test.

5.3.11 Document the test parameters and provide a formal detailed written report of the test program and test results.

5.3.12 Provide photographic coverage of the test items, the fire and hose stream tests and the post-test activities. Provide video coverage of the test items during the fire and hose stream test and post-test.

5.4 Laboratory (OPL) Quality Assurance / Quality Control

5.4.1 Receive, inspect, and record all materials associated with the test items. The quality control documentation for these materials provided by the Laboratory will be documented in the final test report.

5.4.2 Inspect and document that the materials used and construction of test items comply with applicable drawings.

5.4.3 Witness the process utilized in the installation of the test assembly and suitably document observations in event logs, inspection reports, etc.

5.4.4 Inspect and document the instrumentation of the test items.

5.4.5 Provide written calibration documentation of all thermocouples, measurement devices and data acquisition systems used in this test program.

5.4.6 Witness the fire endurance test and hose stream test to document test performance and confirm test results.

5.4.7 Complete the Test Article Attribute Checklist (Drawing 02-5050112A) prior to the start of the test.

6.0 PREREQUISITES

6.1 General Test Configuration Requirements

The test items used in this test program shall be representative of plant configurations or intended plant configurations and shall be specified and designed by FANP / PE and its contractors. The test items to be subjected to fire endurance and hose stream tests shall be in accordance with FANP assembly drawings and instructions. The following are the assembly drawings and instructions:

- Drawing 02-5050102A-00 (Revision 0)
- Drawing 02-5050103A-01 (Revision 1)
- Drawing 02-5050104A-01 (Revision 1)
- Drawing 02-5050105A-00 (Revision 0)
- Drawing 02-5050106A-00 (Revision 0)
- Drawing 02-5050107A-00 (Revision 0)
- Drawing 02-5050108A-01 (Revision 1)
- Drawing 02-5050109A-01 (Revision 1)
- Drawing 02-5050110A-01 (Revision 1)
- Drawing 02-5050111A-01 (Revision 1)
- Drawing 02-5050112A-00 (Revision 0)

6.2 Traceability Requirements

All thermocouples used in this test program shall be traceable to the respective thermocouple manufacturer, with calibration certification, provided by Omega Point Laboratories.

6.3 Dimensioned Drawings

6.3.1 All test articles shall conform to the dimensioned drawings provided by FANP. All changes to these drawings shall be implemented and controlled by FANP and approved by PE. Final revisions of all drawings shall be implemented and controlled by FANP. Final revisions of all drawings shall be provided by FANP for inclusion into and use in preparing the final test report.

6.3.2 Final, dimensioned drawings depicting layout of the furnace thermocouples will be prepared by OPL, for inclusion in the final test report.

6.4 Electrical Wiring Diagrams

6.4.1 All test articles shall conform to the Electrical Wiring Diagrams provided by OPL (See figures 7.1 through 7.4 in this test plan). All changes to these diagrams shall be implemented and controlled by FANP and approved by PE. Final revisions of all diagrams shall be implemented and controlled by FANP. Final revisions of all diagrams shall be provided by FANP in this Test Plan for inclusion into and use in preparing the final test report.

6.5 Test Configurations

6.5.1 General

6.5.1.1 The test articles shall be sufficiently secured to the test deck and/or sealed by Laboratory personnel, in accordance with instructions and drawings. The test deck will consist of 8' x 13', 8" thick concrete slab, reinforced with structural steel elements sufficient to carry the load of the test items.

6.5.1.2 The concrete test slab is to be cured and conditioned to reduce the risk of spalling. Where an existing test slab is to be reused, it shall be inspected to ensure that it is in good condition. The slab will be conditioned to moisture equilibrium at indoor conditions or drier to ensure no spalling.

6.5.1.3 Penetration openings for the Meggitt cables will be sealed using ceramic fiber.

6.5.2 Test Articles

All test items will be constructed in accordance with drawings provided by FANP.

6.5.3 Grounding of Supports

Meggitt Safety Systems, Inc. cable supports will be grounded by attaching grounding cables on top of the slab to the through slab all thread rod which attaches the surface mounted steel plates for each of the hangers to the slab.

6.6 Thermocouple Installation

6.6.1 Furnace thermocouples shall be provided and installed in accordance with GL 86-10, Supplement 1. All thermocouples used in this test program shall be provided and installed by OPL, with QC surveillance by Laboratory personnel.

6.6.2 The measured temperature to be compared with the standard time-temperature curve is to be the average temperature obtained from the reading of thermocouples symmetrically disposed and distributed to indicate the temperature near all parts of the specimen.

6.6.3 At least three thermocouples are to be used with no fewer than five thermocouples per 100 square feet of test slab area. The junctions of the thermocouples are to be placed approximately 12 inches from the exposed surface of the test assembly.

6.6.4 Each furnace thermocouple is to be enclosed in a sealed protection tube. The exposed combined length of protection tube and thermocouple in the furnace chamber is to be not less than 12 inches.

6.6.5 The time constant of the protected thermocouple assembly is to be within the range of 5.0 to 7.2 minutes. A typical thermocouple assembly complying with this time constant requirement is fabricated by fusion-welding the twisted ends of No. 18 AWG chromel-alumel wires, mounting the leads in porcelain insulators and inserting the assembly into a standard weight ½ inch (0.84 inch outside diameter) black wrought iron, black wrought steel or Inconel pipe, and sealing the end of the pipe that is inside the furnace. The thermocouple junction is to be inside the pipe, 1/2 inch from the sealed end.

6.6.6 The temperatures are to be read at intervals not exceeding 1 minute throughout the fire test.

6.6.7 The temperature of the furnace is to be controlled so that the area under the measured time-temperature curve, obtained by averaging the results from the thermocouple readings, is within 5 percent of the corresponding area under the standard time-temperature curve at the end of 3 hours.

6.7 Preburn Inspection

6.7.1 Prior to the commencement of the fire endurance test, a thorough check of the test assembly and associated equipment (including data recording equipment, megohmeter for Megger testing, High Potential test equipment, leakage current testing equipment and conductor resistance testing equipment) and completion of applicable Laboratory QA/QC checklists shall be performed and documented by the testing laboratory. This will include the completion of the Test Article Attribute Checklist (FANP Drawing 02-5050112A).

6.7.2 Written approval of the construction, assembly, installation and instrumentation will be supplied by FANP and OPL prior to performance of the fire exposure test (a sign-off sheet for this purpose will be supplied by the Laboratory).

7.0 PROCEDURE

7.1 General

7.1.1 The testing sequence will be as follows:

7.1.1.1 After construction and connection of the test assembly and prior to the start of the fire endurance test: Megger testing data collection shall be conducted in accordance with Section 7.2. Leakage current monitoring and data collection shall be performed in accordance with Section 7.3. Conductor resistance data collection shall be performed in accordance with Section 7.4. High Potential data collection shall be performed in accordance with Section 7.5.

7.1.1.2 During the conduct of the 3-hour fire endurance test, Megger testing data collection shall be performed as often as possible starting at approximately 30 minutes into the fire test. High Potential testing data collection shall be performed immediately following each session of Megger testing data collection. The test may be extended past 3-hours as necessary to finalize the data collection. Megger testing data collection shall be conducted in accordance with Section 7.2. High Potential testing data collection shall be performed in accordance with Section 7.5. The conductors designated to be energized will be energized after each round of Megger / High Potential testing.

Leakage current monitoring and data collection shall be performed in accordance with Section 7.3.

7.1.1.3 At the completion of the fire endurance test and after the cables are de-energized, the test assembly shall be subjected to a hose stream test in accordance with Section 7.6.

7.1.1.4 Immediately following the hose stream test, Megger testing data collection and High Potential data collection shall be conducted in accordance with Section 7.2 and Section 7.5, respectively.

7.1.1.5 After the hose stream test, and after the test assembly has been allowed time to cool and dry the following monitoring/data collection shall be performed: Megger testing data collection shall be conducted in accordance with Section 7.2. High Potential data collection shall be conducted in accordance with Section 7.5. Leakage current monitoring and data collection shall be performed in accordance with Section 7.3. Conductor resistance data collection shall be performed in accordance with Section 7.4.

7.2 Megger Testing Data Collection

7.2.1 The Megger testing is to be performed with a megohmeter. The power cable (4/C #8) shall be tested at 1000 VDC. The control cables (7/C #10, 8/C #12 and 7/C #14) shall be tested at 500 VDC.

7.2.2 The Megger testing is to be performed on each adjacent conductor-to-conductor path and on each conductor-to-ground path.

7.2.3 The Megger testing data collection results shall be corrected to reflect only that portion of insulation resistance which is contributed to by the Meggitt Safety Systems, Inc. cable.

7.2.4 The results from each of the Megger testing data collections along with a detailed explanation of the data correction and the final corrected results shall be documented in the final test report.

7.3 Leakage Current Data Collection

7.3.1 One conductor in each of the Meggitt Safety Systems, Inc. cables shall be energized from an AC electrical supply source. The energized conductor will not be terminated. The switch for the conductor between the Megger point and the resistor will be left open.

7.3.2 Leakage current data collection will be performed at intervals not exceeding 1 minute.

7.3.3 The 4/C #8 power cable is to be energized from a 480 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.1 for the electrical connection diagram.

7.3.4 The 8/C # 12 control cable is to be energized from a 120 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.2 for the electrical connection diagram.

7.3.5 The 7/C # 14 control cable is to be energized from a 120 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.3 for the electrical connection diagram.

7.3.6 The 7/C # 10 control cable is to be energized from a 120 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.4 for the electrical connection diagram.

7.3.7 The non-energized conductors adjacent to the energized conductor in each cable shall be monitored for voltage drop across a resistor to detect current leakage to each conductor.

7.3.8 All non-energized conductors which are not adjacent to the energized conductor in each cable will be tied together and monitored for voltage drop across a resistor as a group to detect current leakage.

7.3.9 Resistors will be sized to result in a maximum current flow of equal to or less than 1.0 amp.

7.3.10 The results from each leakage current data collection along with a detailed explanation of the data correction shall be documented in the final test report.

7.4 Conductor Resistance Data Collection

7.4.1 Conductor resistance data collection will occur prior to the beginning of the Fire Endurance and after the hose stream test when the test assembly has cooled and dried. Conductor resistance shall be measured for each conductor in each cable. Conductor resistance will be measured utilizing an Ohmmeter.

7.4.2 Perform correction to eliminate any resistance which is contributed from sources other than the Meggitt Safety Systems, Inc. cable conductors.

7.4.3 The results from each conductor resistance data collection along with a detailed explanation of the data correction and the final corrected results shall be documented in the final test report.

7.5 High Potential Testing Data Collection

7.5.1 The High Potential testing is to be performed on the power cable (4/C #8) at 3200VDC. High Potential testing will be performed at the same connection points as for the meggering (See Figure 1)

7.5.2 The High Potential test is to be performed on each conductor to conductor path and on each conductor to ground path for a minimum of 60 seconds.

7.5.3 The High Potential test data collection results shall be documented in the final test report.

7.6 Water Hose Stream Test

7.6.1 Immediately following the fire endurance test, a hose stream test will be performed in accordance with USNRC Generic Letter 86-10, Supplement 1, Enclosure 1, Section VI. The hose stream will be "applied at random to all exposed surfaces of the test specimen through a 1-1/2" fog nozzle set at a discharge angle of 30 degrees with a nozzle pressure of not less than 75 psi and a minimum discharge pressure of 75 gpm with the tip of the nozzle at a maximum of 5 feet from the test specimen. Duration of the hose stream application is 5 minutes." Prior to the hose stream application, the laboratory will ensure the correct angle spray

pattern, pressure and flow is being achieved through calibrated gauges and other equipment as required. This is to be documented by OPL.

7.7 Fire Endurance Test

7.7.1 The test equipment and test assembly are to be protected from any condition of wind or weather that influences the test results. The air temperature at the beginning of the test is to be within the range of 50 to 90°F, unless otherwise approved by PE.

7.7.2 The test item shall be exposed to the standard time/temperature curve found in ASTM E119 (88) for a minimum period of one hundred eighty (180) minutes, unless directed by FANP to conclude the test.

7.7.3 Furnace pressure shall be controlled to be as nearly neutral as possible with respect to the surrounding laboratory atmosphere, measured at the vertical mid-point of the test specimen.

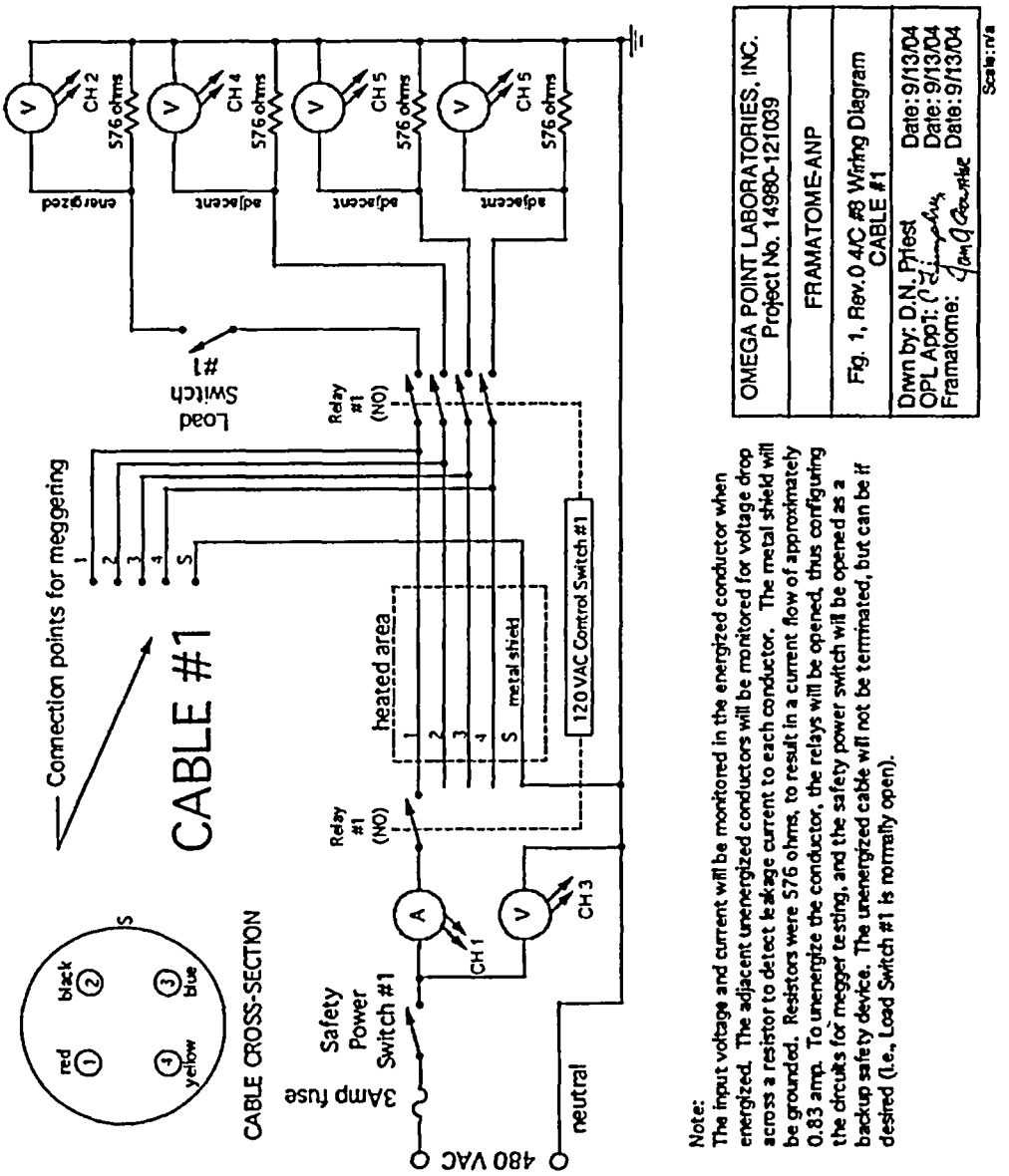
7.7.4 The testing organization shall adapt their testing procedures to assure the fire test complies with the requirements established in all referenced portions of referenced standards. Any changes, revisions, or deviations required to comply with this requirement shall be documented and properly justified and included as a part of the final test report.

7.8 Furnace Thermocouple monitoring

7.8.1 During the fire exposure period, the thermocouples will be scanned at one minute intervals or less. Data storage for reporting purposes will be at one minute intervals, although the furnace thermocouples will be scanned and displayed every 15 seconds, to allow close control of the furnace. The test report will contain thermocouple data at one minute intervals.

7.8.2 Monitoring of all thermocouples will be terminated upon completion of the fire endurance test.

Figure 7.1



Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 576 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #1 is normally open).

Figure 7.2

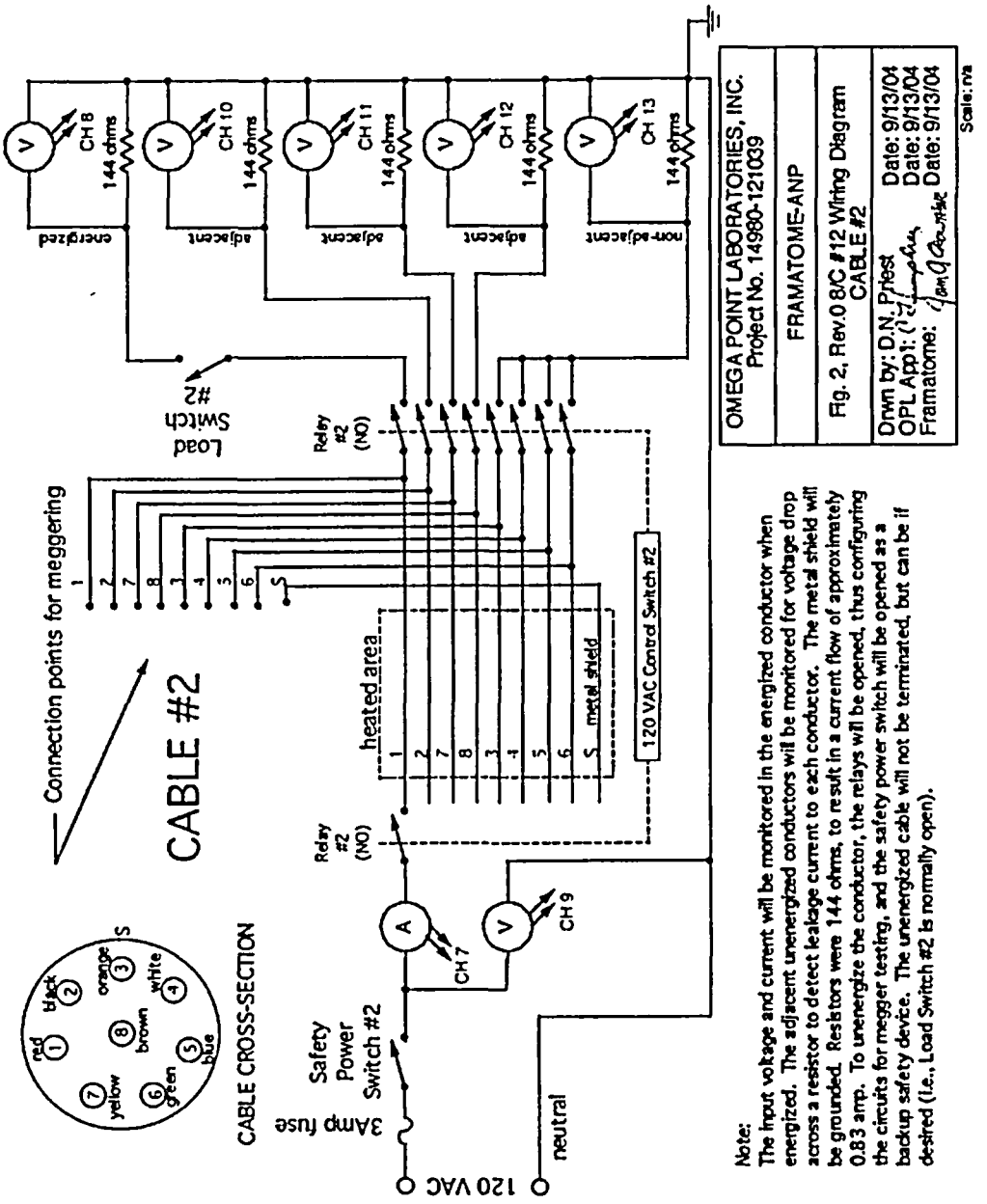

OMEGA POINT LABORATORIES, INC.
Project No. 14980-121039
FRAMATOME-ANP
Fig. 2, Rev.0 8/C #12 Wiring Diagram
CABLE #2
Drawn by: D.N. Priest Date: 9/13/04
OPL Appl: Date: 9/13/04
Framatome: Date: 9/13/04
Scale: n/a
CH 8
CH 10
CH 11
CH 12
CH 13
144 ohms
energized
adjacent
adjacent
adjacent
non-adjacent
Load Switch #2
Relay #2 (NO)
Connection points for meggering
CABLE #2
heated area
metal shield
120 VAC Control Switch #2
CH 7
CH 9
Safety Power Switch #2
3Amp fuse
120 VAC
neutral
CABLE CROSS-SECTION
red
black
orange
white
brown
blue
green
yellow
Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #2 is normally open).

Figure 7.3

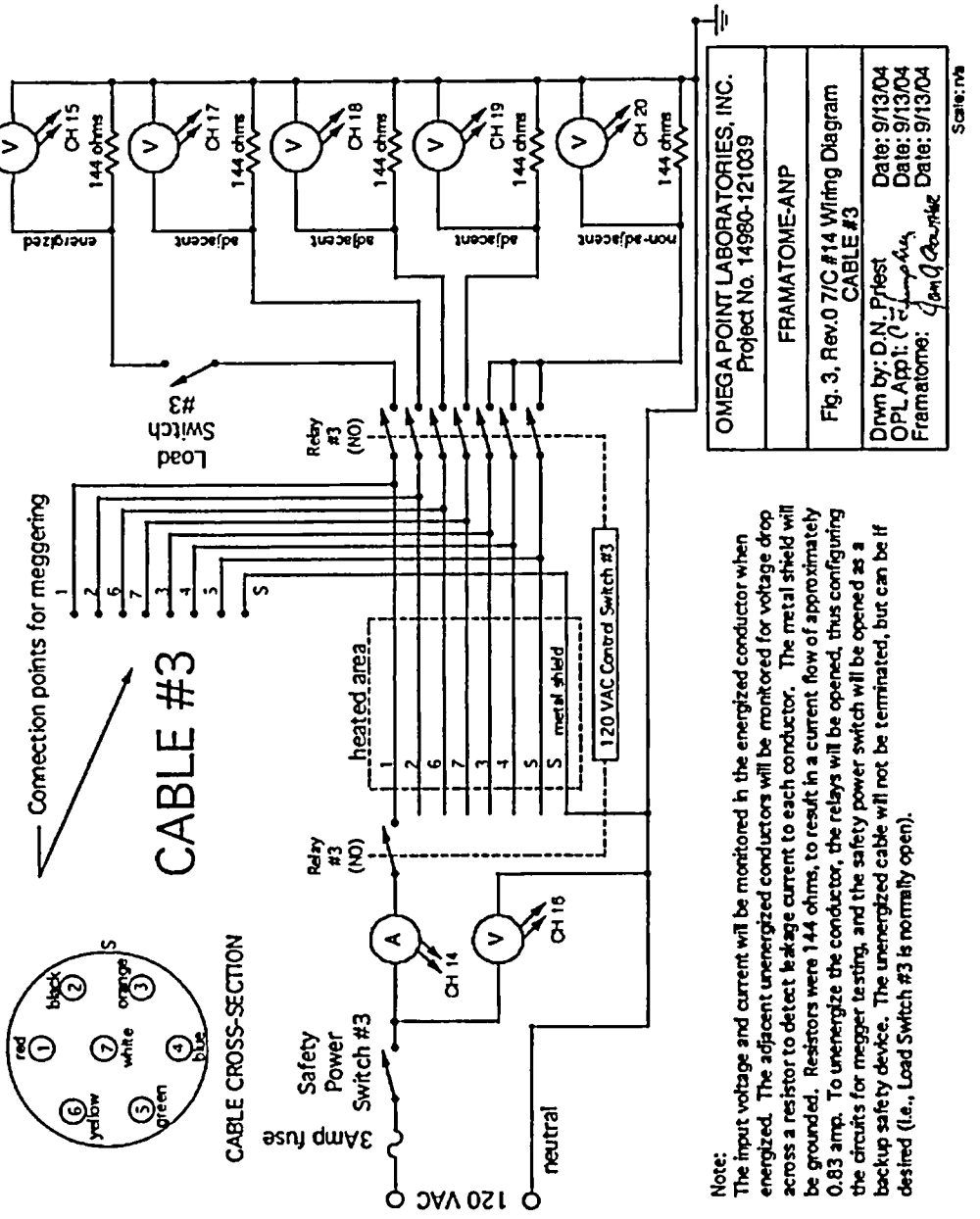
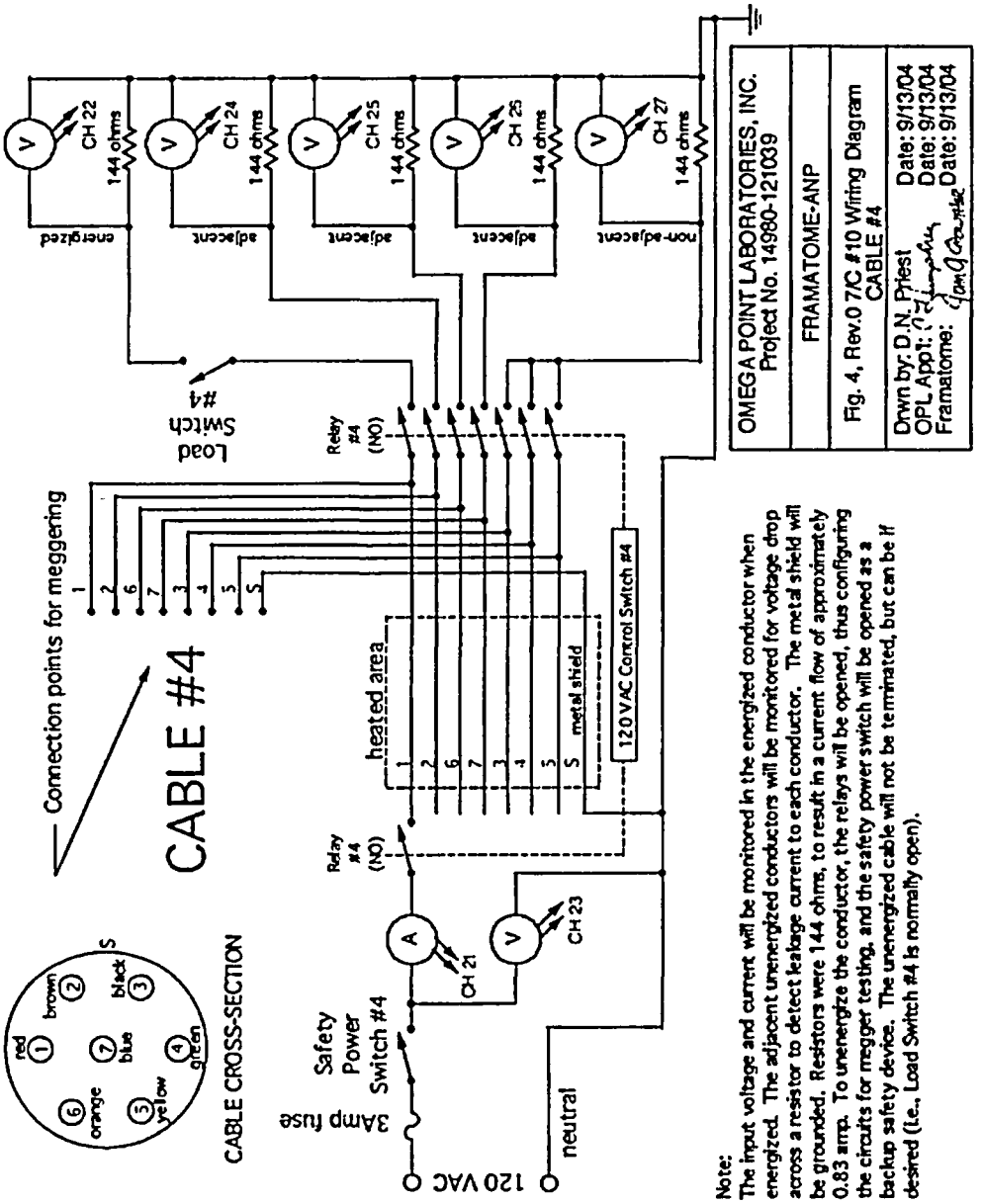

OMEGA POINT LABORATORIES, INC.
Project No. 14980-121039
FRAMATOME-ANP
Fig. 3, Rev.0 7/C #14 Wiring Diagram
CABLE #3
Drwn by: D.N. Priest Date: 9/13/04
OPL App'l: Date: 9/13/04
Framatome: Date: 9/13/04
Scale: n/a
CABLE #3
Connection points for meggering
CABLE CROSS-SECTION
red
black
orange
white
blue
yellow
green
heated area
metal shield
120 VAC Control Switch #3
Load Switch #3
Relay #3 (NO)
Relay #3 (NO)
CH 14
CH 16
CH 15
CH 17
CH 18
CH 19
CH 20
144 ohms
energized
adjacent
adjacent
adjacent
non-adjacent
Safety Power Switch #3
3Amp fuse
120 VAC
neutral
Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #3 is normally open).

Figure 7.4


OMEGA POINT LABORATORIES, INC.
Project No. 14980-121039
FRAMATOME-ANP
Fig. 4, Rev.0 7C #10 Wiring Diagram
CABLE #4
Drwn by: D.N. Priest Date: 9/13/04
OPL Appt: Date: 9/13/04
Framatome: Date: 9/13/04
CH 22
CH 24
CH 25
CH 26
CH 27
144 ohms
energized
adjacent
non-adjacent
Load Switch #4
Relay #4 (NO)
Connection points for meggering
CABLE #4
heated area
metal shield
120 VAC Control Switch #4
CH 21
CH 23
Safety Power Switch #4
3Amp fuse
120 VAC
neutral
CABLE CROSS-SECTION
red
brown
black
blue
green
orange
yellow
Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #4 is normally open).

8.0 FIRE TEST REPORT

8.1 The Laboratory will submit a report on the results of the test including whether the acceptance criteria for fire test were met. Initially a DRAFT report will be sent within 14 days of test completion for one set of consolidated review comments by PE and FANP.

8.2 The Laboratory will assemble the final test report, containing the collected data and required quality control documentation. Five (5) CD's of test reports will be provided to FANP. The CD's will contain the test report in pdf format, all test data in Excel® format and all photographs (whether or not they were selected for use in the final report) in high resolution jpeg format.

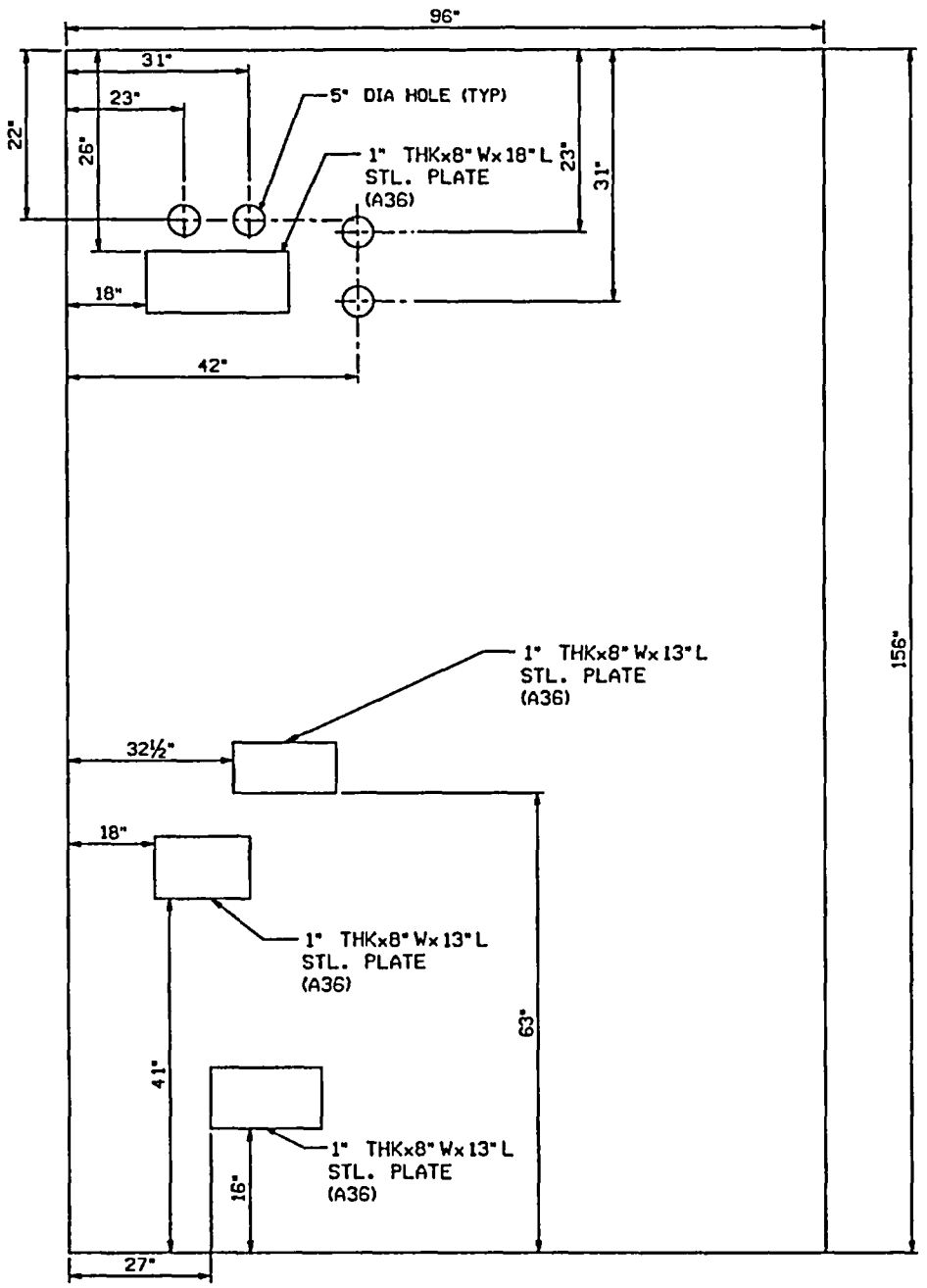
8.3 The test report shall be prepared in sufficient detail to summarize the total testing activity. The report shall include as a minimum:

a) Identification of the testing laboratory and identification of the employer of the personnel who witnessed the preparation of the test samples
b) A description of the assembly, materials and installation of the fire resistive cable including drawings depicting the geometry and location of the fire resistive cable within the test assembly.
c) The type of fire resistive cable including description and manufacturers part number.
d) Complete description of the electrical circuit.
e) A record of the test instruments used and calibration verification.
f) A record of the voltage and current applied to the fire resistive cable.
g) The temperature of the furnace during the fire test.
h) A description of the equipment used for the hose stream test.
i) A record of the hose stream test.
j) A record of the Megger test measurements and the elapsed time between the end of the hose stream test and the beginning of the Megger test.
k) A record of the leakage current data collection.
l) Observations on the behavior of the cable during the fire endurance test and during the hose stream test.
m) Observation on the behavior of the supports during the fire endurance test and during the hose stream test.
n) A record of the conductor resistance data collected.
o) A record of the High Potential data collected.

AREVA

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	9/13/04		

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



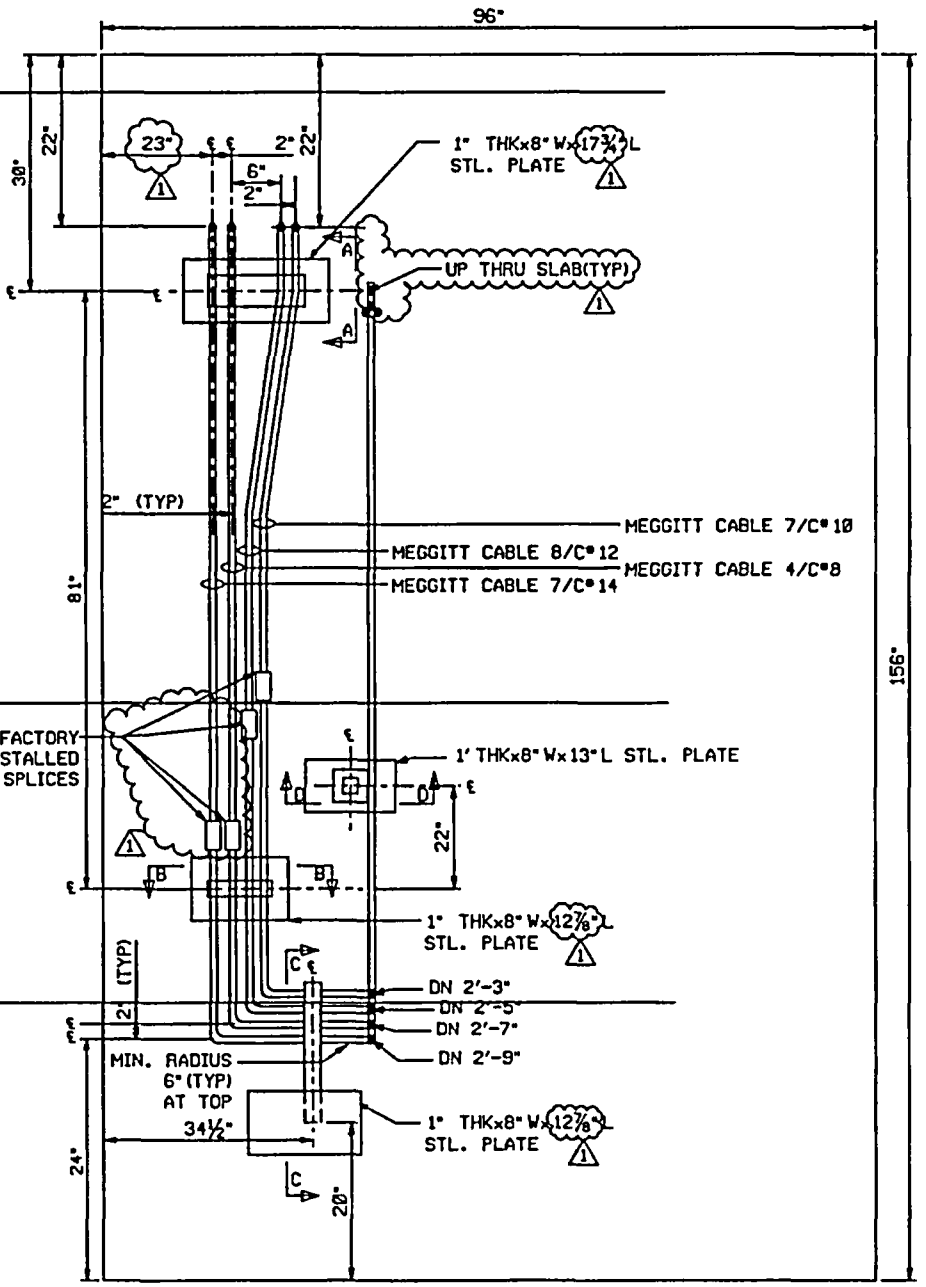
DRAWN BY K. GROSZEK	CHECKED BY JOHN G. LAWTHER	PROGRESS ENERGY MEGGITT CABLE TEST #3 TEST SLAB PLAN VIEW	SCALE NONE	DATE 9/13/04
PASSED BY RL DIBLE	APPROVED BY CA BROWNING		DWG. NO. 02-5050102A-00	

CAD FILE 02-5050102A-00 .DGN

AREVA

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	9/13/04	QA ENGINEERING	
1	AS BUILT CONDITIONS	2/10/05	CABunnell	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

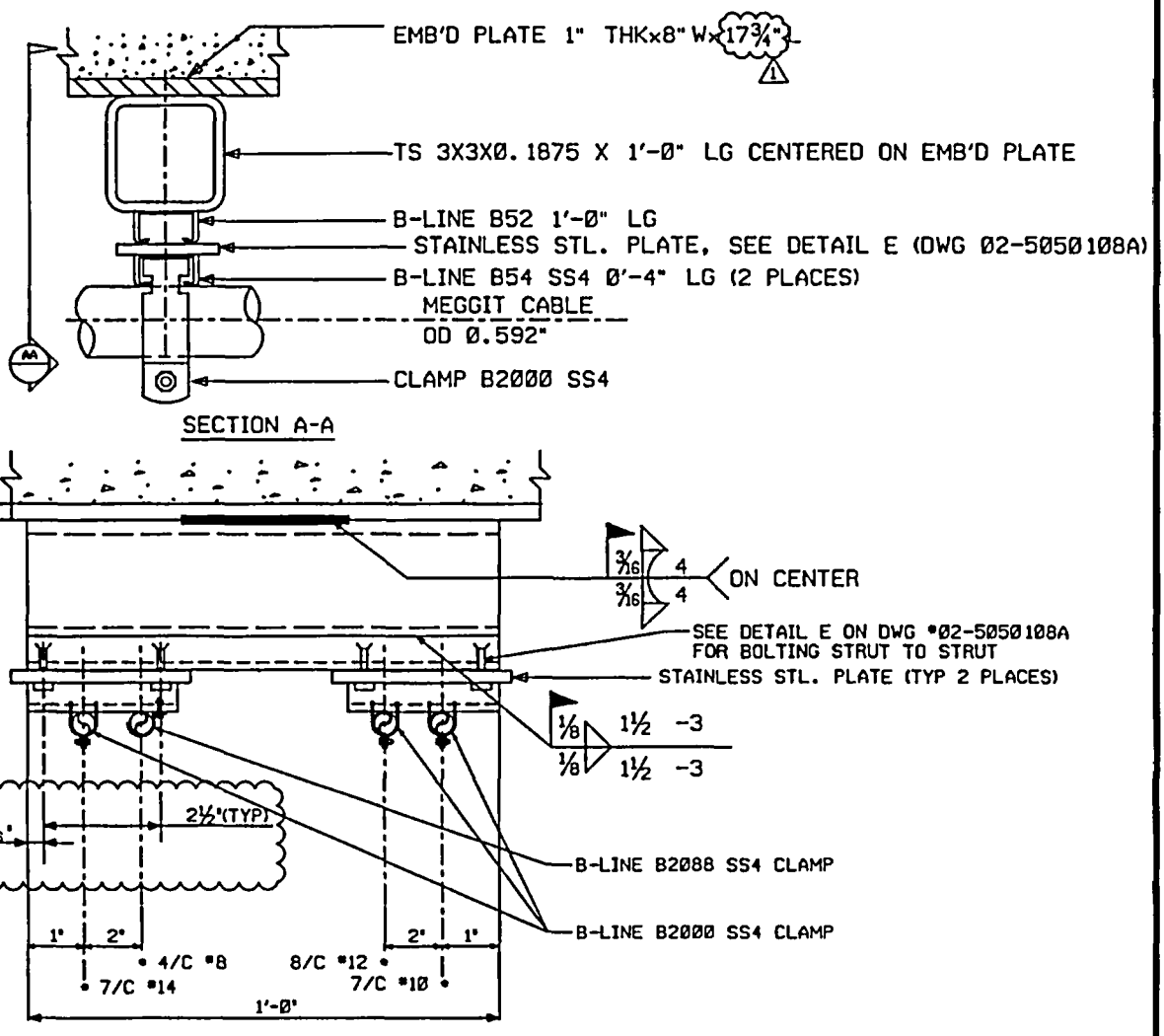


DRAWN BY K GROSZEK	CHECKED BY JOHN G. CRAWTHER	PROGRESS ENERGY MEGGITT CABLE TEST #3 PLAN VIEW BELOW SLAB	SCALE NONE / DATE 9/13/04
PASSED BY R.L. DIBLE	APPROVED BY C.A. BUNNELL		DWG. NO. 02-5050103A-01
			CAD FILE 02-5050103A-01.DGN

AREVA

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	9/13/04	CA Bunning	
1	AS BUILT CONDITIONS	2/10/05	CA Bunning	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



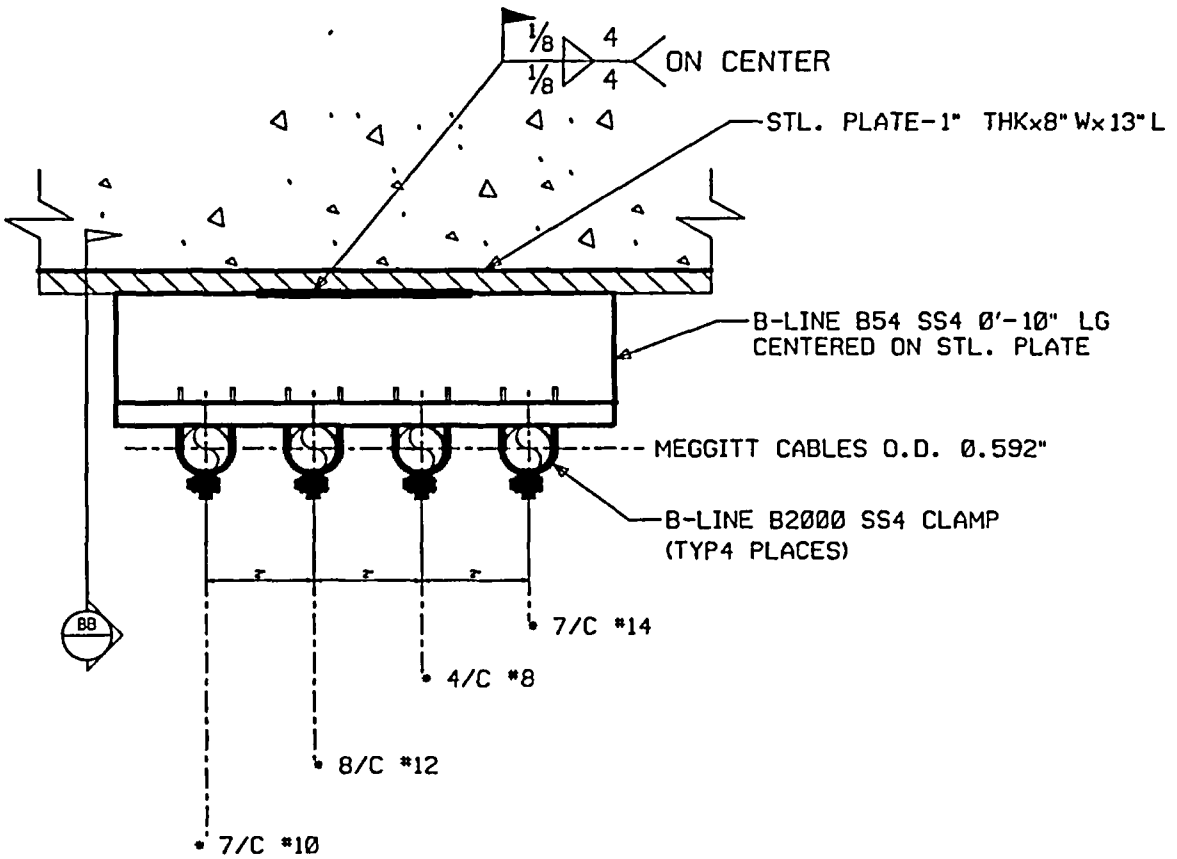
NOTE: SUPPORT IS GROUNDED BY ATTACHING GROUND CABLES ON TOP OF THE TEST SLAB TO THE ATR WHICH ATTACHES THE EMBED PLATE TO THE TEST SLAB.

DRAWN BY K GROSZEK	CHECKED BY John G. Crowther	PROGRESS ENERGY MEGGITT CABLE TEST #3 ELEVATION A-A	SCALE NONE DATE 9/13/04
PASSED BY R L DIBLE	APPROVED BY CA Bunning		DWG. NO. 02-5050104A-01
			CAD FILE 02-5050104A-01.DGN

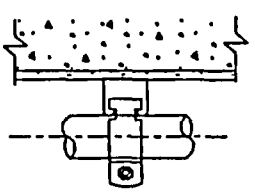
AREVA

REVISIONS				M F
REV	DESCRIPTION	DATE	APPROVAL	
0	ORIGINAL ISSUE	9/13/04		

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



SECTION B-B



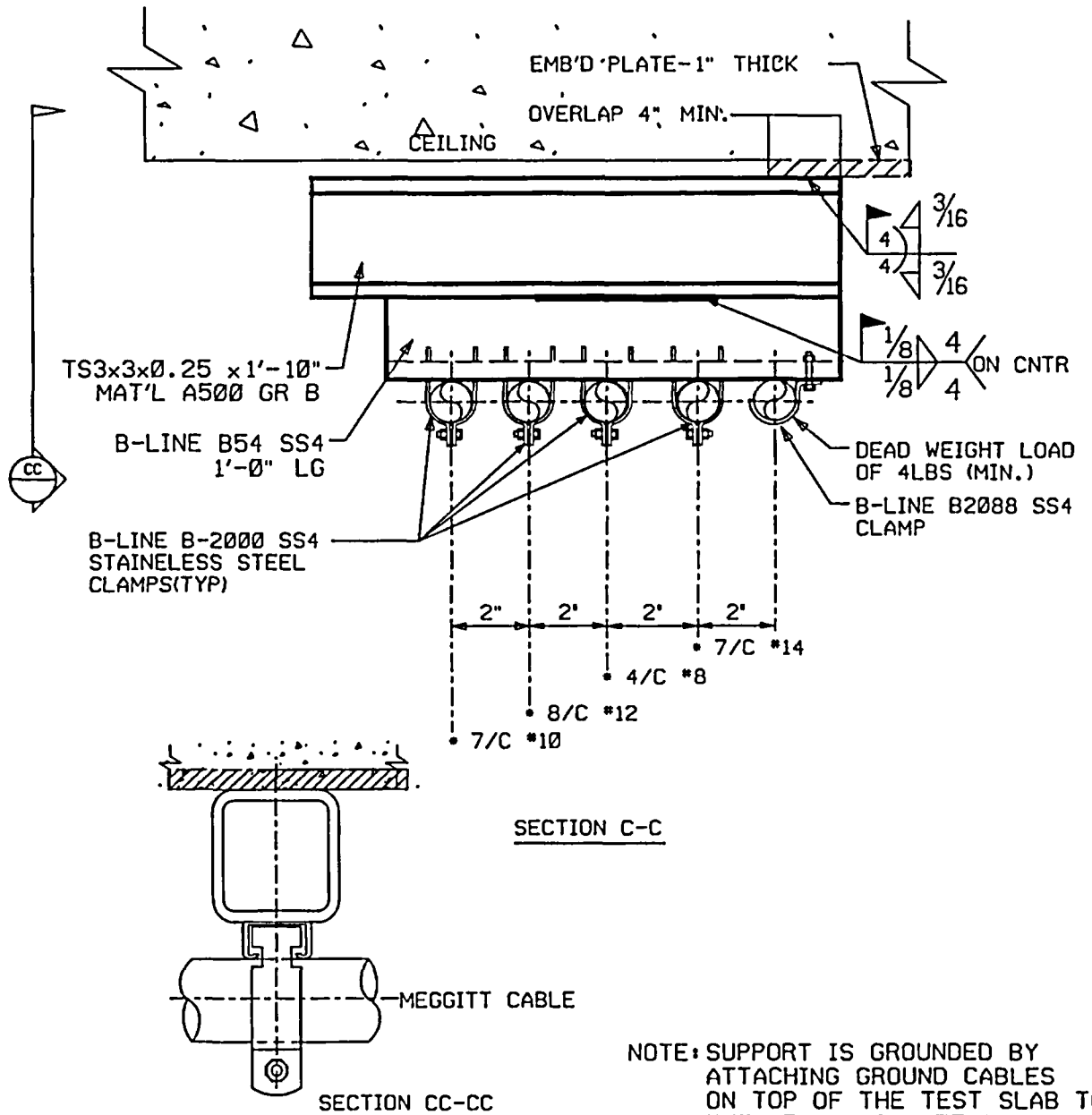
SECTION BB-BB

DRAWN BY K GROSZEK	CHECKED BY J.G. GRAITHER	PROGRESS ENERGY MEGGITT CABLE TEST #3 ELEVATION B-B	SCALE NONE	DATE 9/13/04
PASSED BY R.L. DIBLE	APPROVED BY R. Banning		DWG. NO. 02-5050105A-00	
			CAD FILE 02-5050105A-00.DGN	

AREVA

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	9/13/04		

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



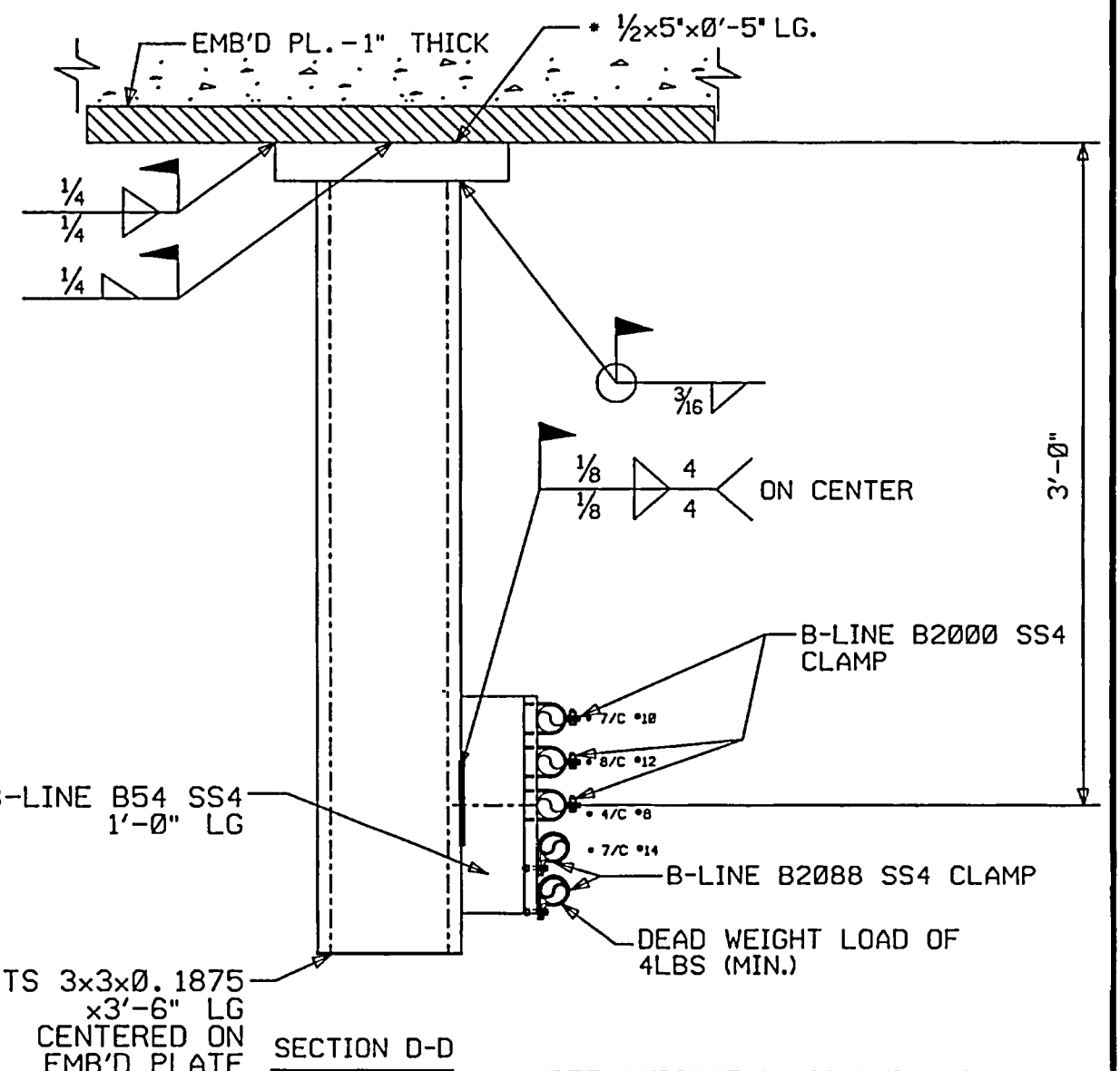
NOTE: SUPPORT IS GROUNDED BY ATTACHING GROUND CABLES ON TOP OF THE TEST SLAB TO THE ATR WHICH ATTACHES THE EMBED PLATE TO THE TEST SLAB.

DRAWN BY K GROSZEK	CHECKED BY	PROGRESS ENERGY MEGGITT CABLE TEST #3 ELEVATION C-C	SCALE NONE DATE 9/13/04
PASSED BY R.L. DIALE	APPROVED BY C.A. Banning		DWG. NO. 02-5050106A-00
			CAD FILE 02-5050106A-00.DGN

AREVA

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	9/13/04	CABanning	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



SECTION D-D

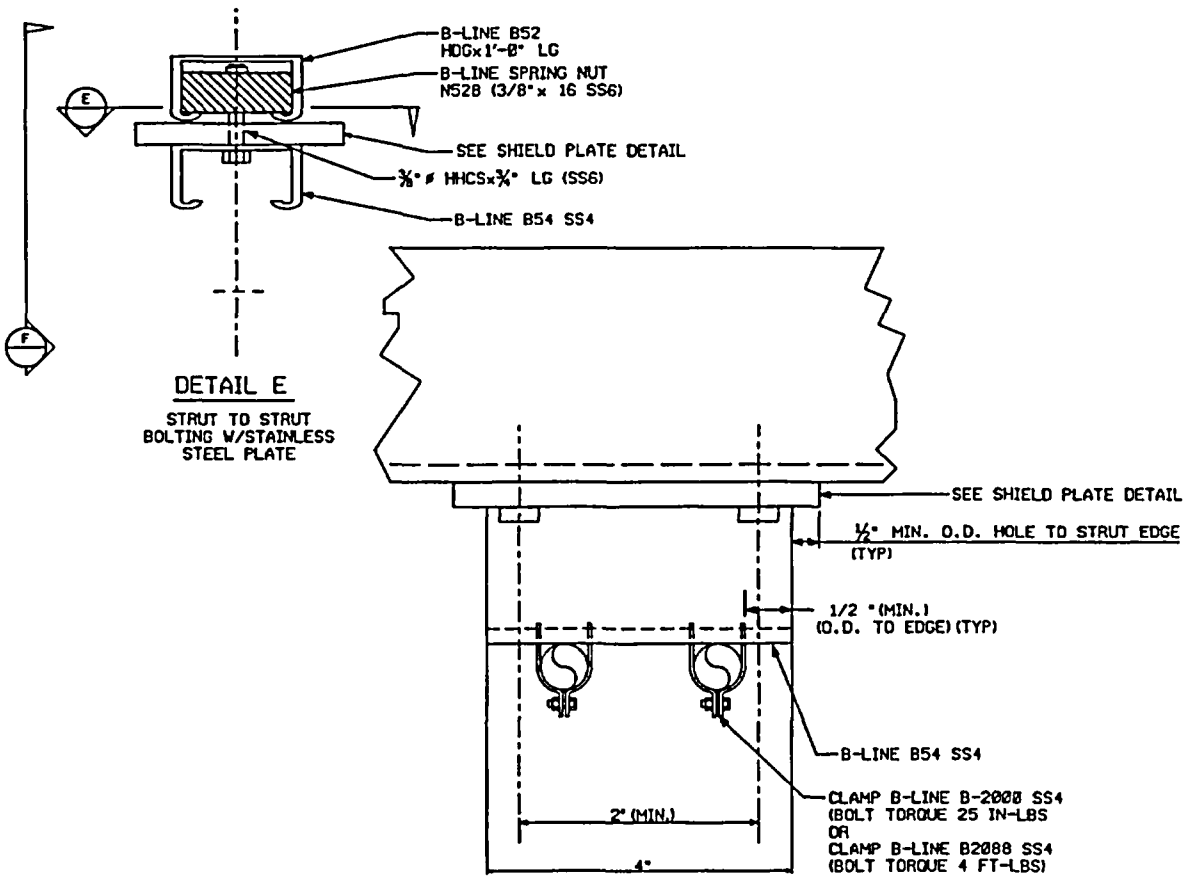
NOTE: SUPPORT IS GROUNDED BY ATTACHING GROUND CABLES ON TOP OF THE TEST SLAB TO THE ATR WHICH ATTACHES THE EMBED PLATE TO THE TEST SLAB.

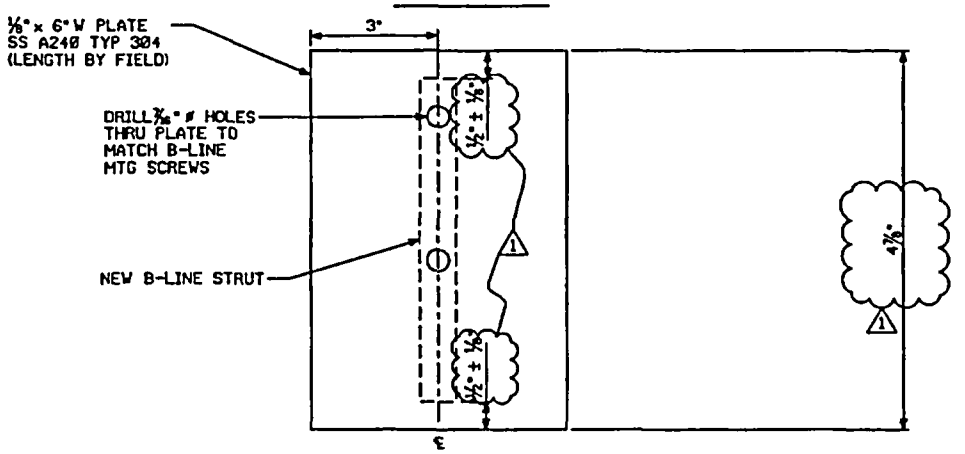
DRAWN BY K GROSZEK	CHECKED BY J.W. Graham	PROGRESS ENERGY MEGGITT CABLE TEST #3 ELEVATION D-D	SCALE NONE DATE 9/13/04
PASSED BY R. DIBLE	APPROVED BY CABanning		DWG. NO. 02-5050107A-00
			CAD FILE 02-5050107A-00.DGN

AREVA

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	9/13/04	CA BANNING	
1	AS BUILT CONDITIONS	2/10/05	CABanning	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.





DRAWN BY K GROSZEK	CHECKED BY JOHN G. CRAWTHER		
PASSED BY D.L. DIBLE	APPROVED BY C.A. Banning	PROGRESS ENERGY MEGGITT CABLE TEST #3 DETAIL E	SCALE NONE / DATE 9/13/04
			DWG. NO. 02-5050108A-01
			CAD FILE 02-5050108A-01.DGN

AREVA

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
0	ORIGINAL ISSUE	9/13/04	CA Banning
1	AS BUILT CONDITIONS	2/10/05	CA Banning

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

GENERAL NOTES

1. Meggitt Si 2400 Cable Installation:

   a) Cables must be uncoiled as the cable is fed out along the routing path. Whether on a reel or in factory coils, the cable must be unrolled in a tangential (circular) manner. DO NOT UNCOIL BY PULLING ON THE END AND HELICALLY STRETCHING.
   b) Minimum bend radius is 6 inches. At least one bend shall be installed with a minimum bend radius as indicated on Drawing No. 02-5050103A.
   c) Each cable contains a factory installed splice located approximately (1) at the middle (1) of the cable sample. The factory installed splice shall be located between Section A-A (Drawing 02-5050104-A) and Section B-B (Drawing 02-5050105A) supports at approximately the midpoint between the supports for the 8C #12 and 7C #10 cables and approximately 12" from support at Section B-B for the 4C #8 and the 7C #14 cables.
   d) Each cable has factory installed terminations at each end of the cable. The terminations each have pigtails approximately 3' long.
   e) Repeated bending and straightening of the cable should be avoided.
   f) Any smooth surface or appropriate radius may be used to form the cable. EMT tube benders are suitable. In many cases the cable can be hand formed.
   g) Smooth contour changes such as dents, digs, ripples, or wrinkles are acceptable.
   h) Gouges or cuts in the cable sheath which exceed 10% of cable wall thickness may be cause for rejection. Wall thickness is nominally .015".
   i) Outside diameter for all Meggitt cables is 0.592"

2. 1" thick plate steel shall be installed against the test slab to simulate embed plates. The plates shall be bolted to the test slab utilizing ½" ATR extending through the test slab to ensure that the plate stays in place. ATR shall be placed at least at each of the 4 corners of the plate, no closer than 1" to the edge of the plate. Additional ATR may be utilized if necessary to ensure that the plate remains in place.

3. Where the drawings indicate that additional dead load weight is to be added to a support, this additional weight will be achieved by appropriately sizing a piece of steel and then attaching it to the support.

DRAWN BY K GROSZEK	CHECKED BY J G Gawthrop	PROGRESS ENERGY MEGGITT CABLE TEST #3 GENERAL NOTES	SCALE NONE / DATE 9/13/04
PASSED BY R. DIBLE	APPROVED BY C A Banning		DWG. NO. 02-5050109A-01
			CAD FILE 02-5050109A-01.DGN

AREVA

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
0	ORIGINAL ISSUE	9/13/04	CA Bamm
1	AS BUILT CONDITIONS	2/10/05	CA Bamm

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

4. Assembly of strut to strut with stainless steel plate:

   a) Drill 7/16" diameter holes in the back of the new strut that is to be installed for all locations where bolting to the existing strut is required on each end of the strut. Make sure that the edge of the drilled hole is no closer than ½" from the edge of the strut. Make sure all the drilled holes are spaced no closer than 2" on-center.
   b) Place the appropriate number of spring nuts in the existing channel and position them at the same locations as to where the drilled holes on the new strut are located.
   c) Place stainless ssteel plate with holes at the same location as shown on Detail E (Drawing 02-5050108A)
   d) Place the new strut on top of the stainless steel plate so that the side of the new strut that has holes drilled in it is resting parallel with the continuous slot side of the existing strut. Place the 3/8" - 16 HHCS through the drilled holes and thread all cap screws into the spring nuts until finger tight.
   e) Using a deep well socket and torque wrench, tighten the cap screws to a torque of 19 ft-lb.

5. Attachment of Meggitt cable to the stainless steel strut using B-Line B2000 SS4 clamps:

   a) Place the two clamp halves around the cable.
   b) Hook the edges of the clamp such that they catch the underside of the strut lips.
   c) Install the slotted hex head machine screw provided and tighten the square nut finger-tight onto the screw.
   d) Torque the screw to 25 lbf-in.
   e) Keep the clamp a minimum of ½" from the end of the strut.

6. Attachment of Meggitt cable to the stainless steel strut using B-Line B2088 SS4 clamps:

   a) Place the single hole tubing clamps over the cable.
   b) Attach the clamp to the strut finger-tight using a B-Line N224 SS6 Channel Nut and a B-Line Hex Head Cap Screw HHC ¼ x 1 SS6 (1" long cap screw to be cut off to make ¾" long so screw can be installed in B54 strut) 1
   c) Tighten the screw to 4 ft-lbs.
   d) Keep the clamp a minimum of ½" from the end of the strut.

DRAWN BY	CHECKED BY		
K GROSZEK	John G Crowther		
PASSED BY R Dible	APPROVED BY CA Bamm	PROGRESS ENERGY MEGGITT CABLE TEST #3 GENERAL NOTES	SCALE NONE / DATE 9/13/04
			DWG NO. 02-5050110A-01
			CAD FILE 02-5050110A-01.DGN

AREVA

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
0	ORIGINAL ISSUE	9/13/04	CBinning
1	AS BUILT CONDITIONS	2/10/05	CBinning

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

BILL OF MATERIALS

QUANTITY	UNIT	ITEM
SUPPLIED BY PROGRESS ENERGY		
40	LF	4C #8 AWG MEGGITT SI 2400 FIRE CABLE, PART NO. 300217-5
40	LF	7C #10 AWG MEGGITT SI 2400 FIRE CABLE, PART NO. 300208-5
40	LF	8C #12 AWG MEGGITT SI 2400 FIRE CABLE, PART NO. 300283-5
40	LF	7C #14 AWG MEGGITT SI 2400 FIRE CABLE PART NO. 300286-5
		⚠1 NOTE: EACH CABLE TO HAVE FACTORY SPLICE INSTALLED APPROXIMATELY AT THE CENTER. EACH CABLE TO HAVE FACTORY INSTALLED CABLE TERMINATIONS AT EACH END.
1	LF	B-LINE B52 CHANNEL (HOT DIPPED GALVANIZED)
4	LF	B-LINE B54 SS4 CHANNEL (TYPE 304 STAINLESS STEEL)
14	EA	B-LINE B2000 SS4 CLAMP (STAINLESS STEEL WITH BOLT AND NUT)
4	EA	B-LINE B2088 SS4 SINGLE HOLE TUBING CLAMP (STAINLESS STEEL)
4	EA	B-LINE HHC 1/4 X 1 SS6 (STAINLESS STEEL SCREW 1/4" DIA., 1" LONG)
4	EA	B-LINE N224 SS6L (STAINLESS STEEL CHANNEL NUT, 1/4" DIA, FOR USE IN B54
		SS4 CHANNEL WITH 1/4" BOLT)
4	EA	B-LINE HHCS 3/8 X 3/4 SS6 (STAINLESS STEEL SCREW 3/8" DIA., 3/4" LONG)
4	EA	B-LINE N528 SS6L (STAINLESS STEEL CHANNEL NUT, 3/8" DIA, FOR USE IN
		B52 CHANNEL WITH 3/8" BOLT)
2	EA	STAINLESS STEEL PLATES 1/8" X 5" X 6"

SUPPLIED BY OMEGA POINT LABORATORIES		
2	LF	3" X 3" X 0.25" TUBE STEEL, ASTM A500 GR B
5	LF	3" X 3" X 0.1875" TUBE STEEL, ASTM A500 GR B
5	LF	8" X 1" STEEL PLATE A36
1	EA	5" X 5" X 1/2" STEEL PLATE A36
20	LF	1/2" ATR
32	EA	1/2" STEEL WASHER
32	EA	1/2" A-307 STEEL NUT
		MISCELLANEOUS STEEL (FOR USE AS DEAD WEIGHT LOADS)

DRAWN BY K GROSZEK	CHECKED BY JOHN C. CRAWTHER	PROGRESS ENERGY MEGGITT CABLE TEST #3 BILL OF MATERIAL	SCALE NONE / DATE 9/13/04
PASSED BY R.L. DIBLE	APPROVED BY C. Binning		DWG. NO. 02-5050111A-01
			CAD FILE 02-5050111A-01.DGN

AREVA

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
0	ORIGINAL ISSUE	9/13/04	

TEST ARTICLE ATTRIBUTE CHECKLIST

PROJECT NUMBER: 14980-121039

PROJECT TITLE: MEGGITT FIRE RESISTIVE CABLE TEST NO. 3

		ATTRIBUTE	SAT	UNSAT
I		TEST DECK		
	A	Test deck configuration and dimensions per approved drawings		
	B	Condition of test deck		
	C	Test deck conditioned to moisture equilibrium at indoor conditions		
II		SUPPORTS/STEEL PLATES		
	A.	Correct materials used		
	B.	Installed per approved drawings		
	C.	Supports for Meggitt cable are properly grounded		
	D.	Applied torque values for strut clamps per approved drawings		
	E.	Welds per approved drawings		
	F.	Dead loads for clamps sized and installed per approved drawings		
III		MEGGITT CABLES		
	A.	Cables installed per approved drawings		
	B.	Minimum bend radius installed where shown on approved drawings		
	C.	Factory installed splices installed as shown on approved drawings		
	D.	Factory installed terminations provided at each end of cable		
	E.	No gouges or cuts in the cable sheath which exceed 10% of cable wall thickness		
V		TEST EQUIPMENT		
	A.	Wiring of test articles conform to the Figures 7.1 through 7.4 in the approved Test Plan		
	B.	Fuses, amp meters, volt meters, resistors and switches installed per Figures 7.1 through 7.4 of the approved Test Plan		
	C.	All electrical devices and equipment have been tested prior to the start of the test to ensure that they are properly connected and functioning as required, showing proper readings on data acquisition equipment		
	D.	Furnace thermocouples are the correct type and are installed per the Test Plan		
	E.	Covers provided on furnace burners.		

NOTE: Verification to be made using initials of OPL Quality Assurance Personnel

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

DRAWN BY	CHECKED BY		
K GROSZEK	J.C. Hunnicutt	PROGRESS ENERGY MEGGITT CABLE TEST #3	SCALE NONE
PASSED BY R.L. Dible	APPROVED BY C.A. Banning	TEST ARTICLE ATTRIBUTE CHECKLIST	DATE 9/13/04
			DWG. NO. 02-5050112A-00
			CAD FILE 02-5050112A-00.DGN

Appendix B

MEGGERING AND CONDUCTOR RESISTANCE RESULTS

MEGGERING DATA SHEET

4/C #8 CABLE #1

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-6-04

Test Condition: **Pre Test**

Megger Operator: Jeff Piel
Megger ID: M-54 50

Scribe: Cleda Patton
Calibration Due: 12-19-04

POWER OFF VERIFIED: ✓

4/C #8 - CABLE #1

MEGGER READINGS
PRE TEST

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	1.79 6Ω	2:42 pm
1	Red	3	Blue	8 6Ω	2:44
1	Red	4	Yellow	7.38 6Ω	2:45
1	Red	Shield	-	5.026 Ω	2:46
2	Black	3	Blue	6.16 6Ω	2:48
2	Black	4	Yellow	8.06Ω	2:50
2	Black	Shield	-	4.876Ω	2:51
3	Blue	4	Yellow	6.78 6Ω	2:52
3	Blue	Shield	-	4.41 6Ω	2:54
4	Yellow	Shield	-	4.44 6Ω	2:55

MEGGERING DATA SHEET

4/C #8 CABLE #1

Cledo Patton
10-6-04

HI-POT READINGS
PRETEST

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	1.22 μA	4:09 pm
1	Red	3	Blue	1.02 μA	4:11
1	Red	4	Yellow	1.01 μA	4:13
1	Red	Shield	-	.91 μA	4:14
2	Black	3	Blue	1.05 μA	4:15
2	Black	4	Yellow	.95 μA	4:17
2	Black	Shield	-	.83 μA	4:17
3	Blue	4	Yellow	.99 μA	4:18
3	Blue	Shield	-	.93 μA	4:19
4	Yellow	Shield	-	.91 μA	4:20

grubb Engineering
model: 2956A
SN: 837

MEGGERING DATA SHEET

4/C #8 CABLE #1

CONDUCTOR RESISTANCE
PRETEST

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	36.5 mΩ	3:54 pm
2	Black	2	Black	36.6 mΩ	3:55
3	Blue	3	Blue	37.1 mΩ	3:56
4	Yellow	4	Yellow	36.1 mΩ	3:56

Grubb Engineering
Biddle Digital Low Resistance Ohmmeter
SN: 7386
Cal due 1-5-05

MEGGERING DATA SHEET

4/C #8 CABLE #1

Client: Framatome-ANP Date: 10-7-04

Project No: 14980-121039

Test Condition: **DURING TEST (From** 0234 **To** 2:08)

Megger Operator: Jeff Pick Scribe: Connie Humphreys

Megger ID: ~~M-54~~ CH 10-7-04 Calibration Due: 12-19-04

~~Program Energy Megger S1-5010~~ CH 10-7-04

POWER OFF VERIFIED: ✓

4/C #8 - CABLE #1

S/N ~~A13273-2~~ 3181 Model No. GR1644A

Megohm Bridge **MEGGER READINGS**

Megit Safety Systems

Jim Thomsen

500 V DC

~~1500 VDC~~ CH 10-7-04

FROM		TO		RESISTANCE (Megohms)	TIME	
COND. #	COLOR	COND. #	COLOR			
1	Red	2	Black	.35 / .51	10:13 am	1000 VDC
1	Red	3	Blue	.34 / .66	10:18 am	1000 VDC
1	Red	4	Yellow	.55	10:24	1000 VDC
1	Red	Shield	-	.13	10:45	
2	Black	3	Blue	.80	10:51	
2	Black	4	Yellow	.45	10:59	
2	Black	Shield	-	.17	11:07	
3	Blue	4	Yellow	.45	11:11	
3	Blue	Shield	-	.18	11:14	
4	Yellow	Shield	-	.20	11:16	

Note: Resistance measurement @ 500 VDC is the first reading in Megohms for Cond. #1 Red to Black and Red to Blue All other readings @ 1000 VDC CH 10-7-04

MEGGERING DATA SHEET

4/C #8 CABLE #1

Client: Framatome-ANP Date: 10-7-04

Project No: 14980-121039

Test Condition: **DURING TEST** (From 2:10 To 2:48 (Hour/minutes into test)

Megger Operator: Jeff Piel Scribe: C Humphrey

Megger ID: ~~A13273~~ 3181 Calibration Due: 12-19-04

Meggitt Safety Syst. Megohm Bridge

POWER OFF VERIFIED: ✓

4/C #8 - CABLE #1

MEGGER READINGS

1000 VDC

FROM		TO		RESISTANCE (Megohms) .24	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	~~Ch 1 280.35~~	~~11:20~~ 11:39 am
1	Red	3	Blue	45 .35	~~11:23~~ 11:44
1	Red	4	Yellow	.25	11:50
1	Red	Shield	-	.14	11:57
2	Black	3	Blue		
2	Black	4	Yellow		
2	Black	Shield	-		
3	Blue	4	Yellow		
3	Blue	Shield	-		
4	Yellow	Shield	-		

MEGGERING DATA SHEET

4/C #8 CABLE #1

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-7-04

Test Condition: **POST HOSE STREAM**

Megger Operator: Jeff Diel
Megger ID: M-54

Scribe: Connie Humphrey
Calibration Due: 12-19-04

POWER OFF VERIFIED: ✓

4/C #8 - CABLE #1

MEGGER READINGS

1500V DC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	6.63 GΩ	12:37 pm
1	Red	3	Blue	6.8 GΩ	12:39
1	Red	4	Yellow	6.01 GΩ	12:40
1	Red	Shield	-	3.82 GΩ	12:41
2	Black	3	Blue	5.71 GΩ	12:42
2	Black	4	Yellow	6.96 GΩ	12:43
2	Black	Shield	-	4.28 GΩ	12:43
3	Blue	4	Yellow	6.30 GΩ	12:44
3	Blue	Shield	-	4.15 GΩ	12:45
4	Yellow	Shield	-	3.86 GΩ	12:46

MEGGERING DATA SHEET

4/C #8 CABLE #1

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-8-04

Test Condition: **POST TEST COLD**

Megger Operator: Jeff Piel
Megger ID: M-54

Scribe: C Humphrey
Calibration Due: 12-19-04 8

POWER OFF VERIFIED: ✓

4/C #8 - CABLE #1

MEGGER READINGS

1500 VDC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	28.0 GΩ	8:15am
1	Red	3	Blue	27.4 GΩ	8:15
1	Red	4	Yellow	26.3 GΩ	8:16
1	Red	Shield	-	16.9 GΩ	8:16
2	Black	3	Blue	23.9 GΩ	8:17
2	Black	4	Yellow	26.7 GΩ	8:18
2	Black	Shield	-	16.8 GΩ	8:19
3	Blue	4	Yellow	23.4 GΩ	8:20
3	Blue	Shield	-	14.5 GΩ	8:21
4	Yellow	Shield	-	13.2 GΩ	8:22

MEGGERING DATA SHEET

4/C #8 CABLE #1

CONDUCTOR RESISTANCE
POST TEST COLD

Jeff Piel

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red	36.9 mΩ	9:18 am
2	Black	2	Black	36.1 mΩ	9:18
3	Blue	3	Blue	37.6 mΩ	9:18
4	Yellow	4	Yellow	36.6 mΩ	9:19

CH
10-8-04

Grubb Eng.
Biddle
low Resistance Ohmeter
S/N 7386
Cal Due 1-5-05

MEGGERING DATA SHEET

8/C #12 CABLE #2

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-6-04

Test Condition: **Pre Test**

Megger Operator: Jeff Piel
Megger ID: M-54

Scribe: C Humphrey
Calibration Due: 12-19-04

Progress Energy Megger Model S1-5010

POWER OFF VERIFIED: ✓

8/C #12 - CABLE #2

MEGGER READINGS

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	152 GΩ	2:58
1	Red	3	Orange	164 GΩ	~~2:59~~ 3:00
1	Red	4	White	140 GΩ	3:02
1	Red	5	Blue	142 GΩ	3:04
1	Red	6	Green	21.5 GΩ	3:05
1	Red	7	Yellow	29.5 GΩ	3:06
1	Red	8	Brown	40.0 GΩ	3:07
1	Red	Shield	-	17.1 GΩ	3:09
2	Black	3	Orange	75.4 GΩ	3:11
2	Black	4	White	43.1 GΩ	3:13
2	Black	5	Blue	40.7 GΩ	3:15 PM
2	Black	6	Green	41.0 GΩ	3:17
2	Black	7	Yellow	47.4 GΩ	3:18
2	Black	8	Brown	56.6 GΩ	3:19
2	Black	Shield	-	36.1 GΩ	3:21
3	Orange	4	White	39.3 GΩ	3:22
3	Orange	5	Blue	37.8 GΩ	3:24
3	Orange	6	Green	36.9 GΩ	3:25
3	Orange	7	Yellow	43.4 GΩ	3:26
3	Orange	8	Brown	52.9 GΩ	3:28
3	Orange	Shield	-	31.4 GΩ	3:29
4	White	5	Blue	8.67 GΩ	3:31
4	White	6	Green	6.89 GΩ	3:33
4	White	7	Yellow	14.2 GΩ	3:34
4	White	8	Brown	22.7 GΩ	3:36
4	White	Shield	-	4.94 GΩ	3:37
5	Blue	6	Green	5.16 GΩ	3:38
5	Blue	7	Yellow	10.5 GΩ	3:40

M-54

S1-5010

MEGGERING DATA SHEET

2 of 10

8/C #12 CABLE #2

Page ~~3~~ ~~of 63~~ Page 69 10/6/04

(Megger Readings Continued): Pre Test 10/6/04 C Humphrey

FROM		TO		RESISTANCE	TIME
COND. #	COLOR	COND. #	COLOR	(Megohms)	
5	Blue	8	Brown	18.0 GΩ	3:42 pm
5	Blue	Shield	-	3.28 GΩ	3:43
6	Green	7	Yellow	6.47 GΩ	3:44
6	Green	8	Brown	14.1 GΩ	3:45
6	Green	Shield	-	2.76 GΩ	3:47
7	Yellow	8	Brown	10.8 GΩ	3:48
7	Yellow	Shield	-	7.79 GΩ	3:50
8	Brown	Shield	-	8.05 GΩ	3:52

S1-5010

Progress Energy Megger
Model S1-5010 &
M-54

MEGGERING DATA SHEET

8/C #12 CABLE #2

CONDUCTOR RESISTANCE
PRE TEST

C Humphrey 10/6/04

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	96.2 mΩ	4:02pm
2	Black	2	Black	97.7 mΩ	4:02
3	Orange	3	Orange	95.5 mΩ	4:02
4	White	4	White	96.0 mΩ	4:03
5	Blue	5	Blue	96.3 mΩ	4:03
6	Green	6	Green	96.6 mΩ	4:03
7	Yellow	7	Yellow	96.9 mΩ	4:03
8	Brown	8	Brown	95.4 mΩ	4:03

SI-5010

Megger box used
SI-5010
and
M-54

MEGGERING DATA SHEET

8/C #12 CABLE #2

Client: Framatome-ANP

Project No: 14980-121039

Date: 10-7-04

Test Condition: **DURING TEST (From 33:30 To _____)**

Megger Operator: Jeff Piel

Megger ID: ~~CH-730~~ M-54

~~Grubb Fin Equip~~ Progress Energy

POWER OFF VERIFIED: SY ✓

Scribe: Connie Humphrey

Calibration Due: 12-19-04

8/C #12 - CABLE #2

MEGGER READINGS

500 V DC

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	.77	9:54 am
1	Red	3	Orange	.87	9:57
1	Red	4	White	.98	9:59
1	Red	5	Blue	1.02	10:01
1	Red	6	Green	1.02	10:03
1	Red	7	Yellow	1.06	10:04
1	Red	8	Brown	1.10	10:06
1	Red	Shield	-	1.13	10:07
2	Black	3	Orange	.42	10:18
2	Black	4	White	.51	10:21
2	Black	5	Blue	.62	10:23
2	Black	6	Green	.69	10:25
2	Black	7	Yellow	.75	10:27
2	Black	8	Brown	.78	10:28
2	Black	Shield	-	.79	10:29
3	Orange	4	White	.35	10:42
3	Orange	5	Blue	.37	10:45
3	Orange	6	Green	.41	10:47
3	Orange	7	Yellow	.53	10:50
3	Orange	8	Brown	.58	10:52
3	Orange	Shield	-	.59	10:54
4	White	5	Blue	.36	11:09
4	White	6	Green	.37	11:11
4	White	7	Yellow	.43	11:14
4	White	8	Brown	.48	11:16
4	White	Shield	-	.53	11:17
5	Blue	6	Green	.34	11:36
5	Blue	7	Yellow	.34	11:43

MEGGERING DATA SHEET

8/C #12 CABLE #2

Page ~~Page 72~~ 5 of 18

(Megger Readings Continued): **DURING TEST (From** 33:30 **To** 2:53):00

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
5	Blue	8	Brown	.35	11:47am
5	Blue	Shield	-	:40	11:49
6	Green	7	Yellow		
6	Green	8	Brown		
6	Green	Shield	-		
7	Yellow	8	Brown		
7	Yellow	Shield	-		
8	Brown	Shield	-		

stopped at 2hrs, 53minutes

@74

Megger box used
M-54

MEGGERING DATA SHEET

8/C #12 CABLE #2

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-7-04

Test Condition: **POST HOSE STREAM**

Megger Operator: Jeff Piel
Megger ID: M-54

Scribe: CZ Humphrey
Calibration Due: 12-19-04

POWER OFF VERIFIED: ✓

8/C #12 - CABLE #2

MEGGER READINGS

500 VDC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	21.6 GΩ	12:48pm
1	Red	3	Orange	22.1 GΩ	12:49
1	Red	4	White	18.4 GΩ	12:50
1	Red	5	Blue	17.6 GΩ	12:51
1	Red	6	Green	17.6 GΩ	12:51
1	Red	7	Yellow	17.6 GΩ	12:52
1	Red	8	Brown	20.2 GΩ	12:53
1	Red	Shield	-	18.2 GΩ	12:54
2	Black	3	Orange	13.4 GΩ	12:55
2	Black	4	White	10.6 GΩ	12:56
2	Black	5	Blue	9.67 GΩ	12:57
2	Black	6	Green	9.69 GΩ	12:58
2	Black	7	Yellow	11.2 GΩ	12:59
2	Black	8	Brown	13.3 GΩ	1:00
2	Black	Shield	-	8.90 GΩ	1:01
3	Orange	4	White	7.73 GΩ	1:02
3	Orange	5	Blue	7.06 GΩ	1:03
3	Orange	6	Green	6.82 GΩ	1:04
3	Orange	7	Yellow	8.37 GΩ	1:05
3	Orange	8	Brown	11.1 GΩ	1:06
3	Orange	Shield	-	6.28 GΩ	1:06
4	White	5	Blue	3.08 GΩ	1:07
4	White	6	Green	3.07 GΩ	1:08
4	White	7	Yellow	4.91 GΩ	1:08
4	White	8	Brown	7.46 GΩ	1:09
4	White	Shield	-	2.12 GΩ	1:10
5	Blue	6	Green	1.75 GΩ	1:11
5	Blue	7	Yellow	3.56 GΩ	1:11

MEGGERING DATA SHEET

8/C #12 CABLE #2

10-7-04 CH

(Megger Readings Continued): **POST HOSE STREAM**

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
5	Blue	8	Brown	6.00 GΩ	1:12
5	Blue	Shield	-	1.07GΩ	1:13
6	Green	7	Yellow	2.3 GΩ	1:14
6	Green	8	Brown	4.9 GΩ	1:15
6	Green	Shield	-	CH ~~9.64~~ 9bb	1:16
7	Yellow	8	Brown	3.91 GΩ	1:17
7	Yellow	Shield	-	2.61 GΩ	1:18
8	Brown	Shield	-	4.88GΩ	1:20

megger bad use
M-54

MEGGERING DATA SHEET

8/C #12 CABLE #2

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-8-04

Test Condition: **POST TEST COLD**

Megger Operator: Jeff Piel
Megger ID: M-54

Scribe: CJ Humphrey
Calibration Due: 12-19-04

POWER OFF VERIFIED: ✓

8/C #12 - CABLE #2

MEGGER READINGS

500 VDC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	55.5GΩ	8:24am
1	Red	3	Orange	86.7 GΩ	8:25
1	Red	4	White	66.6 GΩ	8:26
1	Red	5	Blue	68.4 GΩ	8:27
1	Red	6	Green	67.7 GΩ	8:29
1	Red	7	Yellow	71.2 GΩ	8:30
1	Red	8	Brown	74.2 GΩ	8:31
1	Red	Shield	-	62.5 GΩ	8:32
2	Black	3	Orange	75.6 GΩ	8:32
2	Black	4	White	50.3 GΩ	8:33
2	Black	5	Blue	50.2 GΩ	8:34
2	Black	6	Green	49.4 GΩ	8:35
2	Black	7	Yellow	56.6GΩ	8:36
2	Black	8	Brown	70.1GΩ	8:37
2	Black	Shield	-	52.8GΩ	8:38
3	Orange	4	White	51.0 GΩ	8:39
3	Orange	5	Blue	48.9 GΩ	8:40
3	Orange	6	Green	49.6 GΩ	8:41
3	Orange	7	Yellow	54.5 GΩ	8:42
3	Orange	8	Brown	76.9 GΩ	8:43
3	Orange	Shield	-	42.2 GΩ	8:44
4	White	5	Blue	20.0GΩ	8:44
4	White	6	Green	19.7 GΩ	8:45
4	White	7	Yellow	32.8 GΩ	8:46
4	White	8	Brown	48.2GΩ	8:47
4	White	Shield	-	13.8 GΩ	8:47
5	Blue	6	Green	11.8 GΩ	8:48
5	Blue	7	Yellow	24.4 GΩ	8:49

MEGGERING DATA SHEET

8/C #12 CABLE #2

(Megger Readings Continued): **POST TEST COLD** 500 VDC

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
5	Blue	8	Brown	43.1 GΩ	8:50 am
5	Blue	Shield	-	7.62 GΩ	8:51
6	Green	7	Yellow	17.3 GΩ	8:52
6	Green	8	Brown	38.3 GΩ	8:54
6	Green	Shield	-	7.48 GΩ	8:55
7	Yellow	8	Brown	32.0 GΩ	8:56
7	Yellow	Shield	-	20.6 GΩ	8:57
8	Brown	Shield	-	37.9 GΩ	8:58

CH
10-8-04

Megger box used
M-54

MEGGERING DATA SHEET

8/C #12 CABLE #2

CONDUCTOR RESISTANCE
POST TEST COLD

JeH Diel

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	98.1 mΩ	9:19 am
2	Black	2	Black	100.1 mΩ	9:19
3	Orange	3	Orange	98.0 mΩ	9:20
4	White	4	White	98.5 mΩ	9:20
5	Blue	5	Blue	98.6 mΩ	9:20
6	Green	6	Green	98.7 mΩ	9:20
7	Yellow	7	Yellow	99.0 mΩ	9:20
8	Brown	8	Brown	97.6 mΩ	9:21

Grubb Engineering
Biddle
Digital Low Resistance Ohmeter
S/N 7386
Cal Due 1-5-05

CTd
10-8-04

MEGGERING DATA SHEET

7/C #14 CABLE #3

Client: Framatome-ANP

Project No: 14980-121039

Date: 10-6-04

Test Condition: **PRE TEST**

Megger Operator: Mike Rawlston

Megger ID: CRDF-011

Progress Energy Megger Box.

POWER OFF VERIFIED: ✓

Scribe: Aleda Patton

Calibration Due: 3-10-04 05

7/C #14 - CABLE #3

MEGGER READINGS

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	>2GΩ	3:15 pm
1	Red	3	Orange	>2GΩ	3:17
1	Red	4	Blue	>2GΩ	3:18
1	Red	5	Green	>2GΩ	3:19
1	Red	6	Yellow	>2GΩ	3:19
1	Red	7	White	>2GΩ	3:19
1	Red	Shield	-	>2GΩ	3:19
2	Black	3	Orange	>2GΩ	3:20
2	Black	4	Blue	>2GΩ	3:20
2	Black	5	Green	>2GΩ	3:20
2	Black	6	Yellow	>2GΩ	3:20
2	Black	7	White	>2GΩ	3:20
2	Black	Shield	-	>2GΩ	3:21
3	Orange	4	Blue	>2GΩ	3:21
3	Orange	5	Green	>2GΩ	3:21
3	Orange	6	Yellow	>2GΩ	3:21
3	Orange	7	White	>2GΩ	3:22
3	Orange	Shield	-	>2GΩ	3:22
4	Blue	5	Green	>2GΩ	3:22
4	Blue	6	Yellow	>2GΩ	3:22
4	Blue	7	White	>2GΩ	3:23
4	Blue	Shield	-	>2GΩ	3:23
5	Green	6	Yellow	>2GΩ	3:23
5	Green	7	White	>2GΩ	3:24
5	Green	Shield	-	>2GΩ	3:24
6	Yellow	7	White	>2GΩ	3:24
6	Yellow	Shield	-	>2GΩ	3:24
7	White	Shield	-	>2GΩ	3:24

MEGGERING DATA SHEET

7/C #14 CABLE #3

10-6-04

~~CBattles~~

CONDUCTOR RESISTANCE
PRE TEST

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	149.9 mΩ	3:50 pm
2	Black	2	Black	150.1 mΩ	3:50
3	Orange	3	Orange	150.1 mΩ	3:51
4	Blue	4	Blue	149.3 mΩ	3:51
5	Green	5	Green	148.5 mΩ	3:52
6	Yellow	6	Yellow	149.6 mΩ	3:53
7	White	7	White	149.4 mΩ	3:53

Grubb Engineering
Biddle Digital Low Resistance Ohmeter
SN 7386
Cal Due 1-5-05

MEGGERING DATA SHEET

7/C #14 CABLE #3

Client: Framatome-ANP Date: 10-7-04 Date: 10-7-04

Project No: 14980-121039

Test Condition: **DURING TEST (From** 23:30 **To** 1 hr 18 min

Megger Operator: Mike Ranton Scribe: Cleda Patton

Megger ID: CRDF-011 Calibration Due: 3-10-05

POWER OFF VERIFIED: ✓

7/C #14 - CABLE #3

MEGGER READINGS

500 V DC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	1.3	9:37 am
1	Red	3	Orange	1.7	9:39
1	Red	4	Blue	1.8	9:41
1	Red	5	Green	1.9	9:42
1	Red	6	Yellow	2	9:43
1	Red	7	White	2	9:44
1	Red	Shield	-	2	9:45
2	Black	3	Orange	.9	9:50
2	Black	4	Blue	1	9:50
2	Black	5	Green	1.1	9:51
2	Black	6	Yellow	1.2	9:52
2	Black	7	White	1.2	9:53
2	Black	Shield	-	1.2	9:54
3	Orange	4	Blue	.8	9:58
3	Orange	5	Green	.9	9:58
3	Orange	6	Yellow	1	9:59
3	Orange	7	White	1.1	10:00
3	Orange	Shield	-	1.1	10:01
4	Blue	5	Green	.8	10:07
4	Blue	6	Yellow	.8	10:07
4	Blue	7	White	.9	10:08
4	Blue	Shield	-	.9	10:08
5	Green	6	Yellow	.7	10:14
5	Green	7	White	.8	10:15
5	Green	Shield	-	.8	10:16
6	Yellow	7	White	.75	10:22
6	Yellow	Shield	-	.8	10:22
7	White	Shield	-	.7	10:28

MEGGERING DATA SHEET

7/C #14 CABLE #3

Page ~~Page 81~~ A of 7

Client: Framatome-ANP

Project No: 14980-121039

Date: 10-7-04

Test Condition: **DURING TEST (From** 2hrs 22min **To** 2:47min.

Megger Operator: Mike Ranton

Megger ID: ~~820~~ 820

Scribe: Cleda Batts

Calibration Due: 1-2-05

POWER OFF VERIFIED: ✓

7/C #14 - CABLE #3

MEGGER READINGS

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	.83	11:37
1	Red	3	Orange	.87	11:38
1	Red	4	Blue	1.2	11:39
1	Red	5	Green	1.3	11:39
1	Red	6	Yellow	1.3	11:39
1	Red	7	White	1.3	11:39
1	Red	Shield	-	1.3	11:39
2	Black	3	Orange	.88	11:45
2	Black	4	Blue	.88	11:45
2	Black	5	Green	.89	11:46
2	Black	6	Yellow	.89	11:46
2	Black	7	White	.89	11:46
2	Black	Shield	-	.89	11:46
3	Orange	4	Blue	.68	11:51
3	Orange	5	Green	.68	11:51
3	Orange	6	Yellow	.68	11:51
3	Orange	7	White	.68	11:52
3	Orange	Shield	-	.70	11:52
4	Blue	5	Green	.65	11:55
4	Blue	6	Yellow	.65	11:55
4	Blue	7	White	.66	11:55
4	Blue	Shield	-	.66	11:56
5	Green	6	Yellow		
5	Green	7	White		
5	Green	Shield	-		
6	Yellow	7	White		
6	Yellow	Shield	-		
7	White	Shield	-		

Stopped at 2hrs 47min

MEGGERING DATA SHEET

7/C #14 CABLE #3

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-7-04

Test Condition: **POST HOSE STREAM**

Megger Operator: Mike Lanter
Megger ID: CRDF-011

Scribe: [signature]
Calibration Due: 3-10-05

POWER OFF VERIFIED: ✓

7/C #14 - CABLE #3

MEGGER READINGS

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	>2GΩ	12:36 pm
1	Red	3	Orange	>2GΩ	12:36
1	Red	4	Blue	>2GΩ	12:37
1	Red	5	Green	>2GΩ	12:37
1	Red	6	Yellow	>2GΩ	12:38
1	Red	7	White	>2GΩ	12:38
1	Red	Shield	-	150	12:38
2	Black	3	Orange	>2GΩ	12:39
2	Black	4	Blue	>2GΩ	12:39
2	Black	5	Green	>2GΩ	12:39
2	Black	6	Yellow	>2GΩ	12:39
2	Black	7	White	>2GΩ	12:39
2	Black	Shield	-	>2GΩ	12:40
3	Orange	4	Blue	>2GΩ	12:40
3	Orange	5	Green	>2GΩ	12:40
3	Orange	6	Yellow	>2GΩ	12:40
3	Orange	7	White	>2GΩ	12:41
3	Orange	Shield	-	>2GΩ	12:41
4	Blue	5	Green	>2GΩ	12:41
4	Blue	6	Yellow	>2GΩ	12:41
4	Blue	7	White	>2GΩ	12:41
4	Blue	Shield	-	>2GΩ	12:42
5	Green	6	Yellow	>2GΩ	12:42
5	Green	7	White	>2GΩ	12:42
5	Green	Shield	-	>2GΩ	12:43
6	Yellow	7	White	>2GΩ	12:43
6	Yellow	Shield	-	>2GΩ	12:43
7	White	Shield	-	>2GΩ	12:44

MEGGERING DATA SHEET

7/C #14 CABLE #3

Page ~~Page 83~~ 5 of 7

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-8-04

Test Condition: **POST TEST COLD**

Megger Operator: Jeff Piel
Megger ID: ~~CRDF-011~~ CRDF-011
10-8-04
POWER OFF VERIFIED: ✓

Scribe: CZ Humphries
Calibration Due: 3-10-05 8

7/C #14 - CABLE #3

MEGGER READINGS

5000VDC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	>2 GΩ	9:02 am
1	Red	3	Orange	>2 GΩ	9:02
1	Red	4	Blue	>2 GΩ	9:03
1	Red	5	Green	>2 GΩ	9:03
1	Red	6	Yellow	>2 GΩ	9:03
1	Red	7	White	>2 GΩ	9:03
1	Red	Shield	-	>2GΩ	9:04
2	Black	3	Orange	>2GΩ	9:04
2	Black	4	Blue	>2GΩ	9:04
2	Black	5	Green	>2GΩ	9:04
2	Black	6	Yellow	>2GΩ	9:05
2	Black	7	White	>2GΩ	9:05
2	Black	Shield	-	>2GΩ	9:05
3	Orange	4	Blue	>2GΩ	9:05
3	Orange	5	Green	>2GΩ	9:05
3	Orange	6	Yellow	>2GΩ	9:06
3	Orange	7	White	>2GΩ	9:06
3	Orange	Shield	-	>2GΩ	9:06
4	Blue	5	Green	>2GΩ	9:06
4	Blue	6	Yellow	>2GΩ	9:06
4	Blue	7	White	>2GΩ	9:06
4	Blue	Shield	-	>2GΩ	9:07
5	Green	6	Yellow	>2GΩ	9:07
5	Green	7	White	>2GΩ	9:07
5	Green	Shield	-	>2GΩ	9:07
6	Yellow	7	White	>2GΩ	9:07
6	Yellow	Shield	-	>2GΩ	9:08
7	White	Shield	-	>2GΩ	9:08

MEGGERING DATA SHEET

7/C #14 CABLE #3

Page ~~Page 84~~ 7

CONDUCTOR RESISTANCE
POST TEST COLD

Jeff Pirl

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red	156.8 mΩ	9:21 am
2	Black	2	Black	156.5 mΩ	9:22
3	Orange	3	Orange	156.3 mΩ	9:22
4	Blue	4	Blue	155.4 mΩ	9:22
5	Green	5	Green	155.1 mΩ	9:22
6	Yellow	6	Yellow	156.3 mΩ	9:23
7	White	7	White	155.7 mΩ	9:23

Grubb Engineering

CH 10-8-04

Biddle
Digital Low Resistance Ohmeter

S/N 7386
Cal Due 1-5-05

MEGGERING DATA SHEET

7/C #10 CABLE #4

Client: Framatome-ANP
Project No: 14980-121039

Date: 10-6-04

Test Condition: **Pre Test**

Megger Operator: Mike Ranton
Megger ID: CRDF-011

Scribe: Aleda Patton
Calibration Due: 3-10-05

POWER OFF VERIFIED: ✓

7/C #10 - CABLE #4

MEGGER READINGS

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Brown	>2 GΩ	3:26 pm
1	Red	3	Black	>2GΩ	3:26
1	Red	4	Green	>2GΩ	3:26
1	Red	5	Yellow	>2GΩ	3:26
1	Red	6	Orange	>2GΩ	3:27
1	Red	7	Blue	>2GΩ	3:27
1	Red	Shield	-	>2GΩ	3:27
2	Brown	3	Black	>2GΩ	3:28
2	Brown	4	Green	>2GΩ	3:28
2	Brown	5	Yellow	>2GΩ	3:28
2	Brown	6	Orange	>2GΩ	3:28
2	Brown	7	Blue	>2GΩ	3:29
2	Brown	Shield	-	>2GΩ	3:29
3	Black	4	Green	>2GΩ	3:29
3	Black	5	Yellow	>2GΩ	3:29
3	Black	6	Orange	>2GΩ	3:30
3	Black	7	Blue	>2GΩ	3:30
3	Black	Shield	-	>2GΩ	3:30
4	Green	5	Yellow	>2GΩ	3:30
4	Green	6	Orange	>2GΩ	3:30
4	Green	7	Blue	>2GΩ	3:30
4	Green	Shield	-	>2GΩ	3:31
5	Yellow	6	Orange	>2GΩ	3:31
5	Yellow	7	Blue	>2GΩ	3:31
5	Yellow	Shield	-	>2GΩ	3:31
6	Orange	7	Blue	>2GΩ	3:31
6	Orange	Shield	-	>2GΩ	3:31
7	Blue	Shield	-	>2GΩ	3:32

MEGGERING DATA SHEET

7/C #10 CABLE #4

CONDUCTOR RESISTANCE
Post Test Cold

Jeff Pied

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	62.6 mΩ	9:25 am
2	Brown	2	Brown	62.4 mΩ	9:25
3	Black	3	Black	62.6 mΩ	9:26
4	Green	4	Green	62.4 mΩ	9:26
5	Yellow	5	Yellow	~~62~~ 61.9 mΩ	9:26
6	Orange	6	Orange	62.3 mΩ	9:26
7	Blue	7	Blue	62.0 mΩ	9:27

Grubb Engineering

Biddle
Digital Low Resistance Ohmeter
S/N 7386
Cal Due 1-505

CZ 10-8-04

MEGGERING DATA SHEET

7/C #10 CABLE #4

Page 2 of 6
Page 87
10-6-04
Date
Jeff Piel

CONDUCTOR RESISTANCE
PRE-TEST

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red	61.6 mΩ	4:00 pm
2	Brown	2	Brown	61.3 mΩ	4:00
3	Black	3	Black	61.6 mΩ	4:01
4	Green	4	Green	61.4 mΩ	4:01
5	Yellow	5	Yellow	60.7 mΩ	4:01
6	Orange	6	Orange	62.2 mΩ	4:02
7	Blue	7	Blue	61.0 mΩ	4:02

Grubb Engineering
Biddle Digital Low Resistance Ohmeter
SN: 7386
Cal Due 1-5-05

MEGGERING DATA SHEET

7/C #10 CABLE #4

Page 3 of 6 Page 88 Date: 10-7-04

Test Condition: **During Test (From** 1hr 18½ min **To** 2 hrs 53 mins

Megger Operator: Mike Ranton Scribe: Cleda Patton

Megger ID: CRDF-011 Calibration Due: 3-10-05

POWER OFF VERIFIED: ✓

7/C #10 - CABLE #4

MEGGER READINGS

500 VDC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Brown	.46	10:37 am
1	Red	3	Black	.46	10:38
1	Red	4	Green	.47	10:39
1	Red	5	Yellow	.49	10:40
1	Red	6	Orange	.48	10:41
1	Red	7	Blue	.47	10:41
1	Red	Shield	-	.46	10:42
2	Brown	3	Black	.38	10:52
2	Brown	4	Green	.38	10:54
2	Brown	5	Yellow	.39	10:54
2	Brown	6	Orange	.39	10:55
2	Brown	7	Blue	.39	10:55
2	Brown	Shield	-	.39	10:55
3	Black	4	Green	.32	11:06
3	Black	5	Yellow	.32	11:07
3	Black	6	Orange	.33	11:07
3	Black	7	Blue	.33	11:08
3	Black	Shield	-	.32	11:08
4	Green	5	Yellow	.30	11:22
4	Green	6	Orange	.30	11:23
4	Green	7	Blue	.31	11:25
4	Green	Shield	-	.31	11:26
5	Yellow	6	Orange	.25	11:41
5	Yellow	7	Blue	.25	11:42
5	Yellow	Shield	-	.25	11:43
6	Orange	7	Blue	.19	12:01
6	Orange	Shield	-	.20	12:01
7	Blue	Shield	-		

Stopped at 2 hrs 53 min.

SP

MEGGERING DATA SHEET

7/C #10 CABLE #4

Page 4 of 6
Page 89

Test Condition: **Post Hose Stream**

Date: 10-7-04

Megger Operator: Mike Ranton
Megger ID: CRDF-011

Scribe: Oleda Patton
Calibration Due: 3-10-05

POWER OFF VERIFIED: _____

7/C #10 - CABLE #4

MEGGER READINGS

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Brown	>2GΩ	~~12:35~~ 12:44pm
1	Red	3	Black	>2GΩ	~~12:35~~ 12:44
1	Red	4	Green	>2GΩ	12:45
1	Red	5	Yellow	>2GΩ	12:45
1	Red	6	Orange	>2GΩ	12:45
1	Red	7	Blue	>2GΩ	12:45
1	Red	Shield	-	>2GΩ	12:45
2	Brown	3	Black	>2GΩ	12:45
2	Brown	4	Green	>2GΩ	12:46
2	Brown	5	Yellow	>2GΩ	12:46
2	Brown	6	Orange	>2GΩ	12:46
2	Brown	7	Blue	>2GΩ	12:46
2	Brown	Shield	-	>2GΩ	12:46
3	Black	4	Green	>2GΩ	12:47
3	Black	5	Yellow	>2GΩ	12:47
3	Black	6	Orange	>2GΩ	12:47
3	Black	7	Blue	>2GΩ	12:47
3	Black	Shield	-	>2GΩ	12:48
4	Green	5	Yellow	>2GΩ	12:48
4	Green	6	Orange	>2GΩ	12:48
4	Green	7	Blue	>2GΩ	12:48
4	Green	Shield	-	>2GΩ	12:48
5	Yellow	6	Orange	>2GΩ	12:49
5	Yellow	7	Blue	>2GΩ	12:49
5	Yellow	Shield	-	>2GΩ	12:49
6	Orange	7	Blue	>2GΩ	12:49
6	Orange	Shield	-	>2GΩ	12:50
7	Blue	Shield	-	>2GΩ	12:50

MEGGERING DATA SHEET

7/C #10 CABLE #4

Test Condition: **Post Test Cold**

Megger Operator: Jeff Piel
Megger ID: CRDF-00 011
p&o-04 CH

Scribe: CZ Humphrey
Calibration Due: 3-10-05

POWER OFF VERIFIED: ✓

7/C #10 - CABLE #4

MEGGER READINGS

500 VDC

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Brown	> 2 GΩ	9:09 am
1	Red	3	Black	> 2 GΩ	9:09 am
1	Red	4	Green	> 2 GΩ	9:10
1	Red	5	Yellow	> 2 GΩ	9:10
1	Red	6	Orange	> 2 GΩ	9:10
1	Red	7	Blue	> 2 GΩ	9:11
1	Red	Shield	-	> 2 GΩ	9:11
2	Brown	3	Black	> 2 GΩ	9:11
2	Brown	4	Green	> 2 GΩ	9:11
2	Brown	5	Yellow	> 2 GΩ	9:11
2	Brown	6	Orange	> 2 GΩ	9:12
2	Brown	7	Blue	> 2 GΩ	9:12
2	Brown	Shield	-	> 2 GΩ	9:12
3	Black	4	Green	> 2 GΩ	9:12
3	Black	5	Yellow	> 2 GΩ	9:13
3	Black	6	Orange	> 2 GΩ	9:13
3	Black	7	Blue	> 2 GΩ	9:13
3	Black	Shield	-	> 2 GΩ	9:14
4	Green	5	Yellow	> 2 GΩ	9:14
4	Green	6	Orange	> 2 GΩ	9:14
4	Green	7	Blue	> 2 GΩ	9:14
4	Green	Shield	-	> 2 GΩ	9:14
5	Yellow	6	Orange	> 2 GΩ	9:15
5	Yellow	7	Blue	> 2 GΩ	9:15
5	Yellow	Shield	-	> 2 GΩ	9:15
6	Orange	7	Blue	> 2 GΩ	9:15
6	Orange	Shield	-	> 2 GΩ	9:16
7	Blue	Shield	-	> 2 GΩ	9:16

OMEGA POINT LABORATORIES

Client Name: Areva

Client #: 14980 Project #: 121039

Description: Megger Boxes from Progress Energy & Megitt Safety Systems

Date: 10-7-04

Name: [illegible]

Megger boxes brought by Progress Energy

(1) AVO, S1-5010, Megger
SN: 010601/1142
Asset No: M-54
Due for recalibration - December 19, 2004

(2) Megger 212559
ID No: CRDF-011
Due for recalibration - March 10, 2005

Megger box brought by Megitt Safety System

Megohm Bridge
Model 1644-A
SN: 3181
Due for recalibration 3-2-2005

SIMCO electronics
6203-J PIEDMONT TRIAD PARKWAY
GREENSBORO, NC 27409

Certificate No. 2327892

CERTIFICATE OF CALIBRATION
FOR
CAROLINA POWER & LIGHT

Description: AVO, S1-5010, MEGGER

Serial No: 010601/1142 Asset No: M-54 Simco ID: 22293-415

Dept: NONE PO No: 154603 REWORK

Calibration Date: 19 DEC 03	Calibration Interval: 12 Months	Recall Date: 19 DEC 04
Arrival Condition: MEETS MANUFACTURER'S SPEC'S.	Service: WARRANTY - CAL TO MFR'S SPEC	

Procedure: 635-0763 REV 2 TUR/Cal Ratio: ≥ 4.00:1
Temperature: 70°F Relative Humidity: 40%

Standards Used:

Type	Simco ID	Due Date	Intvl Mos	Acc/Unc	Trace No.
GIGOHM DECADE RESISTOR;	17826*28	15 AUG 04	15	+/-.05% UNC	264744 RES
GIGOHM DECADE RESISTOR;	17826*28	15 AUG 04	15	+/-.07% UNC	264744 RES
GIGOHM DECADE RESISTOR;	17826*28	15 AUG 04	15	+/-.1% UNC	264744 RES
GIGOHM DECADE RESISTOR;	17826*28	15 AUG 04	15	+/-.2% UNC	264744 RES
RESISTANCE BOX	17826*581	18 APR 04	12	RESISTANCE MOHM	266764-02
DIGITAL MULTIMETER	17826*269	25 APR 04	5	+/-25ppm DCV	264703-01
HIGH VOLTAGE DIVIDER	17826*155	01 OCT 04	15	DC VOLTS	811/254159

There are 1 Supplementary Data Sheet(s) attached.

Work performed by:
Keith Donner
Operation Supervisor (11319)

Reviewed by:
Donald Rankin
TECHNICIAN LEAD

SIMCO Electronics' quality system conforms to ANSI/NCSL Z540-1 and all elements of ISO/IEC 17025 and as a result to ISO 9002. The Test uncertainty ratio is based on the uncertainty of the standards used. All calibrations are performed using internationally recognized standards traceable to the SI Units. Traceability is achieved through calibrations by the National Institute of Standards and Technology (NIST), other National Measurement Institutes (NMIs'), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The information shown on this certificate applies only to the instrument identified above and may not be reproduced, except in full, without prior written consent from SIMCO Electronics.

Dated: 19 DEC 03 correction issued as of 02 JAN 04

CALIBRATION DATA/TEST SHEET

MFG: BIDDLE MODEL: SI-5010
DESC: MEGOHMMETER SERIAL#: 010601/1142 ID#: M-54
CALIBRATION DATE : 12-19-03 TEMP: 70 %RH: 40 TESTED BY: 11319
PROCEDURE: 635-0763 APPROVAL: K. Donner DATE: 10-21-00
PAGE: 1 OF: 1 FILE LOC: 649 REV#: 0 REF#: 2327892

PROC STEP#	FUNCTION	OBSERVATION			CALIBRATION LIMITS
		NOMINAL	INIT.	FINAL	
4.1	DC VOLTS ACC	(VDC)	(VDC)	(VDC)	(VDC)
		500	506	Same	475 to 525
		1000	1021	↓	950 to 1050
		1500	1531	↓	1425 to 1575
		2000	2035	↓	1900 to 2100
		2500	2544	↓	2375 to 2625
		5000	5065	↓	4750 to 5250
4.2	MEGOHMMETER	(Ω)	(Ω)	(Ω)	(Ω)
	@500V	10MΩ	9.96	Same	9.5 to 10.5 MΩ
		100MΩ	99.6	↓	95 to 105 MΩ
		1GΩ	.96	↓	.95 to 1.05 GΩ
		10GΩ	10.2	↓	9.5 to 10.5 GΩ
		100GΩ	102	↓	95 to 105 GΩ

CALIBRATION DATA FORM

Tool Description Megger 212559 ID No. CKDF-011

Temperature 73°F Humidity 35%

Controlled Tool Maintenance Instruction No. MTE-004

AS FOUND data meets required accuracy Yes ✓ No _____*

* If AS FOUND data does NOT meet required accuracy, refer to MNT-NGGC-0050.

AS LEFT data meets required accuracy Yes ✓ No _____

Calibration performed by: Tim Farish Date 3-10-04

Calibration reviewed by: John P. McKay Date 3-11-04

Reference Standards: Megadek 1433H HV Probe 45 TempRec

Standard ID number: RS47 RS40 RS174 RS163 RS178

Cal. Due Date: 8-15-04 10-30-04 6-25-04 6-23-04 3-04-05

RESISTANCE READINGS

RESISTANCE INPUT (Ohms)	DESIRED READING (Ohms)	AS FOUND READING (Ohms)	ALLOWABLE RANGE (Ohms)	AS LEFT READING (Ohms)
200M 1kV	200M	200	175-250M	
100M 1kV	100M	100	85-125M	
50M 1kV	50M	50	43-58M	
5M 1kV	5M	5.0	4.5-6.0M	
500M 500V	500M	500	450-700M	
5K Ω	5K	5000	4600-5600	
100M 100V	100M	100	85-125M	
100M 250V	100M	100	85-125M	

FINAL READINGS SAME AS AS FOUND

VOLTAGE READINGS

VOLTAGE RANGE	DESIRED READING	AS FOUND VOLTAGE READING	ALLOWABLE RANGE	AS LEFT VOLTAGE READING
1kV	1000	1083	1000-1300	
500V	500	554	500-650	
250V	250	286	250-325	
100V	100	120	100-140	

FINAL READINGS SAME AS AS FOUND

primary INSTRUMENTS

Accredited Calibration Laboratory

9553 Vassar Ave.
Chatsworth CA 91311
Tel. 818.993.4971 Fax: 818.701.5516
www.primaryinstruments.com

ACCREDITED
Certificate No. 2011.01

Test Number : 10423930732

REPORT OF CALIBRATION

for

MEGGITT SAFETY SYSTEMS, INC.

1915 VOYAGER AVE. SIMI VALLEY CA 93063

Model :	1644-A	Test Date :	9/2/2004
Description :	MEGOHM BRIDGE	Recall Date :	3/2/2005
Manufacturer :	GENERAL RADIO	Interval (Mos) :	6
Serial Number :	3181	Location :	LABORATORY
Asset Number :	A13273	Temperature:	20° C Humidity : 35%
Before Service :	LIMITED CALIBRATION	After Service :	LIMITED CALIBRATION
Procedure :	T.O. 33K2-4-313-1	Technician :	28
Accuracy :	MFR.SPECIFICATIONS - 1 Year		

Remarks : 1 Gigohm range Inoperative.

MEASUREMENT STANDARDS

Asset	Manufacturer	Model	Due Date	Traceability No.
10201	VICTOREEN	10 GIG	03/28/2005	10000020861441
10330	HEWLETT PACKARD	34401A	05/07/2005	10412825200
10445	GENERAL RADIO	1433-Y	11/24/2004	10331715668
10460	IET	HRRS-B-3-1M	02/06/2005	1043618525

Primary Instruments Inc (PII) maintains A2LA accreditation to ISO/IEC 17025 for the specific calibrations listed in A2LA Certificate #2011.01 and meets the requirements of ANSI/NCSL Z540-1-1994. The calibration performed for this product is covered by this accreditation and conducted using standards traceable to the SI units through NIST or other National Metrological Institutes. Some measurements are traceable to natural physical constants, consensus standards or ratio type measurements. The Test Accuracy Ratio (TAR) for all items calibrated is 4.00:1 or greater unless otherwise noted in the remarks section.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95% and has been carried out in accordance with the requirements of ISO/IEC 17025. All uncertainties are determined at the time of measurement. A number of factors may cause the calibration item to drift out of calibration before the recommended interval expires. Uncertainty limits quoted refer to measured values only, with no account being taken of the instrument's ability to maintain its calibration.

TECHNICIAN : _____ LABORATORY MANAGER : _____

This certificate may not be reproduced other than in full, except with the prior written approval of Primary Instruments Inc.

MEGGITT SAFETY SYSTEMS INC

CALIBRATION RECORD

CALIBRATION ID NO.
A13273

MANUFACTURER	MODEL NO.	DESCRIPTION	ASSET NO.
GENERAL RADIO	1644-A	MEGOHM BRIDGE	13273
CALIBRATION PROCEDURE	**S/N**		**LOCATION**
MFR'S	3.81		RFT

DATE CALIB.	DATE DUE	APPROVED	INTERVAL	SOURCE	STATUS	TC	AL	REMARKS
2-24-2000	8-24-2000	~~RBH~~	6	QSI	CAL	A	A	
8-31-2000	2-28-2001	~~CA~~	6	QSI	CAL	A	A	
2-6-02	8-6-02	DC	6	QSI	CAL	D	B	
~~A13~~ 8-8-02	2-8-03	DC	6	QSI	CAL	A	A	
2-11-03	8-11-03	DC	6	QSI	CAL	A	A	
2-26-03	8-26-03	DC	6	MMI	CAL	A	A	
8-28-03	2-28-04	DC	6	MMI	LCAL	A	A	1 GIG OHM INOPERATIVE
2-28-04	8-28-04	DC	6	PRI	LCAL	A	A	1 GIGOHM INOP.
9-2-04	3-2-05	DC	6	PRI	LCAL	A	A	1 GIGOHM INOP.

QAD-274
Revised 01/30

CERT. NUMBER: 24592:1073468065

Rothe Development, Inc.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Grubb Engineering_ INC.

P.O.Box 65
Converse, TX 78109

MFG: Assoc Res
MODEL: 2956A
NOMEN: VAR VOLT MEG-CHEK
S/N: 720
CUST. ID:

CAL DATE: 1/7/04
DUE DATE: 1/7/05

CONTROL NO: 290 - 24592
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 002034477
CUSTOMER P.O.:
RECEIVED CONDITION: OUT OF TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 12Mo.
TEMPERATURE: 73.0°F
RELATIVE HUMIDITY: 25%

DATE RECEIVED: 1/2/04

COMMENTS:

ATTACHMENTS: CALIBRATION DATA 2 SHEETS

All calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI / NCSL Z540-1-1994, ANSI / ISO / IEC 17025, ISO / IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR ≥ 4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
162	ROTHE	180	001	8/22/2004
173	FLUKE	8050A	3074382	7/15/2004

APPROVED BY: _____ ☑ CMS ☐ QCO DATE: 1/8/04

RDMSD 1001
11/03
This certificate may not be reproduced, except in full, without written approval of Rothe Development, Inc. Metrology Services Division

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: ASSOCIATED REASEARCH MODEL 2956A MEG-CHECK

CUSTOMER: Grubb Engineering
WO NUMBER: 00203447
SERIAL: 720
CUST ID:

DATE: 7 Jan 04
TECH: Robert Stemmons
INST NO: 24592

CALIBRATION DATA TAKEN

INCOMING ✓
OUTGOING

CONDITION OF EQUIPMENT

IN TOLERANCE
OUT OF TOLERANCE ✓ *

VOLTAGE METER ACCURACY

METER INDICATION	MIN	READING	MAX
1000	900	1011	1100 V
2000	1900	2039	2100
3000	2900	3040	3100
4000	3900	3976	4100
5000	4900	4930	5100

MEGOHMS METER ACCURACY

RANGE	METER INDICATION	MIN	READING	MAX	
0.1	2.0	2.45	2.86	2.55 mA	*
	2.8	1.735	2.00	1.835	
	4.0	1.20	1.56	1.30	
	8.0	.575	.793	.675	
	20.0	.200	.314	.300	
1	2.0	245	304	255 uA	
10	2.0	24.5	29.9	25.5	
100	2.0	2.45	3.06	2.55	*

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: ASSOCIATED REASEARCH MODEL 2956A MEG-CHECK

CUSTOMER: Grubb Engineering
WO NUMBER: 002034477
SERIAL: 720
CUST ID:

DATE: 7 Jan 04
TECH: [signature]
INST NO: 24592

CALIBRATION DATA TAKEN

INCOMING
OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓
OUT OF TOLERANCE

VOLTAGE METER ACCURACY

METER INDICATION	MIN	READING	MAX
1000	900	1005	1100 V
2000	1900	2026	2100
3000	2900	3034	3100
4000	3900	3973	4100
5000	4900	4933	5100

MEGOHMS METER ACCURACY

RANGE	METER INDICATION	MIN	READING	MAX
0.1	2.0	2.45	2.48	2.55 mA
	2.8	1.735	1.76	1.835
	4.0	1.20	1.25	1.30
	8.0	.575	.631	.675
	20.0	.200	.250	.300
1	2.0	245	248	255 uA
10	2.0	24.5	24.8	25.5
100	2.0	2.45	2.54	2.55

DOC. DATE: 2/21/2000

Rothe Development, Inc. 4614 Sinclair Road San Antonio, Texas 78222
METROLOGY SERVICES DIVISION TRACEABLE TO NIST (210)648-3131 Fax (210)648-4091

Page 100

CHARGE # 107 CONTROL # CS299 - 24592 WORK ORDER # 00203417

CUSTOMER

RECEIVED FROM: Grubb Engineering_ INC. DATE 1/2/2004
PHONE # 210-658-7250
ADDRESS: P.O.Box 65 FAX #:
Converse, TX 78109
CONTACT NAME: Mr. JEFFREY PIEL
PURCHASE ORDER #:

ITEM

MFG: Assoc Res
MODEL: 2956A
NOMEN: VAR VOLT MEG-CHEK
S/N: 720
CUST ID:
ACCESS
RCVD: pouch w/ leads

CUSTOMER COMMENTS/REQUIREMENTS: TAX 7.975% BOBBY GRUBB

OUR PO:

DATA:

RECEIVED:	RETURNED:	CALIBRATION INTERVAL: 12 Mo.	CAL'D AT:
( ) IN TOLERANCE	(X) IN TOLERANCE	CAL DATE: 7 Jan 04	( ) RDMSD
(X) OUT OF TOLERANCE	( ) LIMITED CALIBRATION	DUE DATE: 7 Jan 05	( ) ON-SITE
( ) INOPERATIVE	( ) REPAIR ONLY		( ) SUB
	( ) NO ACTION DATA 2		

ENVIRONMENTAL CONDITIONS:	SPECIFICATIONS:	PROCEDURE:	RDMSD TECH:	SERVICE CODE:
73 °F	(X) MFG	(X) MFG	PIs	F
25 %RH	( ) RDMSD:	( ) RDMSD:		
	( ) OTHER:	( ) OTHER:		

FAULT/SYMPTOM: Megohm Meter out of tolerance
All resistance reading were high
Cal Seal broken on adjustment pot.

WORK PERFORMED: Cal Data Taken replaced tube in resistance circuit. Adjusted unit.

CAL

TR#s: 162, 173

LIMITED CALIBRATION:

COMMENTS:

CKT REF	QTY	PART #	DESCRIPTION	COST
	1	12AU7A	Tube	16 76
		THIS IS NOT AN INVOICE		

REPAIR LABOR HOURS: .75

PARTS TOTAL	16 76
REPAIR LABOR	37 50
SHIPPING	
TEARDOWN CHARGE	
CALIBRATION	100 00
TAX 0.00	12 15
TOTAL	166 41

SHIP VIA: DATE:

RDMSD 2002 - 11/03

RCVD BY
(SIGNED): (PRINTED):

1 OF 1

CERT. NUMBER: 18912:1088704349

Rothe Development, Inc.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Grubb Engineering_ INC.
P.O.Box 65
Converse, TX 78109

MFG: Assoc Res
MODEL: 2956A
NOMEN: Hypot
S/N: 837
CUST. ID:

CAL DATE: 7/2/04
DUE DATE: 1/2/05

CONTROL NO: 290 - 18912
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 002038667
CUSTOMER P.O.:
RECEIVED CONDITION: IN TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 6Mo.
TEMPERATURE: 73.0°F
RELATIVE HUMIDITY: 38%

DATE RECEIVED: 6/28/04

COMMENTS:

ATTACHMENTS:

All calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI / NCSL Z540-1-1994, ANSI / ISO / IEC 17025, ISO / IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR ≥ 4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
173	FLUKE	8050A	3074382	7/15/2004
162	ROTHE	180	001	8/22/2004

ISO 9001

REGISTERED TO ISO 9001
CERTIFICATE NO. A9422

APPROVED BY: _____ ☑ CMS ☐ QCO DATE: 7/6/04

This certificate may not be reproduced, except in full, without written approval of Rothe Development, Inc. Metrology Services Division

CERT. NUMBER: 16958:1073294914

Rothe Development, Inc.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Grubb Engineering_ INC.

P.O.Box 65
Converse, TX 78109

MFG: Biddle
MODEL: 247000
NOMEN: DIG LOW RES OHM
S/N: 7386
CUST. ID:

CAL DATE: 1/5/04
DUE DATE: 1/5/05

CONTROL NO: 290 - 16958
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 002034474
CUSTOMER P.O.:
RECEIVED CONDITION: IN TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 12Mo.
TEMPERATURE: 72.0°F
RELATIVE HUMIDITY: 28%

DATE RECEIVED: 1/2/04

COMMENTS:

ATTACHMENTS:

All calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI / NCSL Z540-1-1994, ANSI / ISO / IEC 17025, ISO / IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR ≥ 4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
75	JRL	NMN	75	1/8/2004
166	RAM/SIMP.	10-500A	7254	12/1/2004
72	HP	3490A	1637A05174	3/10/2004

APPROVED BY: Peter J. Stammen ☑ CMS ☐ QCO DATE: 1/8/04

This certificate may not be reproduced, except in full, without written approval of Rothe Development, Inc. Metrology Services Division

Rothe Development, Inc. 4614 Sinclair Road San Antonio, Texas 78222
METROLOGY SERVICES DIVISION TRACEABLE TO NIST (210)648-3131 Fax (210)648-4091

Page 103

CHARGE # 107 | CONTROL # CS290 - 16958 | WORK ORDER # DD203447

CUSTOMER

RECEIVED FROM: Grubb Engineering, INC.
ADDRESS: P.O.Box 65
Converse, TX 78109
CONTACT NAME: Mr. JEFFREY PIEL
PURCHASE ORDER #:

DATE: 1/2/2004
PHONE #: 210-658-7250
FAX #:

ITEM

MFG: Biddle
MODEL: 247000
NOMEN: DIG LOW RES OHM
S/N: 7386
CUST ID:
ACCESS
RCVD: Leads. 2 piec Unit

CUSTOMER COMMENTS/REQUIREMENTS: TAX 7.875% | BOBBY GRUBB | OUR PO:

DATA:

RECEIVED:
(X) IN TOLERANCE
( ) OUT OF TOLERANCE
( ) INOPERATIVE

RETURNED:
(X) IN TOLERANCE
( ) LIMITED CALIBRATION
( ) REPAIR ONLY
( ) NO ACTION

CALIBRATION INTERVAL: 12 Mo.
CAL DATE: 5 Jan 04
DUE DATE: 5 Jan 05

CAL'D AT:
(X) RDMSD
( ) ON-SITE
( ) SUB

ENVIRONMENTAL CONDITIONS:
72 °F
28 %RH

SPECIFICATIONS:
(X) MFG
( ) RDMSD:
( ) OTHER:

PROCEDURE:
(X) MFG
( ) RDMSD:
( ) OTHER:

RDMSD TECH: PJS

SERVICE CODE: J

FAULT/SYMPTOM:

WORK PERFORMED:

CAL

TR#'s: 75, 166, 72

LIMITED CALIBRATION:

COMMENTS:

CKT REF	QTY	PART #	DESCRIPTION	COST

REPAIR LABOR HOURS:

PARTS TOTAL	
REPAIR LABOR	
SHIPPING	
TEAR DOWN CHARGE	
CALIBRATION	125
TAX	9 87
TOTAL	134 87

SHIP VIA: DATE:

RDMSD 2002 11/03

RCVD BY
(SIGNED): (PRINTED):

1 OF 1

Appendix C1

TEST DATA - PRE-TEST CURRENT LEAKAGE

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
0.0	0.003	0.1	0.000	480.0	0.1	0.000
0.5	0.003	0.1	0.000	480.0	0.1	0.000
1.0	0.003	0.1	0.000	477.9	0.1	0.000
1.5	0.003	0.1	0.000	477.7	0.0	0.000
2.0	0.003	0.1	0.000	476.3	0.1	0.000
2.5	0.003	0.1	0.000	477.6	0.1	0.000
3.0	0.003	0.1	0.000	477.5	0.1	0.000
3.5	0.003	0.1	0.000	477.9	0.1	0.000

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
0.0	0.1	0.000	0.1	0.000	0.000	0.0
0.5	0.1	0.000	0.1	0.000	0.000	0.0
1.0	0.1	0.000	0.1	0.000	0.001	0.0
1.5	0.0	0.000	0.1	0.000	0.000	0.0
2.0	0.1	0.000	0.1	0.000	0.000	0.0
2.5	0.1	0.000	0.1	0.000	0.000	0.0
3.0	0.0	0.000	0.1	0.000	0.001	0.0
3.5	0.0	0.000	0.1	0.000	0.001	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
0.0	0.000	122.6	0.0	0.000	0.0	0.000
0.5	0.000	122.6	0.0	0.000	0.0	0.000
1.0	0.000	122.6	0.0	0.000	0.0	0.000
1.5	0.000	122.6	0.0	0.000	0.0	0.000
2.0	0.000	122.6	0.0	0.000	0.0	0.000
2.5	0.000	122.6	0.0	0.000	0.0	0.000
3.0	0.000	122.6	0.0	0.000	0.0	0.000
3.5	0.000	122.6	0.0	0.000	0.0	0.000

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
0.0	0.0	0.000	0.0	0.000	0.000	0.0
0.5	0.0	0.000	0.0	0.000	0.000	0.0
1.0	0.0	0.000	0.0	0.000	0.000	0.0
1.5	0.0	0.000	0.0	0.000	0.000	0.0
2.0	0.0	0.000	0.0	0.000	0.000	0.0
2.5	0.0	0.000	0.0	0.000	0.000	0.0
3.0	0.0	0.000	0.0	0.000	0.000	0.0
3.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
0.0	0.000	122.7	0.0	0.000	0.0	0.000
0.5	0.000	122.7	0.0	0.000	0.0	0.000
1.0	0.000	122.7	0.0	0.000	0.0	0.000
1.5	0.000	122.6	0.0	0.000	0.0	0.000
2.0	0.000	122.7	0.0	0.000	0.0	0.000
2.5	0.000	122.7	0.0	0.000	0.0	0.000
3.0	0.000	122.7	0.0	0.000	0.0	0.000
3.5	0.000	122.6	0.0	0.000	0.0	0.000

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
0.0	0.0	0.000	0.0	0.000	0.000	0.0
0.5	0.0	0.000	0.0	0.000	0.000	0.0
1.0	0.0	0.000	0.0	0.000	0.000	0.0
1.5	0.0	0.000	0.0	0.000	0.000	0.0
2.0	0.0	0.000	0.0	0.000	0.000	0.0
2.5	0.0	0.000	0.0	0.000	0.000	0.0
3.0	0.0	0.000	0.0	0.000	0.000	0.0
3.5	0.0	0.000	0.0	0.000	0.000	0.0

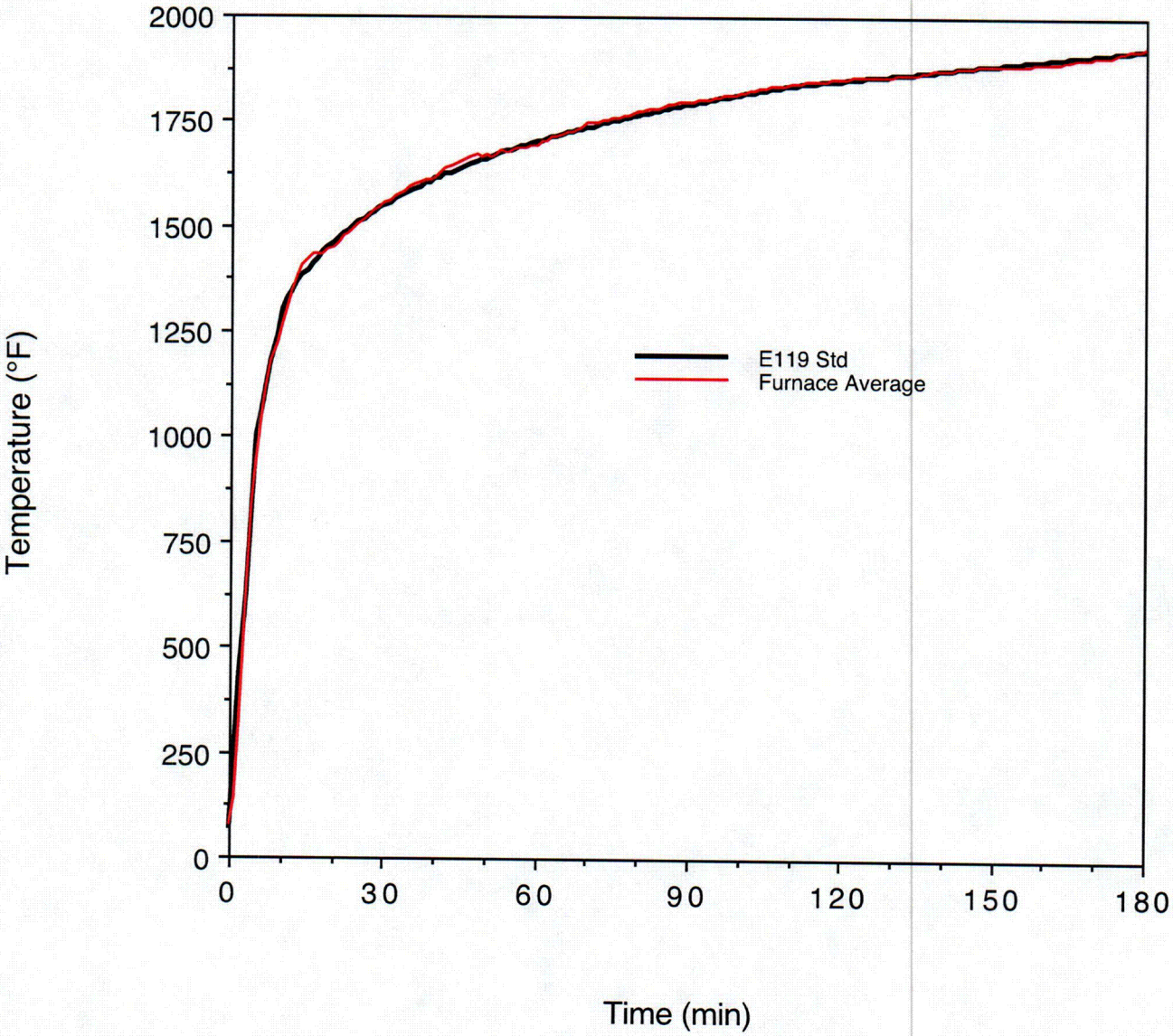
Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
0.0	0.000	122.8	0.0	0.000	0.0	0.000
0.5	0.000	122.8	0.0	0.000	0.0	0.000
1.0	0.000	122.8	0.0	0.000	0.0	0.000
1.5	0.000	122.8	0.0	0.000	0.0	0.000
2.0	0.000	122.8	0.0	0.000	0.0	0.000
2.5	0.000	122.8	0.0	0.000	0.0	0.000
3.0	0.000	122.9	0.0	0.000	0.0	0.000
3.5	0.000	122.8	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
0.0	0.0	0.000	0.0	0.000
0.5	0.0	0.000	0.0	0.000
1.0	0.0	0.000	0.0	0.000
1.5	0.0	0.000	0.0	0.000
2.0	0.0	0.000	0.0	0.000
2.5	0.0	0.000	0.0	0.000
3.0	0.0	0.000	0.0	0.000
3.5	0.0	0.000	0.0	0.000

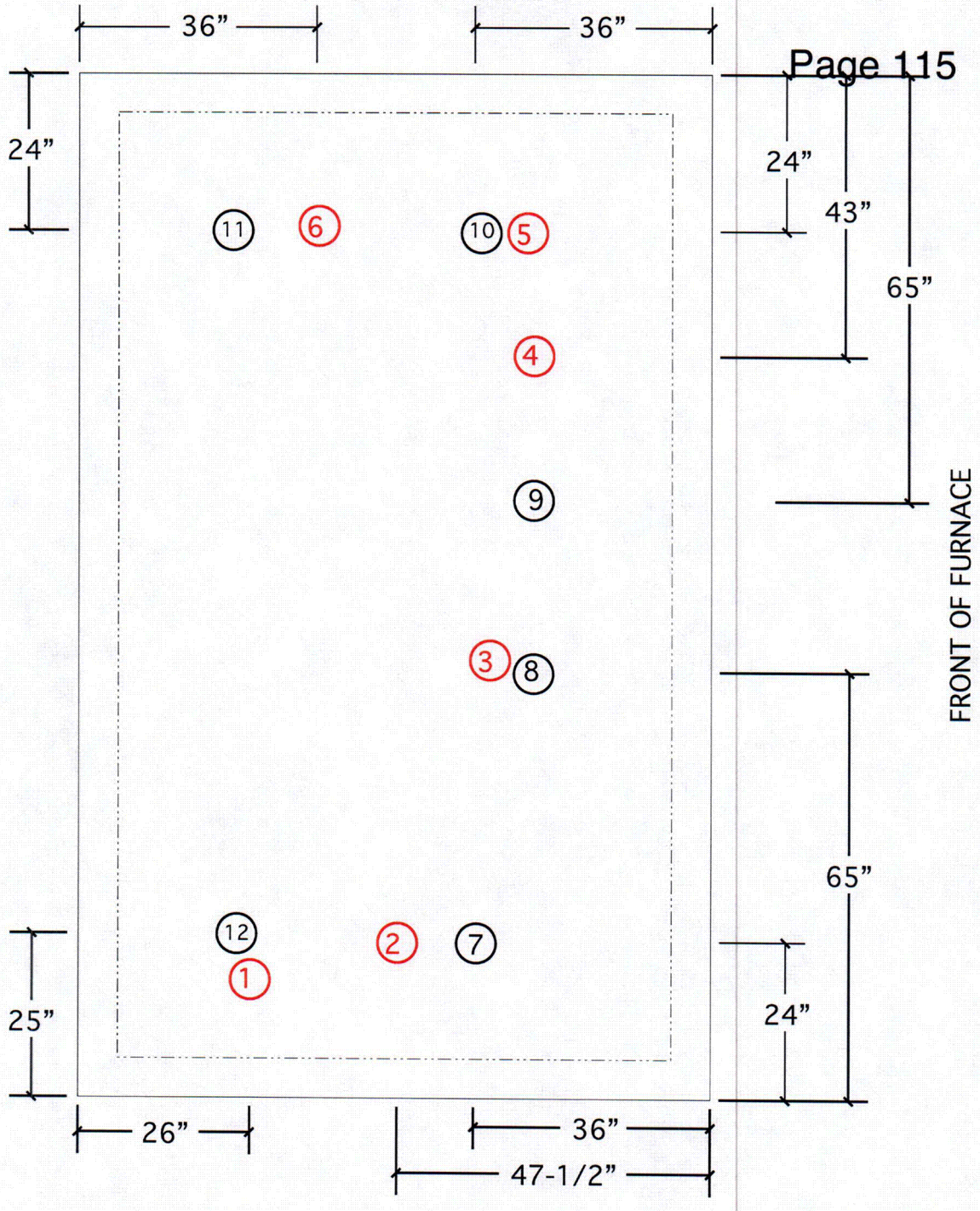
Appendix C2

TEST DATA - FIRE EXPOSURE

Project No. 14980-121039
AREVA
Furnace Interior Temperature



C01



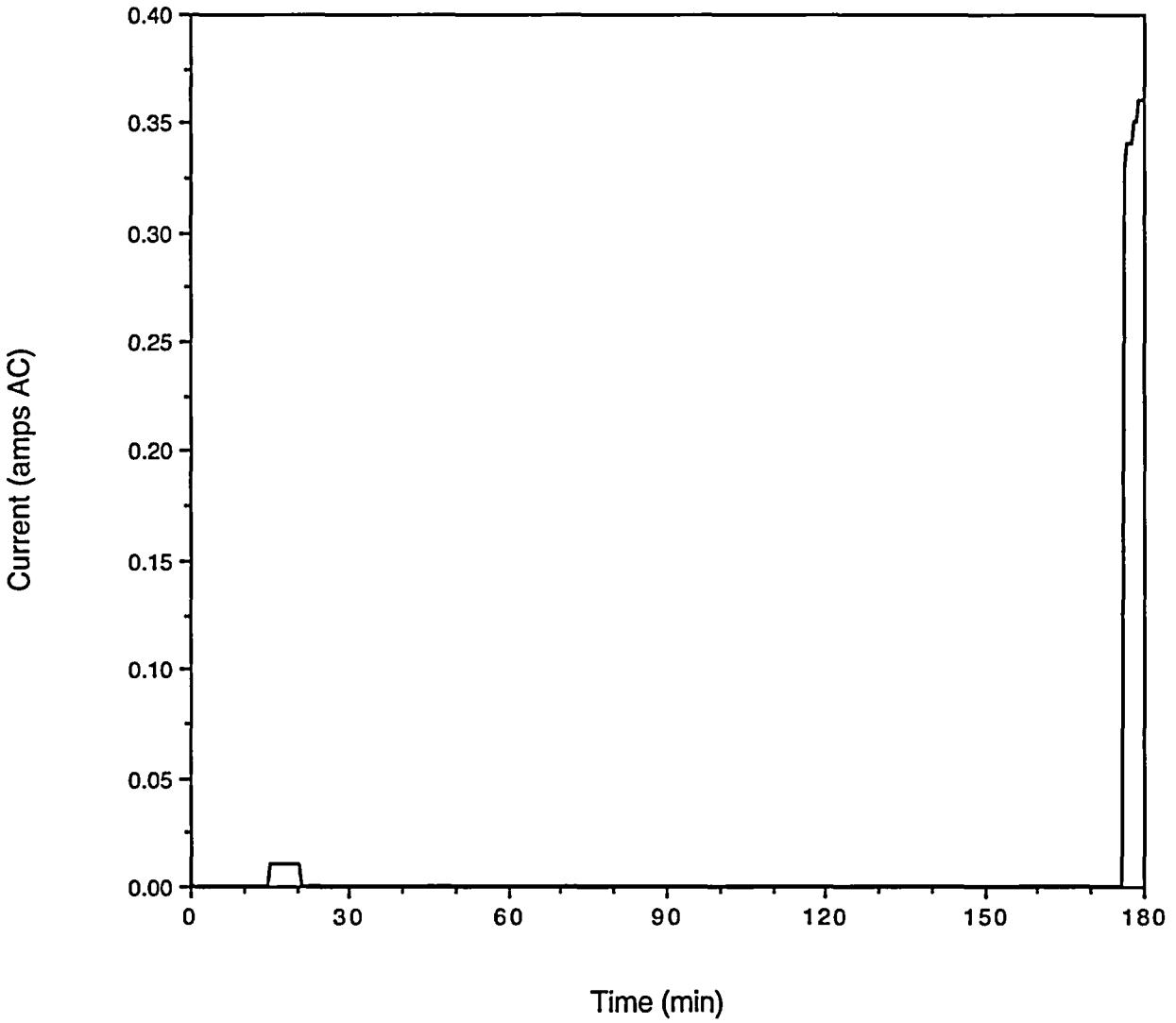
Note:
Furnace control thermocouple Nos. 1 - 6 were located 12” below the bottom of the concrete slab. TC Nos. 7 - 12 were positioned 48” below the concrete slab.

OMEGA POINT LABORATORIES, INC. Project No. 14980-121039
AREVA
FURNACE CONTROL THERMOCOUPLE LOCATIONS

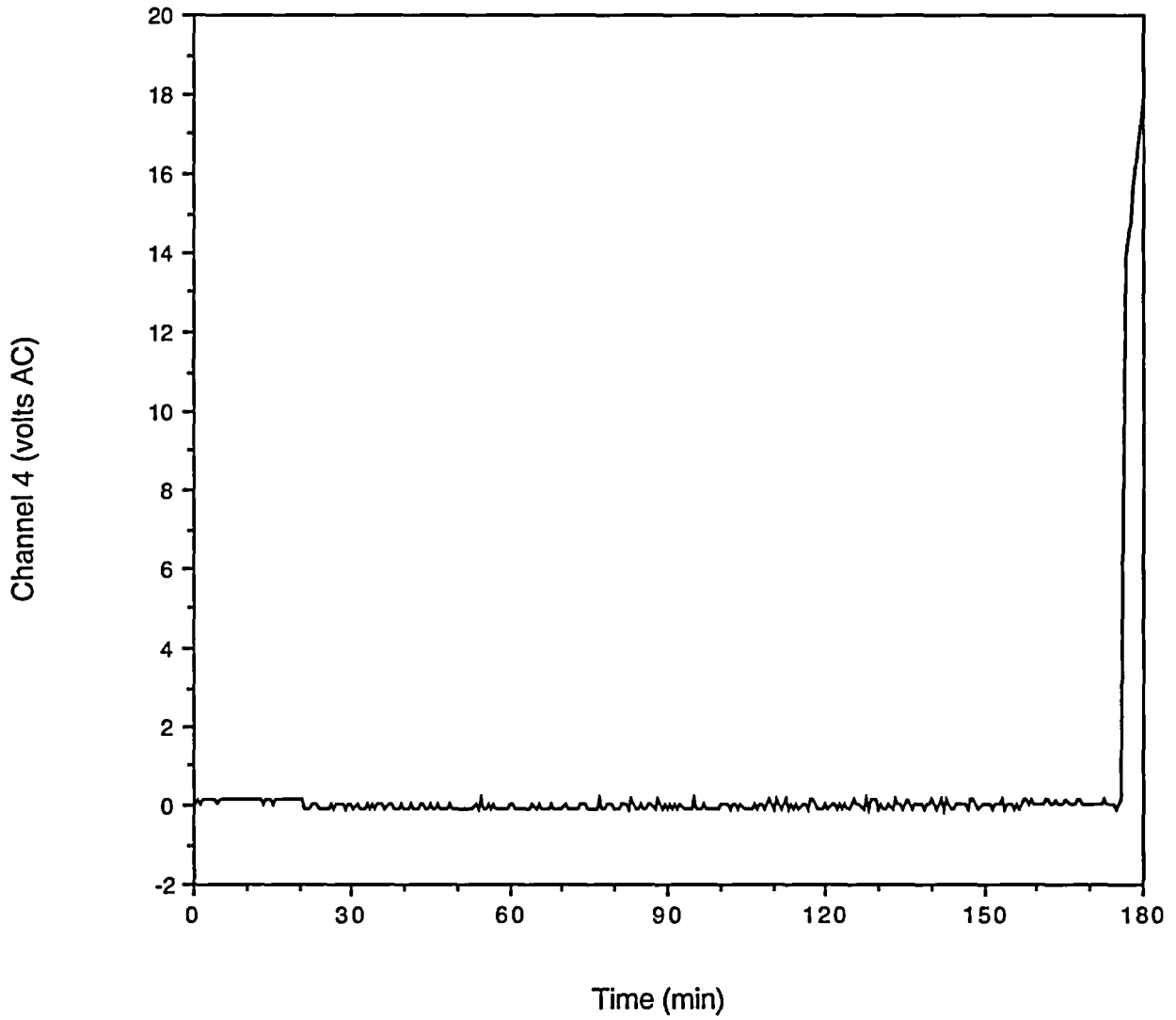
Scale: 1/2"=1'

C02

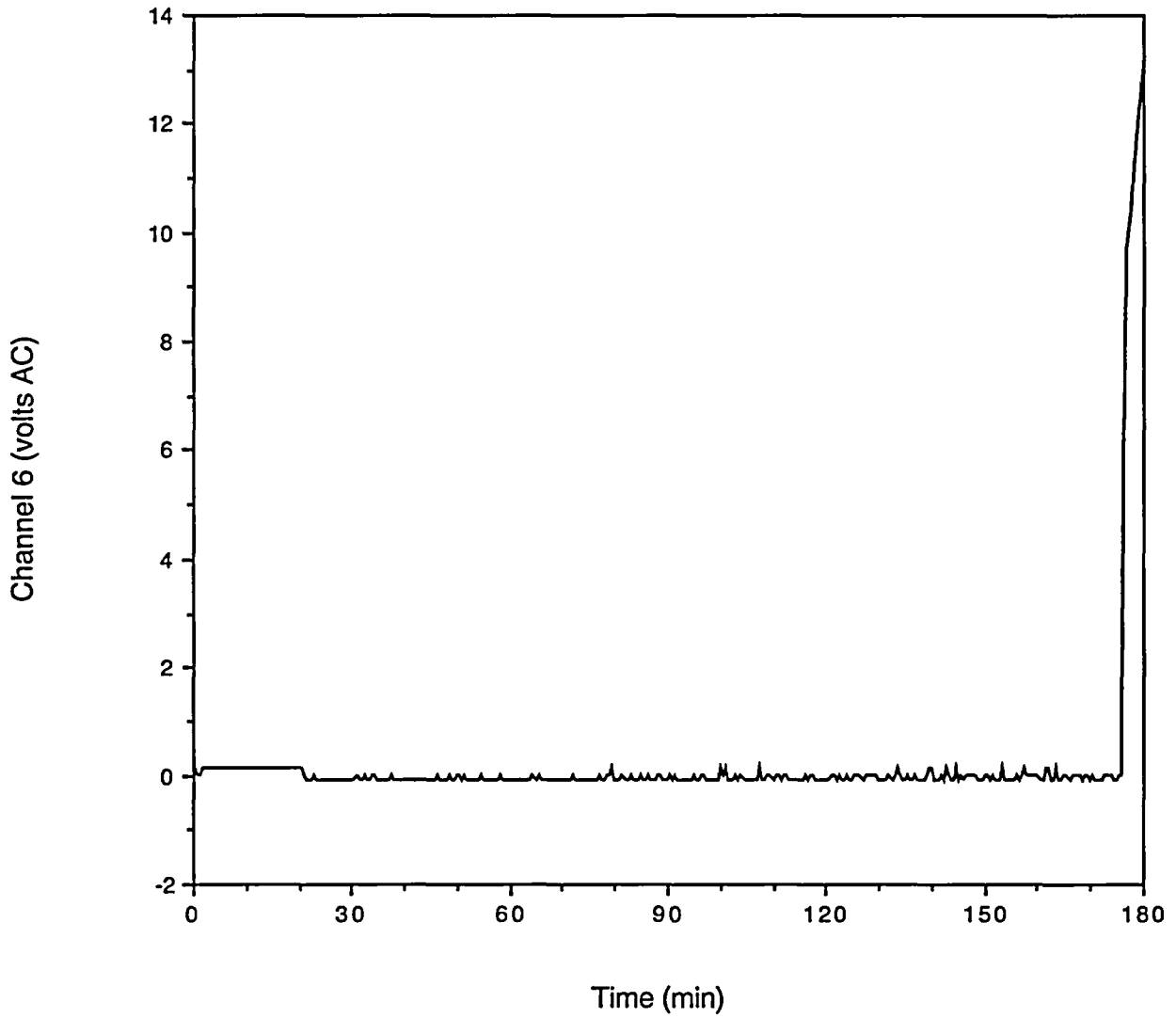
Project No. 14980-121039 (Data During Fire Test)
AREVA
Channel 1: Current to Cable #1 (4/C #8 AWG)



Project No. 14980-121039 (Data During Fire Test)
AREVA
Channel 4: Voltage from Conductor #2 in Cable #1 (4/C #8 AWG)



Project No. 14980-121039 (Data During Fire Test)
AREVA
Channel 6: Voltage from Conductor #4 in Cable #1 (4/C #8 AWG)



Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
0.0	0.003	0.1	0.000	480.0	0.0	0.000
0.5	0.003	0.1	0.000	480.0	0.0	0.000
1.0	0.003	0.1	0.000	480.0	0.1	0.000
1.5	0.003	0.1	0.000	479.9	0.0	0.000
2.0	0.003	0.1	0.000	479.7	0.1	0.000
2.5	0.003	0.1	0.000	480.0	0.1	0.000
3.0	0.003	0.1	0.000	480.2	0.1	0.000
3.5	0.003	0.1	0.000	479.7	0.1	0.000
4.0	0.003	0.1	0.000	479.9	0.1	0.000
4.5	0.003	0.1	0.000	480.1	0.0	0.000
5.0	0.003	0.1	0.000	480.1	0.1	0.000
5.5	0.003	0.1	0.000	479.9	0.1	0.000
6.0	0.003	0.1	0.000	479.8	0.1	0.000
6.5	0.003	0.1	0.000	479.6	0.1	0.000
7.0	0.003	0.1	0.000	479.9	0.1	0.000
7.5	0.003	0.1	0.000	479.3	0.1	0.000
8.0	0.003	0.1	0.000	479.3	0.1	0.000
8.5	0.003	0.1	0.000	479.6	0.1	0.000
9.0	0.003	0.1	0.000	479.3	0.1	0.000
9.5	0.003	0.1	0.000	479.4	0.1	0.000
10.0	0.003	0.1	0.000	479.4	0.1	0.000
10.5	0.003	0.1	0.000	479.6	0.1	0.000
11.0	0.003	0.1	0.000	479.2	0.1	0.000
11.5	0.003	0.1	0.000	479.3	0.1	0.000
12.0	0.003	0.1	0.000	479.3	0.1	0.000
12.5	0.003	0.1	0.000	479.3	0.1	0.000
13.0	0.003	0.1	0.000	479.1	0.1	0.000
13.5	0.003	0.1	0.000	479.1	0.0	0.000
14.0	0.004	0.1	0.000	479.1	0.1	0.000
14.5	0.004	0.1	0.000	479.4	0.1	0.000
15.0	0.005	0.1	0.000	478.6	0.0	0.000
15.5	0.006	0.1	0.000	479.1	0.1	0.000
16.0	0.006	0.1	0.000	479.3	0.1	0.000
16.5	0.007	0.1	0.000	479.2	0.1	0.000
17.0	0.006	0.1	0.000	479.2	0.1	0.000
17.5	0.006	0.1	0.000	479.5	0.1	0.000
18.0	0.006	0.1	0.000	479.3	0.1	0.000
18.5	0.006	0.1	0.000	479.0	0.1	0.000
19.0	0.006	0.1	0.000	478.9	0.1	0.000
19.5	0.006	0.1	0.000	478.9	0.1	0.000
20.0	0.007	0.1	0.000	479.0	0.1	0.000
20.5	0.007	0.1	0.000	478.7	0.1	0.000
21.0	0.000	0.0	0.000	0.0	-0.1	0.000
21.5	0.000	0.0	0.000	0.0	-0.1	0.000
22.0	0.000	-0.1	0.000	0.0	-0.1	0.000
22.5	0.000	0.0	0.000	0.0	0.0	0.000

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
23.0	0.000	-0.1	0.000	0.0	0.0	0.000
23.5	0.000	0.0	0.000	-0.1	0.0	0.000
24.0	0.000	0.0	0.000	0.0	-0.1	0.000
24.5	0.000	-0.1	0.000	0.0	-0.1	0.000
25.0	0.000	-0.1	0.000	0.0	-0.1	0.000
25.5	0.000	0.0	0.000	-0.1	-0.1	0.000
26.0	0.000	-0.1	0.000	0.0	0.0	0.000
26.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
27.0	0.000	0.0	0.000	0.0	0.0	0.000
27.5	0.000	-0.1	0.000	0.0	0.0	0.000
28.0	0.000	-0.1	0.000	0.0	0.0	0.000
28.5	0.000	0.0	0.000	0.0	0.0	0.000
29.0	0.000	0.0	0.000	-0.1	-0.1	0.000
29.5	0.000	-0.1	0.000	-0.1	0.0	0.000
30.0	0.000	0.0	0.000	0.0	0.0	0.000
30.5	0.000	0.0	0.000	0.0	-0.1	0.000
31.0	0.000	0.0	0.000	-0.1	0.0	0.000
31.5	0.000	0.0	0.000	-0.1	-0.1	0.000
32.0	0.000	-0.1	0.000	0.0	-0.1	0.000
32.5	0.000	0.0	0.000	0.0	-0.1	0.000
33.0	0.000	-0.1	0.000	0.0	0.0	0.000
33.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
34.0	0.000	0.0	0.000	0.0	0.0	0.000
34.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
35.0	0.000	0.0	0.000	0.0	0.0	0.000
35.5	0.000	0.0	0.000	-0.1	0.0	0.000
36.0	0.000	-0.1	0.000	-0.1	0.0	0.000
36.5	0.000	0.0	0.000	-0.1	-0.1	0.000
37.0	0.000	0.0	0.000	-0.1	0.0	0.000
37.5	0.000	-0.1	0.000	-0.1	0.0	0.000
38.0	0.000	0.0	0.000	-0.1	-0.1	0.000
38.5	0.000	-0.1	0.000	0.0	-0.1	0.000
39.0	0.000	-0.1	0.000	0.0	-0.1	0.000
39.5	0.000	-0.1	0.000	-0.1	0.0	0.000
40.0	0.000	0.0	0.000	0.0	-0.1	0.000
40.5	0.000	-0.1	0.000	0.0	-0.1	0.000
41.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
41.5	0.000	-0.1	0.000	0.0	0.0	0.000
42.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
42.5	0.000	0.0	0.000	0.0	-0.1	0.000
43.0	0.000	0.0	0.000	0.0	0.0	0.000
43.5	0.000	-0.1	0.000	-0.1	0.0	0.000
44.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
44.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
45.0	0.000	0.0	0.000	0.0	0.0	0.000
45.5	0.000	-0.1	0.000	-0.1	-0.1	0.000

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
46.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
46.5	0.000	0.0	0.000	0.1	0.0	0.000
47.0	0.000	-0.1	0.000	0.0	-0.1	0.000
47.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
48.0	0.000	-0.1	0.000	0.0	-0.1	0.000
48.5	0.000	-0.1	0.000	-0.1	0.0	0.000
49.0	0.000	-0.1	0.000	0.0	-0.1	0.000
49.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
50.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
50.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
51.0	0.000	-0.1	0.000	0.0	-0.1	0.000
51.5	0.000	0.0	0.000	-0.1	-0.1	0.000
52.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
52.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
53.0	0.000	-0.1	0.000	0.0	-0.1	0.000
53.5	0.000	-0.1	0.000	-0.1	0.0	0.000
54.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
54.5	0.000	0.0	0.000	0.0	0.1	0.000
55.0	0.000	-0.1	0.000	0.0	-0.1	0.000
55.5	0.000	-0.1	0.000	0.0	-0.1	0.000
56.0	0.000	-0.1	0.000	-0.1	0.0	0.000
56.5	0.000	-0.1	0.000	0.0	-0.1	0.000
57.0	0.000	-0.1	0.000	0.0	0.0	0.000
57.5	0.000	-0.1	0.000	0.0	-0.1	0.000
58.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
58.5	0.000	-0.1	0.000	0.0	-0.1	0.000
59.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
59.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
60.0	0.000	-0.1	0.000	-0.1	0.0	0.000
60.5	0.000	-0.1	0.000	-0.1	0.0	0.000
61.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
61.5	0.000	-0.1	0.000	0.0	-0.1	0.000
62.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
62.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
63.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
63.5	0.000	0.0	0.000	-0.1	-0.1	0.000
64.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
64.5	0.000	0.0	0.000	0.1	0.0	0.000
65.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
65.5	0.000	0.0	0.000	-0.1	0.0	0.000
66.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
66.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
67.0	0.000	0.0	0.000	-0.1	-0.1	0.000
67.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
68.0	0.000	-0.1	0.000	-0.1	0.0	0.000
68.5	0.000	0.0	0.000	-0.1	-0.1	0.000

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
69.0	0.000	0.0	0.000	-0.1	-0.1	0.000
69.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
70.0	0.000	-0.1	0.000	0.0	-0.1	0.000
70.5	0.000	-0.1	0.000	-0.1	0.0	0.000
71.0	0.000	-0.1	0.000	0.0	-0.1	0.000
71.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
72.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
72.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
73.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
73.5	0.000	0.0	0.000	-0.1	0.0	0.000
74.0	0.000	-0.1	0.000	-0.1	0.0	0.000
74.5	0.000	0.0	0.000	0.0	0.0	0.000
75.0	0.000	-0.1	0.000	0.0	-0.1	0.000
75.5	0.000	0.0	0.000	-0.1	-0.1	0.000
76.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
76.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
77.0	0.000	0.1	0.000	0.0	0.1	0.000
77.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
78.0	0.000	-0.1	0.000	0.0	-0.1	0.000
78.5	0.000	0.0	0.000	0.1	0.0	0.000
79.0	0.000	0.0	0.000	0.0	0.0	0.000
79.5	0.000	0.0	0.000	0.0	0.0	0.000
80.0	0.000	0.0	0.000	-0.1	-0.1	0.000
80.5	0.000	0.0	0.000	-0.1	-0.1	0.000
81.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
81.5	0.000	0.1	0.000	0.0	0.0	0.000
82.0	0.000	-0.1	0.000	-0.1	0.0	0.000
82.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
83.0	0.000	0.0	0.000	0.0	0.1	0.000
83.5	0.000	-0.1	0.000	0.0	0.0	0.000
84.0	0.000	0.0	0.000	-0.1	-0.1	0.000
84.5	0.000	0.0	0.000	-0.1	-0.1	0.000
85.0	0.000	0.0	0.000	0.0	0.0	0.000
85.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
86.0	0.000	0.0	0.000	-0.1	-0.1	0.000
86.5	0.000	0.0	0.000	0.0	0.0	0.000
87.0	0.000	-0.1	0.000	-0.1	0.0	0.000
87.5	0.000	-0.1	0.000	0.0	-0.1	0.000
88.0	0.000	0.0	0.000	0.0	0.1	0.000
88.5	0.000	0.0	0.000	0.0	0.0	0.000
89.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
89.5	0.000	-0.1	0.000	0.0	0.0	0.000
90.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
90.5	0.000	0.0	0.000	0.0	0.0	0.000
91.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
91.5	0.000	0.1	0.000	0.0	0.0	0.000

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
92.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
92.5	0.000	-0.1	0.000	-0.1	0.0	0.000
93.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
93.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
94.0	0.000	0.0	0.000	-0.1	-0.1	0.000
94.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
95.0	0.000	0.0	0.000	0.1	0.1	0.000
95.5	0.000	0.0	0.000	-0.1	-0.1	0.000
96.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
96.5	0.000	-0.1	0.000	0.0	-0.1	0.000
97.0	0.000	0.0	0.000	0.0	0.0	0.000
97.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
98.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
98.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
99.0	0.000	-0.1	0.000	0.0	-0.1	0.000
99.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
100.0	0.000	0.0	0.000	0.0	0.0	0.000
100.5	0.000	-0.1	0.000	-0.1	0.0	0.000
101.0	0.000	0.0	0.000	0.0	0.0	0.000
101.5	0.000	-0.1	0.000	-0.1	0.0	0.000
102.0	0.000	0.0	0.000	-0.1	-0.1	0.000
102.5	0.000	-0.1	0.000	-0.1	0.0	0.000
103.0	0.000	0.1	0.000	0.1	0.0	0.000
103.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
104.0	0.000	0.0	0.000	0.0	0.0	0.000
104.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
105.0	0.000	-0.1	0.000	0.0	-0.1	0.000
105.5	0.000	0.0	0.000	-0.1	-0.1	0.000
106.0	0.000	0.0	0.000	-0.1	-0.1	0.000
106.5	0.000	0.0	0.000	-0.1	0.0	0.000
107.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
107.5	0.000	0.0	0.000	0.1	0.0	0.000
108.0	0.000	0.0	0.000	-0.1	0.0	0.000
108.5	0.000	0.0	0.000	-0.1	-0.1	0.000
109.0	0.000	0.1	0.000	0.0	0.0	0.000
109.5	0.000	0.0	0.000	0.1	0.1	0.000
110.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
110.5	0.000	0.0	0.000	0.0	0.1	0.000
111.0	0.000	0.1	0.000	0.0	0.0	0.000
111.5	0.000	-0.1	0.000	0.0	-0.1	0.000
112.0	0.000	0.0	0.000	0.1	0.0	0.000
112.5	0.000	0.1	0.000	0.1	0.1	0.000
113.0	0.000	-0.1	0.000	0.0	-0.1	0.000
113.5	0.000	-0.1	0.000	0.0	0.0	0.000
114.0	0.000	0.0	0.000	0.0	-0.1	0.000
114.5	0.000	-0.1	0.000	-0.1	0.0	0.000

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
115.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
115.5	0.000	0.0	0.000	-0.1	0.0	0.000
116.0	0.000	0.1	0.000	0.1	0.0	0.000
116.5	0.000	-0.1	0.000	0.0	-0.1	0.000
117.0	0.000	0.1	0.000	0.1	0.1	0.000
117.5	0.000	0.1	0.000	0.0	0.1	0.000
118.0	0.000	-0.1	0.000	-0.1	0.0	0.000
118.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
119.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
119.5	0.000	-0.1	0.000	0.0	-0.1	0.000
120.0	0.000	0.0	0.000	0.0	0.0	0.000
120.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
121.0	0.000	0.1	0.000	0.1	0.0	0.000
121.5	0.000	0.0	0.000	0.1	0.0	0.000
122.0	0.000	0.0	0.000	0.0	-0.1	0.000
122.5	0.000	0.1	0.000	0.0	0.0	0.000
123.0	0.000	0.0	0.000	-0.1	-0.1	0.000
123.5	0.000	-0.1	0.000	0.0	0.0	0.000
124.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
124.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
125.0	0.000	0.0	0.000	-0.1	0.0	0.000
125.5	0.000	0.1	0.000	0.1	0.1	0.000
126.0	0.000	0.0	0.000	0.0	0.0	0.000
126.5	0.000	0.1	0.000	0.0	0.0	0.000
127.0	0.000	0.0	0.000	0.0	-0.1	0.000
127.5	0.000	0.1	0.000	0.0	0.1	0.000
128.0	0.000	0.0	0.000	-0.1	-0.1	0.000
128.5	0.000	0.0	0.000	0.0	0.1	0.000
129.0	0.000	0.0	0.000	0.0	0.1	0.000
129.5	0.000	0.0	0.000	0.0	0.1	0.000
130.0	0.000	0.0	0.000	0.0	-0.1	0.000
130.5	0.000	0.0	0.000	-0.1	0.0	0.000
131.0	0.000	0.0	0.000	0.0	-0.1	0.000
131.5	0.000	-0.1	0.000	0.0	-0.1	0.000
132.0	0.000	0.0	0.000	0.0	0.0	0.000
132.5	0.000	0.0	0.000	0.0	-0.1	0.000
133.0	0.000	0.0	0.000	0.0	0.1	0.000
133.5	0.000	0.0	0.000	0.1	0.0	0.000
134.0	0.000	0.0	0.000	0.1	0.0	0.000
134.5	0.000	0.0	0.000	-0.1	-0.1	0.000
135.0	0.000	-0.1	0.000	-0.1	0.0	0.000
135.5	0.000	0.1	0.000	0.1	0.1	0.000
136.0	0.000	-0.1	0.000	0.0	0.0	0.000
136.5	0.000	0.0	0.000	-0.1	-0.1	0.000
137.0	0.000	0.1	0.000	0.0	0.0	0.000
137.5	0.000	0.0	0.000	0.0	0.0	0.000

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
138.0	0.000	-0.1	0.000	0.0	0.0	0.000
138.5	0.000	0.0	0.000	0.0	-0.1	0.000
139.0	0.000	0.0	0.000	0.0	0.0	0.000
139.5	0.000	0.1	0.000	0.0	0.0	0.000
140.0	0.000	0.1	0.000	0.1	0.1	0.000
140.5	0.000	-0.1	0.000	-0.1	0.0	0.000
141.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
141.5	0.000	-0.1	0.000	-0.1	0.0	0.000
142.0	0.000	0.1	0.000	0.1	0.1	0.000
142.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
143.0	0.000	0.0	0.000	0.0	0.1	0.000
143.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
144.0	0.000	-0.1	0.000	0.0	-0.1	0.000
144.5	0.000	0.0	0.000	0.0	0.0	0.000
145.0	0.000	-0.1	0.000	0.0	0.0	0.000
145.5	0.000	0.1	0.000	0.1	0.0	0.000
146.0	0.000	-0.1	0.000	0.0	0.0	0.000
146.5	0.000	-0.1	0.000	-0.1	0.0	0.000
147.0	0.000	-0.1	0.000	-0.1	-0.1	0.000
147.5	0.000	0.1	0.000	0.1	0.1	0.000
148.0	0.000	0.0	0.000	0.1	0.1	0.000
148.5	0.000	-0.1	0.000	0.0	0.0	0.000
149.0	0.000	-0.1	0.000	0.0	-0.1	0.000
149.5	0.000	0.0	0.000	-0.1	0.0	0.000
150.0	0.000	0.0	0.000	0.0	0.0	0.000
150.5	0.000	-0.1	0.000	0.0	0.0	0.000
151.0	0.000	-0.1	0.000	0.0	0.0	0.000
151.5	0.000	0.0	0.000	0.0	-0.1	0.000
152.0	0.000	0.0	0.000	0.0	0.0	0.000
152.5	0.000	0.0	0.000	0.0	0.0	0.000
153.0	0.000	-0.1	0.000	-0.1	0.0	0.000
153.5	0.000	0.1	0.000	0.1	0.1	0.000
154.0	0.000	0.0	0.000	0.0	-0.1	0.000
154.5	0.000	0.0	0.000	0.0	0.0	0.000
155.0	0.000	-0.1	0.000	0.0	0.0	0.000
155.5	0.000	0.0	0.000	-0.1	-0.1	0.000
156.0	0.000	0.0	0.000	0.0	0.0	0.000
156.5	0.000	-0.1	0.000	-0.1	-0.1	0.000
157.0	0.000	-0.1	0.000	0.0	0.0	0.000
157.5	0.000	0.1	0.000	0.0	0.1	0.000
158.0	0.000	0.1	0.000	0.1	0.1	0.000
158.5	0.000	-0.1	0.000	-0.1	0.0	0.000
159.0	0.000	0.0	0.000	0.1	0.1	0.000
159.5	0.000	0.1	0.000	0.0	0.0	0.000
160.0	0.000	-0.1	0.000	0.0	0.0	0.000
160.5	0.000	0.0	0.000	0.0	0.0	0.000

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
161.0	0.000	0.0	0.000	0.0	0.0	0.000
161.5	0.000	0.1	0.000	0.1	0.1	0.000
162.0	0.000	0.1	0.000	0.1	0.1	0.000
162.5	0.000	-0.1	0.000	0.0	0.0	0.000
163.0	0.000	-0.1	0.000	-0.1	0.0	0.000
163.5	0.000	0.1	0.000	0.1	0.1	0.000
164.0	0.000	0.0	0.000	0.0	0.0	0.000
164.5	0.000	0.0	0.000	0.0	0.0	0.000
165.0	0.000	0.0	0.000	0.0	0.0	0.000
165.5	0.000	0.1	0.000	0.1	0.1	0.000
166.0	0.000	-0.1	0.000	0.0	0.0	0.000
166.5	0.000	-0.1	0.000	0.0	0.0	0.000
167.0	0.000	-0.1	0.000	0.0	0.0	0.000
167.5	0.000	0.1	0.000	0.1	0.1	0.000
168.0	0.000	0.0	0.000	0.1	0.1	0.000
168.5	0.000	0.0	0.000	-0.1	0.0	0.000
169.0	0.000	0.0	0.000	0.0	0.0	0.000
169.5	0.000	0.0	0.000	0.0	0.0	0.000
170.0	0.000	-0.1	0.000	0.0	0.0	0.000
170.5	0.000	0.0	0.000	0.0	0.0	0.000
171.0	0.000	0.0	0.000	0.0	0.0	0.000
171.5	0.000	-0.1	0.000	0.0	0.0	0.000
172.0	0.000	0.0	0.000	-0.1	0.0	0.000
172.5	0.000	0.1	0.000	0.1	0.1	0.000
173.0	0.000	0.0	0.000	0.0	0.0	0.000
173.5	0.000	0.0	0.000	-0.1	0.0	0.000
174.0	0.000	0.0	0.000	-0.1	0.0	0.000
174.5	0.000	-0.1	0.000	0.0	0.0	0.000
175.0	0.000	0.0	0.000	0.0	-0.1	0.000
175.5	0.000	0.0	0.000	-0.1	0.0	0.000
176.0	0.000	0.1	0.000	0.1	0.1	0.000
176.5	0.328	0.0	0.000	475.1	8.1	0.014
177.0	0.336	0.1	0.000	475.4	13.9	0.024
177.5	0.343	0.1	0.000	474.8	14.8	0.026
178.0	0.349	0.1	0.000	474.7	15.7	0.027
178.5	0.353	0.1	0.000	474.6	16.2	0.028
179.0	0.357	0.1	0.000	475.1	16.7	0.029
179.5	0.361	0.1	0.000	474.8	17.2	0.030
180.0	0.365	0.2	0.000	475.1	17.7	0.031

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
0.0	0.0	0.000	0.1	0.000	0.000	0.0
0.5	0.0	0.000	0.1	0.000	0.000	0.0
1.0	0.0	0.000	0.0	0.000	0.000	0.0
1.5	0.0	0.000	0.0	0.000	0.000	0.0
2.0	0.0	0.000	0.1	0.000	0.000	0.0
2.5	0.1	0.000	0.1	0.000	0.000	0.0
3.0	0.1	0.000	0.1	0.000	0.000	0.0
3.5	0.1	0.000	0.1	0.000	0.000	0.0
4.0	0.0	0.000	0.1	0.000	0.000	0.0
4.5	0.1	0.000	0.1	0.000	0.000	0.0
5.0	0.0	0.000	0.1	0.000	0.000	0.0
5.5	0.0	0.000	0.1	0.000	0.000	0.0
6.0	0.0	0.000	0.1	0.000	0.000	0.0
6.5	0.0	0.000	0.1	0.000	0.000	0.0
7.0	0.1	0.000	0.1	0.000	0.000	0.0
7.5	0.1	0.000	0.1	0.000	0.000	0.0
8.0	0.1	0.000	0.1	0.000	0.000	0.0
8.5	0.0	0.000	0.1	0.000	0.000	0.0
9.0	0.0	0.000	0.1	0.000	0.000	0.0
9.5	0.1	0.000	0.1	0.000	0.000	0.0
10.0	0.1	0.000	0.1	0.000	0.000	0.0
10.5	0.1	0.000	0.1	0.000	0.000	0.0
11.0	0.1	0.000	0.1	0.000	0.000	0.0
11.5	0.0	0.000	0.1	0.000	0.000	0.0
12.0	0.1	0.000	0.1	0.000	0.000	0.0
12.5	0.1	0.000	0.1	0.000	0.000	0.0
13.0	0.0	0.000	0.1	0.000	0.000	0.0
13.5	0.0	0.000	0.1	0.000	0.000	0.0
14.0	0.0	0.000	0.1	0.000	0.000	0.0
14.5	0.1	0.000	0.1	0.000	0.000	0.0
15.0	0.1	0.000	0.1	0.000	0.000	0.0
15.5	0.0	0.000	0.1	0.000	0.000	0.0
16.0	0.0	0.000	0.1	0.000	0.000	0.0
16.5	0.0	0.000	0.1	0.000	0.000	0.0
17.0	0.0	0.000	0.1	0.000	0.000	0.0
17.5	0.0	0.000	0.1	0.000	0.000	0.0
18.0	0.0	0.000	0.1	0.000	0.000	0.0
18.5	0.0	0.000	0.1	0.000	0.000	0.0
19.0	0.1	0.000	0.1	0.000	0.000	0.0
19.5	0.1	0.000	0.1	0.000	0.000	0.0
20.0	0.0	0.000	0.1	0.000	0.000	0.0
20.5	0.0	0.000	0.1	0.000	0.000	0.0
21.0	0.0	0.000	0.0	0.000	0.000	0.0
21.5	0.0	0.000	-0.1	0.000	0.000	0.0
22.0	-0.1	0.000	-0.1	0.000	0.000	0.0
22.5	0.0	0.000	-0.1	0.000	0.000	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
23.0	-0.1	0.000	0.0	0.000	0.000	0.0
23.5	-0.1	0.000	-0.1	0.000	0.000	0.0
24.0	-0.1	0.000	-0.1	0.000	0.000	0.0
24.5	-0.1	0.000	-0.1	0.000	0.000	0.0
25.0	-0.1	0.000	-0.1	0.000	0.000	0.0
25.5	-0.1	0.000	-0.1	0.000	0.000	0.0
26.0	-0.1	0.000	-0.1	0.000	0.000	0.0
26.5	-0.1	0.000	-0.1	0.000	0.000	0.0
27.0	-0.1	0.000	-0.1	0.000	0.000	0.0
27.5	-0.1	0.000	-0.1	0.000	0.000	0.0
28.0	0.0	0.000	-0.1	0.000	0.000	0.0
28.5	-0.1	0.000	-0.1	0.000	0.000	0.0
29.0	-0.1	0.000	-0.1	0.000	0.000	0.0
29.5	-0.1	0.000	-0.1	0.000	0.000	0.0
30.0	-0.1	0.000	-0.1	0.000	0.000	0.0
30.5	-0.1	0.000	-0.1	0.000	0.000	0.0
31.0	-0.1	0.000	0.0	0.000	0.000	0.0
31.5	0.0	0.000	-0.1	0.000	0.000	0.0
32.0	0.0	0.000	-0.1	0.000	0.000	0.0
32.5	-0.1	0.000	0.0	0.000	0.000	0.0
33.0	-0.1	0.000	-0.1	0.000	0.000	0.0
33.5	-0.1	0.000	-0.1	0.000	0.000	0.0
34.0	0.0	0.000	0.0	0.000	0.000	0.0
34.5	-0.1	0.000	0.0	0.000	0.000	0.0
35.0	-0.1	0.000	-0.1	0.000	0.000	0.0
35.5	-0.1	0.000	-0.1	0.000	0.000	0.0
36.0	-0.1	0.000	-0.1	0.000	0.000	0.0
36.5	-0.1	0.000	-0.1	0.000	0.000	0.0
37.0	-0.1	0.000	-0.1	0.000	0.000	0.0
37.5	-0.1	0.000	0.0	0.000	0.000	0.0
38.0	-0.1	0.000	-0.1	0.000	0.000	0.0
38.5	-0.1	0.000	-0.1	0.000	0.000	0.0
39.0	-0.1	0.000	-0.1	0.000	0.000	0.0
39.5	-0.1	0.000	-0.1	0.000	0.000	0.0
40.0	-0.1	0.000	-0.1	0.000	0.000	0.0
40.5	-0.1	0.000	-0.1	0.000	0.000	0.0
41.0	0.0	0.000	-0.1	0.000	0.000	0.0
41.5	-0.1	0.000	-0.1	0.000	0.000	0.0
42.0	-0.1	0.000	-0.1	0.000	0.000	0.0
42.5	-0.1	0.000	-0.1	0.000	0.000	0.0
43.0	-0.1	0.000	-0.1	0.000	0.000	0.0
43.5	-0.1	0.000	-0.1	0.000	0.000	0.0
44.0	-0.1	0.000	-0.1	0.000	0.000	0.0
44.5	-0.1	0.000	-0.1	0.000	0.000	0.0
45.0	-0.1	0.000	-0.1	0.000	0.000	0.0
45.5	-0.1	0.000	-0.1	0.000	0.000	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
46.0	0.0	0.000	-0.1	0.000	0.000	0.0
46.5	0.0	0.000	0.0	0.000	0.000	0.0
47.0	0.0	0.000	-0.1	0.000	0.000	0.0
47.5	-0.1	0.000	-0.1	0.000	0.000	0.0
48.0	-0.1	0.000	-0.1	0.000	0.000	0.0
48.5	-0.1	0.000	0.0	0.000	0.000	0.0
49.0	-0.1	0.000	-0.1	0.000	0.000	0.0
49.5	-0.1	0.000	-0.1	0.000	0.000	0.0
50.0	-0.1	0.000	0.0	0.000	0.000	0.0
50.5	-0.1	0.000	0.0	0.000	0.000	0.0
51.0	0.0	0.000	-0.1	0.000	0.000	0.0
51.5	0.0	0.000	0.0	0.000	0.000	0.0
52.0	0.0	0.000	-0.1	0.000	0.000	0.0
52.5	-0.1	0.000	-0.1	0.000	0.000	0.0
53.0	-0.1	0.000	-0.1	0.000	0.000	0.0
53.5	-0.1	0.000	-0.1	0.000	0.000	0.0
54.0	-0.1	0.000	-0.1	0.000	0.000	0.0
54.5	0.0	0.000	0.0	0.000	0.000	0.0
55.0	-0.1	0.000	-0.1	0.000	0.000	0.0
55.5	-0.1	0.000	-0.1	0.000	0.000	0.0
56.0	-0.1	0.000	-0.1	0.000	0.000	0.0
56.5	-0.1	0.000	-0.1	0.000	0.000	0.0
57.0	-0.1	0.000	-0.1	0.000	0.000	0.0
57.5	-0.1	0.000	-0.1	0.000	0.000	0.0
58.0	-0.1	0.000	-0.1	0.000	0.000	0.0
58.5	-0.1	0.000	0.0	0.000	0.000	0.0
59.0	-0.1	0.000	-0.1	0.000	0.000	0.0
59.5	-0.1	0.000	-0.1	0.000	0.000	0.0
60.0	-0.1	0.000	-0.1	0.000	0.000	0.0
60.5	-0.1	0.000	-0.1	0.000	0.000	0.0
61.0	-0.1	0.000	-0.1	0.000	0.000	0.0
61.5	-0.1	0.000	-0.1	0.000	0.000	0.0
62.0	-0.1	0.000	-0.1	0.000	0.000	0.0
62.5	-0.1	0.000	-0.1	0.000	0.000	0.0
63.0	-0.1	0.000	-0.1	0.000	0.000	0.0
63.5	-0.1	0.000	-0.1	0.000	0.000	0.0
64.0	0.0	0.000	-0.1	0.000	0.000	0.0
64.5	0.0	0.000	0.0	0.000	0.000	0.0
65.0	0.0	0.000	-0.1	0.000	0.000	0.0
65.5	-0.1	0.000	0.0	0.000	0.000	0.0
66.0	-0.1	0.000	-0.1	0.000	0.000	0.0
66.5	-0.1	0.000	-0.1	0.000	0.000	0.0
67.0	-0.1	0.000	-0.1	0.000	0.000	0.0
67.5	-0.1	0.000	-0.1	0.000	0.000	0.0
68.0	-0.1	0.000	-0.1	0.000	0.000	0.0
68.5	-0.1	0.000	-0.1	0.000	0.000	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
69.0	-0.1	0.000	-0.1	0.000	0.000	0.0
69.5	-0.1	0.000	-0.1	0.000	0.000	0.0
70.0	-0.1	0.000	-0.1	0.000	0.000	0.0
70.5	-0.1	0.000	-0.1	0.000	0.000	0.0
71.0	-0.1	0.000	-0.1	0.000	0.000	0.0
71.5	-0.1	0.000	-0.1	0.000	0.000	0.0
72.0	-0.1	0.000	0.0	0.000	0.000	0.0
72.5	-0.1	0.000	-0.1	0.000	0.000	0.0
73.0	-0.1	0.000	-0.1	0.000	0.000	0.0
73.5	-0.1	0.000	-0.1	0.000	0.000	0.0
74.0	-0.1	0.000	-0.1	0.000	0.000	0.0
74.5	-0.1	0.000	-0.1	0.000	0.000	0.0
75.0	-0.1	0.000	-0.1	0.000	0.000	0.0
75.5	-0.1	0.000	-0.1	0.000	0.000	0.0
76.0	-0.1	0.000	-0.1	0.000	0.000	0.0
76.5	-0.1	0.000	-0.1	0.000	0.000	0.0
77.0	0.1	0.000	0.0	0.000	0.000	0.0
77.5	-0.1	0.000	-0.1	0.000	0.000	0.0
78.0	-0.1	0.000	-0.1	0.000	0.000	0.0
78.5	0.0	0.000	0.0	0.000	0.000	0.0
79.0	0.1	0.000	0.0	0.000	0.000	0.0
79.5	0.0	0.000	0.1	0.000	0.000	0.0
80.0	-0.1	0.000	-0.1	0.000	0.000	0.0
80.5	-0.1	0.000	-0.1	0.000	0.000	0.0
81.0	-0.1	0.000	-0.1	0.000	0.000	0.0
81.5	0.0	0.000	0.0	0.000	0.000	0.0
82.0	-0.1	0.000	-0.1	0.000	0.000	0.0
82.5	-0.1	0.000	-0.1	0.000	0.000	0.0
83.0	0.0	0.000	0.0	0.000	0.000	0.0
83.5	-0.1	0.000	-0.1	0.000	0.000	0.0
84.0	-0.1	0.000	-0.1	0.000	0.000	0.0
84.5	-0.1	0.000	-0.1	0.000	0.000	0.0
85.0	0.0	0.000	0.0	0.000	0.000	0.0
85.5	-0.1	0.000	-0.1	0.000	0.000	0.0
86.0	-0.1	0.000	-0.1	0.000	0.000	0.0
86.5	0.0	0.000	0.0	0.000	0.000	0.0
87.0	-0.1	0.000	-0.1	0.000	0.000	0.0
87.5	-0.1	0.000	-0.1	0.000	0.000	0.0
88.0	0.0	0.000	0.0	0.000	0.000	0.0
88.5	0.0	0.000	0.0	0.000	0.000	0.0
89.0	-0.1	0.000	-0.1	0.000	0.000	0.0
89.5	-0.1	0.000	-0.1	0.000	0.000	0.0
90.0	-0.1	0.000	-0.1	0.000	0.000	0.0
90.5	0.0	0.000	0.0	0.000	0.000	0.0
91.0	-0.1	0.000	-0.1	0.000	0.000	0.0
91.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
92.0	-0.1	0.000	-0.1	0.000	0.000	0.0
92.5	-0.1	0.000	-0.1	0.000	0.000	0.0
93.0	-0.1	0.000	-0.1	0.000	0.000	0.0
93.5	-0.1	0.000	-0.1	0.000	0.000	0.0
94.0	-0.1	0.000	-0.1	0.000	0.000	0.0
94.5	-0.1	0.000	-0.1	0.000	0.000	0.0
95.0	0.0	0.000	0.0	0.000	0.000	0.0
95.5	-0.1	0.000	-0.1	0.000	0.000	0.0
96.0	-0.1	0.000	-0.1	0.000	0.000	0.0
96.5	-0.1	0.000	0.0	0.000	0.000	0.0
97.0	0.0	0.000	0.0	0.000	0.000	0.0
97.5	-0.1	0.000	-0.1	0.000	0.000	0.0
98.0	-0.1	0.000	-0.1	0.000	0.000	0.0
98.5	-0.1	0.000	-0.1	0.000	0.000	0.0
99.0	-0.1	0.000	-0.1	0.000	0.000	0.0
99.5	-0.1	0.000	-0.1	0.000	0.000	0.0
100.0	0.0	0.000	0.1	0.000	0.000	0.0
100.5	-0.1	0.000	0.0	0.000	0.000	0.0
101.0	0.0	0.000	0.1	0.000	0.000	0.0
101.5	-0.1	0.000	-0.1	0.000	0.000	0.0
102.0	-0.1	0.000	-0.1	0.000	0.000	0.0
102.5	-0.1	0.000	-0.1	0.000	0.000	0.0
103.0	0.0	0.000	0.0	0.000	0.000	0.0
103.5	-0.1	0.000	-0.1	0.000	0.000	0.0
104.0	0.1	0.000	0.0	0.000	0.000	0.0
104.5	-0.1	0.000	-0.1	0.000	0.000	0.0
105.0	-0.1	0.000	-0.1	0.000	0.000	0.0
105.5	0.0	0.000	-0.1	0.000	0.000	0.0
106.0	-0.1	0.000	-0.1	0.000	0.000	0.0
106.5	-0.1	0.000	-0.1	0.000	0.000	0.0
107.0	0.0	0.000	-0.1	0.000	0.000	0.0
107.5	0.0	0.000	0.1	0.000	0.000	0.0
108.0	-0.1	0.000	-0.1	0.000	0.000	0.0
108.5	-0.1	0.000	-0.1	0.000	0.000	0.0
109.0	0.0	0.000	0.0	0.000	0.000	0.0
109.5	0.0	0.000	0.0	0.000	0.000	0.0
110.0	-0.1	0.000	-0.1	0.000	0.000	0.0
110.5	0.0	0.000	0.0	0.000	0.000	0.0
111.0	0.0	0.000	0.0	0.000	0.000	0.0
111.5	-0.1	0.000	-0.1	0.000	0.000	0.0
112.0	0.0	0.000	0.0	0.000	0.000	0.0
112.5	0.0	0.000	0.0	0.000	0.000	0.0
113.0	-0.1	0.000	-0.1	0.000	0.000	0.0
113.5	-0.1	0.000	-0.1	0.000	0.000	0.0
114.0	-0.1	0.000	-0.1	0.000	0.000	0.0
114.5	-0.1	0.000	-0.1	0.000	0.000	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
115.0	0.0	0.000	-0.1	0.000	0.000	0.0
115.5	-0.1	0.000	-0.1	0.000	0.000	0.0
116.0	0.0	0.000	0.0	0.000	0.000	0.0
116.5	-0.1	0.000	-0.1	0.000	0.000	0.0
117.0	0.0	0.000	0.0	0.000	0.000	0.0
117.5	0.0	0.000	0.0	0.000	0.000	0.0
118.0	-0.1	0.000	-0.1	0.000	0.000	0.0
118.5	-0.1	0.000	-0.1	0.000	0.000	0.0
119.0	-0.1	0.000	-0.1	0.000	0.000	0.0
119.5	-0.1	0.000	-0.1	0.000	0.000	0.0
120.0	-0.1	0.000	-0.1	0.000	0.000	0.0
120.5	-0.1	0.000	-0.1	0.000	0.000	0.0
121.0	0.0	0.000	0.0	0.000	0.000	0.0
121.5	0.0	0.000	0.0	0.000	0.000	0.0
122.0	-0.1	0.000	-0.1	0.000	0.000	0.0
122.5	0.1	0.000	0.0	0.000	0.000	0.0
123.0	-0.1	0.000	-0.1	0.000	0.000	0.0
123.5	-0.1	0.000	-0.1	0.000	0.000	0.0
124.0	-0.1	0.000	0.0	0.000	0.000	0.0
124.5	-0.1	0.000	-0.1	0.000	0.000	0.0
125.0	-0.1	0.000	-0.1	0.000	0.000	0.0
125.5	0.1	0.000	0.0	0.000	0.000	0.0
126.0	0.0	0.000	0.0	0.000	0.000	0.0
126.5	0.0	0.000	0.0	0.000	0.000	0.0
127.0	-0.1	0.000	-0.1	0.000	0.000	0.0
127.5	0.0	0.000	0.0	0.000	0.000	0.0
128.0	-0.1	0.000	0.0	0.000	0.000	0.0
128.5	0.0	0.000	0.0	0.000	0.000	0.0
129.0	0.0	0.000	0.0	0.000	0.000	0.0
129.5	0.0	0.000	0.0	0.000	0.000	0.0
130.0	-0.1	0.000	-0.1	0.000	0.000	0.0
130.5	-0.1	0.000	-0.1	0.000	0.000	0.0
131.0	-0.1	0.000	-0.1	0.000	0.000	0.0
131.5	-0.1	0.000	-0.1	0.000	0.000	0.0
132.0	-0.1	0.000	0.0	0.000	0.000	0.0
132.5	0.0	0.000	-0.1	0.000	0.000	0.0
133.0	0.0	0.000	0.0	0.000	0.000	0.0
133.5	0.0	0.000	0.1	0.000	0.000	0.0
134.0	0.1	0.000	0.0	0.000	0.000	0.0
134.5	-0.1	0.000	-0.1	0.000	0.000	0.0
135.0	-0.1	0.000	-0.1	0.000	0.000	0.0
135.5	0.0	0.000	0.0	0.000	0.000	0.0
136.0	0.0	0.000	-0.1	0.000	0.000	0.0
136.5	-0.1	0.000	-0.1	0.000	0.000	0.0
137.0	0.1	0.000	0.0	0.000	0.000	0.0
137.5	-0.1	0.000	-0.1	0.000	0.000	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
138.0	0.0	0.000	-0.1	0.000	0.000	0.0
138.5	-0.1	0.000	-0.1	0.000	0.000	0.0
139.0	-0.1	0.000	0.0	0.000	0.000	0.0
139.5	0.0	0.000	0.1	0.000	0.000	0.0
140.0	0.0	0.000	0.1	0.000	0.000	0.0
140.5	0.0	0.000	-0.1	0.000	0.000	0.0
141.0	-0.1	0.000	-0.1	0.000	0.000	0.0
141.5	-0.1	0.000	-0.1	0.000	0.000	0.0
142.0	0.0	0.000	0.0	0.000	0.000	0.0
142.5	-0.1	0.000	-0.1	0.000	0.000	0.0
143.0	0.0	0.000	0.1	0.000	0.000	0.0
143.5	-0.1	0.000	-0.1	0.000	0.000	0.0
144.0	-0.1	0.000	-0.1	0.000	0.000	0.0
144.5	0.0	0.000	0.1	0.000	0.000	0.0
145.0	-0.1	0.000	-0.1	0.000	0.000	0.0
145.5	0.1	0.000	0.0	0.000	0.000	0.0
146.0	-0.1	0.000	-0.1	0.000	0.000	0.0
146.5	-0.1	0.000	0.0	0.000	0.000	0.0
147.0	-0.1	0.000	0.0	0.000	0.000	0.0
147.5	0.0	0.000	0.0	0.000	0.000	0.0
148.0	0.0	0.000	0.0	0.000	0.000	0.0
148.5	-0.1	0.000	0.0	0.000	0.000	0.0
149.0	-0.1	0.000	-0.1	0.000	0.000	0.0
149.5	-0.1	0.000	-0.1	0.000	0.000	0.0
150.0	-0.1	0.000	0.0	0.000	0.000	0.0
150.5	-0.1	0.000	0.0	0.000	0.000	0.0
151.0	-0.1	0.000	-0.1	0.000	0.000	0.0
151.5	0.0	0.000	0.0	0.000	0.000	0.0
152.0	0.0	0.000	-0.1	0.000	0.000	0.0
152.5	0.0	0.000	-0.1	0.000	0.000	0.0
153.0	-0.1	0.000	-0.1	0.000	0.000	0.0
153.5	0.0	0.000	0.1	0.000	0.000	0.0
154.0	-0.1	0.000	-0.1	0.000	0.000	0.0
154.5	0.0	0.000	-0.1	0.000	0.000	0.0
155.0	-0.1	0.000	-0.1	0.000	0.000	0.0
155.5	-0.1	0.000	-0.1	0.000	0.000	0.0
156.0	-0.1	0.000	0.0	0.000	0.000	0.0
156.5	-0.1	0.000	-0.1	0.000	0.000	0.0
157.0	-0.1	0.000	0.0	0.000	0.000	0.0
157.5	0.1	0.000	0.1	0.000	0.000	0.0
158.0	0.0	0.000	0.0	0.000	0.000	0.0
158.5	-0.1	0.000	0.0	0.000	0.000	0.0
159.0	0.1	0.000	0.0	0.000	0.000	0.0
159.5	0.0	0.000	0.0	0.000	0.000	0.0
160.0	0.0	0.000	0.0	0.000	0.000	0.0
160.5	-0.1	0.000	-0.1	0.000	0.000	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
161.0	0.0	0.000	-0.1	0.000	0.000	0.0
161.5	0.0	0.000	0.1	0.000	0.000	0.0
162.0	0.0	0.000	0.1	0.000	0.000	0.0
162.5	-0.1	0.000	-0.1	0.000	0.000	0.0
163.0	-0.1	0.000	-0.1	0.000	0.000	0.0
163.5	0.0	0.000	0.1	0.000	0.000	0.0
164.0	-0.1	0.000	-0.1	0.000	0.000	0.0
164.5	0.0	0.000	-0.1	0.000	0.000	0.0
165.0	0.0	0.000	0.0	0.000	0.000	0.0
165.5	0.0	0.000	0.0	0.000	0.000	0.0
166.0	0.0	0.000	-0.1	0.000	0.000	0.0
166.5	0.0	0.000	0.0	0.000	0.000	0.0
167.0	0.0	0.000	0.0	0.000	0.000	0.0
167.5	0.0	0.000	0.0	0.000	0.000	0.0
168.0	0.0	0.000	0.0	0.000	0.000	0.0
168.5	0.0	0.000	-0.1	0.000	0.000	0.0
169.0	-0.1	0.000	0.0	0.000	0.000	0.0
169.5	-0.1	0.000	0.0	0.000	0.000	0.0
170.0	-0.1	0.000	-0.1	0.000	0.000	0.0
170.5	-0.1	0.000	0.0	0.000	0.000	0.0
171.0	0.0	0.000	-0.1	0.000	0.000	0.0
171.5	-0.1	0.000	-0.1	0.000	0.000	0.0
172.0	0.0	0.000	-0.1	0.000	0.000	0.0
172.5	0.0	0.000	0.0	0.000	0.000	0.0
173.0	0.0	0.000	0.0	0.000	0.000	0.0
173.5	-0.1	0.000	0.0	0.000	0.000	0.0
174.0	0.0	0.000	0.0	0.000	0.000	0.0
174.5	-0.1	0.000	-0.1	0.000	0.000	0.0
175.0	-0.1	0.000	-0.1	0.000	0.000	0.0
175.5	-0.1	0.000	0.0	0.000	0.000	0.0
176.0	0.0	0.000	0.0	0.000	0.000	0.0
176.5	0.0	0.000	6.1	0.011	0.033	0.0
177.0	0.1	0.000	9.7	0.017	0.034	0.0
177.5	0.0	0.000	10.4	0.018	0.034	0.0
178.0	0.1	0.000	11.1	0.019	0.035	0.0
178.5	0.0	0.000	11.6	0.020	0.035	0.0
179.0	0.0	0.000	12.1	0.021	0.035	0.0
179.5	0.1	0.000	12.5	0.022	0.036	0.0
180.0	0.1	0.000	13.0	0.023	0.037	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
0.0	0.000	122.6	0.0	0.000	0.0	0.000
0.5	0.000	122.6	0.0	0.000	0.0	0.000
1.0	0.000	122.6	0.0	0.000	0.0	0.000
1.5	0.000	122.7	0.0	0.000	0.0	0.000
2.0	0.000	122.6	0.0	0.000	0.0	0.000
2.5	0.000	122.7	0.0	0.000	0.0	0.000
3.0	0.000	122.7	0.0	0.000	0.0	0.000
3.5	0.000	122.6	0.0	0.000	0.0	0.000
4.0	0.000	122.6	0.0	0.000	0.0	0.000
4.5	0.000	122.7	0.0	0.000	0.0	0.000
5.0	0.000	122.7	0.0	0.000	0.0	0.000
5.5	0.000	122.7	0.0	0.000	0.0	0.000
6.0	0.000	122.6	0.0	0.000	0.0	0.000
6.5	0.000	122.6	0.0	0.000	0.0	0.000
7.0	0.000	122.7	0.0	0.000	0.0	0.000
7.5	0.000	122.5	0.0	0.000	0.0	0.000
8.0	0.000	122.5	0.0	0.000	0.0	0.000
8.5	0.000	122.6	0.0	0.000	0.0	0.000
9.0	0.000	122.5	0.0	0.000	0.0	0.000
9.5	0.000	122.6	0.0	0.000	0.0	0.000
10.0	0.000	122.6	0.0	0.000	0.0	0.000
10.5	0.000	122.6	0.0	0.000	0.0	0.000
11.0	0.000	122.5	0.0	0.000	0.0	0.000
11.5	0.000	122.5	0.0	0.000	0.0	0.000
12.0	0.000	122.5	0.0	0.000	0.0	0.000
12.5	0.000	122.4	0.0	0.000	0.0	0.000
13.0	0.000	122.5	0.0	0.000	0.0	0.000
13.5	0.000	122.5	0.0	0.000	0.0	0.000
14.0	0.000	122.4	0.0	0.000	0.0	0.000
14.5	0.000	122.5	0.0	0.000	0.0	0.000
15.0	0.000	122.4	0.0	0.000	0.0	0.000
15.5	0.000	122.4	0.0	0.000	0.0	0.000
16.0	0.000	122.5	0.0	0.000	0.0	0.000
16.5	0.000	122.5	0.0	0.000	0.0	0.000
17.0	0.000	122.5	0.0	0.000	0.0	0.000
17.5	0.000	122.6	0.0	0.000	0.0	0.000
18.0	0.000	122.5	0.0	0.000	0.0	0.000
18.5	0.000	122.4	0.0	0.000	0.0	0.000
19.0	0.000	122.4	0.0	0.000	0.0	0.000
19.5	0.000	122.4	0.0	0.000	0.0	0.000
20.0	0.000	122.4	0.0	0.000	0.0	0.000
20.5	0.000	122.4	0.0	0.000	0.0	0.000
21.0	0.000	0.0	0.0	0.000	0.0	0.000
21.5	0.000	0.0	0.0	0.000	0.0	0.000
22.0	0.000	0.0	0.0	0.000	0.0	0.000
22.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
23.0	0.000	0.0	0.0	0.000	0.0	0.000
23.5	0.000	0.0	0.0	0.000	0.0	0.000
24.0	0.000	0.0	0.0	0.000	0.0	0.000
24.5	0.000	0.0	0.0	0.000	0.0	0.000
25.0	0.000	0.0	0.0	0.000	0.0	0.000
25.5	0.000	0.0	0.0	0.000	0.0	0.000
26.0	0.000	0.0	0.0	0.000	0.0	0.000
26.5	0.000	0.0	0.0	0.000	0.0	0.000
27.0	0.000	0.0	0.0	0.000	0.0	0.000
27.5	0.000	0.0	0.0	0.000	0.0	0.000
28.0	0.000	0.0	0.0	0.000	0.0	0.000
28.5	0.000	0.0	0.0	0.000	0.0	0.000
29.0	0.000	0.0	0.0	0.000	0.0	0.000
29.5	0.000	0.0	0.0	0.000	0.0	0.000
30.0	0.000	0.0	0.0	0.000	0.0	0.000
30.5	0.000	0.0	0.0	0.000	0.0	0.000
31.0	0.000	0.0	0.0	0.000	0.0	0.000
31.5	0.000	0.0	0.0	0.000	0.0	0.000
32.0	0.000	0.0	0.0	0.000	0.0	0.000
32.5	0.000	0.0	0.0	0.000	0.0	0.000
33.0	0.000	0.0	0.0	0.000	0.0	0.000
33.5	0.000	0.0	0.0	0.000	0.0	0.000
34.0	0.000	0.0	0.0	0.000	0.0	0.000
34.5	0.000	0.0	0.0	0.000	0.0	0.000
35.0	0.000	0.0	0.0	0.000	0.0	0.000
35.5	0.000	0.0	0.0	0.000	0.0	0.000
36.0	0.000	0.0	0.0	0.000	0.0	0.000
36.5	0.000	0.0	0.0	0.000	0.0	0.000
37.0	0.000	0.0	0.0	0.000	0.0	0.000
37.5	0.000	0.0	0.0	0.000	0.0	0.000
38.0	0.000	0.0	0.0	0.000	0.0	0.000
38.5	0.000	0.0	0.0	0.000	0.0	0.000
39.0	0.000	0.0	0.0	0.000	0.0	0.000
39.5	0.000	0.0	0.0	0.000	0.0	0.000
40.0	0.000	0.0	0.0	0.000	0.0	0.000
40.5	0.000	0.0	0.0	0.000	0.0	0.000
41.0	0.000	0.0	0.0	0.000	0.0	0.000
41.5	0.000	0.0	0.0	0.000	0.0	0.000
42.0	0.000	0.0	0.0	0.000	0.0	0.000
42.5	0.000	0.0	0.0	0.000	0.0	0.000
43.0	0.000	0.0	0.0	0.000	0.0	0.000
43.5	0.000	0.0	0.0	0.000	0.0	0.000
44.0	0.000	0.0	0.0	0.000	0.0	0.000
44.5	0.000	0.0	0.0	0.000	0.0	0.000
45.0	0.000	0.0	0.0	0.000	0.0	0.000
45.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
46.0	0.000	0.0	0.0	0.000	0.0	0.000
46.5	0.000	0.0	0.0	0.000	0.0	0.000
47.0	0.000	0.0	0.0	0.000	0.0	0.000
47.5	0.000	0.0	0.0	0.000	0.0	0.000
48.0	0.000	0.0	0.0	0.000	0.0	0.000
48.5	0.000	0.0	0.0	0.000	0.0	0.000
49.0	0.000	0.0	0.0	0.000	0.0	0.000
49.5	0.000	0.0	0.0	0.000	0.0	0.000
50.0	0.000	0.0	0.0	0.000	0.0	0.000
50.5	0.000	0.0	0.0	0.000	0.0	0.000
51.0	0.000	0.0	0.0	0.000	0.0	0.000
51.5	0.000	0.0	0.0	0.000	0.0	0.000
52.0	0.000	0.0	0.0	0.000	0.0	0.000
52.5	0.000	0.0	0.0	0.000	0.0	0.000
53.0	0.000	0.0	0.0	0.000	0.0	0.000
53.5	0.000	0.0	0.0	0.000	0.0	0.000
54.0	0.000	0.0	0.0	0.000	0.0	0.000
54.5	0.000	0.0	0.0	0.000	0.0	0.000
55.0	0.000	0.0	0.0	0.000	0.0	0.000
55.5	0.000	0.0	0.0	0.000	0.0	0.000
56.0	0.000	0.0	0.0	0.000	0.0	0.000
56.5	0.000	0.0	0.0	0.000	0.0	0.000
57.0	0.000	0.0	0.0	0.000	0.0	0.000
57.5	0.000	0.0	0.0	0.000	0.0	0.000
58.0	0.000	0.0	0.0	0.000	0.0	0.000
58.5	0.000	0.0	0.0	0.000	0.0	0.000
59.0	0.000	0.0	0.0	0.000	0.0	0.000
59.5	0.000	0.0	0.0	0.000	0.0	0.000
60.0	0.000	0.0	0.0	0.000	0.0	0.000
60.5	0.000	0.0	0.0	0.000	0.0	0.000
61.0	0.000	0.0	0.0	0.000	0.0	0.000
61.5	0.000	0.0	0.0	0.000	0.0	0.000
62.0	0.000	0.0	0.0	0.000	0.0	0.000
62.5	0.000	0.0	0.0	0.000	0.0	0.000
63.0	0.000	0.0	0.0	0.000	0.0	0.000
63.5	0.000	0.0	0.0	0.000	0.0	0.000
64.0	0.000	0.0	0.0	0.000	0.0	0.000
64.5	0.000	0.0	0.0	0.000	0.0	0.000
65.0	0.000	0.0	0.0	0.000	0.0	0.000
65.5	0.000	0.0	0.0	0.000	0.0	0.000
66.0	0.000	0.0	0.0	0.000	0.0	0.000
66.5	0.000	0.0	0.0	0.000	0.0	0.000
67.0	0.000	0.0	0.0	0.000	0.0	0.000
67.5	0.000	0.0	0.0	0.000	0.0	0.000
68.0	0.000	0.0	0.0	0.000	0.0	0.000
68.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
69.0	0.000	0.0	0.0	0.000	0.0	0.000
69.5	0.000	0.0	0.0	0.000	0.0	0.000
70.0	0.000	0.0	0.0	0.000	0.0	0.000
70.5	0.000	0.0	0.0	0.000	0.0	0.000
71.0	0.000	0.0	0.0	0.000	0.0	0.000
71.5	0.000	0.0	0.0	0.000	0.0	0.000
72.0	0.000	0.0	0.0	0.000	0.0	0.000
72.5	0.000	0.0	0.0	0.000	0.0	0.000
73.0	0.000	0.0	0.0	0.000	0.0	0.000
73.5	0.000	0.0	0.0	0.000	0.0	0.000
74.0	0.000	0.0	0.0	0.000	0.0	0.000
74.5	0.000	0.0	0.0	0.000	0.0	0.000
75.0	0.000	0.0	0.0	0.000	0.0	0.000
75.5	0.000	0.0	0.0	0.000	0.0	0.000
76.0	0.000	0.0	0.0	0.000	0.0	0.000
76.5	0.000	0.0	0.0	0.000	0.0	0.000
77.0	0.000	0.0	0.0	0.000	0.0	0.000
77.5	0.000	0.0	0.0	0.000	0.0	0.000
78.0	0.000	0.0	0.0	0.000	0.0	0.000
78.5	0.000	0.0	0.0	0.000	0.0	0.000
79.0	0.000	0.0	0.0	0.000	0.0	0.000
79.5	0.000	0.0	0.0	0.000	0.0	0.000
80.0	0.000	0.0	0.0	0.000	0.0	0.000
80.5	0.000	0.0	0.0	0.000	0.0	0.000
81.0	0.000	0.0	0.0	0.000	0.0	0.000
81.5	0.000	0.0	0.0	0.000	0.0	0.000
82.0	0.000	0.0	0.0	0.000	0.0	0.000
82.5	0.000	0.0	0.0	0.000	0.0	0.000
83.0	0.000	0.0	0.0	0.000	0.0	0.000
83.5	0.000	0.0	0.0	0.000	0.0	0.000
84.0	0.000	0.0	0.0	0.000	0.0	0.000
84.5	0.000	0.0	0.0	0.000	0.0	0.000
85.0	0.000	0.0	0.0	0.000	0.0	0.000
85.5	0.000	0.0	0.0	0.000	0.0	0.000
86.0	0.000	0.0	0.0	0.000	0.0	0.000
86.5	0.000	0.0	0.0	0.000	0.0	0.000
87.0	0.000	0.0	0.0	0.000	0.0	0.000
87.5	0.000	0.0	0.0	0.000	0.0	0.000
88.0	0.000	0.0	0.0	0.000	0.0	0.000
88.5	0.000	0.0	0.0	0.000	0.0	0.000
89.0	0.000	0.0	0.0	0.000	0.0	0.000
89.5	0.000	0.0	0.0	0.000	0.0	0.000
90.0	0.000	0.0	0.0	0.000	0.0	0.000
90.5	0.000	0.0	0.0	0.000	0.0	0.000
91.0	0.000	0.0	0.0	0.000	0.0	0.000
91.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
92.0	0.000	0.0	0.0	0.000	0.0	0.000
92.5	0.000	0.0	0.0	0.000	0.0	0.000
93.0	0.000	0.0	0.0	0.000	0.0	0.000
93.5	0.000	0.0	0.0	0.000	0.0	0.000
94.0	0.000	0.0	0.0	0.000	0.0	0.000
94.5	0.000	0.0	0.0	0.000	0.0	0.000
95.0	0.000	0.0	0.0	0.000	0.0	0.000
95.5	0.000	0.0	0.0	0.000	0.0	0.000
96.0	0.000	0.0	0.0	0.000	0.0	0.000
96.5	0.000	0.0	0.0	0.000	0.0	0.000
97.0	0.000	0.0	0.0	0.000	0.0	0.000
97.5	0.000	0.0	0.0	0.000	0.0	0.000
98.0	0.000	0.0	0.0	0.000	0.0	0.000
98.5	0.000	0.0	0.0	0.000	0.0	0.000
99.0	0.000	0.0	0.0	0.000	0.0	0.000
99.5	0.000	0.0	0.0	0.000	0.0	0.000
100.0	0.000	0.0	0.0	0.000	0.0	0.000
100.5	0.000	0.0	0.0	0.000	0.0	0.000
101.0	0.000	0.0	0.0	0.000	0.0	0.000
101.5	0.000	0.0	0.0	0.000	0.0	0.000
102.0	0.000	0.0	0.0	0.000	0.0	0.000
102.5	0.000	0.0	0.0	0.000	0.0	0.000
103.0	0.000	0.0	0.0	0.000	0.0	0.000
103.5	0.000	0.0	0.0	0.000	0.0	0.000
104.0	0.000	0.0	0.0	0.000	0.0	0.000
104.5	0.000	0.0	0.0	0.000	0.0	0.000
105.0	0.000	0.0	0.0	0.000	0.0	0.000
105.5	0.000	0.0	0.0	0.000	0.0	0.000
106.0	0.000	0.0	0.0	0.000	0.0	0.000
106.5	0.000	0.0	0.0	0.000	0.0	0.000
107.0	0.000	0.0	0.0	0.000	0.0	0.000
107.5	0.000	0.0	0.0	0.000	0.0	0.000
108.0	0.000	0.0	0.0	0.000	0.0	0.000
108.5	0.000	0.0	0.0	0.000	0.0	0.000
109.0	0.000	0.0	0.0	0.000	0.0	0.000
109.5	0.000	0.0	0.0	0.000	0.0	0.000
110.0	0.000	0.0	0.0	0.000	0.0	0.000
110.5	0.000	0.0	0.0	0.000	0.0	0.000
111.0	0.000	0.0	0.0	0.000	0.0	0.000
111.5	0.000	0.0	0.0	0.000	0.0	0.000
112.0	0.000	0.0	0.0	0.000	0.0	0.000
112.5	0.000	0.0	0.0	0.000	0.0	0.000
113.0	0.000	0.0	0.0	0.000	0.0	0.000
113.5	0.000	0.0	0.0	0.000	0.0	0.000
114.0	0.000	0.0	0.0	0.000	0.0	0.000
114.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
115.0	0.000	0.0	0.0	0.000	0.0	0.000
115.5	0.000	0.0	0.0	0.000	0.0	0.000
116.0	0.000	0.0	0.0	0.000	0.0	0.000
116.5	0.000	0.0	0.0	0.000	0.0	0.000
117.0	0.000	0.0	0.0	0.000	0.0	0.000
117.5	0.000	0.0	0.0	0.000	0.0	0.000
118.0	0.000	0.0	0.0	0.000	0.0	0.000
118.5	0.000	0.0	0.0	0.000	0.0	0.000
119.0	0.000	0.0	0.0	0.000	0.0	0.000
119.5	0.000	0.0	0.0	0.000	0.0	0.000
120.0	0.000	0.0	0.0	0.000	0.0	0.000
120.5	0.000	0.0	0.0	0.000	0.0	0.000
121.0	0.000	0.0	0.0	0.000	0.0	0.000
121.5	0.000	0.0	0.0	0.000	0.0	0.000
122.0	0.000	0.0	0.0	0.000	0.0	0.000
122.5	0.000	0.0	0.0	0.000	0.0	0.000
123.0	0.000	0.0	0.0	0.000	0.0	0.000
123.5	0.000	0.0	0.0	0.000	0.0	0.000
124.0	0.000	0.0	0.0	0.000	0.0	0.000
124.5	0.000	0.0	0.0	0.000	0.0	0.000
125.0	0.000	0.0	0.0	0.000	0.0	0.000
125.5	0.000	0.0	0.0	0.000	0.0	0.000
126.0	0.000	0.0	0.0	0.000	0.0	0.000
126.5	0.000	0.0	0.0	0.000	0.0	0.000
127.0	0.000	0.0	0.0	0.000	0.0	0.000
127.5	0.000	0.0	0.0	0.000	0.0	0.000
128.0	0.000	0.0	0.0	0.000	0.0	0.000
128.5	0.000	0.0	0.0	0.000	0.0	0.000
129.0	0.000	0.0	0.0	0.000	0.0	0.000
129.5	0.000	0.0	0.0	0.000	0.0	0.000
130.0	0.000	0.0	0.0	0.000	0.0	0.000
130.5	0.000	0.0	0.0	0.000	0.0	0.000
131.0	0.000	0.0	0.0	0.000	0.0	0.000
131.5	0.000	0.0	0.0	0.000	0.0	0.000
132.0	0.000	0.0	0.0	0.000	0.0	0.000
132.5	0.000	0.0	0.0	0.000	0.0	0.000
133.0	0.000	0.0	0.0	0.000	0.0	0.000
133.5	0.000	0.0	0.0	0.000	0.0	0.000
134.0	0.000	0.0	0.0	0.000	0.0	0.000
134.5	0.000	0.0	0.0	0.000	0.0	0.000
135.0	0.000	0.0	0.0	0.000	0.0	0.000
135.5	0.000	0.0	0.0	0.000	0.0	0.000
136.0	0.000	0.0	0.0	0.000	0.0	0.000
136.5	0.000	0.0	0.0	0.000	0.0	0.000
137.0	0.000	0.0	0.0	0.000	0.0	0.000
137.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
138.0	0.000	0.0	0.0	0.000	0.0	0.000
138.5	0.000	0.0	0.0	0.000	0.0	0.000
139.0	0.000	0.0	0.0	0.000	0.0	0.000
139.5	0.000	0.0	0.0	0.000	0.0	0.000
140.0	0.000	0.0	0.0	0.000	0.0	0.000
140.5	0.000	0.0	0.0	0.000	0.0	0.000
141.0	0.000	0.0	0.0	0.000	0.0	0.000
141.5	0.000	0.0	0.0	0.000	0.0	0.000
142.0	0.000	0.0	0.0	0.000	0.0	0.000
142.5	0.000	0.0	0.0	0.000	0.0	0.000
143.0	0.000	0.0	0.0	0.000	0.0	0.000
143.5	0.000	0.0	0.0	0.000	0.0	0.000
144.0	0.000	0.0	0.0	0.000	0.0	0.000
144.5	0.000	0.0	0.0	0.000	0.0	0.000
145.0	0.000	0.0	0.0	0.000	0.0	0.000
145.5	0.000	0.0	0.0	0.000	0.0	0.000
146.0	0.000	0.0	0.0	0.000	0.0	0.000
146.5	0.000	0.0	0.0	0.000	0.0	0.000
147.0	0.000	0.0	0.0	0.000	0.0	0.000
147.5	0.000	0.0	0.0	0.000	0.0	0.000
148.0	0.000	0.0	0.0	0.000	0.0	0.000
148.5	0.000	0.0	0.0	0.000	0.0	0.000
149.0	0.000	0.0	0.0	0.000	0.0	0.000
149.5	0.000	0.0	0.0	0.000	0.0	0.000
150.0	0.000	0.0	0.0	0.000	0.0	0.000
150.5	0.000	0.0	0.0	0.000	0.0	0.000
151.0	0.000	0.0	0.0	0.000	0.0	0.000
151.5	0.000	0.0	0.0	0.000	0.0	0.000
152.0	0.000	0.0	0.0	0.000	0.0	0.000
152.5	0.000	0.0	0.0	0.000	0.0	0.000
153.0	0.000	0.0	0.0	0.000	0.0	0.000
153.5	0.000	0.0	0.0	0.000	0.0	0.000
154.0	0.000	0.0	0.0	0.000	0.0	0.000
154.5	0.000	0.0	0.0	0.000	0.0	0.000
155.0	0.000	0.0	0.0	0.000	0.0	0.000
155.5	0.000	0.0	0.0	0.000	0.0	0.000
156.0	0.000	0.0	0.0	0.000	0.0	0.000
156.5	0.000	0.0	0.0	0.000	0.0	0.000
157.0	0.000	0.0	0.0	0.000	0.0	0.000
157.5	0.000	0.0	0.0	0.000	0.0	0.000
158.0	0.000	0.0	0.0	0.000	0.0	0.000
158.5	0.000	0.0	0.0	0.000	0.0	0.000
159.0	0.000	0.0	0.0	0.000	0.0	0.000
159.5	0.000	0.0	0.0	0.000	0.0	0.000
160.0	0.000	0.0	0.0	0.000	0.0	0.000
160.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
161.0	0.000	0.0	0.0	0.000	0.0	0.000
161.5	0.000	0.0	0.0	0.000	0.0	0.000
162.0	0.000	0.0	0.0	0.000	0.0	0.000
162.5	0.000	0.0	0.0	0.000	0.0	0.000
163.0	0.000	0.0	0.0	0.000	0.0	0.000
163.5	0.000	0.0	0.0	0.000	0.0	0.000
164.0	0.000	0.0	0.0	0.000	0.0	0.000
164.5	0.000	0.0	0.0	0.000	0.0	0.000
165.0	0.000	0.0	0.0	0.000	0.0	0.000
165.5	0.000	0.0	0.0	0.000	0.0	0.000
166.0	0.000	0.0	0.0	0.000	0.0	0.000
166.5	0.000	0.0	0.0	0.000	0.0	0.000
167.0	0.000	0.0	0.0	0.000	0.0	0.000
167.5	0.000	0.0	0.0	0.000	0.0	0.000
168.0	0.000	0.0	0.0	0.000	0.0	0.000
168.5	0.000	0.0	0.0	0.000	0.0	0.000
169.0	0.000	0.0	0.0	0.000	0.0	0.000
169.5	0.000	0.0	0.0	0.000	0.0	0.000
170.0	0.000	0.0	0.0	0.000	0.0	0.000
170.5	0.000	0.0	0.0	0.000	0.0	0.000
171.0	0.000	0.0	0.0	0.000	0.0	0.000
171.5	0.000	0.0	0.0	0.000	0.0	0.000
172.0	0.000	0.0	0.0	0.000	0.0	0.000
172.5	0.000	0.0	0.0	0.000	0.0	0.000
173.0	0.000	0.0	0.0	0.000	0.0	0.000
173.5	0.000	0.0	0.0	0.000	0.0	0.000
174.0	0.000	0.0	0.0	0.000	0.0	0.000
174.5	0.000	0.0	0.0	0.000	0.0	0.000
175.0	0.000	0.0	0.0	0.000	0.0	0.000
175.5	0.000	0.0	0.0	0.000	0.0	0.000
176.0	0.000	0.0	0.0	0.000	0.0	0.000
176.5	0.000	121.3	0.0	0.000	0.0	0.000
177.0	0.000	121.3	0.0	0.000	0.0	0.000
177.5	0.000	121.3	0.0	0.000	0.0	0.000
178.0	0.000	121.3	0.0	0.000	0.0	0.000
178.5	0.000	121.3	0.0	0.000	0.0	0.000
179.0	0.000	121.4	0.0	0.000	0.0	0.000
179.5	0.000	121.4	0.0	0.000	0.0	0.000
180.0	0.000	121.4	0.0	0.000	0.0	0.000

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
0.0	0.0	0.000	0.0	0.000	0.000	0.0
0.5	0.0	0.000	0.0	0.000	0.000	0.0
1.0	0.0	0.000	0.0	0.000	0.000	0.0
1.5	0.0	0.000	0.0	0.000	0.000	0.0
2.0	0.0	0.000	0.0	0.000	0.000	0.0
2.5	0.0	0.000	0.0	0.000	0.000	0.0
3.0	0.0	0.000	0.0	0.000	0.000	0.0
3.5	0.0	0.000	0.0	0.000	0.000	0.0
4.0	0.0	0.000	0.0	0.000	0.000	0.0
4.5	0.0	0.000	0.0	0.000	0.000	0.0
5.0	0.0	0.000	0.0	0.000	0.000	0.0
5.5	0.0	0.000	0.0	0.000	0.000	0.0
6.0	0.0	0.000	0.0	0.000	0.000	0.0
6.5	0.0	0.000	0.0	0.000	0.000	0.0
7.0	0.0	0.000	0.0	0.000	0.000	0.0
7.5	0.0	0.000	0.0	0.000	0.000	0.0
8.0	0.0	0.000	0.0	0.000	0.000	0.0
8.5	0.0	0.000	0.0	0.000	0.000	0.0
9.0	0.0	0.000	0.0	0.000	0.000	0.0
9.5	0.0	0.000	0.0	0.000	0.000	0.0
10.0	0.0	0.000	0.0	0.000	0.000	0.0
10.5	0.0	0.000	0.0	0.000	0.000	0.0
11.0	0.0	0.000	0.0	0.000	0.000	0.0
11.5	0.0	0.000	0.0	0.000	0.000	0.0
12.0	0.0	0.000	0.0	0.000	0.000	0.0
12.5	0.0	0.000	0.0	0.000	0.000	0.0
13.0	0.0	0.000	0.0	0.000	0.000	0.0
13.5	0.0	0.000	0.0	0.000	0.000	0.0
14.0	0.0	0.000	0.0	0.000	0.000	0.0
14.5	0.0	0.000	0.0	0.000	0.000	0.0
15.0	0.0	0.000	0.0	0.000	0.000	0.0
15.5	0.0	0.000	0.0	0.000	0.000	0.0
16.0	0.0	0.000	0.0	0.000	0.000	0.0
16.5	0.0	0.000	0.0	0.000	0.000	0.0
17.0	0.0	0.000	0.0	0.000	0.000	0.0
17.5	0.0	0.000	0.0	0.000	0.000	0.0
18.0	0.0	0.000	0.0	0.000	0.000	0.0
18.5	0.0	0.000	0.0	0.000	0.000	0.0
19.0	0.0	0.000	0.0	0.000	0.000	0.0
19.5	0.0	0.000	0.0	0.000	0.000	0.0
20.0	0.0	0.000	0.0	0.000	0.000	0.0
20.5	0.0	0.000	0.0	0.000	0.000	0.0
21.0	0.0	0.000	0.0	0.000	0.000	0.0
21.5	0.0	0.000	0.0	0.000	0.000	0.0
22.0	0.0	0.000	0.0	0.000	0.000	0.0
22.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
23.0	0.0	0.000	0.0	0.000	0.000	0.0
23.5	0.0	0.000	0.0	0.000	0.000	0.0
24.0	0.0	0.000	0.0	0.000	0.000	0.0
24.5	0.0	0.000	0.0	0.000	0.000	0.0
25.0	0.0	0.000	0.0	0.000	0.000	0.0
25.5	0.0	0.000	0.0	0.000	0.000	0.0
26.0	0.0	0.000	0.0	0.000	0.000	0.0
26.5	0.0	0.000	0.0	0.000	0.000	0.0
27.0	0.0	0.000	0.0	0.000	0.000	0.0
27.5	0.0	0.000	0.0	0.000	0.000	0.0
28.0	0.0	0.000	0.0	0.000	0.000	0.0
28.5	0.0	0.000	0.0	0.000	0.000	0.0
29.0	0.0	0.000	0.0	0.000	0.000	0.0
29.5	0.0	0.000	0.0	0.000	0.000	0.0
30.0	0.0	0.000	0.0	0.000	0.000	0.0
30.5	0.0	0.000	0.0	0.000	0.000	0.0
31.0	0.0	0.000	0.0	0.000	0.000	0.0
31.5	0.0	0.000	0.0	0.000	0.000	0.0
32.0	0.0	0.000	0.0	0.000	0.000	0.0
32.5	0.0	0.000	0.0	0.000	0.000	0.0
33.0	0.0	0.000	0.0	0.000	0.000	0.0
33.5	0.0	0.000	0.0	0.000	0.000	0.0
34.0	0.0	0.000	0.0	0.000	0.000	0.0
34.5	0.0	0.000	0.0	0.000	0.000	0.0
35.0	0.0	0.000	0.0	0.000	0.000	0.0
35.5	0.0	0.000	0.0	0.000	0.000	0.0
36.0	0.0	0.000	0.0	0.000	0.000	0.0
36.5	0.0	0.000	0.0	0.000	0.000	0.0
37.0	0.0	0.000	0.0	0.000	0.000	0.0
37.5	0.0	0.000	0.0	0.000	0.000	0.0
38.0	0.0	0.000	0.0	0.000	0.000	0.0
38.5	0.0	0.000	0.0	0.000	0.000	0.0
39.0	0.0	0.000	0.0	0.000	0.000	0.0
39.5	0.0	0.000	0.0	0.000	0.000	0.0
40.0	0.0	0.000	0.0	0.000	0.000	0.0
40.5	0.0	0.000	0.0	0.000	0.000	0.0
41.0	0.0	0.000	0.0	0.000	0.000	0.0
41.5	0.0	0.000	0.0	0.000	0.000	0.0
42.0	0.0	0.000	0.0	0.000	0.000	0.0
42.5	0.0	0.000	0.0	0.000	0.000	0.0
43.0	0.0	0.000	0.0	0.000	0.000	0.0
43.5	0.0	0.000	0.0	0.000	0.000	0.0
44.0	0.0	0.000	0.0	0.000	0.000	0.0
44.5	0.0	0.000	0.0	0.000	0.000	0.0
45.0	0.0	0.000	0.0	0.000	0.000	0.0
45.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
46.0	0.0	0.000	0.0	0.000	0.000	0.0
46.5	0.0	0.000	0.0	0.000	0.000	0.0
47.0	0.0	0.000	0.0	0.000	0.000	0.0
47.5	0.0	0.000	0.0	0.000	0.000	0.0
48.0	0.0	0.000	0.0	0.000	0.000	0.0
48.5	0.0	0.000	0.0	0.000	0.000	0.0
49.0	0.0	0.000	0.0	0.000	0.000	0.0
49.5	0.0	0.000	0.0	0.000	0.000	0.0
50.0	0.0	0.000	0.0	0.000	0.000	0.0
50.5	0.0	0.000	0.0	0.000	0.000	0.0
51.0	0.0	0.000	0.0	0.000	0.000	0.0
51.5	0.0	0.000	0.0	0.000	0.000	0.0
52.0	0.0	0.000	0.0	0.000	0.000	0.0
52.5	0.0	0.000	0.0	0.000	0.000	0.0
53.0	0.0	0.000	0.0	0.000	0.000	0.0
53.5	0.0	0.000	0.0	0.000	0.000	0.0
54.0	0.0	0.000	0.0	0.000	0.000	0.0
54.5	0.0	0.000	0.0	0.000	0.000	0.0
55.0	0.0	0.000	0.0	0.000	0.000	0.0
55.5	0.0	0.000	0.0	0.000	0.000	0.0
56.0	0.0	0.000	0.0	0.000	0.000	0.0
56.5	0.0	0.000	0.0	0.000	0.000	0.0
57.0	0.0	0.000	0.0	0.000	0.000	0.0
57.5	0.0	0.000	0.0	0.000	0.000	0.0
58.0	0.0	0.000	0.0	0.000	0.000	0.0
58.5	0.0	0.000	0.0	0.000	0.000	0.0
59.0	0.0	0.000	0.0	0.000	0.000	0.0
59.5	0.0	0.000	0.0	0.000	0.000	0.0
60.0	0.0	0.000	0.0	0.000	0.000	0.0
60.5	0.0	0.000	0.0	0.000	0.000	0.0
61.0	0.0	0.000	0.0	0.000	0.000	0.0
61.5	0.0	0.000	0.0	0.000	0.000	0.0
62.0	0.0	0.000	0.0	0.000	0.000	0.0
62.5	0.0	0.000	0.0	0.000	0.000	0.0
63.0	0.0	0.000	0.0	0.000	0.000	0.0
63.5	0.0	0.000	0.0	0.000	0.000	0.0
64.0	0.0	0.000	0.0	0.000	0.000	0.0
64.5	0.0	0.000	0.0	0.000	0.000	0.0
65.0	0.0	0.000	0.0	0.000	0.000	0.0
65.5	0.0	0.000	0.0	0.000	0.000	0.0
66.0	0.0	0.000	0.0	0.000	0.000	0.0
66.5	0.0	0.000	0.0	0.000	0.000	0.0
67.0	0.0	0.000	0.0	0.000	0.000	0.0
67.5	0.0	0.000	0.0	0.000	0.000	0.0
68.0	0.0	0.000	0.0	0.000	0.000	0.0
68.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
69.0	0.0	0.000	0.0	0.000	0.000	0.0
69.5	0.0	0.000	0.0	0.000	0.000	0.0
70.0	0.0	0.000	0.0	0.000	0.000	0.0
70.5	0.0	0.000	0.0	0.000	0.000	0.0
71.0	0.0	0.000	0.0	0.000	0.000	0.0
71.5	0.0	0.000	0.0	0.000	0.000	0.0
72.0	0.0	0.000	0.0	0.000	0.000	0.0
72.5	0.0	0.000	0.0	0.000	0.000	0.0
73.0	0.0	0.000	0.0	0.000	0.000	0.0
73.5	0.0	0.000	0.0	0.000	0.000	0.0
74.0	0.0	0.000	0.0	0.000	0.000	0.0
74.5	0.0	0.000	0.0	0.000	0.000	0.0
75.0	0.0	0.000	0.0	0.000	0.000	0.0
75.5	0.0	0.000	0.0	0.000	0.000	0.0
76.0	0.0	0.000	0.0	0.000	0.000	0.0
76.5	0.0	0.000	0.0	0.000	0.000	0.0
77.0	0.0	0.000	0.0	0.000	0.000	0.0
77.5	0.0	0.000	0.0	0.000	0.000	0.0
78.0	0.0	0.000	0.0	0.000	0.000	0.0
78.5	0.0	0.000	0.0	0.000	0.000	0.0
79.0	0.0	0.000	0.0	0.000	0.000	0.0
79.5	0.0	0.000	0.0	0.000	0.000	0.0
80.0	0.0	0.000	0.0	0.000	0.000	0.0
80.5	0.0	0.000	0.0	0.000	0.000	0.0
81.0	0.0	0.000	0.0	0.000	0.000	0.0
81.5	0.0	0.000	0.0	0.000	0.000	0.0
82.0	0.0	0.000	0.0	0.000	0.000	0.0
82.5	0.0	0.000	0.0	0.000	0.000	0.0
83.0	0.0	0.000	0.0	0.000	0.000	0.0
83.5	0.0	0.000	0.0	0.000	0.000	0.0
84.0	0.0	0.000	0.0	0.000	0.000	0.0
84.5	0.0	0.000	0.0	0.000	0.000	0.0
85.0	0.0	0.000	0.0	0.000	0.000	0.0
85.5	0.0	0.000	0.0	0.000	0.000	0.0
86.0	0.0	0.000	0.0	0.000	0.000	0.0
86.5	0.0	0.000	0.0	0.000	0.000	0.0
87.0	0.0	0.000	0.0	0.000	0.000	0.0
87.5	0.0	0.000	0.0	0.000	0.000	0.0
88.0	0.0	0.000	0.0	0.000	0.000	0.0
88.5	0.0	0.000	0.0	0.000	0.000	0.0
89.0	0.0	0.000	0.0	0.000	0.000	0.0
89.5	0.0	0.000	0.0	0.000	0.000	0.0
90.0	0.0	0.000	0.0	0.000	0.000	0.0
90.5	0.0	0.000	0.0	0.000	0.000	0.0
91.0	0.0	0.000	0.0	0.000	0.000	0.0
91.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
92.0	0.0	0.000	0.0	0.000	0.000	0.0
92.5	0.0	0.000	0.0	0.000	0.000	0.0
93.0	0.0	0.000	0.0	0.000	0.000	0.0
93.5	0.0	0.000	0.0	0.000	0.000	0.0
94.0	0.0	0.000	0.0	0.000	0.000	0.0
94.5	0.0	0.000	0.0	0.000	0.000	0.0
95.0	0.0	0.000	0.0	0.000	0.000	0.0
95.5	0.0	0.000	0.0	0.000	0.000	0.0
96.0	0.0	0.000	0.0	0.000	0.000	0.0
96.5	0.0	0.000	0.0	0.000	0.000	0.0
97.0	0.0	0.000	0.0	0.000	0.000	0.0
97.5	0.0	0.000	0.0	0.000	0.000	0.0
98.0	0.0	0.000	0.0	0.000	0.000	0.0
98.5	0.0	0.000	0.0	0.000	0.000	0.0
99.0	0.0	0.000	0.0	0.000	0.000	0.0
99.5	0.0	0.000	0.0	0.000	0.000	0.0
100.0	0.0	0.000	0.0	0.000	0.000	0.0
100.5	0.0	0.000	0.0	0.000	0.000	0.0
101.0	0.0	0.000	0.0	0.000	0.000	0.0
101.5	0.0	0.000	0.0	0.000	0.000	0.0
102.0	0.0	0.000	0.0	0.000	0.000	0.0
102.5	0.0	0.000	0.0	0.000	0.000	0.0
103.0	0.0	0.000	0.0	0.000	0.000	0.0
103.5	0.0	0.000	0.0	0.000	0.000	0.0
104.0	0.0	0.000	0.0	0.000	0.000	0.0
104.5	0.0	0.000	0.0	0.000	0.000	0.0
105.0	0.0	0.000	0.0	0.000	0.000	0.0
105.5	0.0	0.000	0.0	0.000	0.000	0.0
106.0	0.0	0.000	0.0	0.000	0.000	0.0
106.5	0.0	0.000	0.0	0.000	0.000	0.0
107.0	0.0	0.000	0.0	0.000	0.000	0.0
107.5	0.0	0.000	0.0	0.000	0.000	0.0
108.0	0.0	0.000	0.0	0.000	0.000	0.0
108.5	0.0	0.000	0.0	0.000	0.000	0.0
109.0	0.0	0.000	0.0	0.000	0.000	0.0
109.5	0.0	0.000	0.0	0.000	0.000	0.0
110.0	0.0	0.000	0.0	0.000	0.000	0.0
110.5	0.0	0.000	0.0	0.000	0.000	0.0
111.0	0.0	0.000	0.0	0.000	0.000	0.0
111.5	0.0	0.000	0.0	0.000	0.000	0.0
112.0	0.0	0.000	0.0	0.000	0.000	0.0
112.5	0.0	0.000	0.0	0.000	0.000	0.0
113.0	0.0	0.000	0.0	0.000	0.000	0.0
113.5	0.0	0.000	0.0	0.000	0.000	0.0
114.0	0.0	0.000	0.0	0.000	0.000	0.0
114.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
115.0	0.0	0.000	0.0	0.000	0.000	0.0
115.5	0.0	0.000	0.0	0.000	0.000	0.0
116.0	0.0	0.000	0.0	0.000	0.000	0.0
116.5	0.0	0.000	0.0	0.000	0.000	0.0
117.0	0.0	0.000	0.0	0.000	0.000	0.0
117.5	0.0	0.000	0.0	0.000	0.000	0.0
118.0	0.0	0.000	0.0	0.000	0.000	0.0
118.5	0.0	0.000	0.0	0.000	0.000	0.0
119.0	0.0	0.000	0.0	0.000	0.000	0.0
119.5	0.0	0.000	0.0	0.000	0.000	0.0
120.0	0.0	0.000	0.0	0.000	0.000	0.0
120.5	0.0	0.000	0.0	0.000	0.000	0.0
121.0	0.0	0.000	0.0	0.000	0.000	0.0
121.5	0.0	0.000	0.0	0.000	0.000	0.0
122.0	0.0	0.000	0.0	0.000	0.000	0.0
122.5	0.0	0.000	0.0	0.000	0.000	0.0
123.0	0.0	0.000	0.0	0.000	0.000	0.0
123.5	0.0	0.000	0.0	0.000	0.000	0.0
124.0	0.0	0.000	0.0	0.000	0.000	0.0
124.5	0.0	0.000	0.0	0.000	0.000	0.0
125.0	0.0	0.000	0.0	0.000	0.000	0.0
125.5	0.0	0.000	0.0	0.000	0.000	0.0
126.0	0.0	0.000	0.0	0.000	0.000	0.0
126.5	0.0	0.000	0.0	0.000	0.000	0.0
127.0	0.0	0.000	0.0	0.000	0.000	0.0
127.5	0.0	0.000	0.0	0.000	0.000	0.0
128.0	0.0	0.000	0.0	0.000	0.000	0.0
128.5	0.0	0.000	0.0	0.000	0.000	0.0
129.0	0.0	0.000	0.0	0.000	0.000	0.0
129.5	0.0	0.000	0.0	0.000	0.000	0.0
130.0	0.0	0.000	0.0	0.000	0.000	0.0
130.5	0.0	0.000	0.0	0.000	0.000	0.0
131.0	0.0	0.000	0.0	0.000	0.000	0.0
131.5	0.0	0.000	0.0	0.000	0.000	0.0
132.0	0.0	0.000	0.0	0.000	0.000	0.0
132.5	0.0	0.000	0.0	0.000	0.000	0.0
133.0	0.0	0.000	0.0	0.000	0.000	0.0
133.5	0.0	0.000	0.0	0.000	0.000	0.0
134.0	0.0	0.000	0.0	0.000	0.000	0.0
134.5	0.0	0.000	0.0	0.000	0.000	0.0
135.0	0.0	0.000	0.0	0.000	0.000	0.0
135.5	0.0	0.000	0.0	0.000	0.000	0.0
136.0	0.0	0.000	0.0	0.000	0.000	0.0
136.5	0.0	0.000	0.0	0.000	0.000	0.0
137.0	0.0	0.000	0.0	0.000	0.000	0.0
137.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
138.0	0.0	0.000	0.0	0.000	0.000	0.0
138.5	0.0	0.000	0.0	0.000	0.000	0.0
139.0	0.0	0.000	0.0	0.000	0.000	0.0
139.5	0.0	0.000	0.0	0.000	0.000	0.0
140.0	0.0	0.000	0.0	0.000	0.000	0.0
140.5	0.0	0.000	0.0	0.000	0.000	0.0
141.0	0.0	0.000	0.0	0.000	0.000	0.0
141.5	0.0	0.000	0.0	0.000	0.000	0.0
142.0	0.0	0.000	0.0	0.000	0.000	0.0
142.5	0.0	0.000	0.0	0.000	0.000	0.0
143.0	0.0	0.000	0.0	0.000	0.000	0.0
143.5	0.0	0.000	0.0	0.000	0.000	0.0
144.0	0.0	0.000	0.0	0.000	0.000	0.0
144.5	0.0	0.000	0.0	0.000	0.000	0.0
145.0	0.0	0.000	0.0	0.000	0.000	0.0
145.5	0.0	0.000	0.0	0.000	0.000	0.0
146.0	0.0	0.000	0.0	0.000	0.000	0.0
146.5	0.0	0.000	0.0	0.000	0.000	0.0
147.0	0.0	0.000	0.0	0.000	0.000	0.0
147.5	0.0	0.000	0.0	0.000	0.000	0.0
148.0	0.0	0.000	0.0	0.000	0.000	0.0
148.5	0.0	0.000	0.0	0.000	0.000	0.0
149.0	0.0	0.000	0.0	0.000	0.000	0.0
149.5	0.0	0.000	0.0	0.000	0.000	0.0
150.0	0.0	0.000	0.0	0.000	0.000	0.0
150.5	0.0	0.000	0.0	0.000	0.000	0.0
151.0	0.0	0.000	0.0	0.000	0.000	0.0
151.5	0.0	0.000	0.0	0.000	0.000	0.0
152.0	0.0	0.000	0.0	0.000	0.000	0.0
152.5	0.0	0.000	0.0	0.000	0.000	0.0
153.0	0.0	0.000	0.0	0.000	0.000	0.0
153.5	0.0	0.000	0.0	0.000	0.000	0.0
154.0	0.0	0.000	0.0	0.000	0.000	0.0
154.5	0.0	0.000	0.0	0.000	0.000	0.0
155.0	0.0	0.000	0.0	0.000	0.000	0.0
155.5	0.0	0.000	0.0	0.000	0.000	0.0
156.0	0.0	0.000	0.0	0.000	0.000	0.0
156.5	0.0	0.000	0.0	0.000	0.000	0.0
157.0	0.0	0.000	0.0	0.000	0.000	0.0
157.5	0.0	0.000	0.0	0.000	0.000	0.0
158.0	0.0	0.000	0.0	0.000	0.000	0.0
158.5	0.0	0.000	0.0	0.000	0.000	0.0
159.0	0.0	0.000	0.0	0.000	0.000	0.0
159.5	0.0	0.000	0.0	0.000	0.000	0.0
160.0	0.0	0.000	0.0	0.000	0.000	0.0
160.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
161.0	0.0	0.000	0.0	0.000	0.000	0.0
161.5	0.0	0.000	0.0	0.000	0.000	0.0
162.0	0.0	0.000	0.0	0.000	0.000	0.0
162.5	0.0	0.000	0.0	0.000	0.000	0.0
163.0	0.0	0.000	0.0	0.000	0.000	0.0
163.5	0.0	0.000	0.0	0.000	0.000	0.0
164.0	0.0	0.000	0.0	0.000	0.000	0.0
164.5	0.0	0.000	0.0	0.000	0.000	0.0
165.0	0.0	0.000	0.0	0.000	0.000	0.0
165.5	0.0	0.000	0.0	0.000	0.000	0.0
166.0	0.0	0.000	0.0	0.000	0.000	0.0
166.5	0.0	0.000	0.0	0.000	0.000	0.0
167.0	0.0	0.000	0.0	0.000	0.000	0.0
167.5	0.0	0.000	0.0	0.000	0.000	0.0
168.0	0.0	0.000	0.0	0.000	0.000	0.0
168.5	0.0	0.000	0.0	0.000	0.000	0.0
169.0	0.0	0.000	0.0	0.000	0.000	0.0
169.5	0.0	0.000	0.0	0.000	0.000	0.0
170.0	0.0	0.000	0.0	0.000	0.000	0.0
170.5	0.0	0.000	0.0	0.000	0.000	0.0
171.0	0.0	0.000	0.0	0.000	0.000	0.0
171.5	0.0	0.000	0.0	0.000	0.000	0.0
172.0	0.0	0.000	0.0	0.000	0.000	0.0
172.5	0.0	0.000	0.0	0.000	0.000	0.0
173.0	0.0	0.000	0.0	0.000	0.000	0.0
173.5	0.0	0.000	0.0	0.000	0.000	0.0
174.0	0.0	0.000	0.0	0.000	0.000	0.0
174.5	0.0	0.000	0.0	0.000	0.000	0.0
175.0	0.0	0.000	0.0	0.000	0.000	0.0
175.5	0.0	0.000	0.0	0.000	0.000	0.0
176.0	0.0	0.000	0.0	0.000	0.000	0.0
176.5	0.0	0.000	0.0	0.000	0.000	0.0
177.0	0.0	0.000	0.0	0.000	0.000	0.0
177.5	0.0	0.000	0.0	0.000	0.000	0.0
178.0	0.0	0.000	0.0	0.000	0.000	0.0
178.5	0.0	0.000	0.0	0.000	0.000	0.0
179.0	0.0	0.000	0.0	0.000	0.000	0.0
179.5	0.0	0.000	0.0	0.000	0.001	0.0
180.0	0.0	0.000	0.0	0.000	0.001	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
0.0	0.000	122.7	0.0	0.000	0.0	0.000
0.5	0.000	122.7	0.0	0.000	0.0	0.000
1.0	0.000	122.7	0.0	0.000	0.0	0.000
1.5	0.000	122.7	0.0	0.000	0.0	0.000
2.0	0.000	122.6	0.0	0.000	0.0	0.000
2.5	0.000	122.7	0.0	0.000	0.0	0.000
3.0	0.000	122.8	0.0	0.000	0.0	0.000
3.5	0.000	122.6	0.0	0.000	0.0	0.000
4.0	0.000	122.7	0.0	0.000	0.0	0.000
4.5	0.000	122.7	0.0	0.000	0.0	0.000
5.0	0.000	122.8	0.0	0.000	0.0	0.000
5.5	0.000	122.7	0.0	0.000	0.0	0.000
6.0	0.000	122.7	0.0	0.000	0.0	0.000
6.5	0.000	122.6	0.0	0.000	0.0	0.000
7.0	0.000	122.7	0.0	0.000	0.0	0.000
7.5	0.000	122.5	0.0	0.000	0.0	0.000
8.0	0.000	122.5	0.0	0.000	0.0	0.000
8.5	0.000	122.6	0.0	0.000	0.0	0.000
9.0	0.000	122.5	0.0	0.000	0.0	0.000
9.5	0.000	122.6	0.0	0.000	0.0	0.000
10.0	0.000	122.6	0.0	0.000	0.0	0.000
10.5	0.000	122.6	0.0	0.000	0.0	0.000
11.0	0.000	122.5	0.0	0.000	0.0	0.000
11.5	0.000	122.5	0.0	0.000	0.0	0.000
12.0	0.000	122.6	0.0	0.000	0.0	0.000
12.5	0.000	122.4	0.0	0.000	0.0	0.000
13.0	0.000	122.5	0.0	0.000	0.0	0.000
13.5	0.000	122.5	0.0	0.000	0.0	0.000
14.0	0.000	122.5	0.0	0.000	0.0	0.000
14.5	0.000	122.6	0.0	0.000	0.0	0.000
15.0	0.000	122.5	0.0	0.000	0.0	0.000
15.5	0.000	122.5	0.0	0.000	0.0	0.000
16.0	0.000	122.6	0.0	0.000	0.0	0.000
16.5	0.000	122.5	0.0	0.000	0.0	0.000
17.0	0.000	122.6	0.0	0.000	0.0	0.000
17.5	0.000	122.6	0.0	0.000	0.0	0.000
18.0	0.000	122.6	0.0	0.000	0.0	0.000
18.5	0.000	122.5	0.0	0.000	0.0	0.000
19.0	0.000	122.4	0.0	0.000	0.0	0.000
19.5	0.000	122.4	0.0	0.000	0.0	0.000
20.0	0.000	122.4	0.0	0.000	0.0	0.000
20.5	0.000	122.4	0.0	0.000	0.0	0.000
21.0	0.000	0.0	0.0	0.000	0.0	0.000
21.5	0.000	0.0	0.0	0.000	0.0	0.000
22.0	0.000	0.0	0.0	0.000	0.0	0.000
22.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
23.0	0.000	0.0	0.0	0.000	0.0	0.000
23.5	0.000	0.0	0.0	0.000	0.0	0.000
24.0	0.000	0.0	0.0	0.000	0.0	0.000
24.5	0.000	0.0	0.0	0.000	0.0	0.000
25.0	0.000	0.0	0.0	0.000	0.0	0.000
25.5	0.000	0.0	0.0	0.000	0.0	0.000
26.0	0.000	0.0	0.0	0.000	0.0	0.000
26.5	0.000	0.0	0.0	0.000	0.0	0.000
27.0	0.000	0.0	0.0	0.000	0.0	0.000
27.5	0.000	0.0	0.0	0.000	0.0	0.000
28.0	0.000	0.0	0.0	0.000	0.0	0.000
28.5	0.000	0.0	0.0	0.000	0.0	0.000
29.0	0.000	0.0	0.0	0.000	0.0	0.000
29.5	0.000	0.0	0.0	0.000	0.0	0.000
30.0	0.000	0.0	0.0	0.000	0.0	0.000
30.5	0.000	0.0	0.0	0.000	0.0	0.000
31.0	0.000	0.0	0.0	0.000	0.0	0.000
31.5	0.000	0.0	0.0	0.000	0.0	0.000
32.0	0.000	0.0	0.0	0.000	0.0	0.000
32.5	0.000	0.0	0.0	0.000	0.0	0.000
33.0	0.000	0.0	0.0	0.000	0.0	0.000
33.5	0.000	0.0	0.0	0.000	0.0	0.000
34.0	0.000	0.0	0.0	0.000	0.0	0.000
34.5	0.000	0.0	0.0	0.000	0.0	0.000
35.0	0.000	0.0	0.0	0.000	0.0	0.000
35.5	0.000	0.0	0.0	0.000	0.0	0.000
36.0	0.000	0.0	0.0	0.000	0.0	0.000
36.5	0.000	0.0	0.0	0.000	0.0	0.000
37.0	0.000	0.0	0.0	0.000	0.0	0.000
37.5	0.000	0.0	0.0	0.000	0.0	0.000
38.0	0.000	0.0	0.0	0.000	0.0	0.000
38.5	0.000	0.0	0.0	0.000	0.0	0.000
39.0	0.000	0.0	0.0	0.000	0.0	0.000
39.5	0.000	0.0	0.0	0.000	0.0	0.000
40.0	0.000	0.0	0.0	0.000	0.0	0.000
40.5	0.000	0.0	0.0	0.000	0.0	0.000
41.0	0.000	0.0	0.0	0.000	0.0	0.000
41.5	0.000	0.0	0.0	0.000	0.0	0.000
42.0	0.000	0.0	0.0	0.000	0.0	0.000
42.5	0.000	0.0	0.0	0.000	0.0	0.000
43.0	0.000	0.0	0.0	0.000	0.0	0.000
43.5	0.000	0.0	0.0	0.000	0.0	0.000
44.0	0.000	0.0	0.0	0.000	0.0	0.000
44.5	0.000	0.0	0.0	0.000	0.0	0.000
45.0	0.000	0.0	0.0	0.000	0.0	0.000
45.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
46.0	0.000	0.0	0.0	0.000	0.0	0.000
46.5	0.000	0.0	0.0	0.000	0.0	0.000
47.0	0.000	0.0	0.0	0.000	0.0	0.000
47.5	0.000	0.0	0.0	0.000	0.0	0.000
48.0	0.000	0.0	0.0	0.000	0.0	0.000
48.5	0.000	0.0	0.0	0.000	0.0	0.000
49.0	0.000	0.0	0.0	0.000	0.0	0.000
49.5	0.000	0.0	0.0	0.000	0.0	0.000
50.0	0.000	0.0	0.0	0.000	0.0	0.000
50.5	0.000	0.0	0.0	0.000	0.0	0.000
51.0	0.000	0.0	0.0	0.000	0.0	0.000
51.5	0.000	0.0	0.0	0.000	0.0	0.000
52.0	0.000	0.0	0.0	0.000	0.0	0.000
52.5	0.000	0.0	0.0	0.000	0.0	0.000
53.0	0.000	0.0	0.0	0.000	0.0	0.000
53.5	0.000	0.0	0.0	0.000	0.0	0.000
54.0	0.000	0.0	0.0	0.000	0.0	0.000
54.5	0.000	0.0	0.0	0.000	0.0	0.000
55.0	0.000	0.0	0.0	0.000	0.0	0.000
55.5	0.000	0.0	0.0	0.000	0.0	0.000
56.0	0.000	0.0	0.0	0.000	0.0	0.000
56.5	0.000	0.0	0.0	0.000	0.0	0.000
57.0	0.000	0.0	0.0	0.000	0.0	0.000
57.5	0.000	0.0	0.0	0.000	0.0	0.000
58.0	0.000	0.0	0.0	0.000	0.0	0.000
58.5	0.000	0.0	0.0	0.000	0.0	0.000
59.0	0.000	0.0	0.0	0.000	0.0	0.000
59.5	0.000	0.0	0.0	0.000	0.0	0.000
60.0	0.000	0.0	0.0	0.000	0.0	0.000
60.5	0.000	0.0	0.0	0.000	0.0	0.000
61.0	0.000	0.0	0.0	0.000	0.0	0.000
61.5	0.000	0.0	0.0	0.000	0.0	0.000
62.0	0.000	0.0	0.0	0.000	0.0	0.000
62.5	0.000	0.0	0.0	0.000	0.0	0.000
63.0	0.000	0.0	0.0	0.000	0.0	0.000
63.5	0.000	0.0	0.0	0.000	0.0	0.000
64.0	0.000	0.0	0.0	0.000	0.0	0.000
64.5	0.000	0.0	0.0	0.000	0.0	0.000
65.0	0.000	0.0	0.0	0.000	0.0	0.000
65.5	0.000	0.0	0.0	0.000	0.0	0.000
66.0	0.000	0.0	0.0	0.000	0.0	0.000
66.5	0.000	0.0	0.0	0.000	0.0	0.000
67.0	0.000	0.0	0.0	0.000	0.0	0.000
67.5	0.000	0.0	0.0	0.000	0.0	0.000
68.0	0.000	0.0	0.0	0.000	0.0	0.000
68.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
69.0	0.000	0.0	0.0	0.000	0.0	0.000
69.5	0.000	0.0	0.0	0.000	0.0	0.000
70.0	0.000	0.0	0.0	0.000	0.0	0.000
70.5	0.000	0.0	0.0	0.000	0.0	0.000
71.0	0.000	0.0	0.0	0.000	0.0	0.000
71.5	0.000	0.0	0.0	0.000	0.0	0.000
72.0	0.000	0.0	0.0	0.000	0.0	0.000
72.5	0.000	0.0	0.0	0.000	0.0	0.000
73.0	0.000	0.0	0.0	0.000	0.0	0.000
73.5	0.000	0.0	0.0	0.000	0.0	0.000
74.0	0.000	0.0	0.0	0.000	0.0	0.000
74.5	0.000	0.0	0.0	0.000	0.0	0.000
75.0	0.000	0.0	0.0	0.000	0.0	0.000
75.5	0.000	0.0	0.0	0.000	0.0	0.000
76.0	0.000	0.0	0.0	0.000	0.0	0.000
76.5	0.000	0.0	0.0	0.000	0.0	0.000
77.0	0.000	0.0	0.0	0.000	0.0	0.000
77.5	0.000	0.0	0.0	0.000	0.0	0.000
78.0	0.000	0.0	0.0	0.000	0.0	0.000
78.5	0.000	0.0	0.0	0.000	0.0	0.000
79.0	0.000	0.0	0.0	0.000	0.0	0.000
79.5	0.000	0.0	0.0	0.000	0.0	0.000
80.0	0.000	0.0	0.0	0.000	0.0	0.000
80.5	0.000	0.0	0.0	0.000	0.0	0.000
81.0	0.000	0.0	0.0	0.000	0.0	0.000
81.5	0.000	0.0	0.0	0.000	0.0	0.000
82.0	0.000	0.0	0.0	0.000	0.0	0.000
82.5	0.000	0.0	0.0	0.000	0.0	0.000
83.0	0.000	0.0	0.0	0.000	0.0	0.000
83.5	0.000	0.0	0.0	0.000	0.0	0.000
84.0	0.000	0.0	0.0	0.000	0.0	0.000
84.5	0.000	0.0	0.0	0.000	0.0	0.000
85.0	0.000	0.0	0.0	0.000	0.0	0.000
85.5	0.000	0.0	0.0	0.000	0.0	0.000
86.0	0.000	0.0	0.0	0.000	0.0	0.000
86.5	0.000	0.0	0.0	0.000	0.0	0.000
87.0	0.000	0.0	0.0	0.000	0.0	0.000
87.5	0.000	0.0	0.0	0.000	0.0	0.000
88.0	0.000	0.0	0.0	0.000	0.0	0.000
88.5	0.000	0.0	0.0	0.000	0.0	0.000
89.0	0.000	0.0	0.0	0.000	0.0	0.000
89.5	0.000	0.0	0.0	0.000	0.0	0.000
90.0	0.000	0.0	0.0	0.000	0.0	0.000
90.5	0.000	0.0	0.0	0.000	0.0	0.000
91.0	0.000	0.0	0.0	0.000	0.0	0.000
91.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
92.0	0.000	0.0	0.0	0.000	0.0	0.000
92.5	0.000	0.0	0.0	0.000	0.0	0.000
93.0	0.000	0.0	0.0	0.000	0.0	0.000
93.5	0.000	0.0	0.0	0.000	0.0	0.000
94.0	0.000	0.0	0.0	0.000	0.0	0.000
94.5	0.000	0.0	0.0	0.000	0.0	0.000
95.0	0.000	0.0	0.0	0.000	0.0	0.000
95.5	0.000	0.0	0.0	0.000	0.0	0.000
96.0	0.000	0.0	0.0	0.000	0.0	0.000
96.5	0.000	0.0	0.0	0.000	0.0	0.000
97.0	0.000	0.0	0.0	0.000	0.0	0.000
97.5	0.000	0.0	0.0	0.000	0.0	0.000
98.0	0.000	0.0	0.0	0.000	0.0	0.000
98.5	0.000	0.0	0.0	0.000	0.0	0.000
99.0	0.000	0.0	0.0	0.000	0.0	0.000
99.5	0.000	0.0	0.0	0.000	0.0	0.000
100.0	0.000	0.0	0.0	0.000	0.0	0.000
100.5	0.000	0.0	0.0	0.000	0.0	0.000
101.0	0.000	0.0	0.0	0.000	0.0	0.000
101.5	0.000	0.0	0.0	0.000	0.0	0.000
102.0	0.000	0.0	0.0	0.000	0.0	0.000
102.5	0.000	0.0	0.0	0.000	0.0	0.000
103.0	0.000	0.0	0.0	0.000	0.0	0.000
103.5	0.000	0.0	0.0	0.000	0.0	0.000
104.0	0.000	0.0	0.0	0.000	0.0	0.000
104.5	0.000	0.0	0.0	0.000	0.0	0.000
105.0	0.000	0.0	0.0	0.000	0.0	0.000
105.5	0.000	0.0	0.0	0.000	0.0	0.000
106.0	0.000	0.0	0.0	0.000	0.0	0.000
106.5	0.000	0.0	0.0	0.000	0.0	0.000
107.0	0.000	0.0	0.0	0.000	0.0	0.000
107.5	0.000	0.0	0.0	0.000	0.0	0.000
108.0	0.000	0.0	0.0	0.000	0.0	0.000
108.5	0.000	0.0	0.0	0.000	0.0	0.000
109.0	0.000	0.0	0.0	0.000	0.0	0.000
109.5	0.000	0.0	0.0	0.000	0.0	0.000
110.0	0.000	0.0	0.0	0.000	0.0	0.000
110.5	0.000	0.0	0.0	0.000	0.0	0.000
111.0	0.000	0.0	0.0	0.000	0.0	0.000
111.5	0.000	0.0	0.0	0.000	0.0	0.000
112.0	0.000	0.0	0.0	0.000	0.0	0.000
112.5	0.000	0.0	0.0	0.000	0.0	0.000
113.0	0.000	0.0	0.0	0.000	0.0	0.000
113.5	0.000	0.0	0.0	0.000	0.0	0.000
114.0	0.000	0.0	0.0	0.000	0.0	0.000
114.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
115.0	0.000	0.0	0.0	0.000	0.0	0.000
115.5	0.000	0.0	0.0	0.000	0.0	0.000
116.0	0.000	0.0	0.0	0.000	0.0	0.000
116.5	0.000	0.0	0.0	0.000	0.0	0.000
117.0	0.000	0.0	0.0	0.000	0.0	0.000
117.5	0.000	0.0	0.0	0.000	0.0	0.000
118.0	0.000	0.0	0.0	0.000	0.0	0.000
118.5	0.000	0.0	0.0	0.000	0.0	0.000
119.0	0.000	0.0	0.0	0.000	0.0	0.000
119.5	0.000	0.0	0.0	0.000	0.0	0.000
120.0	0.000	0.0	0.0	0.000	0.0	0.000
120.5	0.000	0.0	0.0	0.000	0.0	0.000
121.0	0.000	0.0	0.0	0.000	0.0	0.000
121.5	0.000	0.0	0.0	0.000	0.0	0.000
122.0	0.000	0.0	0.0	0.000	0.0	0.000
122.5	0.000	0.0	0.0	0.000	0.0	0.000
123.0	0.000	0.0	0.0	0.000	0.0	0.000
123.5	0.000	0.0	0.0	0.000	0.0	0.000
124.0	0.000	0.0	0.0	0.000	0.0	0.000
124.5	0.000	0.0	0.0	0.000	0.0	0.000
125.0	0.000	0.0	0.0	0.000	0.0	0.000
125.5	0.000	0.0	0.0	0.000	0.0	0.000
126.0	0.000	0.0	0.0	0.000	0.0	0.000
126.5	0.000	0.0	0.0	0.000	0.0	0.000
127.0	0.000	0.0	0.0	0.000	0.0	0.000
127.5	0.000	0.0	0.0	0.000	0.0	0.000
128.0	0.000	0.0	0.0	0.000	0.0	0.000
128.5	0.000	0.0	0.0	0.000	0.0	0.000
129.0	0.000	0.0	0.0	0.000	0.0	0.000
129.5	0.000	0.0	0.0	0.000	0.0	0.000
130.0	0.000	0.0	0.0	0.000	0.0	0.000
130.5	0.000	0.0	0.0	0.000	0.0	0.000
131.0	0.000	0.0	0.0	0.000	0.0	0.000
131.5	0.000	0.0	0.0	0.000	0.0	0.000
132.0	0.000	0.0	0.0	0.000	0.0	0.000
132.5	0.000	0.0	0.0	0.000	0.0	0.000
133.0	0.000	0.0	0.0	0.000	0.0	0.000
133.5	0.000	0.0	0.0	0.000	0.0	0.000
134.0	0.000	0.0	0.0	0.000	0.0	0.000
134.5	0.000	0.0	0.0	0.000	0.0	0.000
135.0	0.000	0.0	0.0	0.000	0.0	0.000
135.5	0.000	0.0	0.0	0.000	0.0	0.000
136.0	0.000	0.0	0.0	0.000	0.0	0.000
136.5	0.000	0.0	0.0	0.000	0.0	0.000
137.0	0.000	0.0	0.0	0.000	0.0	0.000
137.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
138.0	0.000	0.0	0.0	0.000	0.0	0.000
138.5	0.000	0.0	0.0	0.000	0.0	0.000
139.0	0.000	0.0	0.0	0.000	0.0	0.000
139.5	0.000	0.0	0.0	0.000	0.0	0.000
140.0	0.000	0.0	0.0	0.000	0.0	0.000
140.5	0.000	0.0	0.0	0.000	0.0	0.000
141.0	0.000	0.0	0.0	0.000	0.0	0.000
141.5	0.000	0.0	0.0	0.000	0.0	0.000
142.0	0.000	0.0	0.0	0.000	0.0	0.000
142.5	0.000	0.0	0.0	0.000	0.0	0.000
143.0	0.000	0.0	0.0	0.000	0.0	0.000
143.5	0.000	0.0	0.0	0.000	0.0	0.000
144.0	0.000	0.0	0.0	0.000	0.0	0.000
144.5	0.000	0.0	0.0	0.000	0.0	0.000
145.0	0.000	0.0	0.0	0.000	0.0	0.000
145.5	0.000	0.0	0.0	0.000	0.0	0.000
146.0	0.000	0.0	0.0	0.000	0.0	0.000
146.5	0.000	0.0	0.0	0.000	0.0	0.000
147.0	0.000	0.0	0.0	0.000	0.0	0.000
147.5	0.000	0.0	0.0	0.000	0.0	0.000
148.0	0.000	0.0	0.0	0.000	0.0	0.000
148.5	0.000	0.0	0.0	0.000	0.0	0.000
149.0	0.000	0.0	0.0	0.000	0.0	0.000
149.5	0.000	0.0	0.0	0.000	0.0	0.000
150.0	0.000	0.0	0.0	0.000	0.0	0.000
150.5	0.000	0.0	0.0	0.000	0.0	0.000
151.0	0.000	0.0	0.0	0.000	0.0	0.000
151.5	0.000	0.0	0.0	0.000	0.0	0.000
152.0	0.000	0.0	0.0	0.000	0.0	0.000
152.5	0.000	0.0	0.0	0.000	0.0	0.000
153.0	0.000	0.0	0.0	0.000	0.0	0.000
153.5	0.000	0.0	0.0	0.000	0.0	0.000
154.0	0.000	0.0	0.0	0.000	0.0	0.000
154.5	0.000	0.0	0.0	0.000	0.0	0.000
155.0	0.000	0.0	0.0	0.000	0.0	0.000
155.5	0.000	0.0	0.0	0.000	0.0	0.000
156.0	0.000	0.0	0.0	0.000	0.0	0.000
156.5	0.000	0.0	0.0	0.000	0.0	0.000
157.0	0.000	0.0	0.0	0.000	0.0	0.000
157.5	0.000	0.0	0.0	0.000	0.0	0.000
158.0	0.000	0.0	0.0	0.000	0.0	0.000
158.5	0.000	0.0	0.0	0.000	0.0	0.000
159.0	0.000	0.0	0.0	0.000	0.0	0.000
159.5	0.000	0.0	0.0	0.000	0.0	0.000
160.0	0.000	0.0	0.0	0.000	0.0	0.000
160.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
161.0	0.000	0.0	0.0	0.000	0.0	0.000
161.5	0.000	0.0	0.0	0.000	0.0	0.000
162.0	0.000	0.0	0.0	0.000	0.0	0.000
162.5	0.000	0.0	0.0	0.000	0.0	0.000
163.0	0.000	0.0	0.0	0.000	0.0	0.000
163.5	0.000	0.0	0.0	0.000	0.0	0.000
164.0	0.000	0.0	0.0	0.000	0.0	0.000
164.5	0.000	0.0	0.0	0.000	0.0	0.000
165.0	0.000	0.0	0.0	0.000	0.0	0.000
165.5	0.000	0.0	0.0	0.000	0.0	0.000
166.0	0.000	0.0	0.0	0.000	0.0	0.000
166.5	0.000	0.0	0.0	0.000	0.0	0.000
167.0	0.000	0.0	0.0	0.000	0.0	0.000
167.5	0.000	0.0	0.0	0.000	0.0	0.000
168.0	0.000	0.0	0.0	0.000	0.0	0.000
168.5	0.000	0.0	0.0	0.000	0.0	0.000
169.0	0.000	0.0	0.0	0.000	0.0	0.000
169.5	0.000	0.0	0.0	0.000	0.0	0.000
170.0	0.000	0.0	0.0	0.000	0.0	0.000
170.5	0.000	0.0	0.0	0.000	0.0	0.000
171.0	0.000	0.0	0.0	0.000	0.0	0.000
171.5	0.000	0.0	0.0	0.000	0.0	0.000
172.0	0.000	0.0	0.0	0.000	0.0	0.000
172.5	0.000	0.0	0.0	0.000	0.0	0.000
173.0	0.000	0.0	0.0	0.000	0.0	0.000
173.5	0.000	0.0	0.0	0.000	0.0	0.000
174.0	0.000	0.0	0.0	0.000	0.0	0.000
174.5	0.000	0.0	0.0	0.000	0.0	0.000
175.0	0.000	0.0	0.0	0.000	0.0	0.000
175.5	0.000	0.0	0.0	0.000	0.0	0.000
176.0	0.000	0.0	0.0	0.000	0.0	0.000
176.5	0.000	121.3	0.0	0.000	0.0	0.000
177.0	0.000	121.4	0.0	0.000	0.0	0.000
177.5	0.000	121.3	0.0	0.000	0.0	0.000
178.0	0.000	121.3	0.0	0.000	0.0	0.000
178.5	0.000	121.3	0.0	0.000	0.0	0.000
179.0	0.000	121.4	0.0	0.000	0.0	0.000
179.5	0.000	121.4	0.0	0.000	0.0	0.000
180.0	0.000	121.4	0.0	0.000	0.0	0.000

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
0.0	0.0	0.000	0.0	0.000	0.000	0.0
0.5	0.0	0.000	0.0	0.000	0.000	0.0
1.0	0.0	0.000	0.0	0.000	0.000	0.0
1.5	0.0	0.000	0.0	0.000	0.000	0.0
2.0	0.0	0.000	0.0	0.000	0.000	0.0
2.5	0.0	0.000	0.0	0.000	0.000	0.0
3.0	0.0	0.000	0.0	0.000	0.000	0.0
3.5	0.0	0.000	0.0	0.000	0.000	0.0
4.0	0.0	0.000	0.0	0.000	0.000	0.0
4.5	0.0	0.000	0.0	0.000	0.000	0.0
5.0	0.0	0.000	0.0	0.000	0.000	0.0
5.5	0.0	0.000	0.0	0.000	0.000	0.0
6.0	0.0	0.000	0.0	0.000	0.000	0.0
6.5	0.0	0.000	0.0	0.000	0.000	0.0
7.0	0.0	0.000	0.0	0.000	0.000	0.0
7.5	0.0	0.000	0.0	0.000	0.000	0.0
8.0	0.0	0.000	0.0	0.000	0.000	0.0
8.5	0.0	0.000	0.0	0.000	0.000	0.0
9.0	0.0	0.000	0.0	0.000	0.000	0.0
9.5	0.0	0.000	0.0	0.000	0.000	0.0
10.0	0.0	0.000	0.0	0.000	0.000	0.0
10.5	0.0	0.000	0.0	0.000	0.000	0.0
11.0	0.0	0.000	0.0	0.000	0.000	0.0
11.5	0.0	0.000	0.0	0.000	0.000	0.0
12.0	0.0	0.000	0.0	0.000	0.000	0.0
12.5	0.0	0.000	0.0	0.000	0.000	0.0
13.0	0.0	0.000	0.0	0.000	0.000	0.0
13.5	0.0	0.000	0.0	0.000	0.000	0.0
14.0	0.0	0.000	0.0	0.000	0.000	0.0
14.5	0.0	0.000	0.0	0.000	0.000	0.0
15.0	0.0	0.000	0.0	0.000	0.000	0.0
15.5	0.0	0.000	0.0	0.000	0.000	0.0
16.0	0.0	0.000	0.0	0.000	0.000	0.0
16.5	0.0	0.000	0.0	0.000	0.000	0.0
17.0	0.0	0.000	0.0	0.000	0.000	0.0
17.5	0.0	0.000	0.0	0.000	0.000	0.0
18.0	0.0	0.000	0.0	0.000	0.000	0.0
18.5	0.0	0.000	0.0	0.000	0.000	0.0
19.0	0.0	0.000	0.0	0.000	0.000	0.0
19.5	0.0	0.000	0.0	0.000	0.000	0.0
20.0	0.0	0.000	0.0	0.000	0.000	0.0
20.5	0.0	0.000	0.0	0.000	0.000	0.0
21.0	0.0	0.000	0.0	0.000	0.000	0.0
21.5	0.0	0.000	0.0	0.000	0.000	0.0
22.0	0.0	0.000	0.0	0.000	0.000	0.0
22.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
23.0	0.0	0.000	0.0	0.000	0.000	0.0
23.5	0.0	0.000	0.0	0.000	0.000	0.0
24.0	0.0	0.000	0.0	0.000	0.000	0.0
24.5	0.0	0.000	0.0	0.000	0.000	0.0
25.0	0.0	0.000	0.0	0.000	0.000	0.0
25.5	0.0	0.000	0.0	0.000	0.000	0.0
26.0	0.0	0.000	0.0	0.000	0.000	0.0
26.5	0.0	0.000	0.0	0.000	0.000	0.0
27.0	0.0	0.000	0.0	0.000	0.000	0.0
27.5	0.0	0.000	0.0	0.000	0.000	0.0
28.0	0.0	0.000	0.0	0.000	0.000	0.0
28.5	0.0	0.000	0.0	0.000	0.000	0.0
29.0	0.0	0.000	0.0	0.000	0.000	0.0
29.5	0.0	0.000	0.0	0.000	0.000	0.0
30.0	0.0	0.000	0.0	0.000	0.000	0.0
30.5	0.0	0.000	0.0	0.000	0.000	0.0
31.0	0.0	0.000	0.0	0.000	0.000	0.0
31.5	0.0	0.000	0.0	0.000	0.000	0.0
32.0	0.0	0.000	0.0	0.000	0.000	0.0
32.5	0.0	0.000	0.0	0.000	0.000	0.0
33.0	0.0	0.000	0.0	0.000	0.000	0.0
33.5	0.0	0.000	0.0	0.000	0.000	0.0
34.0	0.0	0.000	0.0	0.000	0.000	0.0
34.5	0.0	0.000	0.0	0.000	0.000	0.0
35.0	0.0	0.000	0.0	0.000	0.000	0.0
35.5	0.0	0.000	0.0	0.000	0.000	0.0
36.0	0.0	0.000	0.0	0.000	0.000	0.0
36.5	0.0	0.000	0.0	0.000	0.000	0.0
37.0	0.0	0.000	0.0	0.000	0.000	0.0
37.5	0.0	0.000	0.0	0.000	0.000	0.0
38.0	0.0	0.000	0.0	0.000	0.000	0.0
38.5	0.0	0.000	0.0	0.000	0.000	0.0
39.0	0.0	0.000	0.0	0.000	0.000	0.0
39.5	0.0	0.000	0.0	0.000	0.000	0.0
40.0	0.0	0.000	0.0	0.000	0.000	0.0
40.5	0.0	0.000	0.0	0.000	0.000	0.0
41.0	0.0	0.000	0.0	0.000	0.000	0.0
41.5	0.0	0.000	0.0	0.000	0.000	0.0
42.0	0.0	0.000	0.0	0.000	0.000	0.0
42.5	0.0	0.000	0.0	0.000	0.000	0.0
43.0	0.0	0.000	0.0	0.000	0.000	0.0
43.5	0.0	0.000	0.0	0.000	0.000	0.0
44.0	0.0	0.000	0.0	0.000	0.000	0.0
44.5	0.0	0.000	0.0	0.000	0.000	0.0
45.0	0.0	0.000	0.0	0.000	0.000	0.0
45.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
46.0	0.0	0.000	0.0	0.000	0.000	0.0
46.5	0.0	0.000	0.0	0.000	0.000	0.0
47.0	0.0	0.000	0.0	0.000	0.000	0.0
47.5	0.0	0.000	0.0	0.000	0.000	0.0
48.0	0.0	0.000	0.0	0.000	0.000	0.0
48.5	0.0	0.000	0.0	0.000	0.000	0.0
49.0	0.0	0.000	0.0	0.000	0.000	0.0
49.5	0.0	0.000	0.0	0.000	0.000	0.0
50.0	0.0	0.000	0.0	0.000	0.000	0.0
50.5	0.0	0.000	0.0	0.000	0.000	0.0
51.0	0.0	0.000	0.0	0.000	0.000	0.0
51.5	0.0	0.000	0.0	0.000	0.000	0.0
52.0	0.0	0.000	0.0	0.000	0.000	0.0
52.5	0.0	0.000	0.0	0.000	0.000	0.0
53.0	0.0	0.000	0.0	0.000	0.000	0.0
53.5	0.0	0.000	0.0	0.000	0.000	0.0
54.0	0.0	0.000	0.0	0.000	0.000	0.0
54.5	0.0	0.000	0.0	0.000	0.000	0.0
55.0	0.0	0.000	0.0	0.000	0.000	0.0
55.5	0.0	0.000	0.0	0.000	0.000	0.0
56.0	0.0	0.000	0.0	0.000	0.000	0.0
56.5	0.0	0.000	0.0	0.000	0.000	0.0
57.0	0.0	0.000	0.0	0.000	0.000	0.0
57.5	0.0	0.000	0.0	0.000	0.000	0.0
58.0	0.0	0.000	0.0	0.000	0.000	0.0
58.5	0.0	0.000	0.0	0.000	0.000	0.0
59.0	0.0	0.000	0.0	0.000	0.000	0.0
59.5	0.0	0.000	0.0	0.000	0.000	0.0
60.0	0.0	0.000	0.0	0.000	0.000	0.0
60.5	0.0	0.000	0.0	0.000	0.000	0.0
61.0	0.0	0.000	0.0	0.000	0.000	0.0
61.5	0.0	0.000	0.0	0.000	0.000	0.0
62.0	0.0	0.000	0.0	0.000	0.000	0.0
62.5	0.0	0.000	0.0	0.000	0.000	0.0
63.0	0.0	0.000	0.0	0.000	0.000	0.0
63.5	0.0	0.000	0.0	0.000	0.000	0.0
64.0	0.0	0.000	0.0	0.000	0.000	0.0
64.5	0.0	0.000	0.0	0.000	0.000	0.0
65.0	0.0	0.000	0.0	0.000	0.000	0.0
65.5	0.0	0.000	0.0	0.000	0.000	0.0
66.0	0.0	0.000	0.0	0.000	0.000	0.0
66.5	0.0	0.000	0.0	0.000	0.000	0.0
67.0	0.0	0.000	0.0	0.000	0.000	0.0
67.5	0.0	0.000	0.0	0.000	0.000	0.0
68.0	0.0	0.000	0.0	0.000	0.000	0.0
68.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
69.0	0.0	0.000	0.0	0.000	0.000	0.0
69.5	0.0	0.000	0.0	0.000	0.000	0.0
70.0	0.0	0.000	0.0	0.000	0.000	0.0
70.5	0.0	0.000	0.0	0.000	0.000	0.0
71.0	0.0	0.000	0.0	0.000	0.000	0.0
71.5	0.0	0.000	0.0	0.000	0.000	0.0
72.0	0.0	0.000	0.0	0.000	0.000	0.0
72.5	0.0	0.000	0.0	0.000	0.000	0.0
73.0	0.0	0.000	0.0	0.000	0.000	0.0
73.5	0.0	0.000	0.0	0.000	0.000	0.0
74.0	0.0	0.000	0.0	0.000	0.000	0.0
74.5	0.0	0.000	0.0	0.000	0.000	0.0
75.0	0.0	0.000	0.0	0.000	0.000	0.0
75.5	0.0	0.000	0.0	0.000	0.000	0.0
76.0	0.0	0.000	0.0	0.000	0.000	0.0
76.5	0.0	0.000	0.0	0.000	0.000	0.0
77.0	0.0	0.000	0.0	0.000	0.000	0.0
77.5	0.0	0.000	0.0	0.000	0.000	0.0
78.0	0.0	0.000	0.0	0.000	0.000	0.0
78.5	0.0	0.000	0.0	0.000	0.000	0.0
79.0	0.0	0.000	0.0	0.000	0.000	0.0
79.5	0.0	0.000	0.0	0.000	0.000	0.0
80.0	0.0	0.000	0.0	0.000	0.000	0.0
80.5	0.0	0.000	0.0	0.000	0.000	0.0
81.0	0.0	0.000	0.0	0.000	0.000	0.0
81.5	0.0	0.000	0.0	0.000	0.000	0.0
82.0	0.0	0.000	0.0	0.000	0.000	0.0
82.5	0.0	0.000	0.0	0.000	0.000	0.0
83.0	0.0	0.000	0.0	0.000	0.000	0.0
83.5	0.0	0.000	0.0	0.000	0.000	0.0
84.0	0.0	0.000	0.0	0.000	0.000	0.0
84.5	0.0	0.000	0.0	0.000	0.000	0.0
85.0	0.0	0.000	0.0	0.000	0.000	0.0
85.5	0.0	0.000	0.0	0.000	0.000	0.0
86.0	0.0	0.000	0.0	0.000	0.000	0.0
86.5	0.0	0.000	0.0	0.000	0.000	0.0
87.0	0.0	0.000	0.0	0.000	0.000	0.0
87.5	0.0	0.000	0.0	0.000	0.000	0.0
88.0	0.0	0.000	0.0	0.000	0.000	0.0
88.5	0.0	0.000	0.0	0.000	0.000	0.0
89.0	0.0	0.000	0.0	0.000	0.000	0.0
89.5	0.0	0.000	0.0	0.000	0.000	0.0
90.0	0.0	0.000	0.0	0.000	0.000	0.0
90.5	0.0	0.000	0.0	0.000	0.000	0.0
91.0	0.0	0.000	0.0	0.000	0.000	0.0
91.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
92.0	0.0	0.000	0.0	0.000	0.000	0.0
92.5	0.0	0.000	0.0	0.000	0.000	0.0
93.0	0.0	0.000	0.0	0.000	0.000	0.0
93.5	0.0	0.000	0.0	0.000	0.000	0.0
94.0	0.0	0.000	0.0	0.000	0.000	0.0
94.5	0.0	0.000	0.0	0.000	0.000	0.0
95.0	0.0	0.000	0.0	0.000	0.000	0.0
95.5	0.0	0.000	0.0	0.000	0.000	0.0
96.0	0.0	0.000	0.0	0.000	0.000	0.0
96.5	0.0	0.000	0.0	0.000	0.000	0.0
97.0	0.0	0.000	0.0	0.000	0.000	0.0
97.5	0.0	0.000	0.0	0.000	0.000	0.0
98.0	0.0	0.000	0.0	0.000	0.000	0.0
98.5	0.0	0.000	0.0	0.000	0.000	0.0
99.0	0.0	0.000	0.0	0.000	0.000	0.0
99.5	0.0	0.000	0.0	0.000	0.000	0.0
100.0	0.0	0.000	0.0	0.000	0.000	0.0
100.5	0.0	0.000	0.0	0.000	0.000	0.0
101.0	0.0	0.000	0.0	0.000	0.000	0.0
101.5	0.0	0.000	0.0	0.000	0.000	0.0
102.0	0.0	0.000	0.0	0.000	0.000	0.0
102.5	0.0	0.000	0.0	0.000	0.000	0.0
103.0	0.0	0.000	0.0	0.000	0.000	0.0
103.5	0.0	0.000	0.0	0.000	0.000	0.0
104.0	0.0	0.000	0.0	0.000	0.000	0.0
104.5	0.0	0.000	0.0	0.000	0.000	0.0
105.0	0.0	0.000	0.0	0.000	0.000	0.0
105.5	0.0	0.000	0.0	0.000	0.000	0.0
106.0	0.0	0.000	0.0	0.000	0.000	0.0
106.5	0.0	0.000	0.0	0.000	0.000	0.0
107.0	0.0	0.000	0.0	0.000	0.000	0.0
107.5	0.0	0.000	0.0	0.000	0.000	0.0
108.0	0.0	0.000	0.0	0.000	0.000	0.0
108.5	0.0	0.000	0.0	0.000	0.000	0.0
109.0	0.0	0.000	0.0	0.000	0.000	0.0
109.5	0.0	0.000	0.0	0.000	0.000	0.0
110.0	0.0	0.000	0.0	0.000	0.000	0.0
110.5	0.0	0.000	0.0	0.000	0.000	0.0
111.0	0.0	0.000	0.0	0.000	0.000	0.0
111.5	0.0	0.000	0.0	0.000	0.000	0.0
112.0	0.0	0.000	0.0	0.000	0.000	0.0
112.5	0.0	0.000	0.0	0.000	0.000	0.0
113.0	0.0	0.000	0.0	0.000	0.000	0.0
113.5	0.0	0.000	0.0	0.000	0.000	0.0
114.0	0.0	0.000	0.0	0.000	0.000	0.0
114.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
115.0	0.0	0.000	0.0	0.000	0.000	0.0
115.5	0.0	0.000	0.0	0.000	0.000	0.0
116.0	0.0	0.000	0.0	0.000	0.000	0.0
116.5	0.0	0.000	0.0	0.000	0.000	0.0
117.0	0.0	0.000	0.0	0.000	0.000	0.0
117.5	0.0	0.000	0.0	0.000	0.000	0.0
118.0	0.0	0.000	0.0	0.000	0.000	0.0
118.5	0.0	0.000	0.0	0.000	0.000	0.0
119.0	0.0	0.000	0.0	0.000	0.000	0.0
119.5	0.0	0.000	0.0	0.000	0.000	0.0
120.0	0.0	0.000	0.0	0.000	0.000	0.0
120.5	0.0	0.000	0.0	0.000	0.000	0.0
121.0	0.0	0.000	0.0	0.000	0.000	0.0
121.5	0.0	0.000	0.0	0.000	0.000	0.0
122.0	0.0	0.000	0.0	0.000	0.000	0.0
122.5	0.0	0.000	0.0	0.000	0.000	0.0
123.0	0.0	0.000	0.0	0.000	0.000	0.0
123.5	0.0	0.000	0.0	0.000	0.000	0.0
124.0	0.0	0.000	0.0	0.000	0.000	0.0
124.5	0.0	0.000	0.0	0.000	0.000	0.0
125.0	0.0	0.000	0.0	0.000	0.000	0.0
125.5	0.0	0.000	0.0	0.000	0.000	0.0
126.0	0.0	0.000	0.0	0.000	0.000	0.0
126.5	0.0	0.000	0.0	0.000	0.000	0.0
127.0	0.0	0.000	0.0	0.000	0.000	0.0
127.5	0.0	0.000	0.0	0.000	0.000	0.0
128.0	0.0	0.000	0.0	0.000	0.000	0.0
128.5	0.0	0.000	0.0	0.000	0.000	0.0
129.0	0.0	0.000	0.0	0.000	0.000	0.0
129.5	0.0	0.000	0.0	0.000	0.000	0.0
130.0	0.0	0.000	0.0	0.000	0.000	0.0
130.5	0.0	0.000	0.0	0.000	0.000	0.0
131.0	0.0	0.000	0.0	0.000	0.000	0.0
131.5	0.0	0.000	0.0	0.000	0.000	0.0
132.0	0.0	0.000	0.0	0.000	0.000	0.0
132.5	0.0	0.000	0.0	0.000	0.000	0.0
133.0	0.0	0.000	0.0	0.000	0.000	0.0
133.5	0.0	0.000	0.0	0.000	0.000	0.0
134.0	0.0	0.000	0.0	0.000	0.000	0.0
134.5	0.0	0.000	0.0	0.000	0.000	0.0
135.0	0.0	0.000	0.0	0.000	0.000	0.0
135.5	0.0	0.000	0.0	0.000	0.000	0.0
136.0	0.0	0.000	0.0	0.000	0.000	0.0
136.5	0.0	0.000	0.0	0.000	0.000	0.0
137.0	0.0	0.000	0.0	0.000	0.000	0.0
137.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
138.0	0.0	0.000	0.0	0.000	0.000	0.0
138.5	0.0	0.000	0.0	0.000	0.000	0.0
139.0	0.0	0.000	0.0	0.000	0.000	0.0
139.5	0.0	0.000	0.0	0.000	0.000	0.0
140.0	0.0	0.000	0.0	0.000	0.000	0.0
140.5	0.0	0.000	0.0	0.000	0.000	0.0
141.0	0.0	0.000	0.0	0.000	0.000	0.0
141.5	0.0	0.000	0.0	0.000	0.000	0.0
142.0	0.0	0.000	0.0	0.000	0.000	0.0
142.5	0.0	0.000	0.0	0.000	0.000	0.0
143.0	0.0	0.000	0.0	0.000	0.000	0.0
143.5	0.0	0.000	0.0	0.000	0.000	0.0
144.0	0.0	0.000	0.0	0.000	0.000	0.0
144.5	0.0	0.000	0.0	0.000	0.000	0.0
145.0	0.0	0.000	0.0	0.000	0.000	0.0
145.5	0.0	0.000	0.0	0.000	0.000	0.0
146.0	0.0	0.000	0.0	0.000	0.000	0.0
146.5	0.0	0.000	0.0	0.000	0.000	0.0
147.0	0.0	0.000	0.0	0.000	0.000	0.0
147.5	0.0	0.000	0.0	0.000	0.000	0.0
148.0	0.0	0.000	0.0	0.000	0.000	0.0
148.5	0.0	0.000	0.0	0.000	0.000	0.0
149.0	0.0	0.000	0.0	0.000	0.000	0.0
149.5	0.0	0.000	0.0	0.000	0.000	0.0
150.0	0.0	0.000	0.0	0.000	0.000	0.0
150.5	0.0	0.000	0.0	0.000	0.000	0.0
151.0	0.0	0.000	0.0	0.000	0.000	0.0
151.5	0.0	0.000	0.0	0.000	0.000	0.0
152.0	0.0	0.000	0.0	0.000	0.000	0.0
152.5	0.0	0.000	0.0	0.000	0.000	0.0
153.0	0.0	0.000	0.0	0.000	0.000	0.0
153.5	0.0	0.000	0.0	0.000	0.000	0.0
154.0	0.0	0.000	0.0	0.000	0.000	0.0
154.5	0.0	0.000	0.0	0.000	0.000	0.0
155.0	0.0	0.000	0.0	0.000	0.000	0.0
155.5	0.0	0.000	0.0	0.000	0.000	0.0
156.0	0.0	0.000	0.0	0.000	0.000	0.0
156.5	0.0	0.000	0.0	0.000	0.000	0.0
157.0	0.0	0.000	0.0	0.000	0.000	0.0
157.5	0.0	0.000	0.0	0.000	0.000	0.0
158.0	0.0	0.000	0.0	0.000	0.000	0.0
158.5	0.0	0.000	0.0	0.000	0.000	0.0
159.0	0.0	0.000	0.0	0.000	0.000	0.0
159.5	0.0	0.000	0.0	0.000	0.000	0.0
160.0	0.0	0.000	0.0	0.000	0.000	0.0
160.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
161.0	0.0	0.000	0.0	0.000	0.000	0.0
161.5	0.0	0.000	0.0	0.000	0.000	0.0
162.0	0.0	0.000	0.0	0.000	0.000	0.0
162.5	0.0	0.000	0.0	0.000	0.000	0.0
163.0	0.0	0.000	0.0	0.000	0.000	0.0
163.5	0.0	0.000	0.0	0.000	0.000	0.0
164.0	0.0	0.000	0.0	0.000	0.000	0.0
164.5	0.0	0.000	0.0	0.000	0.000	0.0
165.0	0.0	0.000	0.0	0.000	0.000	0.0
165.5	0.0	0.000	0.0	0.000	0.000	0.0
166.0	0.0	0.000	0.0	0.000	0.000	0.0
166.5	0.0	0.000	0.0	0.000	0.000	0.0
167.0	0.0	0.000	0.0	0.000	0.000	0.0
167.5	0.0	0.000	0.0	0.000	0.000	0.0
168.0	0.0	0.000	0.0	0.000	0.000	0.0
168.5	0.0	0.000	0.0	0.000	0.000	0.0
169.0	0.0	0.000	0.0	0.000	0.000	0.0
169.5	0.0	0.000	0.0	0.000	0.000	0.0
170.0	0.0	0.000	0.0	0.000	0.000	0.0
170.5	0.0	0.000	0.0	0.000	0.000	0.0
171.0	0.0	0.000	0.0	0.000	0.000	0.0
171.5	0.0	0.000	0.0	0.000	0.000	0.0
172.0	0.0	0.000	0.0	0.000	0.000	0.0
172.5	0.0	0.000	0.0	0.000	0.000	0.0
173.0	0.0	0.000	0.0	0.000	0.000	0.0
173.5	0.0	0.000	0.0	0.000	0.000	0.0
174.0	0.0	0.000	0.0	0.000	0.000	0.0
174.5	0.0	0.000	0.0	0.000	0.000	0.0
175.0	0.0	0.000	0.0	0.000	0.000	0.0
175.5	0.0	0.000	0.0	0.000	0.000	0.0
176.0	0.0	0.000	0.0	0.000	0.000	0.0
176.5	0.0	0.000	0.0	0.000	0.056	0.0
177.0	0.0	0.000	0.0	0.000	0.057	0.0
177.5	0.0	0.000	0.0	0.000	0.057	0.0
178.0	0.0	0.000	0.0	0.000	0.058	0.0
178.5	0.0	0.000	0.0	0.000	0.059	0.0
179.0	0.0	0.000	0.0	0.000	0.060	0.0
179.5	0.0	0.000	0.0	0.000	0.061	0.0
180.0	0.0	0.000	0.0	0.000	0.062	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
0.0	0.000	122.7	0.0	0.000	0.0	0.000
0.5	0.000	122.7	0.0	0.000	0.0	0.000
1.0	0.000	122.8	0.0	0.000	0.0	0.000
1.5	0.000	122.8	0.0	0.000	0.0	0.000
2.0	0.000	122.7	0.0	0.000	0.0	0.000
2.5	0.000	122.8	0.0	0.000	0.0	0.000
3.0	0.000	122.8	0.0	0.000	0.0	0.000
3.5	0.000	122.8	0.0	0.000	0.0	0.000
4.0	0.000	122.8	0.0	0.000	0.0	0.000
4.5	0.000	122.9	0.0	0.000	0.0	0.000
5.0	0.000	122.9	0.0	0.000	0.0	0.000
5.5	0.000	122.8	0.0	0.000	0.0	0.000
6.0	0.000	122.8	0.0	0.000	0.0	0.000
6.5	0.000	122.8	0.0	0.000	0.0	0.000
7.0	0.000	122.8	0.0	0.000	0.0	0.000
7.5	0.000	122.7	0.0	0.000	0.0	0.000
8.0	0.000	122.7	0.0	0.000	0.0	0.000
8.5	0.000	122.8	0.0	0.000	0.0	0.000
9.0	0.000	122.7	0.0	0.000	0.0	0.000
9.5	0.000	122.7	0.0	0.000	0.0	0.000
10.0	0.000	122.7	0.0	0.000	0.0	0.000
10.5	0.000	122.7	0.0	0.000	0.0	0.000
11.0	0.000	122.6	0.0	0.000	0.0	0.000
11.5	0.000	122.7	0.0	0.000	0.0	0.000
12.0	0.000	122.7	0.0	0.000	0.0	0.000
12.5	0.000	122.5	0.0	0.000	0.0	0.000
13.0	0.000	122.6	0.0	0.000	0.0	0.000
13.5	0.000	122.6	0.0	0.000	0.0	0.000
14.0	0.000	122.6	0.0	0.000	0.0	0.000
14.5	0.000	122.7	0.0	0.000	0.0	0.000
15.0	0.000	122.6	0.0	0.000	0.0	0.000
15.5	0.000	122.6	0.0	0.000	0.0	0.000
16.0	0.000	122.7	0.0	0.000	0.0	0.000
16.5	0.000	122.7	0.0	0.000	0.0	0.000
17.0	0.000	122.7	0.0	0.000	0.0	0.000
17.5	0.000	122.7	0.0	0.000	0.0	0.000
18.0	0.000	122.6	0.0	0.000	0.0	0.000
18.5	0.000	122.6	0.0	0.000	0.0	0.000
19.0	0.000	122.6	0.0	0.000	0.0	0.000
19.5	0.000	122.6	0.0	0.000	0.0	0.000
20.0	0.000	122.6	0.0	0.000	0.0	0.000
20.5	0.000	122.5	0.0	0.000	0.0	0.000
21.0	0.000	0.0	0.0	0.000	0.0	0.000
21.5	0.000	0.0	0.0	0.000	0.0	0.000
22.0	0.000	0.0	0.0	0.000	0.0	0.000
22.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
23.0	0.000	0.0	0.0	0.000	0.0	0.000
23.5	0.000	0.0	0.0	0.000	0.0	0.000
24.0	0.000	0.0	0.0	0.000	0.0	0.000
24.5	0.000	0.0	0.0	0.000	0.0	0.000
25.0	0.000	0.0	0.0	0.000	0.0	0.000
25.5	0.000	0.0	0.0	0.000	0.0	0.000
26.0	0.000	0.0	0.0	0.000	0.0	0.000
26.5	0.000	0.0	0.0	0.000	0.0	0.000
27.0	0.000	0.0	0.0	0.000	0.0	0.000
27.5	0.000	0.0	0.0	0.000	0.0	0.000
28.0	0.000	0.0	0.0	0.000	0.0	0.000
28.5	0.000	0.0	0.0	0.000	0.0	0.000
29.0	0.000	0.0	0.0	0.000	0.0	0.000
29.5	0.000	0.0	0.0	0.000	0.0	0.000
30.0	0.000	0.0	0.0	0.000	0.0	0.000
30.5	0.000	0.0	0.0	0.000	0.0	0.000
31.0	0.000	0.0	0.0	0.000	0.0	0.000
31.5	0.000	0.0	0.0	0.000	0.0	0.000
32.0	0.000	0.0	0.0	0.000	0.0	0.000
32.5	0.000	0.0	0.0	0.000	0.0	0.000
33.0	0.000	0.0	0.0	0.000	0.0	0.000
33.5	0.000	0.0	0.0	0.000	0.0	0.000
34.0	0.000	0.0	0.0	0.000	0.0	0.000
34.5	0.000	0.0	0.0	0.000	0.0	0.000
35.0	0.000	0.0	0.0	0.000	0.0	0.000
35.5	0.000	0.0	0.0	0.000	0.0	0.000
36.0	0.000	0.0	0.0	0.000	0.0	0.000
36.5	0.000	0.0	0.0	0.000	0.0	0.000
37.0	0.000	0.0	0.0	0.000	0.0	0.000
37.5	0.000	0.0	0.0	0.000	0.0	0.000
38.0	0.000	0.0	0.0	0.000	0.0	0.000
38.5	0.000	0.0	0.0	0.000	0.0	0.000
39.0	0.000	0.0	0.0	0.000	0.0	0.000
39.5	0.000	0.0	0.0	0.000	0.0	0.000
40.0	0.000	0.0	0.0	0.000	0.0	0.000
40.5	0.000	0.0	0.0	0.000	0.0	0.000
41.0	0.000	0.0	0.0	0.000	0.0	0.000
41.5	0.000	0.0	0.0	0.000	0.0	0.000
42.0	0.000	0.0	0.0	0.000	0.0	0.000
42.5	0.000	0.0	0.0	0.000	0.0	0.000
43.0	0.000	0.0	0.0	0.000	0.0	0.000
43.5	0.000	0.0	0.0	0.000	0.0	0.000
44.0	0.000	0.0	0.0	0.000	0.0	0.000
44.5	0.000	0.0	0.0	0.000	0.0	0.000
45.0	0.000	0.0	0.0	0.000	0.0	0.000
45.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
46.0	0.000	0.0	0.0	0.000	0.0	0.000
46.5	0.000	0.0	0.0	0.000	0.0	0.000
47.0	0.000	0.0	0.0	0.000	0.0	0.000
47.5	0.000	0.0	0.0	0.000	0.0	0.000
48.0	0.000	0.0	0.0	0.000	0.0	0.000
48.5	0.000	0.0	0.0	0.000	0.0	0.000
49.0	0.000	0.0	0.0	0.000	0.0	0.000
49.5	0.000	0.0	0.0	0.000	0.0	0.000
50.0	0.000	0.0	0.0	0.000	0.0	0.000
50.5	0.000	0.0	0.0	0.000	0.0	0.000
51.0	0.000	0.0	0.0	0.000	0.0	0.000
51.5	0.000	0.0	0.0	0.000	0.0	0.000
52.0	0.000	0.0	0.0	0.000	0.0	0.000
52.5	0.000	0.0	0.0	0.000	0.0	0.000
53.0	0.000	0.0	0.0	0.000	0.0	0.000
53.5	0.000	0.0	0.0	0.000	0.0	0.000
54.0	0.000	0.0	0.0	0.000	0.0	0.000
54.5	0.000	0.0	0.0	0.000	0.0	0.000
55.0	0.000	0.0	0.0	0.000	0.0	0.000
55.5	0.000	0.0	0.0	0.000	0.0	0.000
56.0	0.000	0.0	0.0	0.000	0.0	0.000
56.5	0.000	0.0	0.0	0.000	0.0	0.000
57.0	0.000	0.0	0.0	0.000	0.0	0.000
57.5	0.000	0.0	0.0	0.000	0.0	0.000
58.0	0.000	0.0	0.0	0.000	0.0	0.000
58.5	0.000	0.0	0.0	0.000	0.0	0.000
59.0	0.000	0.0	0.0	0.000	0.0	0.000
59.5	0.000	0.0	0.0	0.000	0.0	0.000
60.0	0.000	0.0	0.0	0.000	0.0	0.000
60.5	0.000	0.0	0.0	0.000	0.0	0.000
61.0	0.000	0.0	0.0	0.000	0.0	0.000
61.5	0.000	0.0	0.0	0.000	0.0	0.000
62.0	0.000	0.0	0.0	0.000	0.0	0.000
62.5	0.000	0.0	0.0	0.000	0.0	0.000
63.0	0.000	0.0	0.0	0.000	0.0	0.000
63.5	0.000	0.0	0.0	0.000	0.0	0.000
64.0	0.000	0.0	0.0	0.000	0.0	0.000
64.5	0.000	0.0	0.0	0.000	0.0	0.000
65.0	0.000	0.0	0.0	0.000	0.0	0.000
65.5	0.000	0.0	0.0	0.000	0.0	0.000
66.0	0.000	0.0	0.0	0.000	0.0	0.000
66.5	0.000	0.0	0.0	0.000	0.0	0.000
67.0	0.000	0.0	0.0	0.000	0.0	0.000
67.5	0.000	0.0	0.0	0.000	0.0	0.000
68.0	0.000	0.0	0.0	0.000	0.0	0.000
68.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
69.0	0.000	0.0	0.0	0.000	0.0	0.000
69.5	0.000	0.0	0.0	0.000	0.0	0.000
70.0	0.000	0.0	0.0	0.000	0.0	0.000
70.5	0.000	0.0	0.0	0.000	0.0	0.000
71.0	0.000	0.0	0.0	0.000	0.0	0.000
71.5	0.000	0.0	0.0	0.000	0.0	0.000
72.0	0.000	0.0	0.0	0.000	0.0	0.000
72.5	0.000	0.0	0.0	0.000	0.0	0.000
73.0	0.000	0.0	0.0	0.000	0.0	0.000
73.5	0.000	0.0	0.0	0.000	0.0	0.000
74.0	0.000	0.0	0.0	0.000	0.0	0.000
74.5	0.000	0.0	0.0	0.000	0.0	0.000
75.0	0.000	0.0	0.0	0.000	0.0	0.000
75.5	0.000	0.0	0.0	0.000	0.0	0.000
76.0	0.000	0.0	0.0	0.000	0.0	0.000
76.5	0.000	0.0	0.0	0.000	0.0	0.000
77.0	0.000	0.0	0.0	0.000	0.0	0.000
77.5	0.000	0.0	0.0	0.000	0.0	0.000
78.0	0.000	0.0	0.0	0.000	0.0	0.000
78.5	0.000	0.0	0.0	0.000	0.0	0.000
79.0	0.000	0.0	0.0	0.000	0.0	0.000
79.5	0.000	0.0	0.0	0.000	0.0	0.000
80.0	0.000	0.0	0.0	0.000	0.0	0.000
80.5	0.000	0.0	0.0	0.000	0.0	0.000
81.0	0.000	0.0	0.0	0.000	0.0	0.000
81.5	0.000	0.0	0.0	0.000	0.0	0.000
82.0	0.000	0.0	0.0	0.000	0.0	0.000
82.5	0.000	0.0	0.0	0.000	0.0	0.000
83.0	0.000	0.0	0.0	0.000	0.0	0.000
83.5	0.000	0.0	0.0	0.000	0.0	0.000
84.0	0.000	0.0	0.0	0.000	0.0	0.000
84.5	0.000	0.0	0.0	0.000	0.0	0.000
85.0	0.000	0.0	0.0	0.000	0.0	0.000
85.5	0.000	0.0	0.0	0.000	0.0	0.000
86.0	0.000	0.0	0.0	0.000	0.0	0.000
86.5	0.000	0.0	0.0	0.000	0.0	0.000
87.0	0.000	0.0	0.0	0.000	0.0	0.000
87.5	0.000	0.0	0.0	0.000	0.0	0.000
88.0	0.000	0.0	0.0	0.000	0.0	0.000
88.5	0.000	0.0	0.0	0.000	0.0	0.000
89.0	0.000	0.0	0.0	0.000	0.0	0.000
89.5	0.000	0.0	0.0	0.000	0.0	0.000
90.0	0.000	0.0	0.0	0.000	0.0	0.000
90.5	0.000	0.0	0.0	0.000	0.0	0.000
91.0	0.000	0.0	0.0	0.000	0.0	0.000
91.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
92.0	0.000	0.0	0.0	0.000	0.0	0.000
92.5	0.000	0.0	0.0	0.000	0.0	0.000
93.0	0.000	0.0	0.0	0.000	0.0	0.000
93.5	0.000	0.0	0.0	0.000	0.0	0.000
94.0	0.000	0.0	0.0	0.000	0.0	0.000
94.5	0.000	0.0	0.0	0.000	0.0	0.000
95.0	0.000	0.0	0.0	0.000	0.0	0.000
95.5	0.000	0.0	0.0	0.000	0.0	0.000
96.0	0.000	0.0	0.0	0.000	0.0	0.000
96.5	0.000	0.0	0.0	0.000	0.0	0.000
97.0	0.000	0.0	0.0	0.000	0.0	0.000
97.5	0.000	0.0	0.0	0.000	0.0	0.000
98.0	0.000	0.0	0.0	0.000	0.0	0.000
98.5	0.000	0.0	0.0	0.000	0.0	0.000
99.0	0.000	0.0	0.0	0.000	0.0	0.000
99.5	0.000	0.0	0.0	0.000	0.0	0.000
100.0	0.000	0.0	0.0	0.000	0.0	0.000
100.5	0.000	0.0	0.0	0.000	0.0	0.000
101.0	0.000	0.0	0.0	0.000	0.0	0.000
101.5	0.000	0.0	0.0	0.000	0.0	0.000
102.0	0.000	0.0	0.0	0.000	0.0	0.000
102.5	0.000	0.0	0.0	0.000	0.0	0.000
103.0	0.000	0.0	0.0	0.000	0.0	0.000
103.5	0.000	0.0	0.0	0.000	0.0	0.000
104.0	0.000	0.0	0.0	0.000	0.0	0.000
104.5	0.000	0.0	0.0	0.000	0.0	0.000
105.0	0.000	0.0	0.0	0.000	0.0	0.000
105.5	0.000	0.0	0.0	0.000	0.0	0.000
106.0	0.000	0.0	0.0	0.000	0.0	0.000
106.5	0.000	0.0	0.0	0.000	0.0	0.000
107.0	0.000	0.0	0.0	0.000	0.0	0.000
107.5	0.000	0.0	0.0	0.000	0.0	0.000
108.0	0.000	0.0	0.0	0.000	0.0	0.000
108.5	0.000	0.0	0.0	0.000	0.0	0.000
109.0	0.000	0.0	0.0	0.000	0.0	0.000
109.5	0.000	0.0	0.0	0.000	0.0	0.000
110.0	0.000	0.0	0.0	0.000	0.0	0.000
110.5	0.000	0.0	0.0	0.000	0.0	0.000
111.0	0.000	0.0	0.0	0.000	0.0	0.000
111.5	0.000	0.0	0.0	0.000	0.0	0.000
112.0	0.000	0.0	0.0	0.000	0.0	0.000
112.5	0.000	0.0	0.0	0.000	0.0	0.000
113.0	0.000	0.0	0.0	0.000	0.0	0.000
113.5	0.000	0.0	0.0	0.000	0.0	0.000
114.0	0.000	0.0	0.0	0.000	0.0	0.000
114.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
115.0	0.000	0.0	0.0	0.000	0.0	0.000
115.5	0.000	0.0	0.0	0.000	0.0	0.000
116.0	0.000	0.0	0.0	0.000	0.0	0.000
116.5	0.000	0.0	0.0	0.000	0.0	0.000
117.0	0.000	0.0	0.0	0.000	0.0	0.000
117.5	0.000	0.0	0.0	0.000	0.0	0.000
118.0	0.000	0.0	0.0	0.000	0.0	0.000
118.5	0.000	0.0	0.0	0.000	0.0	0.000
119.0	0.000	0.0	0.0	0.000	0.0	0.000
119.5	0.000	0.0	0.0	0.000	0.0	0.000
120.0	0.000	0.0	0.0	0.000	0.0	0.000
120.5	0.000	0.0	0.0	0.000	0.0	0.000
121.0	0.000	0.0	0.0	0.000	0.0	0.000
121.5	0.000	0.0	0.0	0.000	0.0	0.000
122.0	0.000	0.0	0.0	0.000	0.0	0.000
122.5	0.000	0.0	0.0	0.000	0.0	0.000
123.0	0.000	0.0	0.0	0.000	0.0	0.000
123.5	0.000	0.0	0.0	0.000	0.0	0.000
124.0	0.000	0.0	0.0	0.000	0.0	0.000
124.5	0.000	0.0	0.0	0.000	0.0	0.000
125.0	0.000	0.0	0.0	0.000	0.0	0.000
125.5	0.000	0.0	0.0	0.000	0.0	0.000
126.0	0.000	0.0	0.0	0.000	0.0	0.000
126.5	0.000	0.0	0.0	0.000	0.0	0.000
127.0	0.000	0.0	0.0	0.000	0.0	0.000
127.5	0.000	0.0	0.0	0.000	0.0	0.000
128.0	0.000	0.0	0.0	0.000	0.0	0.000
128.5	0.000	0.0	0.0	0.000	0.0	0.000
129.0	0.000	0.0	0.0	0.000	0.0	0.000
129.5	0.000	0.0	0.0	0.000	0.0	0.000
130.0	0.000	0.0	0.0	0.000	0.0	0.000
130.5	0.000	0.0	0.0	0.000	0.0	0.000
131.0	0.000	0.0	0.0	0.000	0.0	0.000
131.5	0.000	0.0	0.0	0.000	0.0	0.000
132.0	0.000	0.0	0.0	0.000	0.0	0.000
132.5	0.000	0.0	0.0	0.000	0.0	0.000
133.0	0.000	0.0	0.0	0.000	0.0	0.000
133.5	0.000	0.0	0.0	0.000	0.0	0.000
134.0	0.000	0.0	0.0	0.000	0.0	0.000
134.5	0.000	0.0	0.0	0.000	0.0	0.000
135.0	0.000	0.0	0.0	0.000	0.0	0.000
135.5	0.000	0.0	0.0	0.000	0.0	0.000
136.0	0.000	0.0	0.0	0.000	0.0	0.000
136.5	0.000	0.0	0.0	0.000	0.0	0.000
137.0	0.000	0.0	0.0	0.000	0.0	0.000
137.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
138.0	0.000	0.0	0.0	0.000	0.0	0.000
138.5	0.000	0.0	0.0	0.000	0.0	0.000
139.0	0.000	0.0	0.0	0.000	0.0	0.000
139.5	0.000	0.0	0.0	0.000	0.0	0.000
140.0	0.000	0.0	0.0	0.000	0.0	0.000
140.5	0.000	0.0	0.0	0.000	0.0	0.000
141.0	0.000	0.0	0.0	0.000	0.0	0.000
141.5	0.000	0.0	0.0	0.000	0.0	0.000
142.0	0.000	0.0	0.0	0.000	0.0	0.000
142.5	0.000	0.0	0.0	0.000	0.0	0.000
143.0	0.000	0.0	0.0	0.000	0.0	0.000
143.5	0.000	0.0	0.0	0.000	0.0	0.000
144.0	0.000	0.0	0.0	0.000	0.0	0.000
144.5	0.000	0.0	0.0	0.000	0.0	0.000
145.0	0.000	0.0	0.0	0.000	0.0	0.000
145.5	0.000	0.0	0.0	0.000	0.0	0.000
146.0	0.000	0.0	0.0	0.000	0.0	0.000
146.5	0.000	0.0	0.0	0.000	0.0	0.000
147.0	0.000	0.0	0.0	0.000	0.0	0.000
147.5	0.000	0.0	0.0	0.000	0.0	0.000
148.0	0.000	0.0	0.0	0.000	0.0	0.000
148.5	0.000	0.0	0.0	0.000	0.0	0.000
149.0	0.000	0.0	0.0	0.000	0.0	0.000
149.5	0.000	0.0	0.0	0.000	0.0	0.000
150.0	0.000	0.0	0.0	0.000	0.0	0.000
150.5	0.000	0.0	0.0	0.000	0.0	0.000
151.0	0.000	0.0	0.0	0.000	0.0	0.000
151.5	0.000	0.0	0.0	0.000	0.0	0.000
152.0	0.000	0.0	0.0	0.000	0.0	0.000
152.5	0.000	0.0	0.0	0.000	0.0	0.000
153.0	0.000	0.0	0.0	0.000	0.0	0.000
153.5	0.000	0.0	0.0	0.000	0.0	0.000
154.0	0.000	0.0	0.0	0.000	0.0	0.000
154.5	0.000	0.0	0.0	0.000	0.0	0.000
155.0	0.000	0.0	0.0	0.000	0.0	0.000
155.5	0.000	0.0	0.0	0.000	0.0	0.000
156.0	0.000	0.0	0.0	0.000	0.0	0.000
156.5	0.000	0.0	0.0	0.000	0.0	0.000
157.0	0.000	0.0	0.0	0.000	0.0	0.000
157.5	0.000	0.0	0.0	0.000	0.0	0.000
158.0	0.000	0.0	0.0	0.000	0.0	0.000
158.5	0.000	0.0	0.0	0.000	0.0	0.000
159.0	0.000	0.0	0.0	0.000	0.0	0.000
159.5	0.000	0.0	0.0	0.000	0.0	0.000
160.0	0.000	0.0	0.0	0.000	0.0	0.000
160.5	0.000	0.0	0.0	0.000	0.0	0.000

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
161.0	0.000	0.0	0.0	0.000	0.0	0.000
161.5	0.000	0.0	0.0	0.000	0.0	0.000
162.0	0.000	0.0	0.0	0.000	0.0	0.000
162.5	0.000	0.0	0.0	0.000	0.0	0.000
163.0	0.000	0.0	0.0	0.000	0.0	0.000
163.5	0.000	0.0	0.0	0.000	0.0	0.000
164.0	0.000	0.0	0.0	0.000	0.0	0.000
164.5	0.000	0.0	0.0	0.000	0.0	0.000
165.0	0.000	0.0	0.0	0.000	0.0	0.000
165.5	0.000	0.0	0.0	0.000	0.0	0.000
166.0	0.000	0.0	0.0	0.000	0.0	0.000
166.5	0.000	0.0	0.0	0.000	0.0	0.000
167.0	0.000	0.0	0.0	0.000	0.0	0.000
167.5	0.000	0.0	0.0	0.000	0.0	0.000
168.0	0.000	0.0	0.0	0.000	0.0	0.000
168.5	0.000	0.0	0.0	0.000	0.0	0.000
169.0	0.000	0.0	0.0	0.000	0.0	0.000
169.5	0.000	0.0	0.0	0.000	0.0	0.000
170.0	0.000	0.0	0.0	0.000	0.0	0.000
170.5	0.000	0.0	0.0	0.000	0.0	0.000
171.0	0.000	0.0	0.0	0.000	0.0	0.000
171.5	0.000	0.0	0.0	0.000	0.0	0.000
172.0	0.000	0.0	0.0	0.000	0.0	0.000
172.5	0.000	0.0	0.0	0.000	0.0	0.000
173.0	0.000	0.0	0.0	0.000	0.0	0.000
173.5	0.000	0.0	0.0	0.000	0.0	0.000
174.0	0.000	0.0	0.0	0.000	0.0	0.000
174.5	0.000	0.0	0.0	0.000	0.0	0.000
175.0	0.000	0.0	0.0	0.000	0.0	0.000
175.5	0.000	0.0	0.0	0.000	0.0	0.000
176.0	0.000	0.0	0.0	0.000	0.0	0.000
176.5	0.000	121.5	0.0	0.000	0.0	0.000
177.0	0.000	121.5	0.0	0.000	0.0	0.000
177.5	0.000	121.5	0.0	0.000	0.0	0.000
178.0	0.000	121.5	0.0	0.000	0.0	0.000
178.5	0.000	121.5	0.0	0.000	0.0	0.000
179.0	0.000	121.6	0.0	0.000	0.0	0.000
179.5	0.000	121.5	0.0	0.000	0.0	0.000
180.0	0.000	121.6	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
0.0	0.0	0.000	0.0	0.000
0.5	0.0	0.000	0.0	0.000
1.0	0.0	0.000	0.0	0.000
1.5	0.0	0.000	0.0	0.000
2.0	0.0	0.000	0.0	0.000
2.5	0.0	0.000	0.0	0.000
3.0	0.0	0.000	0.0	0.000
3.5	0.0	0.000	0.0	0.000
4.0	0.0	0.000	0.0	0.000
4.5	0.0	0.000	0.0	0.000
5.0	0.0	0.000	0.0	0.000
5.5	0.0	0.000	0.0	0.000
6.0	0.0	0.000	0.0	0.000
6.5	0.0	0.000	0.0	0.000
7.0	0.0	0.000	0.0	0.000
7.5	0.0	0.000	0.0	0.000
8.0	0.0	0.000	0.0	0.000
8.5	0.0	0.000	0.0	0.000
9.0	0.0	0.000	0.0	0.000
9.5	0.0	0.000	0.0	0.000
10.0	0.0	0.000	0.0	0.000
10.5	0.0	0.000	0.0	0.000
11.0	0.0	0.000	0.0	0.000
11.5	0.0	0.000	0.0	0.000
12.0	0.0	0.000	0.0	0.000
12.5	0.0	0.000	0.0	0.000
13.0	0.0	0.000	0.0	0.000
13.5	0.0	0.000	0.0	0.000
14.0	0.0	0.000	0.0	0.000
14.5	0.0	0.000	0.0	0.000
15.0	0.0	0.000	0.0	0.000
15.5	0.0	0.000	0.0	0.000
16.0	0.0	0.000	0.0	0.000
16.5	0.0	0.000	0.0	0.000
17.0	0.0	0.000	0.0	0.000
17.5	0.0	0.000	0.0	0.000
18.0	0.0	0.000	0.0	0.000
18.5	0.0	0.000	0.0	0.000
19.0	0.0	0.000	0.0	0.000
19.5	0.0	0.000	0.0	0.000
20.0	0.0	0.000	0.0	0.000
20.5	0.0	0.000	0.0	0.000
21.0	0.0	0.000	0.0	0.000
21.5	0.0	0.000	0.0	0.000
22.0	0.0	0.000	0.0	0.000
22.5	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
23.0	0.0	0.000	0.0	0.000
23.5	0.0	0.000	0.0	0.000
24.0	0.0	0.000	0.0	0.000
24.5	0.0	0.000	0.0	0.000
25.0	0.0	0.000	0.0	0.000
25.5	0.0	0.000	0.0	0.000
26.0	0.0	0.000	0.0	0.000
26.5	0.0	0.000	0.0	0.000
27.0	0.0	0.000	0.0	0.000
27.5	0.0	0.000	0.0	0.000
28.0	0.0	0.000	0.0	0.000
28.5	0.0	0.000	0.0	0.000
29.0	0.0	0.000	0.0	0.000
29.5	0.0	0.000	0.0	0.000
30.0	0.0	0.000	0.0	0.000
30.5	0.0	0.000	0.0	0.000
31.0	0.0	0.000	0.0	0.000
31.5	0.0	0.000	0.0	0.000
32.0	0.0	0.000	0.0	0.000
32.5	0.0	0.000	0.0	0.000
33.0	0.0	0.000	0.0	0.000
33.5	0.0	0.000	0.0	0.000
34.0	0.0	0.000	0.0	0.000
34.5	0.0	0.000	0.0	0.000
35.0	0.0	0.000	0.0	0.000
35.5	0.0	0.000	0.0	0.000
36.0	0.0	0.000	0.0	0.000
36.5	0.0	0.000	0.0	0.000
37.0	0.0	0.000	0.0	0.000
37.5	0.0	0.000	0.0	0.000
38.0	0.0	0.000	0.0	0.000
38.5	0.0	0.000	0.0	0.000
39.0	0.0	0.000	0.0	0.000
39.5	0.0	0.000	0.0	0.000
40.0	0.0	0.000	0.0	0.000
40.5	0.0	0.000	0.0	0.000
41.0	0.0	0.000	0.0	0.000
41.5	0.0	0.000	0.0	0.000
42.0	0.0	0.000	0.0	0.000
42.5	0.0	0.000	0.0	0.000
43.0	0.0	0.000	0.0	0.000
43.5	0.0	0.000	0.0	0.000
44.0	0.0	0.000	0.0	0.000
44.5	0.0	0.000	0.0	0.000
45.0	0.0	0.000	0.0	0.000
45.5	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
46.0	0.0	0.000	0.0	0.000
46.5	0.0	0.000	0.0	0.000
47.0	0.0	0.000	0.0	0.000
47.5	0.0	0.000	0.0	0.000
48.0	0.0	0.000	0.0	0.000
48.5	0.0	0.000	0.0	0.000
49.0	0.0	0.000	0.0	0.000
49.5	0.0	0.000	0.0	0.000
50.0	0.0	0.000	0.0	0.000
50.5	0.0	0.000	0.0	0.000
51.0	0.0	0.000	0.0	0.000
51.5	0.0	0.000	0.0	0.000
52.0	0.0	0.000	0.0	0.000
52.5	0.0	0.000	0.0	0.000
53.0	0.0	0.000	0.0	0.000
53.5	0.0	0.000	0.0	0.000
54.0	0.0	0.000	0.0	0.000
54.5	0.0	0.000	0.0	0.000
55.0	0.0	0.000	0.0	0.000
55.5	0.0	0.000	0.0	0.000
56.0	0.0	0.000	0.0	0.000
56.5	0.0	0.000	0.0	0.000
57.0	0.0	0.000	0.0	0.000
57.5	0.0	0.000	0.0	0.000
58.0	0.0	0.000	0.0	0.000
58.5	0.0	0.000	0.0	0.000
59.0	0.0	0.000	0.0	0.000
59.5	0.0	0.000	0.0	0.000
60.0	0.0	0.000	0.0	0.000
60.5	0.0	0.000	0.0	0.000
61.0	0.0	0.000	0.0	0.000
61.5	0.0	0.000	0.0	0.000
62.0	0.0	0.000	0.0	0.000
62.5	0.0	0.000	0.0	0.000
63.0	0.0	0.000	0.0	0.000
63.5	0.0	0.000	0.0	0.000
64.0	0.0	0.000	0.0	0.000
64.5	0.0	0.000	0.0	0.000
65.0	0.0	0.000	0.0	0.000
65.5	0.0	0.000	0.0	0.000
66.0	0.0	0.000	0.0	0.000
66.5	0.0	0.000	0.0	0.000
67.0	0.0	0.000	0.0	0.000
67.5	0.0	0.000	0.0	0.000
68.0	0.0	0.000	0.0	0.000
68.5	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
69.0	0.0	0.000	0.0	0.000
69.5	0.0	0.000	0.0	0.000
70.0	0.0	0.000	0.0	0.000
70.5	0.0	0.000	0.0	0.000
71.0	0.0	0.000	0.0	0.000
71.5	0.0	0.000	0.0	0.000
72.0	0.0	0.000	0.0	0.000
72.5	0.0	0.000	0.0	0.000
73.0	0.0	0.000	0.0	0.000
73.5	0.0	0.000	0.0	0.000
74.0	0.0	0.000	0.0	0.000
74.5	0.0	0.000	0.0	0.000
75.0	0.0	0.000	0.0	0.000
75.5	0.0	0.000	0.0	0.000
76.0	0.0	0.000	0.0	0.000
76.5	0.0	0.000	0.0	0.000
77.0	0.0	0.000	0.0	0.000
77.5	0.0	0.000	0.0	0.000
78.0	0.0	0.000	0.0	0.000
78.5	0.0	0.000	0.0	0.000
79.0	0.0	0.000	0.0	0.000
79.5	0.0	0.000	0.0	0.000
80.0	0.0	0.000	0.0	0.000
80.5	0.0	0.000	0.0	0.000
81.0	0.0	0.000	0.0	0.000
81.5	0.0	0.000	0.0	0.000
82.0	0.0	0.000	0.0	0.000
82.5	0.0	0.000	0.0	0.000
83.0	0.0	0.000	0.0	0.000
83.5	0.0	0.000	0.0	0.000
84.0	0.0	0.000	0.0	0.000
84.5	0.0	0.000	0.0	0.000
85.0	0.0	0.000	0.0	0.000
85.5	0.0	0.000	0.0	0.000
86.0	0.0	0.000	0.0	0.000
86.5	0.0	0.000	0.0	0.000
87.0	0.0	0.000	0.0	0.000
87.5	0.0	0.000	0.0	0.000
88.0	0.0	0.000	0.0	0.000
88.5	0.0	0.000	0.0	0.000
89.0	0.0	0.000	0.0	0.000
89.5	0.0	0.000	0.0	0.000
90.0	0.0	0.000	0.0	0.000
90.5	0.0	0.000	0.0	0.000
91.0	0.0	0.000	0.0	0.000
91.5	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
92.0	0.0	0.000	0.0	0.000
92.5	0.0	0.000	0.0	0.000
93.0	0.0	0.000	0.0	0.000
93.5	0.0	0.000	0.0	0.000
94.0	0.0	0.000	0.0	0.000
94.5	0.0	0.000	0.0	0.000
95.0	0.0	0.000	0.0	0.000
95.5	0.0	0.000	0.0	0.000
96.0	0.0	0.000	0.0	0.000
96.5	0.0	0.000	0.0	0.000
97.0	0.0	0.000	0.0	0.000
97.5	0.0	0.000	0.0	0.000
98.0	0.0	0.000	0.0	0.000
98.5	0.0	0.000	0.0	0.000
99.0	0.0	0.000	0.0	0.000
99.5	0.0	0.000	0.0	0.000
100.0	0.0	0.000	0.0	0.000
100.5	0.0	0.000	0.0	0.000
101.0	0.0	0.000	0.0	0.000
101.5	0.0	0.000	0.0	0.000
102.0	0.0	0.000	0.0	0.000
102.5	0.0	0.000	0.0	0.000
103.0	0.0	0.000	0.0	0.000
103.5	0.0	0.000	0.0	0.000
104.0	0.0	0.000	0.0	0.000
104.5	0.0	0.000	0.0	0.000
105.0	0.0	0.000	0.0	0.000
105.5	0.0	0.000	0.0	0.000
106.0	0.0	0.000	0.0	0.000
106.5	0.0	0.000	0.0	0.000
107.0	0.0	0.000	0.0	0.000
107.5	0.0	0.000	0.0	0.000
108.0	0.0	0.000	0.0	0.000
108.5	0.0	0.000	0.0	0.000
109.0	0.0	0.000	0.0	0.000
109.5	0.0	0.000	0.0	0.000
110.0	0.0	0.000	0.0	0.000
110.5	0.0	0.000	0.0	0.000
111.0	0.0	0.000	0.0	0.000
111.5	0.0	0.000	0.0	0.000
112.0	0.0	0.000	0.0	0.000
112.5	0.0	0.000	0.0	0.000
113.0	0.0	0.000	0.0	0.000
113.5	0.0	0.000	0.0	0.000
114.0	0.0	0.000	0.0	0.000
114.5	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
115.0	0.0	0.000	0.0	0.000
115.5	0.0	0.000	0.0	0.000
116.0	0.0	0.000	0.0	0.000
116.5	0.0	0.000	0.0	0.000
117.0	0.0	0.000	0.0	0.000
117.5	0.0	0.000	0.0	0.000
118.0	0.0	0.000	0.0	0.000
118.5	0.0	0.000	0.0	0.000
119.0	0.0	0.000	0.0	0.000
119.5	0.0	0.000	0.0	0.000
120.0	0.0	0.000	0.0	0.000
120.5	0.0	0.000	0.0	0.000
121.0	0.0	0.000	0.0	0.000
121.5	0.0	0.000	0.0	0.000
122.0	0.0	0.000	0.0	0.000
122.5	0.0	0.000	0.0	0.000
123.0	0.0	0.000	0.0	0.000
123.5	0.0	0.000	0.0	0.000
124.0	0.0	0.000	0.0	0.000
124.5	0.0	0.000	0.0	0.000
125.0	0.0	0.000	0.0	0.000
125.5	0.0	0.000	0.0	0.000
126.0	0.0	0.000	0.0	0.000
126.5	0.0	0.000	0.0	0.000
127.0	0.0	0.000	0.0	0.000
127.5	0.0	0.000	0.0	0.000
128.0	0.0	0.000	0.0	0.000
128.5	0.0	0.000	0.0	0.000
129.0	0.0	0.000	0.0	0.000
129.5	0.0	0.000	0.0	0.000
130.0	0.0	0.000	0.0	0.000
130.5	0.0	0.000	0.0	0.000
131.0	0.0	0.000	0.0	0.000
131.5	0.0	0.000	0.0	0.000
132.0	0.0	0.000	0.0	0.000
132.5	0.0	0.000	0.0	0.000
133.0	0.0	0.000	0.0	0.000
133.5	0.0	0.000	0.0	0.000
134.0	0.0	0.000	0.0	0.000
134.5	0.0	0.000	0.0	0.000
135.0	0.0	0.000	0.0	0.000
135.5	0.0	0.000	0.0	0.000
136.0	0.0	0.000	0.0	0.000
136.5	0.0	0.000	0.0	0.000
137.0	0.0	0.000	0.0	0.000
137.5	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
138.0	0.0	0.000	0.0	0.000
138.5	0.0	0.000	0.0	0.000
139.0	0.0	0.000	0.0	0.000
139.5	0.0	0.000	0.0	0.000
140.0	0.0	0.000	0.0	0.000
140.5	0.0	0.000	0.0	0.000
141.0	0.0	0.000	0.0	0.000
141.5	0.0	0.000	0.0	0.000
142.0	0.0	0.000	0.0	0.000
142.5	0.0	0.000	0.0	0.000
143.0	0.0	0.000	0.0	0.000
143.5	0.0	0.000	0.0	0.000
144.0	0.0	0.000	0.0	0.000
144.5	0.0	0.000	0.0	0.000
145.0	0.0	0.000	0.0	0.000
145.5	0.0	0.000	0.0	0.000
146.0	0.0	0.000	0.0	0.000
146.5	0.0	0.000	0.0	0.000
147.0	0.0	0.000	0.0	0.000
147.5	0.0	0.000	0.0	0.000
148.0	0.0	0.000	0.0	0.000
148.5	0.0	0.000	0.0	0.000
149.0	0.0	0.000	0.0	0.000
149.5	0.0	0.000	0.0	0.000
150.0	0.0	0.000	0.0	0.000
150.5	0.0	0.000	0.0	0.000
151.0	0.0	0.000	0.0	0.000
151.5	0.0	0.000	0.0	0.000
152.0	0.0	0.000	0.0	0.000
152.5	0.0	0.000	0.0	0.000
153.0	0.0	0.000	0.0	0.000
153.5	0.0	0.000	0.0	0.000
154.0	0.0	0.000	0.0	0.000
154.5	0.0	0.000	0.0	0.000
155.0	0.0	0.000	0.0	0.000
155.5	0.0	0.000	0.0	0.000
156.0	0.0	0.000	0.0	0.000
156.5	0.0	0.000	0.0	0.000
157.0	0.0	0.000	0.0	0.000
157.5	0.0	0.000	0.0	0.000
158.0	0.0	0.000	0.0	0.000
158.5	0.0	0.000	0.0	0.000
159.0	0.0	0.000	0.0	0.000
159.5	0.0	0.000	0.0	0.000
160.0	0.0	0.000	0.0	0.000
160.5	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
161.0	0.0	0.000	0.0	0.000
161.5	0.0	0.000	0.0	0.000
162.0	0.0	0.000	0.0	0.000
162.5	0.0	0.000	0.0	0.000
163.0	0.0	0.000	0.0	0.000
163.5	0.0	0.000	0.0	0.000
164.0	0.0	0.000	0.0	0.000
164.5	0.0	0.000	0.0	0.000
165.0	0.0	0.000	0.0	0.000
165.5	0.0	0.000	0.0	0.000
166.0	0.0	0.000	0.0	0.000
166.5	0.0	0.000	0.0	0.000
167.0	0.0	0.000	0.0	0.000
167.5	0.0	0.000	0.0	0.000
168.0	0.0	0.000	0.0	0.000
168.5	0.0	0.000	0.0	0.000
169.0	0.0	0.000	0.0	0.000
169.5	0.0	0.000	0.0	0.000
170.0	0.0	0.000	0.0	0.000
170.5	0.0	0.000	0.0	0.000
171.0	0.0	0.000	0.0	0.000
171.5	0.0	0.000	0.0	0.000
172.0	0.0	0.000	0.0	0.000
172.5	0.0	0.000	0.0	0.000
173.0	0.0	0.000	0.0	0.000
173.5	0.0	0.000	0.0	0.000
174.0	0.0	0.000	0.0	0.000
174.5	0.0	0.000	0.0	0.000
175.0	0.0	0.000	0.0	0.000
175.5	0.0	0.000	0.0	0.000
176.0	0.0	0.000	0.0	0.000
176.5	0.0	0.000	0.0	0.000
177.0	0.0	0.000	0.0	0.000
177.5	0.0	0.000	0.0	0.000
178.0	0.0	0.000	0.0	0.000
178.5	0.0	0.000	0.0	0.000
179.0	0.0	0.000	0.0	0.000
179.5	0.0	0.000	0.0	0.000
180.0	0.0	0.000	0.0	0.000

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Std Dev of Furnace Probes (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)
0	68	79	1	0	0	0.00
1	254	141	20	26	75	-66.0
2	441	328	69	159	336	-52.6
3	627	640	175	545	784	-30.5
4	814	835	175	1,205	1,418	-15.0
5	1000	946	152	2,020	2,238	-9.73
6	1060	1040	141	2,936	3,193	-8.05
7	1120	1119	132	3,941	4,209	-6.36
8	1180	1177	123	5,017	5,285	-5.08
9	1240	1223	112	6,145	6,421	-4.30
10	1300	1266	107	7,317	7,617	-3.93
11	1328	1307	103	8,532	8,863	-3.74
12	1347	1344	100	9,786	10,130	-3.40
13	1364	1376	96	11,075	11,416	-2.99
14	1381	1405	94	12,395	12,719	-2.55
15	1396	1424	88	13,740	14,038	-2.13
16	1410	1434	82	15,101	15,372	-1.76
17	1424	1433	72	16,467	16,720	-1.51
18	1436	1435	65	17,832	18,080	-1.37
19	1448	1441	62	19,201	19,453	-1.30
20	1459	1450	59	20,578	20,838	-1.25
21	1470	1460	54	21,963	22,233	-1.22
22	1480	1476	51	23,362	23,640	-1.17
23	1490	1484	43	24,773	25,056	-1.13
24	1499	1492	38	26,193	26,482	-1.09
25	1508	1502	34	27,621	27,917	-1.06
26	1517	1514	32	29,060	29,361	-1.02
27	1525	1524	30	30,510	30,813	-0.98
28	1533	1536	29	31,972	32,274	-0.94
29	1541	1544	26	33,443	33,743	-0.89
30	1549	1553	26	34,922	35,219	-0.84
31	1556	1561	25	36,410	36,702	-0.80
32	1563	1568	24	37,905	38,193	-0.75
33	1570	1575	23	39,408	39,691	-0.71
34	1576	1582	23	40,918	41,195	-0.67
35	1583	1590	23	42,436	42,706	-0.63
36	1589	1596	23	43,960	44,223	-0.59
37	1595	1602	22	45,491	45,746	-0.56
38	1601	1607	23	47,027	47,275	-0.53
39	1606	1611	22	48,568	48,810	-0.50
40	1612	1615	22	50,112	50,351	-0.47
41	1617	1625	23	51,663	51,897	-0.45
42	1623	1635	24	53,224	53,449	-0.42
43	1628	1642	23	54,794	55,006	-0.39

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Std Dev of Furnace Probes (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)
44	1633	1648	23	56,370	56,568	-0.35
45	1638	1653	23	57,952	58,135	-0.31
46	1643	1661	24	59,540	59,707	-0.28
47	1648	1666	25	61,135	61,284	-0.24
48	1652	1667	25	62,734	62,865	-0.21
49	1657	1666	21	64,332	64,451	-0.18
50	1661	1667	19	65,930	66,042	-0.17
51	1666	1666	17	67,528	67,637	-0.16
52	1670	1672	19	69,129	69,236	-0.16
53	1674	1678	22	70,734	70,840	-0.15
54	1678	1677	18	72,345	72,447	-0.14
55	1682	1683	21	73,955	74,059	-0.14
56	1686	1685	20	75,571	75,675	-0.14
57	1690	1688	19	77,190	77,295	-0.14
58	1694	1688	17	78,810	78,918	-0.14
59	1698	1691	17	80,430	80,546	-0.14
60	1701	1694	15	82,055	82,177	-0.15
61	1705	1701	17	83,684	83,812	-0.15
62	1709	1705	17	85,318	85,450	-0.15
63	1712	1711	18	86,957	87,092	-0.15
64	1716	1716	18	88,603	88,738	-0.15
65	1719	1721	18	90,252	90,387	-0.15
66	1722	1724	17	91,906	92,039	-0.14
67	1726	1727	16	93,563	93,695	-0.14
68	1729	1729	15	95,222	95,354	-0.14
69	1732	1736	22	96,885	97,016	-0.14
70	1735	1744	32	98,557	98,681	-0.13
71	1738	1745	31	100,233	100,350	-0.12
72	1742	1747	31	101,910	102,022	-0.11
73	1745	1751	33	103,590	103,697	-0.10
74	1748	1753	31	105,274	105,374	-0.10
75	1751	1755	31	106,960	107,055	-0.09
76	1753	1758	29	108,648	108,739	-0.08
77	1756	1761	30	110,339	110,426	-0.08
78	1759	1765	31	112,034	112,115	-0.07
79	1762	1766	30	113,731	113,807	-0.07
80	1765	1772	32	115,432	115,502	-0.06
81	1768	1773	30	117,136	117,200	-0.05
82	1770	1777	30	118,843	118,901	-0.05
83	1773	1779	29	120,553	120,604	-0.04
84	1776	1781	28	122,265	122,310	-0.04
85	1778	1784	27	123,980	124,019	-0.03
86	1781	1789	28	125,698	125,730	-0.03
87	1783	1791	27	127,420	127,444	-0.02

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Std Dev of Furnace Probes (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)
88	1786	1796	29	129,145	129,160	-0.01
89	1788	1797	29	130,873	130,879	0.00
90	1791	1796	28	132,601	132,600	0.00
91	1793	1797	26	134,330	134,324	0.00
92	1796	1800	26	136,060	136,050	0.01
93	1798	1801	25	137,792	137,778	0.01
94	1800	1804	25	139,526	139,509	0.01
95	1803	1807	26	141,264	141,242	0.02
96	1805	1807	26	143,003	142,978	0.02
97	1807	1810	26	144,743	144,716	0.02
98	1809	1812	25	146,486	146,456	0.02
99	1812	1815	24	148,231	148,198	0.02
100	1814	1818	24	149,979	149,943	0.02
101	1816	1820	24	151,729	151,690	0.03
102	1818	1823	25	153,483	153,439	0.03
103	1820	1824	24	155,238	155,190	0.03
104	1823	1827	25	156,996	156,943	0.03
105	1825	1831	25	158,756	158,699	0.04
106	1827	1832	25	160,520	160,456	0.04
107	1829	1834	25	162,285	162,216	0.04
108	1831	1835	25	164,051	163,977	0.05
109	1833	1837	25	165,819	165,741	0.05
110	1835	1839	25	167,590	167,507	0.05
111	1836	1840	25	169,361	169,274	0.05
112	1838	1841	24	171,134	171,043	0.05
113	1839	1843	23	172,908	172,813	0.05
114	1840	1845	23	174,684	174,585	0.06
115	1841	1846	24	176,461	176,357	0.06
116	1843	1846	23	178,238	178,131	0.06
117	1844	1848	23	180,017	179,906	0.06
118	1845	1849	23	181,797	181,682	0.06
119	1846	1850	23	183,578	183,460	0.06
120	1848	1851	21	185,360	185,239	0.07
121	1849	1853	21	187,144	187,019	0.07
122	1850	1854	21	188,929	188,800	0.07
123	1851	1854	21	190,715	190,583	0.07
124	1853	1856	21	192,502	192,367	0.07
125	1854	1857	22	194,291	194,152	0.07
126	1855	1858	21	196,080	195,939	0.07
127	1856	1857	20	197,869	197,726	0.07
128	1858	1858	20	199,659	199,515	0.07
129	1859	1859	20	201,449	201,305	0.07
130	1860	1859	21	203,240	203,097	0.07
131	1861	1862	21	205,032	204,889	0.07

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Std Dev of Furnace Probes (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)
176	1918	1917	23	286,865	286,861	0.00
177	1919	1921	21	288,715	288,712	0.00
178	1921	1922	21	290,569	290,563	0.00
179	1922	1924	21	292,424	292,416	0.00
180	1923	1926	23	294,281	294,271	0.00

Time (min)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)
0	79	79	79	80	80	80	78	78
1	132	129	177	152	173	132	122	152
2	340	322	400	321	312	259	321	364
3	700	696	714	552	548	461	769	709
4	918	927	892	724	711	671	994	928
5	1026	1029	986	839	815	804	1090	1029
6	1119	1118	1074	937	909	896	1174	1114
7	1192	1190	1145	1019	992	972	1244	1188
8	1243	1241	1196	1082	1053	1034	1295	1244
9	1290	1281	1238	1134	1103	1088	1333	1286
10	1330	1319	1278	1180	1148	1135	1371	1325
11	1371	1355	1318	1224	1189	1179	1411	1363
12	1409	1390	1354	1262	1227	1217	1449	1400
13	1445	1421	1380	1298	1262	1253	1478	1434
14	1479	1454	1407	1329	1293	1284	1506	1464
15	1488	1469	1426	1350	1317	1307	1520	1482
16	1488	1476	1437	1365	1334	1324	1526	1493
17	1475	1465	1434	1372	1341	1331	1517	1488
18	1473	1463	1436	1379	1349	1341	1513	1486
19	1477	1467	1443	1389	1358	1351	1517	1489
20	1483	1473	1451	1399	1369	1363	1523	1495
21	1493	1482	1462	1414	1384	1378	1527	1505
22	1509	1497	1478	1434	1403	1396	1539	1519
23	1507	1499	1483	1449	1420	1413	1538	1526
24	1507	1502	1489	1462	1435	1428	1539	1534
25	1513	1510	1499	1475	1450	1443	1546	1543
26	1523	1521	1510	1488	1464	1459	1556	1552
27	1531	1529	1520	1501	1477	1472	1564	1562
28	1542	1541	1532	1513	1490	1486	1575	1572
29	1546	1548	1541	1525	1502	1497	1579	1582
30	1553	1556	1550	1535	1512	1506	1586	1590
31	1559	1564	1559	1545	1523	1516	1592	1600
32	1565	1571	1565	1552	1531	1523	1598	1607
33	1571	1578	1574	1562	1540	1531	1604	1615
34	1577	1585	1581	1571	1549	1540	1609	1623
35	1585	1592	1590	1579	1557	1547	1617	1631
36	1590	1598	1596	1586	1564	1554	1623	1638
37	1594	1603	1602	1594	1572	1562	1626	1648
38	1597	1606	1607	1598	1578	1568	1630	1655
39	1601	1611	1612	1603	1583	1573	1634	1658
40	1606	1616	1617	1608	1589	1578	1637	1664
41	1614	1627	1630	1619	1600	1587	1645	1675
42	1622	1637	1643	1632	1611	1597	1653	1690
43	1630	1644	1649	1640	1619	1605	1659	1693

Time (min)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)
44	1636	1650	1657	1648	1627	1613	1665	1699
45	1640	1655	1662	1655	1633	1619	1669	1705
46	1646	1662	1671	1665	1643	1628	1673	1716
47	1651	1666	1677	1670	1648	1634	1675	1724
48	1652	1667	1676	1669	1648	1637	1677	1727
49	1653	1666	1673	1668	1647	1637	1679	1713
50	1656	1668	1673	1668	1647	1638	1681	1707
51	1658	1669	1672	1666	1646	1637	1682	1700
52	1662	1674	1679	1672	1653	1643	1685	1711
53	1666	1679	1687	1681	1661	1650	1688	1728
54	1667	1678	1683	1678	1659	1651	1690	1717
55	1671	1684	1692	1683	1665	1655	1694	1731
56	1673	1685	1692	1687	1669	1660	1696	1728
57	1677	1689	1695	1689	1671	1663	1699	1730
58	1679	1689	1693	1688	1670	1663	1700	1725
59	1682	1693	1697	1690	1673	1665	1703	1728
60	1688	1698	1700	1692	1675	1668	1708	1725
61	1693	1705	1709	1700	1683	1674	1714	1736
62	1697	1708	1712	1704	1687	1679	1717	1739
63	1702	1714	1720	1711	1695	1686	1722	1750
64	1706	1719	1724	1716	1700	1692	1727	1757
65	1712	1724	1730	1720	1705	1696	1730	1759
66	1716	1727	1731	1724	1707	1700	1734	1759
67	1719	1731	1735	1727	1711	1705	1737	1761
68	1723	1733	1736	1727	1711	1706	1740	1759
69	1726	1739	1746	1734	1719	1712	1744	1791
70	1730	1747	1756	1739	1725	1717	1749	1833
71	1731	1751	1757	1740	1725	1718	1754	1830
72	1734	1756	1759	1741	1727	1720	1763	1828
73	1738	1760	1763	1744	1730	1723	1765	1839
74	1741	1762	1765	1747	1733	1726	1769	1836
75	1744	1766	1769	1749	1736	1729	1771	1836
76	1746	1768	1770	1754	1740	1732	1775	1832
77	1749	1772	1773	1756	1742	1735	1780	1839
78	1753	1775	1776	1759	1745	1739	1783	1847
79	1755	1777	1778	1760	1747	1741	1784	1845
80	1760	1782	1783	1765	1752	1746	1787	1859
81	1762	1784	1784	1768	1755	1749	1789	1854
82	1766	1788	1788	1772	1758	1753	1794	1856
83	1768	1790	1790	1774	1761	1755	1796	1856
84	1771	1792	1792	1777	1764	1759	1799	1853
85	1774	1794	1795	1781	1767	1762	1801	1852
86	1777	1798	1799	1785	1772	1767	1803	1862
87	1780	1801	1802	1788	1775	1770	1806	1860

Time (min)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)
88	1783	1803	1807	1793	1780	1775	1805	1872
89	1786	1805	1806	1794	1780	1776	1809	1876
90	1787	1807	1806	1792	1779	1775	1811	1872
91	1790	1810	1808	1793	1780	1776	1816	1864
92	1794	1814	1812	1794	1782	1779	1819	1865
93	1796	1817	1812	1796	1783	1780	1823	1862
94	1800	1820	1816	1798	1786	1783	1829	1864
95	1802	1821	1819	1801	1789	1785	1829	1874
96	1802	1821	1818	1802	1789	1786	1828	1872
97	1805	1825	1820	1804	1792	1788	1831	1874
98	1808	1827	1823	1807	1795	1792	1835	1871
99	1811	1830	1826	1810	1798	1795	1836	1873
100	1815	1835	1830	1813	1801	1798	1842	1874
101	1817	1837	1832	1815	1803	1801	1844	1877
102	1819	1838	1834	1819	1806	1804	1844	1885
103	1822	1840	1836	1820	1807	1806	1847	1882
104	1825	1844	1839	1822	1810	1807	1851	1886
105	1828	1847	1842	1826	1814	1811	1855	1889
106	1830	1848	1843	1827	1815	1812	1855	1892
107	1831	1849	1844	1829	1817	1814	1855	1894
108	1832	1849	1845	1831	1819	1817	1857	1897
109	1834	1851	1847	1833	1821	1819	1858	1899
110	1835	1852	1849	1835	1823	1821	1860	1901
111	1837	1854	1850	1837	1825	1823	1859	1902
112	1838	1856	1852	1837	1825	1823	1861	1899
113	1841	1858	1854	1839	1827	1826	1864	1899
114	1843	1860	1856	1841	1830	1828	1866	1901
115	1843	1860	1856	1841	1830	1828	1866	1904
116	1844	1860	1856	1842	1830	1829	1865	1902
117	1846	1863	1858	1843	1832	1831	1870	1904
118	1847	1864	1860	1845	1833	1833	1870	1902
119	1849	1865	1861	1846	1835	1834	1873	1903
120	1851	1867	1862	1848	1836	1836	1876	1898
121	1853	1869	1863	1849	1838	1837	1878	1898
122	1854	1870	1864	1850	1839	1838	1878	1899
123	1855	1871	1865	1851	1840	1839	1878	1900
124	1857	1872	1866	1852	1841	1841	1882	1900
125	1857	1872	1867	1853	1842	1842	1880	1906
126	1857	1873	1868	1854	1843	1843	1881	1905
127	1858	1873	1867	1854	1843	1843	1880	1902
128	1858	1873	1868	1855	1844	1844	1882	1902
129	1859	1874	1869	1855	1845	1845	1880	1904
130	1859	1874	1869	1856	1846	1845	1881	1907
131	1861	1877	1871	1858	1848	1847	1885	1909

Time (min)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)
132	1861	1877	1872	1859	1848	1848	1884	1912
133	1862	1877	1872	1860	1850	1849	1882	1915
134	1863	1878	1873	1861	1851	1851	1885	1911
135	1864	1880	1875	1862	1852	1851	1886	1913
136	1866	1881	1877	1864	1854	1854	1889	1918
137	1866	1881	1877	1866	1856	1855	1887	1923
138	1868	1884	1879	1868	1858	1857	1890	1926
139	1869	1885	1881	1870	1860	1859	1890	1924
140	1870	1886	1881	1870	1860	1860	1892	1923
141	1872	1887	1883	1873	1863	1862	1890	1928
142	1872	1887	1884	1873	1863	1863	1891	1927
143	1874	1889	1885	1874	1865	1864	1895	1926
144	1875	1891	1887	1876	1866	1866	1897	1926
145	1876	1891	1887	1877	1867	1867	1896	1928
146	1877	1892	1888	1877	1867	1868	1898	1927
147	1879	1894	1891	1879	1869	1869	1902	1934
148	1881	1896	1892	1881	1871	1871	1901	1937
149	1882	1897	1893	1883	1873	1872	1901	1940
150	1883	1897	1895	1885	1876	1875	1900	1943
151	1883	1897	1895	1886	1876	1876	1902	1939
152	1884	1897	1895	1886	1877	1876	1902	1936
153	1881	1895	1892	1884	1875	1875	1896	1935
154	1881	1894	1891	1883	1874	1874	1899	1938
155	1880	1894	1890	1883	1874	1873	1897	1941
156	1881	1894	1892	1884	1876	1874	1896	1946
157	1881	1895	1892	1885	1877	1876	1895	1949
158	1882	1895	1894	1887	1879	1878	1893	1953
159	1883	1896	1894	1888	1879	1878	1896	1953
160	1885	1897	1897	1890	1882	1880	1894	1955
161	1885	1899	1897	1891	1882	1881	1898	1956
162	1885	1899	1896	1890	1882	1881	1899	1954
163	1886	1899	1897	1891	1883	1881	1897	1957
164	1890	1904	1902	1895	1887	1885	1901	1964
165	1891	1904	1903	1896	1889	1887	1903	1968
166	1893	1906	1905	1899	1891	1889	1904	1968
167	1894	1908	1906	1900	1892	1890	1909	1966
168	1896	1911	1908	1902	1894	1892	1908	1974
169	1896	1911	1908	1902	1894	1892	1907	1967
170	1898	1913	1910	1904	1896	1894	1909	1970
171	1900	1915	1912	1905	1897	1895	1913	1971
172	1902	1916	1914	1907	1900	1897	1913	1981
173	1902	1916	1913	1908	1900	1898	1911	1980
174	1904	1919	1917	1912	1904	1901	1914	1986
175	1906	1921	1919	1914	1907	1904	1915	1986

Time (min)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)
176	1909	1924	1921	1916	1909	1906	1922	1981
177	1912	1928	1924	1920	1913	1910	1925	1980
178	1915	1930	1926	1922	1915	1912	1930	1980
179	1916	1932	1928	1924	1917	1914	1928	1984
180	1917	1932	1929	1926	1919	1916	1926	1991

Time (min)	Furnace Probe #9 (°F)	Furnace Probe #10 (°F)	Furnace Probe #11 (°F)	Furnace Probe #12 (°F)	Lab Ambient Temp (°F)
0	79	79	78	78	76
1	153	128	113	126	76
2	361	243	220	472	76
3	678	425	401	1027	76
4	880	611	589	1179	76
5	985	762	743	1240	76
6	1072	882	870	1319	76
7	1147	977	974	1384	76
8	1200	1053	1058	1429	76
9	1240	1114	1124	1450	76
10	1278	1166	1179	1484	76
11	1313	1213	1228	1515	76
12	1347	1254	1271	1545	76
13	1374	1290	1311	1564	76
14	1403	1322	1343	1581	76
15	1423	1346	1367	1588	76
16	1435	1365	1384	1585	76
17	1435	1376	1393	1564	76
18	1435	1386	1404	1551	76
19	1442	1397	1413	1550	76
20	1450	1409	1427	1553	76
21	1462	1424	1444	1546	76
22	1478	1443	1465	1555	76
23	1487	1460	1483	1546	76
24	1497	1474	1495	1543	76
25	1508	1488	1508	1544	76
26	1520	1500	1522	1556	76
27	1530	1513	1533	1559	76
28	1539	1524	1545	1568	76
29	1550	1540	1550	1568	76
30	1559	1548	1561	1576	76
31	1567	1557	1571	1579	76
32	1574	1567	1573	1585	76
33	1584	1577	1578	1588	76
34	1592	1586	1584	1592	76
35	1600	1594	1590	1599	76
36	1606	1601	1597	1604	76
37	1614	1609	1603	1600	76
38	1620	1613	1606	1601	76
39	1624	1618	1610	1605	76
40	1629	1621	1612	1607	76
41	1642	1628	1618	1612	76
42	1654	1635	1625	1615	76
43	1660	1645	1633	1623	76

Time (min)	Furnace Probe #9 (°F)	Furnace Probe #10 (°F)	Furnace Probe #11 (°F)	Furnace Probe #12 (°F)	Lab Ambient Temp (°F)
44	1667	1651	1639	1627	76
45	1673	1656	1643	1630	76
46	1684	1664	1650	1632	76
47	1688	1669	1656	1633	76
48	1686	1671	1658	1635	76
49	1682	1674	1658	1639	76
50	1683	1674	1659	1646	76
51	1681	1673	1658	1652	76
52	1689	1677	1663	1650	76
53	1698	1683	1670	1649	76
54	1691	1684	1671	1653	76
55	1700	1688	1675	1655	76
56	1702	1694	1681	1656	76
57	1704	1697	1683	1663	76
58	1700	1699	1683	1667	76
59	1705	1699	1685	1673	76
60	1707	1700	1686	1685	76
61	1717	1704	1691	1684	76
62	1721	1708	1695	1690	76
63	1728	1716	1702	1688	77
64	1731	1722	1707	1693	76
65	1737	1725	1710	1699	76
66	1738	1729	1714	1703	76
67	1742	1733	1718	1705	76
68	1741	1735	1719	1714	76
69	1749	1739	1724	1708	77
70	1753	1740	1729	1707	77
71	1753	1738	1731	1706	77
72	1754	1738	1732	1708	77
73	1759	1741	1734	1710	77
74	1760	1744	1737	1713	77
75	1765	1745	1740	1715	77
76	1769	1749	1744	1718	77
77	1769	1752	1747	1722	77
78	1772	1754	1749	1724	77
79	1773	1756	1751	1727	76
80	1778	1761	1755	1731	77
81	1780	1763	1758	1733	77
82	1785	1766	1761	1737	77
83	1785	1769	1763	1740	77
84	1787	1772	1767	1742	77
85	1791	1776	1771	1745	77
86	1795	1781	1775	1748	77
87	1799	1785	1778	1751	77

Time (min)	Furnace Probe #9 (°F)	Furnace Probe #10 (°F)	Furnace Probe #11 (°F)	Furnace Probe #12 (°F)	Lab Ambient Temp (°F)
88	1805	1789	1782	1754	77
89	1802	1788	1782	1757	77
90	1801	1787	1781	1759	78
91	1800	1786	1781	1763	78
92	1801	1788	1783	1766	77
93	1802	1790	1784	1769	78
94	1805	1791	1786	1774	78
95	1806	1794	1788	1777	78
96	1807	1796	1789	1775	79
97	1810	1798	1792	1777	79
98	1813	1799	1794	1780	79
99	1815	1802	1797	1783	79
100	1818	1804	1800	1787	80
101	1822	1804	1803	1789	80
102	1824	1809	1806	1790	80
103	1824	1807	1807	1793	80
104	1826	1812	1808	1796	80
105	1831	1816	1812	1799	80
106	1830	1820	1814	1800	80
107	1832	1823	1816	1801	80
108	1833	1824	1819	1802	80
109	1836	1826	1821	1804	80
110	1838	1828	1823	1806	80
111	1841	1828	1823	1806	80
112	1841	1827	1824	1809	80
113	1841	1828	1826	1811	80
114	1845	1832	1828	1813	80
115	1844	1832	1828	1814	80
116	1845	1831	1829	1813	80
117	1846	1834	1831	1816	80
118	1847	1833	1832	1816	80
119	1848	1833	1833	1819	80
120	1849	1836	1836	1822	80
121	1850	1837	1837	1824	81
122	1851	1839	1838	1824	80
123	1852	1839	1839	1824	80
124	1854	1841	1840	1827	80
125	1855	1843	1840	1826	81
126	1856	1845	1841	1827	81
127	1855	1843	1842	1828	81
128	1855	1841	1843	1829	80
129	1856	1842	1844	1829	81
130	1857	1845	1844	1830	81
131	1859	1847	1846	1831	81

Time (min)	Furnace Probe #9 (°F)	Furnace Probe #10 (°F)	Furnace Probe #11 (°F)	Furnace Probe #12 (°F)	Lab Ambient Temp (°F)
132	1859	1850	1846	1832	80
133	1862	1850	1849	1833	81
134	1863	1851	1850	1835	80
135	1863	1852	1850	1836	80
136	1865	1856	1853	1837	80
137	1866	1856	1855	1839	81
138	1869	1860	1857	1840	81
139	1871	1859	1858	1841	81
140	1871	1859	1859	1844	81
141	1873	1861	1861	1845	81
142	1874	1862	1862	1845	81
143	1875	1864	1863	1846	81
144	1876	1864	1864	1849	81
145	1877	1865	1866	1849	81
146	1877	1864	1866	1850	81
147	1880	1863	1867	1852	80
148	1881	1866	1869	1854	81
149	1884	1868	1870	1856	80
150	1886	1873	1873	1856	81
151	1886	1873	1874	1856	81
152	1885	1874	1876	1858	81
153	1883	1873	1874	1855	81
154	1883	1872	1873	1857	81
155	1883	1872	1872	1857	81
156	1884	1874	1874	1857	81
157	1885	1874	1875	1858	81
158	1887	1875	1876	1859	81
159	1887	1876	1877	1860	81
160	1890	1876	1879	1861	81
161	1890	1878	1879	1863	81
162	1890	1877	1878	1863	81
163	1891	1878	1879	1862	81
164	1896	1883	1883	1866	81
165	1897	1884	1886	1868	81
166	1899	1888	1889	1870	81
167	1900	1889	1889	1872	81
168	1902	1888	1890	1873	81
169	1903	1887	1891	1872	81
170	1904	1890	1892	1874	81
171	1906	1892	1893	1877	81
172	1908	1895	1895	1879	81
173	1908	1897	1896	1878	81
174	1912	1902	1901	1881	81
175	1914	1903	1905	1882	81

Time (min)	Furnace Probe #9 (°F)	Furnace Probe #10 (°F)	Furnace Probe #11 (°F)	Furnace Probe #12 (°F)	Lab Ambient Temp (°F)
176	1916	1909	1907	1885	81
177	1921	1916	1912	1888	81
178	1921	1915	1913	1890	81
179	1924	1915	1916	1892	80
180	1926	1916	1917	1893	81

Appendix C3

TEST DATA - POST-HOSE STREAM CURRENT LEAKAGE

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
0.0	0.003	0.1	0.000	477.7	0.1	0.000
0.5	0.003	0.1	0.000	477.7	0.1	0.000
1.0	0.003	0.1	0.000	477.9	0.1	0.000
1.5	0.003	0.1	0.000	477.7	0.0	0.000
2.0	0.003	0.1	0.000	476.3	0.1	0.000
2.5	0.003	0.1	0.000	477.6	0.1	0.000
3.0	0.003	0.1	0.000	477.5	0.1	0.000
3.5	0.003	0.1	0.000	477.9	0.1	0.000
4.0	0.003	0.1	0.000	477.7	0.1	0.000
4.5	0.003	0.1	0.000	477.6	0.1	0.000
5.0	0.003	0.1	0.000	477.6	0.1	0.000
5.5	0.003	0.1	0.000	477.6	0.1	0.000

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
0.0	0.1	0.000	0.1	0.000	0.000	0.0
0.5	0.1	0.000	0.1	0.000	0.000	0.0
1.0	0.1	0.000	0.1	0.000	0.001	0.0
1.5	0.0	0.000	0.1	0.000	0.000	0.0
2.0	0.1	0.000	0.1	0.000	0.000	0.0
2.5	0.1	0.000	0.1	0.000	0.000	0.0
3.0	0.1	0.000	0.1	0.000	0.001	0.0
3.5	0.1	0.000	0.1	0.000	0.001	0.0
4.0	0.1	0.000	0.1	0.000	0.001	0.0
4.5	0.1	0.000	0.1	0.000	0.000	0.0
5.0	0.1	0.000	0.1	0.000	0.000	0.0
5.5	0.1	0.000	0.1	0.000	0.001	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
0.0	0.000	122.0	0.0	0.000	0.0	0.000
0.5	0.000	122.0	0.0	0.000	0.0	0.000
1.0	0.000	122.0	0.0	0.000	0.0	0.000
1.5	0.000	122.0	0.0	0.000	0.0	0.000
2.0	0.000	121.7	0.0	0.000	0.0	0.000
2.5	0.000	122.0	0.0	0.000	0.0	0.000
3.0	0.000	122.0	0.0	0.000	0.0	0.000
3.5	0.000	122.1	0.0	0.000	0.0	0.000
4.0	0.000	122.0	0.0	0.000	0.0	0.000
4.5	0.000	122.0	0.0	0.000	0.0	0.000
5.0	0.000	122.0	0.0	0.000	0.0	0.000
5.5	0.000	121.9	0.0	0.000	0.0	0.000

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
0.0	0.0	0.000	0.0	0.000	0.000	0.0
0.5	0.0	0.000	0.0	0.000	0.000	0.0
1.0	0.0	0.000	0.0	0.000	0.001	0.0
1.5	0.0	0.000	0.0	0.000	0.000	0.0
2.0	0.0	0.000	0.0	0.000	0.001	0.0
2.5	0.0	0.000	0.0	0.000	0.000	0.0
3.0	0.0	0.000	0.0	0.000	0.001	0.0
3.5	0.0	0.000	0.0	0.000	0.001	0.0
4.0	0.0	0.000	0.0	0.000	0.000	0.0
4.5	0.0	0.000	0.0	0.000	0.000	0.0
5.0	0.0	0.000	0.0	0.000	0.001	0.0
5.5	0.0	0.000	0.0	0.000	0.000	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
0.0	0.000	122.0	0.0	0.000	0.0	0.000
0.5	0.000	122.0	0.0	0.000	0.0	0.000
1.0	0.000	122.0	0.0	0.000	0.0	0.000
1.5	0.000	122.0	0.0	0.000	0.0	0.000
2.0	0.000	121.7	0.0	0.000	0.0	0.000
2.5	0.000	122.0	0.0	0.000	0.0	0.000
3.0	0.000	122.0	0.0	0.000	0.0	0.000
3.5	0.000	122.1	0.0	0.000	0.0	0.000
4.0	0.000	122.1	0.0	0.000	0.0	0.000
4.5	0.000	122.1	0.0	0.000	0.0	0.000
5.0	0.000	122.0	0.0	0.000	0.0	0.000
5.5	0.000	121.9	0.0	0.000	0.0	0.000

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
0.0	0.0	0.000	0.0	0.000	0.000	0.0
0.5	0.0	0.000	0.0	0.000	0.000	0.0
1.0	0.0	0.000	0.0	0.000	0.001	0.0
1.5	0.0	0.000	0.0	0.000	0.000	0.0
2.0	0.0	0.000	0.0	0.000	0.001	0.0
2.5	0.0	0.000	0.0	0.000	0.001	0.0
3.0	0.0	0.000	0.0	0.000	0.001	0.0
3.5	0.0	0.000	0.0	0.000	0.001	0.0
4.0	0.0	0.000	0.0	0.000	0.001	0.0
4.5	0.0	0.000	0.0	0.000	0.000	0.0
5.0	0.0	0.000	0.0	0.000	0.001	0.0
5.5	0.0	0.000	0.0	0.000	0.001	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
0.0	0.000	122.1	0.0	0.000	0.0	0.000
0.5	0.000	122.1	0.0	0.000	0.0	0.000
1.0	0.000	122.1	0.0	0.000	0.0	0.000
1.5	0.000	122.1	0.0	0.000	0.0	0.000
2.0	0.000	121.9	0.0	0.000	0.0	0.000
2.5	0.000	122.1	0.0	0.000	0.0	0.000
3.0	0.000	122.1	0.0	0.000	0.0	0.000
3.5	0.000	122.3	0.0	0.000	0.0	0.000
4.0	0.000	122.2	0.0	0.000	0.0	0.000
4.5	0.000	122.2	0.0	0.000	0.0	0.000
5.0	0.000	122.1	0.0	0.000	0.0	0.000
5.5	0.000	122.1	0.0	0.000	0.0	0.000

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
0.0	0.0	0.000	0.0	0.000
0.5	0.0	0.000	0.0	0.000
1.0	0.0	0.000	0.0	0.000
1.5	0.0	0.000	0.0	0.000
2.0	0.0	0.000	0.0	0.000
2.5	0.0	0.000	0.0	0.000
3.0	0.0	0.000	0.0	0.000
3.5	0.0	0.000	0.0	0.000
4.0	0.0	0.000	0.0	0.000
4.5	0.0	0.000	0.0	0.000
5.0	0.0	0.000	0.0	0.000
5.5	0.0	0.000	0.0	0.000

Appendix D

QUALITY ASSURANCE

Quality Assurance Statement

Omega Point Laboratories, Inc. is an independent, wholly owned company incorporated in the state of Texas, devoted to engineering, inspection, quality assurance and testing of building materials, products and assemblies. The company has developed and implemented a Quality Assurance Program designed to provide its clients with a planned procedure of order and document processing for inspection and testing services it provides to assure conformity to requirements, codes, standards and specifications. The Program is designed to meet the intent of ANSI 45.2 Quality Assurance Program Requirements for Nuclear Power Plants, and complies with the requirements of the ASME Code, SPPE, Military Standards and other less stringent programs. It is the Laboratory's intention to adhere strictly to this Program, to assure that the services offered to its clients remains of the highest quality and accuracy possible.

The overall responsibility of the supervision, operation and coordination of this Quality Assurance Program is that of the Quality Assurance Manager, a person not involved with the performance of the inspection or testing services, and who is under the full time employ of the Laboratory. This individual is responsible for implementing and enforcing all procedures presented in the Quality Assurance Manual and the Procedures Manual. All personnel involved with activities which fall under the scope of this Program are required to cooperate with the letter and intent of this Program.

All QA Surveillance documents remain on file at the Laboratory, and are available for inspection by authorized personnel in the performance of an on-site QA Audit. All materials, services and supplies utilized herein were obtained with appropriate QA Certifications of Compliance, and the inclusion of these in this report would not be practical nor useful to the reader.

OMEGA POINT ® LABORATORIES

ACCEPTABILITY DOCUMENTATION

PROJECT NO. 14980-121039

AREVA

The following signatures attest to the review and acceptance of each attribute listed regarding the above-noted project:

I. TEST ARTICLE ASSEMBLY

Omega Point Laboratories, Inc. — Date: 10/7/04

AREVA — Date: 10/7/04

II. CABLE INSTALLATION

Omega Point Laboratories, Inc. — Date: 10/7/04

AREVA — Date: 10/7/04

Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas 78112-9784 USA
210-635-8100 / FAX: 210-635-8101 / 800-966-5253
www.opl.com moreinfo@opl.com

III. ACCEPTANCE OF:

PRETEST MEGGERING RESULTS
PRETEST CONDUCTOR RESISTANCE MEASUREMENT

Omega Point Laboratories, Inc. — Date 10/7/04

AREVA — Date 10/7/04

IV. FINAL PRE-BURN INSPECTION

Omega Point Laboratories, Inc. — Date 10/7/04

AREVA — Date 10/7/04

AREVA

REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
0	ORIGINAL ISSUE	9/13/04	

TEST ARTICLE ATTRIBUTE CHECKLIST

PROJECT NUMBER: 14980-121039

PROJECT TITLE: MEGGITT FIRE RESISTIVE CABLE TEST NO. 3

		ATTRIBUTE	SAT	UNSAT
I		TEST DECK		
	A	Test deck configuration and dimensions per approved drawings	10-7-04	
	B	Condition of test deck		
	C	Test deck conditioned to moisture equilibrium at indoor conditions		
II		SUPPORTS/STEEL PLATES		
	A.	Correct materials used		
	B.	Installed per approved drawings		
	C.	Supports for Meggitt cable are properly grounded		
	D.	Applied torque values for strut clamps per approved drawings		
	E.	Welds per approved drawings		
	F.	Dead loads for clamps sized and installed per approved drawings		
III		MEGGITT CABLES		
	A.	Cables installed per approved drawings		
	B.	Minimum bend radius installed where shown on approved drawings		
	C.	Factory installed splices installed as shown on approved drawings		
	D.	Factory installed terminations provided at each end of cable		
	E.	No gouges or cuts in the cable sheath which exceed 10% of cable wall thickness		
V		TEST EQUIPMENT		
	A.	Wiring of test articles conform to the Figures 7.1 through 7.4 in the approved Test Plan		
	B.	Fuses, amp meters, volt meters, resistors and switches installed per Figures 7.1 through 7.4 of the approved Test Plan		
	C.	All electrical devices and equipment have been tested prior to the start of the test to ensure that they are properly connected and functioning as required, showing proper readings on data acquisition equipment		
	D.	Furnace thermocouples are the correct type and are installed per the Test Plan		
	E.	Covers provided on furnace burners.		

NOTE: Verification to be made using initials of OPL Quality Assurance Personnel

10/7/04

10/7/04

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

DRAWN BY K GROSZEK	CHECKED BY	PROGRESS ENERGY MEGGITT CABLE TEST #3 TEST ARTICLE ATTRIBUTE CHECKLIST	SCALE NONE DATE 9/13/04
PASSED BY	APPROVED BY		DWG. NO. 02-5050112A-00
			CAD FILE 02-5050112A-00.DGN

EVENT LOG

AREVA
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #121039 for AREVA. The following is a brief description of this project:

Project No. 121039: **Fire Resistance Test of Horizontal Concrete Slab Supporting Fire-Rated Electrical Cables**

ITEM	DATE	INITIL
Deg Priest, President of Omega Point Labs, issues Proposal No. P040810-01 to John Crowther, Areva Project Manager.	8/10/04	CH
OPL receives the Progress Energy Megatt Cable Test Plan - Test 3 from John Crowther.	8/31	CH
Framatome ANP (AREVA) Purchase Order No. 153335 received by OPL for Fire Testing Services in accordance with OPL Proposal P040810-01.	9/2	CH
Received hardware from Progress Energy.	9/13	CH
Received additional B-Line hardware from Progress Energy.	9/14	CH
Revised test plan received from John Crowther.	9/14	CH
OPL QA/QC personnel orders steel material from Texas Specialty Steel.	9/15	CH
OPL advises Alan Morris from Progress Energy that packages with deliveries received on the 13th and 14th from Progress Energy.	9/16	CH
John Crowther advised by OPL QA/QC personnel that B-Line Strutt received from Progress Energy was labeled incorrectly but the material was correct.	9/20	CH
Texas Specialty Steel order is received by OPL QA/QC.	9/22	CH
OPL technicians begin installing test article hardware.	9/23	CH
Technicians complete installation of test article hardware.	9/24	CH

EVENT LOG

AREVA
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #121039 for AREVA. The following is a brief description of this project:

Project No. 121039: **Fire Resistance Test of Horizontal Concrete Slab Supporting Fire-Rated Electrical Cables**

ITEM	DATE	INIT'L
Electrical cables are received (pm) from Megsitt Safety Systems.	9/27/04	CH
John Crowther verified and inspected electrical cables received by OPL QA/QC personnel.	9/28	CH
John Crowther inspected the test assembly for compliance to approved drawings.	9/28	CH
Alan Morisi arrives from Progress Energy to observe and John Crowther inspect the test assembly, and oversee the installation of test assembly electrical cables and bolt tightening to appropriate torque values.	9/29	CH
John Crowther and Alan Morisi verify receiving documents on the steel hardware and materials.	9/29	CH
OPL Technicians move the electrical circuitry board to the test area and connected to the electrical cables.	10/4	CH
Electrical cables in furnace are measured and the results documented.	10/5	CH
Mike Fletcher, Tony Manes and Alan Morisi arrive at OPL from Progress Energy. Jim ~~Thompson~~ Thorsen from Megsitt Safety Systems and John Crowther, Areva, arrive at OPL.	10/6	CH
OPL Technicians realign the clamps that hold the dead weight on CC and DD per Mike Fletcher.	10/6	CH
	10/6/04	CH

EVENT LOG

AREVA
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #121039 for AREVA. The following is a brief description of this project:

Project No. 121039: **Fire Resistance Test of Horizontal Concrete Slab Supporting Fire-Rated Electrical Cables**

ITEM	DATE	INIT'L
Jeff Piel and Mike Ranton from Hilti Engineering arrive Ohio to do the pre test megging and conductor resistance testing.	10/6/04	CH
Megging and conductor resistance testing is completed with OPC QA/QC personnel Cleda Patton and Connie Humphrey. Dee Priest verified the electrical circuitry and the data acquisition equipment.	10/6	CH
Dee Priest and Mike Dey complete the pre test checklists. (3 hours)	10/7	CH
On site to witness the fire resistance test of project 121039 are the following personnel:	10/7	CH
Dee Priest — Omega Point Labs		
Mike Dey — " " "		
Connie Humphrey — " " "		
Cleda Patton — " " "		
Troy Bronstad — " " "		
Oscar Estrada — " " "		
Richard Beasley — " " "		
John Crowther — AREVA		
Cal Banning — "		
Mike Fletcher — Progress Energy		
Alan Morisi — " "		
Tony Manos — " "		
Jim Thomsen — Meggitt Safety Systems		
Jeff Piel — Hilti Engineering		
Mike Ranton — " "		
The three hour fire test began at 9:10 am. Megging began at approximately 2½ minutes into the fire test with the following	10/7	CH
	10/7/04	CH

EVENT LOG

AREVA
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #121039 for AREVA. The following is a brief description of this project:

Project No. 121039: **Fire Resistance Test of Horizontal Concrete Slab Supporting Fire-Rated Electrical Cables**

ITEM	DATE	INIT'L
personnel:	10/7/04	CH
Connie Humphreys OPL QA/QC,		
Ocda Patton " "		
Jeff Priel Intertek Eng.		
Mike Ranton " "		
Megging continued throughout the fire test and was halted at approximately 2 hours and 53 minutes. Test was stopped at 3 hours.	10/7	CH
Following the completion of the fire test, the test assembly was moved by overhead crane to start the hose stream test.	10/7	CH
The hose stream test began at 3:04:55 ~~into the CH 10/7/04~~ and was completed after five minutes at 3:09:55. The hose stream test was conducted from a distance of five feet using the 1.5" nozzle with a 30° spray pattern and a pressure of 75 psi.	10/7	CH
The hose stream test ended at 12:18 pm and post test megging began at 12:36 pm using the same megging team. Megging was completed by 1:20 pm.	10/7	CH
Next Day Megging was started at 8:15 am and conductor resistance testing began at 9:18 am. Following the completion of the megging and conductor resistance testing Jeff Priest conducted the post test of electrical circuitry check.	10/8	CH
	10/8/04	CH
- end -		

Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas 78112
800-966-5253 FAX 210-635-8101

Certificate of Calibration

Certification No.: 92135

Calibration Date: 9/10/04

Recalibration Date: 3/10/2005

Manufacturer: Yokogawa

Model No.: 100 Channel DAU

Serial No.: 99LE004

Equipment Description: 100 Channel Data Acquisition System with YOKOGAWA Darwin Series

Calibration Sources: TEGAM Model 840-A, SN: T-207318. Calibration due 05-03-2005

PERFORMANCE:

Temperature: (75°F) +1.3/-0.2	Temperature: (150°F) +1.3/-0.3	Temperature: (300°F) +1.1/0	Temperature: (400°F) +1.2/0.1	Temperature: (1000°F) +0.9/-0.3	Temperature: (2000°F) +1/-1

Calibration Performed by:

Mike Dey
Manager of Fire Resistance

Calibration Approved by:

Javier Trevino
Manager of Special Projects

Channel Verification for Yokogawa 100 Channel

Serial No.: 99-LE-004

Within specs? Yes/No

Calibrator Used: Tegam T-207318

Performed by: Mike Dey
Title: Mgr. Dept. 2

Temperature Setting (°F): 75.0

Approved by:
Title: mgr Dept 4

Date: 9/10/04

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	75.7	0.7	51	75.6	0.6
2	75.7	0.7	52	75.2	0.2
3	75.6	0.6	53	75.2	0.2
4	75.7	0.7	54	75.2	0.2
5	75.6	0.6	55	75.4	0.4
6	75.6	0.6	56	75.4	0.4
7	75.6	0.6	57	75.6	0.6
8	75.7	0.7	58	75.2	0.2
9	75.7	0.7	59	75.6	0.6
10	75.9	0.9	60	75.7	0.7
11	75.2	0.2	61	75.9	0.9
12	74.8	-0.2	62	75.7	0.7
13	74.8	-0.2	63	75.7	0.7
14	75.0	0.0	64	75.6	0.6
15	74.8	-0.2	65	75.7	0.7
16	74.8	-0.2	66	75.7	0.7
17	74.8	-0.2	67	75.7	0.7
18	75.0	0.0	68	75.7	0.7
19	75.2	0.2	69	75.7	0.7
20	75.4	0.4	70	75.7	0.7
21	75.7	0.7	71	75.7	0.7
22	75.6	0.6	72	75.6	0.6
23	75.6	0.6	73	75.6	0.6
24	75.6	0.6	74	75.6	0.6
25	75.6	0.6	75	75.6	0.6
26	75.6	0.6	76	75.6	0.6
27	75.6	0.6	77	75.7	0.7
28	75.7	0.7	78	75.7	0.7
29	75.9	0.9	79	75.7	0.7
30	76.3	1.3	80	75.7	0.7
31	76.3	1.3	81	75.7	0.7
32	75.9	0.9	82	75.6	0.6
33	75.9	0.9	83	75.6	0.6
34	75.7	0.7	84	75.6	0.6
35	75.7	0.7	85	75.6	0.6
36	75.7	0.7	86	75.6	0.6
37	75.7	0.7	87	75.6	0.6
38	75.7	0.7	88	75.6	0.6
39	75.9	0.9	89	75.6	0.6
40	76.1	1.1	90	75.7	0.7
41	76.1	1.1	91	75.4	0.4
42	75.7	0.7	92	75.2	0.2
43	75.7	0.7	93	75.2	0.2
44	75.7	0.7	94	75.2	0.2
45	75.7	0.7	95	75.2	0.2
46	75.7	0.7	96	75.4	0.4
47	75.7	0.7	97	75.4	0.4
48	75.7	0.7	98	75.2	0.2
49	75.7	0.7	99	75.4	0.4
50	76.1	1.1	100	75.7	0.7

		Lower	Upper	
Range of 75°F Readings:	+1.3/-0.2	Allowable limits	73.2	76.8 (±1.8)

Channel Verification for Yokogawa 100 Channel

Serial No.: 99-LE-004

Within specs? Yes/No

Calibrator Used: Tegam T-207318

Performed by: Mike Dey

Title: Mgr. Dept. 2

Temperature Setting (°F): 150.0

Approved by:

Title: Engr Mgr 4

Date: 9/10/04

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	151.2	1.2	51	150.4	0.4
2	151.0	1.0	52	150.3	0.3
3	151.0	1.0	53	150.3	0.3
4	150.8	0.8	54	150.3	0.3
5	150.8	0.8	55	150.3	0.3
6	150.8	0.8	56	150.3	0.3
7	150.8	0.8	57	150.3	0.3
8	151.0	1.0	58	150.3	0.3
9	151.2	1.2	59	150.3	0.3
10	151.3	1.3	60	150.4	0.4
11	150.8	0.8	61	151.0	1.0
12	150.4	0.4	62	150.6	0.6
13	150.4	0.4	63	150.6	0.6
14	150.4	0.4	64	150.6	0.6
15	150.4	0.4	65	150.6	0.6
16	150.4	0.4	66	150.6	0.6
17	150.4	0.4	67	150.6	0.6
18	150.6	0.6	68	150.6	0.6
19	150.8	0.8	69	150.6	0.6
20	150.8	0.8	70	151.0	1.0
21	150.8	0.8	71	150.6	0.6
22	150.8	0.8	72	150.3	0.3
23	150.6	0.6	73	150.4	0.4
24	150.6	0.6	74	150.4	0.4
25	150.8	0.8	75	150.4	0.4
26	150.8	0.8	76	150.4	0.4
27	150.8	0.8	77	150.4	0.4
28	150.8	0.8	78	150.4	0.4
29	150.8	0.8	79	150.4	0.4
30	151.3	1.3	80	150.8	0.8
31	151.0	1.0	81	150.6	0.6
32	150.8	0.8	82	150.4	0.4
33	150.6	0.6	83	150.3	0.3
34	150.6	0.6	84	150.3	0.3
35	150.6	0.6	85	150.3	0.3
36	150.4	0.4	86	150.3	0.3
37	150.6	0.6	87	150.3	0.3
38	150.4	0.4	88	150.3	0.3
39	150.4	0.4	89	150.3	0.3
40	150.8	0.8	90	150.6	0.6
41	150.8	0.8	91	150.3	0.3
42	150.6	0.6	92	150.3	0.3
43	150.4	0.4	93	150.3	0.3
44	150.3	0.3	94	150.3	0.3
45	150.4	0.4	95	150.3	0.3
46	150.4	0.4	96	150.3	0.3
47	150.3	0.3	97	150.3	0.3
48	150.3	0.3	98	150.3	0.3
49	150.4	0.4	99	150.4	0.4
50	150.8	0.8	100	150.6	0.6

		Lower	Upper	
Range of 150°F Readings:	+1.3/0.3	Allowable limits	148.2	151.8 (±1.8)

Channel Verification for Yokogawa 100 Channel

Serial No.: 99-LE-004

Within specs? Yes/No

Calibrator Used: Tegam T-207318

Performed by: Mike Dey

Title: Mgr. Dept. 2

Temperature Setting (°F): 300.0

Approved by:

Title: Dept Y

Date: 9/10/04

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	300.7	0.7	51	300.2	0.2
2	300.6	0.6	52	300.0	0.0
3	300.6	0.6	53	300.0	0.0
4	300.6	0.6	54	300.0	0.0
5	300.6	0.6	55	300.0	0.0
6	300.6	0.6	56	300.0	0.0
7	300.4	0.4	57	300.0	0.0
8	300.6	0.6	58	300.2	0.2
9	300.7	0.7	59	300.0	0.0
10	300.9	0.9	60	300.4	0.4
11	300.2	0.2	61	300.9	0.9
12	300.2	0.2	62	300.7	0.7
13	300.2	0.2	63	300.6	0.6
14	300.2	0.2	64	300.6	0.6
15	300.2	0.2	65	300.6	0.6
16	300.2	0.2	66	300.6	0.6
17	300.2	0.2	67	300.6	0.6
18	300.2	0.2	68	300.7	0.7
19	300.4	0.4	69	300.7	0.7
20	300.7	0.7	70	300.9	0.9
21	300.7	0.7	71	300.6	0.6
22	300.4	0.4	72	300.4	0.4
23	300.6	0.6	73	300.2	0.2
24	300.6	0.6	74	300.2	0.2
25	300.4	0.4	75	300.4	0.4
26	300.6	0.6	76	300.4	0.4
27	300.6	0.6	77	300.2	0.2
28	300.6	0.6	78	300.4	0.4
29	300.7	0.7	79	300.6	0.6
30	301.1	1.1	80	300.7	0.7
31	300.7	0.7	81	300.4	0.4
32	300.6	0.6	82	300.2	0.2
33	300.4	0.4	83	300.2	0.2
34	300.6	0.6	84	300.2	0.2
35	300.4	0.4	85	300.2	0.2
36	300.2	0.2	86	300.2	0.2
37	300.2	0.2	87	300.2	0.2
38	300.2	0.2	88	300.2	0.2
39	300.4	0.4	89	300.2	0.2
40	300.7	0.7	90	300.6	0.6
41	300.7	0.7	91	300.2	0.2
42	300.6	0.6	92	300.2	0.2
43	300.6	0.6	93	300.0	0.0
44	300.7	0.7	94	300.2	0.2
45	300.6	0.6	95	300.2	0.2
46	300.6	0.6	96	300.0	0.0
47	300.6	0.6	97	300.2	0.2
48	300.6	0.6	98	300.0	0.0
49	300.6	0.6	99	300.2	0.2
50	300.9	0.9	100	300.4	0.4

Range of 300°F Readings: +1.1/0

	Lower	Upper	
Allowable limits	298.1	301.9	(±1.9)

Channel Verification for Yokogawa 100 Channel

Serial No.: 99-LE-004

Within specs? Yes/No

Calibrator Used: Tegam T-207318

Performed by: Mike Dey

Title: Mgr. Dept. 2

Temperature Setting (°F): 400.0

Approved by:

Title: Mgr Dept

Date: 9/10/04

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	401.0	1.0	51	400.3	0.3
2	400.8	0.8	52	400.1	0.1
3	400.8	0.8	53	400.1	0.1
4	400.8	0.8	54	400.3	0.3
5	400.8	0.8	55	400.1	0.1
6	400.6	0.6	56	400.1	0.1
7	400.8	0.8	57	400.1	0.1
8	400.8	0.8	58	400.3	0.3
9	400.8	0.8	59	400.3	0.3
10	401.2	1.2	60	400.5	0.5
11	400.5	0.5	61	401.0	1.0
12	400.3	0.3	62	400.6	0.6
13	400.3	0.3	63	400.6	0.6
14	400.3	0.3	64	400.6	0.6
15	400.3	0.3	65	400.5	0.5
16	400.3	0.3	66	400.5	0.5
17	400.3	0.3	67	400.6	0.6
18	400.5	0.5	68	400.6	0.6
19	400.5	0.5	69	400.6	0.6
20	400.8	0.8	70	401.0	1.0
21	400.6	0.6	71	400.8	0.8
22	400.5	0.5	72	400.3	0.3
23	400.3	0.3	73	400.3	0.3
24	400.3	0.3	74	400.5	0.5
25	400.5	0.5	75	400.5	0.5
26	400.3	0.3	76	400.3	0.3
27	400.5	0.5	77	400.6	0.6
28	400.5	0.5	78	400.5	0.5
29	400.6	0.6	79	400.3	0.3
30	401.0	1.0	80	400.8	0.8
31	400.8	0.8	81	400.3	0.3
32	400.6	0.6	82	400.3	0.3
33	400.5	0.5	83	400.3	0.3
34	400.5	0.5	84	400.3	0.3
35	400.5	0.5	85	400.3	0.3
36	400.3	0.3	86	400.3	0.3
37	400.3	0.3	87	400.1	0.1
38	400.5	0.5	88	400.3	0.3
39	400.5	0.5	89	400.3	0.3
40	400.8	0.8	90	400.5	0.5
41	400.8	0.8	91	400.1	0.1
42	400.5	0.5	92	400.1	0.1
43	400.5	0.5	93	400.1	0.1
44	400.5	0.5	94	400.1	0.1
45	400.5	0.5	95	400.1	0.1
46	400.5	0.5	96	400.1	0.1
47	400.5	0.5	97	400.1	0.1
48	400.5	0.5	98	400.1	0.1
49	400.5	0.5	99	400.3	0.3
50	400.8	0.8	100	400.3	0.3

			Lower	Upper	
Range of 400°F Readings:	+1.2/0.1	Allowable limits	398.0	402.0	(±2.0)

Channel Verification for Yokogawa 100 Channel

Serial No.: 99-LE-004

Within specs? Yes/No

Calibrator Used: Tegam T-207318

Performed by: Mike Dey
Title: Mgr. Dept. 2

Temperature Setting (°F): 1000.0

Approved by:
Title: Mgr Dept 2

Date: 9/10/04

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	1000.8	0.8	51	999.7	-0.3
2	1000.6	0.6	52	999.7	-0.3
3	1000.6	0.6	53	999.7	-0.3
4	1000.6	0.6	54	999.7	-0.3
5	1000.6	0.6	55	999.7	-0.3
6	1000.6	0.6	56	999.7	-0.3
7	1000.6	0.6	57	999.7	-0.3
8	1000.6	0.6	58	999.7	-0.3
9	1000.8	0.8	59	999.9	-0.1
10	1000.9	0.9	60	1000.0	0.0
11	1000.6	0.6	61	1000.8	0.8
12	1000.6	0.6	62	1000.6	0.6
13	1000.4	0.4	63	1000.6	0.6
14	1000.4	0.4	64	1000.2	0.2
15	1000.4	0.4	65	1000.6	0.6
16	1000.4	0.4	66	1000.6	0.6
17	1000.2	0.2	67	1000.4	0.4
18	1000.4	0.4	68	1000.6	0.6
19	1000.6	0.6	69	1000.6	0.6
20	1000.8	0.8	70	1000.8	0.8
21	1000.6	0.6	71	1000.4	0.4
22	1000.4	0.4	72	1000.0	0.0
23	1000.4	0.4	73	1000.2	0.2
24	1000.4	0.4	74	1000.0	0.0
25	1000.4	0.4	75	1000.2	0.2
26	1000.4	0.4	76	1000.2	0.2
27	1000.6	0.6	77	1000.2	0.2
28	1000.6	0.6	78	1000.2	0.2
29	1000.6	0.6	79	1000.2	0.2
30	1000.9	0.9	80	1000.4	0.4
31	1000.6	0.6	81	1000.6	0.6
32	1000.4	0.4	82	1000.0	0.0
33	1000.2	0.2	83	1000.0	0.0
34	1000.4	0.4	84	1000.0	0.0
35	1000.2	0.2	85	1000.0	0.0
36	1000.2	0.2	86	1000.0	0.0
37	1000.4	0.4	87	1000.2	0.2
38	1000.2	0.2	88	1000.0	0.0
39	1000.4	0.4	89	1000.0	0.0
40	1000.8	0.8	90	1000.6	0.6
41	1000.4	0.4	91	1000.0	0.0
42	1000.2	0.2	92	1000.0	0.0
43	1000.0	0.0	93	999.9	-0.1
44	1000.0	0.0	94	1000.0	0.0
45	1000.0	0.0	95	1000.0	0.0
46	1000.0	0.0	96	999.9	-0.1
47	1000.0	0.0	97	1000.0	0.0
48	1000.0	0.0	98	1000.0	0.0
49	1000.2	0.2	99	1000.0	0.0
50	1000.4	0.4	100	1000.0	0.0

Range of 2000°F Readings: +0.9/-0.3

	Lower	Upper	
Allowable limits	997.7	1002.3	(±2.3)

Channel Verification for Yokogawa 100 Channel

Serial No.: 99-LE-004

Within specs? Yes/No

Calibrator Used: Tegam T-207318

Performed by: Mike Dey
Title: Mgr. Dept. 2

Temperature Setting (°F): 2000.0

Approved by:
Title:

Date: 9/10/04

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	2000.3	0.3	51	1999.2	-0.8
2	1999.9	-0.1	52	1999.2	-0.8
3	1999.9	-0.1	53	1999.0	-1.0
4	2000.1	0.1	54	1999.2	-0.8
5	1999.9	-0.1	55	1999.2	-0.8
6	1999.9	-0.1	56	1999.0	-1.0
7	1999.9	-0.1	57	1999.2	-0.8
8	1999.9	-0.1	58	1999.2	-0.8
9	1999.9	-0.1	59	1999.2	-0.8
10	2000.7	0.7	60	1999.6	-0.4
11	2001.0	1.0	61	2001.0	1.0
12	2000.7	0.7	62	2000.7	0.7
13	2000.7	0.7	63	2000.5	0.5
14	2000.7	0.7	64	2000.5	0.5
15	2000.7	0.7	65	2000.5	0.5
16	2000.7	0.7	66	2000.3	0.3
17	2000.7	0.7	67	2000.5	0.5
18	2000.7	0.7	68	2000.5	0.5
19	2000.7	0.7	69	2000.7	0.7
20	2001.0	1.0	70	2000.7	0.7
21	2000.7	0.7	71	2000.1	0.1
22	2000.3	0.3	72	1999.9	-0.1
23	2000.1	0.1	73	1999.9	-0.1
24	2000.3	0.3	74	1999.9	-0.1
25	2000.5	0.5	75	1999.9	-0.1
26	2000.3	0.3	76	1999.9	-0.1
27	2000.3	0.3	77	1999.9	-0.1
28	2000.5	0.5	78	1999.9	-0.1
29	2000.5	0.5	79	1999.9	-0.1
30	2000.8	0.8	80	2000.3	0.3
31	2000.5	0.5	81	2000.5	0.5
32	2000.3	0.3	82	2000.5	0.5
33	1999.9	-0.1	83	2000.3	0.3
34	2000.1	0.1	84	2000.1	0.1
35	2000.1	0.1	85	2000.3	0.3
36	1999.9	-0.1	86	2000.1	0.1
37	1999.9	-0.1	87	2000.1	0.1
38	1999.9	-0.1	88	2000.3	0.3
39	1999.9	-0.1	89	2000.3	0.3
40	2000.3	0.3	90	2000.5	0.5
41	1999.9	-0.1	91	1999.8	-0.2
42	1999.9	-0.1	92	1999.6	-0.4
43	1999.9	-0.1	93	1999.6	-0.4
44	1999.9	-0.1	94	1999.6	-0.4
45	1999.9	-0.1	95	1999.6	-0.4
46	1999.9	-0.1	96	1999.6	-0.4
47	1999.9	-0.1	97	1999.6	-0.4
48	1999.9	-0.1	98	1999.6	-0.4
49	1999.9	-0.1	99	1999.8	-0.2
50	2000.1	0.1	100	1999.8	-0.2

	Lower	Upper	
Range of 2000°F Readings: +1/-1	Allowable limits	1997.2	2002.8	(±2.8)

Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas 78112
800-966-5253 FAX 210-635-8101

Certificate of Verification

Certification No.:	92136
Verification Date:	09/24/2004
Re-verification Date:	03/24/2005
Manufacturer:	Yokogawa
Model No.:	300 Channel DAU-
Serial No.:	48JF0082
Equipment Description:	300 Channel Data Acquisition System with YOKOGAWA Darwin Series
Calibration Sources:	Tegam T-207318 due: 5/03/2005

PERFORMANCE:

Temperature: (75°F) +1.5/-0.5	Temperature: (150°F) +1.3/-0.3	Temperature: (300°F) +1.13/-0.5	Temperature: (400°F) +1.4/-0.4	Temperature: (1000°F) +1.7/-0.5	Temperature: (2000°F) +2.5/-0.6

Measurement Uncertainty: ± 0.2%

Verification Performed by:

Mike Dey
Manager Fire Resistance

Verification Approved by:

Deg Priest
President-Chief Technical Officer

Channel Verification for Yokogawa 300 Channel

Senal No.: 48JF0082

Calibrator Used: Tegam T-207318

Temperature Setting (°F): 75.0

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	75.9	0.9	101	75.0	0.0	201	74.5	-0.5
2	75.7	0.7	102	75.0	0.0	202	74.5	-0.5
3	75.7	0.7	103	75.2	0.2	203	74.5	-0.5
4	75.7	0.7	104	75.2	0.2	204	74.5	-0.5
5	75.7	0.7	105	75.2	0.2	205	74.5	-0.5
6	75.9	0.9	106	75.4	0.4	206	74.5	-0.5
7	75.9	0.9	107	75.4	0.4	207	74.5	-0.5
8	75.9	0.9	108	75.6	0.6	208	74.5	-0.5
9	76.3	1.3	109	75.7	0.7	209	74.5	-0.5
10	76.5	1.5	110	76.1	1.1	210	74.8	-0.2
11	75.6	0.6	111	75.2	0.2	211	75.0	0.0
12	75.6	0.6	112	75.2	0.2	212	75.0	0.0
13	75.6	0.6	113	75.2	0.2	213	74.8	-0.2
14	75.6	0.6	114	75.2	0.2	214	74.7	-0.3
15	75.7	0.7	115	75.7	0.7	215	74.8	-0.2
16	75.6	0.6	116	75.4	0.4	216	75.0	0.0
17	75.7	0.7	117	75.6	0.6	217	75.2	0.2
18	75.7	0.7	118	75.7	0.7	218	75.2	0.2
19	75.9	0.9	119	75.7	0.7	219	75.2	0.2
20	76.3	1.3	120	76.1	1.1	220	75.7	0.7
21	75.6	0.6	121	75.7	0.7	221	75.0	0.0
22	75.6	0.6	122	75.4	0.4	222	75.2	0.2
23	75.6	0.6	123	75.4	0.4	223	74.7	-0.3
24	75.6	0.6	124	75.6	0.6	224	74.8	-0.2
25	75.7	0.7	125	75.2	0.2	225	74.8	-0.2
26	75.6	0.6	126	75.2	0.2	226	74.8	-0.2
27	75.7	0.7	127	75.2	0.2	227	75.0	0.0
28	75.7	0.7	128	75.4	0.4	228	75.2	0.2
29	75.7	0.7	129	75.7	0.7	229	75.2	0.2
30	76.1	1.1	130	75.9	0.9	230	75.4	0.4
31	75.7	0.7	131	74.7	-0.3	231	74.7	-0.3
32	75.7	0.7	132	74.5	-0.5	232	75.0	0.0
33	75.7	0.7	133	74.7	-0.3	233	75.2	0.2
34	75.7	0.7	134	74.8	-0.2	234	75.0	0.0
35	75.9	0.9	135	75.0	0.0	235	75.2	0.2
36	75.9	0.9	136	75.2	0.2	236	75.2	0.2
37	75.9	0.9	137	75.0	0.0	237	75.2	0.2
38	76.1	1.1	138	75.0	0.0	238	75.2	0.2
39	76.3	1.3	139	75.2	0.2	239	75.2	0.2
40	76.5	1.5	140	75.7	0.7	240	75.6	0.6
41	75.2	0.2	141	75.2	0.2	241	75.2	0.2
42	75.4	0.4	142	75.2	0.2	242	75.2	0.2
43	75.6	0.6	143	75.2	0.2	243	75.2	0.2
44	75.6	0.6	144	75.2	0.2	244	75.2	0.2
45	75.6	0.6	145	75.4	0.4	245	75.2	0.2
46	75.6	0.6	146	75.6	0.6	246	75.2	0.2
47	75.7	0.7	147	75.6	0.6	247	75.4	0.4
48	75.6	0.6	148	75.6	0.6	248	75.6	0.6
49	75.7	0.7	149	75.4	0.4	249	75.7	0.7
50	75.9	0.9	150	75.7	0.7	250	76.3	1.3
51	75.0	0.0	151	75.2	0.2	251	74.8	-0.2
52	75.2	0.2	152	75.2	0.2	252	74.8	-0.2
53	75.2	0.2	153	75.4	0.4	253	75.0	0.0
54	75.2	0.2	154	75.4	0.4	254	75.0	0.0

55	75.2	0.2	155	75.2	0.2	255	75.0	0.0
56	75.6	0.6	156	75.4	0.4	256	75.0	0.0
57	75.6	0.6	157	75.4	0.4	257	75.2	0.2
58	75.6	0.6	158	75.6	0.6	258	75.2	0.2
59	75.7	0.7	159	75.7	0.7	259	75.4	0.4
60	75.7	0.7	160	75.9	0.9	260	75.7	0.7
61	75.6	0.6	161	75.2	0.2	261	75.0	0.0
62	75.4	0.4	162	75.6	0.6	262	75.2	0.2
63	75.4	0.4	163	75.2	0.2	263	75.2	0.2
64	75.4	0.4	164	75.2	0.2	264	75.2	0.2
65	75.6	0.6	165	75.6	0.6	265	75.4	0.4
66	75.4	0.4	166	75.6	0.6	266	75.4	0.4
67	75.7	0.7	167	75.6	0.6	267	75.4	0.4
68	75.7	0.7	168	75.7	0.7	268	75.7	0.7
69	75.9	0.9	169	75.7	0.7	269	75.7	0.7
70	76.3	1.3	170	76.3	1.3	270	75.7	0.7
71	75.4	0.4	171	75.0	0.0	271	75.2	0.2
72	75.4	0.4	172	75.0	0.0	272	75.2	0.2
73	75.6	0.6	173	75.2	0.2	273	75.2	0.2
74	75.6	0.6	174	75.2	0.2	274	75.2	0.2
75	75.6	0.6	175	75.4	0.4	275	75.2	0.2
76	75.6	0.6	176	75.2	0.2	276	75.2	0.2
77	75.6	0.6	177	75.4	0.4	277	75.2	0.2
78	75.7	0.7	178	75.6	0.6	278	75.4	0.4
79	75.7	0.7	179	75.7	0.7	279	75.6	0.6
80	76.1	1.1	180	75.7	0.7	280	75.7	0.7
81	75.4	0.4	181	75.2	0.2	281	74.7	-0.3
82	75.2	0.2	182	75.4	0.4	282	74.7	-0.3
83	75.6	0.6	183	75.4	0.4	283	74.8	-0.2
84	75.7	0.7	184	75.4	0.4	284	74.8	-0.2
85	75.7	0.7	185	75.4	0.4	285	75.0	0.0
86	75.7	0.7	186	75.6	0.6	286	75.0	0.0
87	75.7	0.7	187	75.4	0.4	287	75.0	0.0
88	75.7	0.7	188	75.6	0.6	288	75.2	0.2
89	76.1	1.1	189	75.7	0.7	289	75.4	0.4
90	76.1	1.1	190	76.1	1.1	290	75.6	0.6
91	75.2	0.2	191	75.2	0.2	291	74.8	-0.2
92	75.4	0.4	192	75.2	0.2	292	74.8	-0.2
93	75.4	0.4	193	75.2	0.2	293	75.2	0.2
94	75.6	0.6	194	75.2	0.2	294	75.2	0.2
95	75.6	0.6	195	75.2	0.2	295	75.2	0.2
96	75.6	0.6	196	75.4	0.4	296	75.4	0.4
97	75.7	0.7	197	75.4	0.4	297	75.4	0.4
98	75.7	0.7	198	75.4	0.4	298	75.4	0.4
99	75.9	0.9	199	75.6	0.6	299	75.4	0.4
100	76.1	1.1	200	75.7	0.7	300	75.4	0.4

Range for 75°F Signal: +1.5/-0.5
Allowable range: ±1.8

Within specification for this temperature? Yes

Performed by: Mike Dey

Mgr. Fire Resistance 9/24/04
Title Date

Approved by:

Pres-CTO 9/24/04
Title Date

Channel Verification for Yokogawa 300 Channel

Serial No.: 48JF0082

Calibrator Used: Tegam T-207318

Temperature Setting (°F): 150.0

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	150.6	0.6	101	150.1	0.1	201	150.1	0.1
2	150.4	0.4	102	150.1	0.1	202	150.1	0.1
3	150.3	0.3	103	150.3	0.3	203	150.1	0.1
4	150.4	0.4	104	150.3	0.3	204	150.3	0.3
5	150.4	0.4	105	150.3	0.3	205	150.3	0.3
6	150.6	0.6	106	150.4	0.4	206	150.1	0.1
7	150.6	0.6	107	150.6	0.6	207	150.3	0.3
8	150.8	0.8	108	150.6	0.6	208	150.4	0.4
9	151.0	1.0	109	150.8	0.8	209	150.3	0.3
10	151.3	1.3	110	150.8	0.8	210	150.8	0.8
11	150.4	0.4	111	149.9	0.1	211	149.9	-0.1
12	150.4	0.4	112	150.1	0.1	212	149.9	-0.1
13	150.3	0.3	113	150.3	0.3	213	149.7	-0.3
14	150.4	0.4	114	150.3	0.3	214	149.7	-0.3
15	150.4	0.4	115	150.6	0.6	215	149.7	-0.3
16	150.4	0.4	116	150.6	0.6	216	150.1	0.1
17	150.4	0.4	117	150.4	0.4	217	150.1	0.1
18	150.6	0.6	118	150.8	0.8	218	150.1	0.1
19	150.8	0.8	119	150.8	0.8	219	150.3	0.3
20	151.0	1.0	120	150.8	0.8	220	150.6	0.6
21	150.4	0.4	121	150.4	0.4	221	149.7	-0.3
22	150.4	0.4	122	150.6	0.6	222	149.7	-0.3
23	150.4	0.4	123	150.6	0.6	223	149.9	-0.1
24	150.6	0.6	124	150.4	0.4	224	149.9	-0.1
25	150.4	0.4	125	150.4	0.4	225	149.9	-0.1
26	150.4	0.4	126	150.4	0.4	226	149.9	-0.1
27	150.4	0.4	127	150.6	0.6	227	150.1	0.1
28	150.8	0.8	128	150.8	0.8	228	150.1	0.1
29	150.8	0.8	129	150.8	0.8	229	150.3	0.3
30	151.0	1.0	130	151.2	1.2	230	150.4	0.4
31	150.3	0.3	131	149.9	-0.1	231	149.7	-0.3
32	150.6	0.6	132	149.9	-0.1	232	149.9	-0.1
33	150.8	0.8	133	149.9	-0.1	233	149.9	-0.1
34	150.6	0.6	134	149.9	-0.1	234	149.9	-0.1
35	150.8	0.8	135	150.3	0.3	235	150.3	0.3
36	150.8	0.8	136	150.3	0.3	236	150.3	0.3
37	150.8	0.8	137	150.3	0.3	237	150.1	0.1
38	151.0	1.0	138	150.3	0.3	238	150.3	0.3
39	151.0	1.0	139	150.4	0.4	239	150.4	0.4
40	151.2	1.2	140	150.8	0.8	240	150.6	0.6
41	150.1	0.1	141	150.1	0.1	241	150.4	0.4
42	150.1	0.1	142	150.1	0.1	242	150.4	0.4
43	150.1	0.1	143	150.3	0.3	243	150.3	0.3
44	150.3	0.3	144	150.1	0.1	244	150.4	0.4
45	150.3	0.3	145	150.3	0.3	245	150.6	0.6
46	150.4	0.4	146	150.3	0.3	246	150.3	0.3
47	150.6	0.6	147	150.3	0.3	247	150.8	0.8
48	150.4	0.4	148	150.4	0.4	248	150.8	0.8
49	150.6	0.6	149	150.4	0.4	249	150.8	0.8
50	150.8	0.8	150	150.6	0.6	250	151.0	1.0
51	150.1	0.1	151	150.3	0.3	251	149.7	-0.3
52	150.1	0.1	152	150.1	0.1	252	149.7	-0.3
53	150.1	0.1	153	150.3	0.3	253	149.7	-0.3
54	150.3	0.3	154	150.4	0.4	254	149.7	-0.3

55	150.3	0.3	155	150.4	0.4	255	149.7	-0.3
56	150.3	0.3	156	150.4	0.4	256	149.7	-0.3
57	150.3	0.3	157	150.6	0.6	257	149.9	-0.1
58	150.4	0.4	158	150.6	0.6	258	150.3	0.3
59	150.4	0.4	159	150.8	0.8	259	150.3	0.3
60	150.8	0.8	160	151.0	1.0	260	150.4	0.4
61	150.6	0.6	161	150.1	0.1	261	150.1	0.1
62	150.6	0.6	162	150.3	0.3	262	150.1	0.1
63	150.4	0.4	163	150.1	0.1	263	150.3	0.3
64	150.6	0.6	164	149.9	-0.1	264	150.1	0.1
65	150.6	0.6	165	150.4	0.4	265	150.1	0.1
66	150.8	0.8	166	150.4	0.4	266	150.3	0.3
67	150.8	0.8	167	150.6	0.6	267	150.3	0.3
68	150.8	0.8	168	150.8	0.8	268	150.3	0.3
69	150.8	0.8	169	150.8	0.8	269	150.8	0.8
70	151.2	1.2	170	151.2	1.2	270	150.8	0.8
71	150.3	0.3	171	150.1	0.1	271	149.9	-0.1
72	150.3	0.3	172	149.9	-0.1	272	150.3	0.3
73	150.4	0.4	173	150.1	0.1	273	150.3	0.3
74	150.6	0.6	174	150.3	0.3	274	150.3	0.3
75	150.3	0.3	175	150.3	0.3	275	150.4	0.4
76	150.3	0.3	176	150.3	0.3	276	150.4	0.4
77	150.4	0.4	177	150.4	0.4	277	150.6	0.6
78	150.6	0.6	178	150.6	0.6	278	150.6	0.6
79	150.8	0.8	179	150.4	0.4	279	150.6	0.6
80	151.2	1.2	180	150.8	0.8	280	150.8	0.8
81	150.3	0.3	181	150.3	0.3	281	149.7	-0.3
82	150.4	0.4	182	150.3	0.3	282	149.7	-0.3
83	150.6	0.6	183	150.3	0.3	283	149.7	-0.3
84	150.4	0.4	184	150.3	0.3	284	149.7	-0.3
85	150.6	0.6	185	150.3	0.3	285	150.1	0.1
86	150.8	0.8	186	150.6	0.6	286	150.1	0.1
87	150.6	0.6	187	150.6	0.6	287	150.1	0.1
88	150.8	0.8	188	150.6	0.6	288	150.3	0.3
89	151.0	1.0	189	151.0	1.0	289	150.3	0.3
90	151.2	1.2	190	151.2	1.2	290	150.6	0.6
91	150.3	0.3	191	150.3	0.3	291	149.7	-0.3
92	150.3	0.3	192	150.3	0.3	292	150.1	0.1
93	150.4	0.4	193	150.4	0.4	293	150.1	0.1
94	150.4	0.4	194	150.3	0.3	294	150.1	0.1
95	150.6	0.6	195	150.4	0.4	295	150.3	0.3
96	150.6	0.6	196	150.6	0.6	296	150.3	0.3
97	150.8	0.8	197	150.3	0.3	297	150.3	0.3
98	150.8	0.8	198	150.6	0.6	298	150.4	0.4
99	151.0	1.0	199	150.6	0.6	299	150.3	0.3
100	151.0	1.0	200	150.8	0.8	300	150.8	0.8

Range for 150°F Signal: +1.3/-0.3
Allowable range: ±1.8

Within specification for this temperature? Yes

Performed by: Mike Dey

Mgr. Fire Resistance — Title
9/24/04 — Date

Approved by:

Pres-CTO — Title
9/24/04 — Date

Channel Verification for Yokogawa 300 Channel

Serial No.: 48JF0082

Calibrator Used: Tegam T-207318

Temperature Setting (°F): 300.0

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	300.2	0.2	101	299.8	-0.2	201	300.0	0.0
2	300.2	0.2	102	300.0	0.0	202	300.2	0.2
3	300.2	0.2	103	300.2	0.2	203	300.2	0.2
4	300.2	0.2	104	300.2	0.2	204	300.2	0.2
5	300.4	0.4	105	300.2	0.2	205	300.4	0.4
6	300.6	0.6	106	300.4	0.4	206	300.4	0.4
7	300.6	0.6	107	300.4	0.4	207	300.2	0.2
8	300.7	0.7	108	300.6	0.6	208	300.4	0.4
9	300.9	0.9	109	300.7	0.7	209	300.6	0.6
10	301.1	1.1	110	300.9	0.9	210	300.6	0.6
11	300.4	0.4	111	299.8	-0.2	211	299.8	-0.2
12	300.2	0.2	112	300.0	0.0	212	299.8	-0.2
13	300.2	0.2	113	300.0	0.0	213	299.8	-0.2
14	300.2	0.2	114	300.2	0.2	214	299.8	-0.2
15	300.2	0.2	115	300.2	0.2	215	300.0	0.0
16	300.2	0.2	116	300.4	0.4	216	300.2	0.2
17	300.4	0.4	117	300.6	0.6	217	300.2	0.2
18	300.4	0.4	118	300.7	0.7	218	300.4	0.4
19	300.7	0.7	119	300.7	0.7	219	300.4	0.4
20	300.9	0.9	120	300.9	0.9	220	300.7	0.7
21	300.2	0.2	121	300.7	0.7	221	299.7	-0.3
22	300.4	0.4	122	300.6	0.6	222	299.7	-0.3
23	300.4	0.4	123	300.6	0.6	223	300.0	0.0
24	300.4	0.4	124	300.6	0.6	224	300.0	0.0
25	300.4	0.4	125	300.6	0.6	225	299.8	-0.2
26	300.2	0.2	126	300.6	0.6	226	299.8	-0.2
27	300.4	0.4	127	300.7	0.7	227	300.0	0.0
28	300.6	0.6	128	300.7	0.7	228	300.2	0.2
29	300.6	0.6	129	300.9	0.9	229	300.2	0.2
30	300.9	0.9	130	301.1	1.1	230	300.6	0.6
31	300.7	0.7	131	300.0	0.0	231	299.7	-0.3
32	300.6	0.6	132	299.8	-0.2	232	299.7	-0.3
33	300.6	0.6	133	300.0	0.0	233	299.7	-0.3
34	300.7	0.7	134	299.8	-0.2	234	300.0	0.0
35	300.7	0.7	135	300.2	0.2	235	300.0	0.0
36	300.7	0.7	136	300.2	0.2	236	300.0	0.0
37	300.7	0.7	137	300.2	0.2	237	300.2	0.2
38	301.1	1.1	138	300.4	0.4	238	300.2	0.2
39	301.1	1.1	139	300.6	0.6	239	300.2	0.2
40	301.3	1.3	140	300.7	0.7	240	300.7	0.7
41	300.2	0.2	141	300.0	0.0	241	300.2	0.2
42	300.2	0.2	142	300.0	0.0	242	300.2	0.2
43	300.2	0.2	143	300.0	0.0	243	300.2	0.2
44	300.2	0.2	144	300.2	0.2	244	300.4	0.4
45	300.2	0.2	145	300.0	0.0	245	300.4	0.4
46	300.6	0.6	146	300.2	0.2	246	300.6	0.6
47	300.6	0.6	147	300.2	0.2	247	300.6	0.6
48	300.6	0.6	148	300.2	0.2	248	300.7	0.7
49	300.6	0.6	149	300.6	0.6	249	300.7	0.7
50	300.7	0.7	150	300.7	0.7	250	300.9	0.9
51	299.7	-0.3	151	300.4	0.4	251	299.8	-0.2
52	299.8	-0.2	152	300.4	0.4	252	299.8	-0.2
53	300.2	0.2	153	300.2	0.2	253	299.8	-0.2
54	300.2	0.2	154	300.4	0.4	254	299.8	-0.2
55	300.2	0.2	155	300.6	0.6	255	300.0	0.0
56	300.2	0.2	156	300.6	0.6	256	300.0	0.0

57	300.4	0.4	157	300.7	0.7	257	300.2	0.2
58	300.4	0.4	158	300.7	0.7	258	300.2	0.2
59	300.4	0.4	159	300.7	0.7	259	300.4	0.4
60	300.6	0.6	160	301.1	1.1	260	300.6	0.6
61	300.6	0.6	161	300.0	0.0	261	299.8	-0.2
62	300.4	0.4	162	300.0	0.0	262	300.2	0.2
63	300.2	0.2	163	300.2	0.2	263	300.0	0.0
64	300.4	0.4	164	300.2	0.2	264	300.0	0.0
65	300.6	0.6	165	300.4	0.4	265	300.2	0.2
66	300.6	0.6	166	300.6	0.6	266	300.0	0.0
67	300.6	0.6	167	300.6	0.6	267	300.2	0.2
68	300.7	0.7	168	300.7	0.7	268	300.6	0.6
69	300.7	0.7	169	300.7	0.7	269	300.4	0.4
70	301.3	1.3	170	300.9	0.9	270	300.7	0.7
71	300.2	0.2	171	299.8	-0.2	271	300.0	0.0
72	300.2	0.2	172	299.8	-0.2	272	300.0	0.0
73	300.4	0.4	173	299.8	-0.2	273	300.0	0.0
74	300.4	0.4	174	300.0	0.0	274	300.2	0.2
75	300.4	0.4	175	300.2	0.2	275	300.0	0.0
76	300.4	0.4	176	300.2	0.2	276	300.2	0.2
77	300.7	0.7	177	300.4	0.4	277	300.2	0.2
78	300.7	0.7	178	300.4	0.4	278	300.4	0.4
79	300.7	0.7	179	300.7	0.7	279	300.6	0.6
80	301.1	1.1	180	300.9	0.9	280	300.7	0.7
81	300.2	0.2	181	300.2	0.2	281	299.7	-0.3
82	300.4	0.4	182	300.2	0.2	282	299.5	-0.5
83	300.4	0.4	183	300.2	0.2	283	299.5	-0.5
84	300.4	0.4	184	300.2	0.2	284	299.8	-0.2
85	300.6	0.6	185	300.2	0.2	285	299.8	-0.2
86	300.4	0.4	186	300.4	0.4	286	299.8	-0.2
87	300.6	0.6	187	300.4	0.4	287	300.0	0.0
88	300.7	0.7	188	300.6	0.6	288	300.0	0.0
89	300.7	0.7	189	300.7	0.7	289	300.2	0.2
90	301.1	1.1	190	300.9	0.9	290	300.6	0.6
91	300.2	0.2	191	299.7	-0.3	291	299.5	-0.5
92	300.2	0.2	192	300.0	0.0	292	299.5	-0.5
93	300.2	0.2	193	300.2	0.2	293	299.8	-0.2
94	300.4	0.4	194	299.8	-0.2	294	299.8	-0.2
95	300.6	0.6	195	300.2	0.2	295	299.8	-0.2
96	300.6	0.6	196	300.2	0.2	296	300.0	0.0
97	300.7	0.7	197	300.2	0.2	297	300.0	0.0
98	300.7	0.7	198	300.4	0.4	298	300.2	0.2
99	300.7	0.7	199	300.4	0.4	299	300.2	0.2
100	301.1	1.1	200	300.7	0.7	300	300.6	0.6

Range for 300°F Signal: +1.3/-0.5
Allowable range ±1.9

Within specification for this temperature? Yes

Performed by: [signature]

Mgr. Fire Resistance 9/24/04
Title Date

Approved by: [signature]

Pres-CTO 9/24/04
Title Date

Channel Verification for Yokogawa 300 Channel

Serial No.: 48JF0082

Calibrator Used: Tegam T-207318

Temperature Setting (°F): 400.0

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	400.5	0.5	101	399.9	-0.1	201	400.3	0.3
2	400.5	0.5	102	400.1	0.1	202	400.3	0.3
3	400.5	0.5	103	400.3	0.3	203	400.1	0.1
4	400.5	0.5	104	400.3	0.3	204	400.3	0.3
5	400.5	0.5	105	400.3	0.3	205	400.3	0.3
6	400.6	0.6	106	400.3	0.3	206	400.3	0.3
7	400.8	0.8	107	400.5	0.5	207	400.5	0.5
8	400.8	0.8	108	400.6	0.6	208	400.6	0.6
9	401.0	1.0	109	400.8	0.8	209	400.6	0.6
10	401.4	1.4	110	401.0	1.0	210	400.8	0.8
11	400.5	0.5	111	400.1	0.1	211	399.9	-0.1
12	400.3	0.3	112	400.1	0.1	212	399.9	-0.1
13	400.5	0.5	113	400.3	0.3	213	399.9	-0.1
14	400.5	0.5	114	400.3	0.3	214	400.1	0.1
15	400.5	0.5	115	400.3	0.3	215	399.9	-0.1
16	400.5	0.5	116	400.6	0.6	216	400.3	0.3
17	400.5	0.5	117	400.6	0.6	217	400.3	0.3
18	400.5	0.5	118	400.6	0.6	218	400.3	0.3
19	400.8	0.8	119	400.8	0.8	219	400.3	0.3
20	400.8	0.8	120	401.2	1.2	220	400.6	0.6
21	400.3	0.3	121	400.6	0.6	221	399.7	-0.3
22	400.3	0.3	122	400.5	0.5	222	399.7	-0.3
23	400.3	0.3	123	400.5	0.5	223	399.9	-0.1
24	400.3	0.3	124	400.6	0.6	224	400.1	0.1
25	400.3	0.3	125	400.5	0.5	225	399.9	-0.1
26	400.3	0.3	126	400.5	0.5	226	400.1	0.1
27	400.3	0.3	127	400.6	0.6	227	400.3	0.3
28	400.3	0.3	128	400.8	0.8	228	400.3	0.3
29	400.6	0.6	129	400.8	0.8	229	400.5	0.5
30	400.8	0.8	130	401.2	1.2	230	400.6	0.6
31	400.3	0.3	131	400.1	0.1	231	399.6	-0.4
32	400.3	0.3	132	399.9	-0.1	232	399.9	-0.1
33	400.5	0.5	133	400.1	0.1	233	399.9	-0.1
34	400.6	0.6	134	400.1	0.1	234	399.9	-0.1
35	400.6	0.6	135	400.3	0.3	235	400.1	0.1
36	400.8	0.8	136	400.3	0.3	236	400.3	0.3
37	400.8	0.8	137	400.3	0.3	237	400.3	0.3
38	400.8	0.8	138	400.3	0.3	238	400.5	0.5
39	401.2	1.2	139	400.5	0.5	239	400.5	0.5
40	401.4	1.4	140	400.6	0.6	240	400.8	0.8
41	400.3	0.3	141	399.9	-0.1	241	400.3	0.3
42	400.3	0.3	142	399.9	-0.1	242	400.3	0.3
43	400.3	0.3	143	399.9	-0.1	243	400.5	0.5
44	400.3	0.3	144	400.1	0.1	244	400.5	0.5
45	400.3	0.3	145	400.1	0.1	245	400.5	0.5
46	400.3	0.3	146	400.1	0.1	246	400.5	0.5
47	400.3	0.3	147	400.5	0.5	247	400.6	0.6
48	400.3	0.3	148	400.5	0.5	248	400.8	0.8
49	400.5	0.5	149	400.5	0.5	249	401.0	1.0
50	400.8	0.8	150	401.0	1.0	250	401.2	1.2
51	399.9	-0.1	151	400.3	0.3	251	399.9	-0.1
52	400.1	0.1	152	400.3	0.3	252	399.7	-0.3
53	400.1	0.1	153	400.3	0.3	253	399.7	-0.3
54	400.3	0.3	154	400.3	0.3	254	399.7	-0.3

55	400.3	0.3	155	400.5	0.5	255	399.9	-0.1
56	400.5	0.5	156	400.5	0.5	256	400.1	0.1
57	400.6	0.6	157	400.8	0.8	257	400.1	0.1
58	400.6	0.6	158	400.8	0.8	258	400.3	0.3
59	400.8	0.8	159	400.8	0.8	259	400.3	0.3
60	401.0	1.0	160	401.2	1.2	260	400.8	0.8
61	400.6	0.6	161	400.3	0.3	261	400.3	0.3
62	400.6	0.6	162	400.3	0.3	262	400.3	0.3
63	400.6	0.6	163	400.3	0.3	263	400.3	0.3
64	400.6	0.6	164	400.3	0.3	264	400.5	0.5
65	400.8	0.8	165	400.6	0.6	265	400.3	0.3
66	400.8	0.8	166	400.8	0.8	266	400.5	0.5
67	400.8	0.8	167	400.6	0.6	267	400.3	0.3
68	401.0	1.0	168	400.6	0.6	268	400.3	0.3
69	401.2	1.2	169	401.0	1.0	269	400.6	0.6
70	401.4	1.4	170	401.0	1.0	270	400.8	0.8
71	400.3	0.3	171	400.1	0.1	271	399.7	-0.3
72	400.3	0.3	172	399.6	-0.4	272	400.1	0.1
73	400.5	0.5	173	399.9	-0.1	273	400.1	0.1
74	400.5	0.5	174	399.9	-0.1	274	400.3	0.3
75	400.5	0.5	175	400.3	0.3	275	400.5	0.5
76	400.6	0.6	176	400.3	0.3	276	400.3	0.3
77	400.8	0.8	177	400.5	0.5	277	400.5	0.5
78	400.8	0.8	178	400.5	0.5	278	400.5	0.5
79	400.8	0.8	179	400.8	0.8	279	400.5	0.5
80	401.2	1.2	180	400.8	0.8	280	400.8	0.8
81	400.3	0.3	181	400.5	0.5	281	399.6	-0.4
82	400.5	0.5	182	400.3	0.3	282	399.6	-0.4
83	400.5	0.5	183	400.5	0.5	283	399.6	-0.4
84	400.5	0.5	184	400.5	0.5	284	399.7	-0.3
85	400.6	0.6	185	400.5	0.5	285	399.7	-0.3
86	400.6	0.6	186	400.6	0.6	286	399.9	-0.1
87	400.6	0.6	187	400.6	0.6	287	400.1	0.1
88	400.8	0.8	188	400.8	0.8	288	399.9	-0.1
89	400.8	0.8	189	401.0	1.0	289	400.3	0.3
90	401.2	1.2	190	401.4	1.4	290	400.5	0.5
91	400.3	0.3	191	400.3	0.3	291	399.7	-0.3
92	400.5	0.5	192	400.3	0.3	292	399.9	-0.1
93	400.5	0.5	193	400.3	0.3	293	399.9	-0.1
94	400.5	0.5	194	400.3	0.3	294	399.9	-0.1
95	400.6	0.6	195	400.5	0.5	295	399.9	-0.1
96	400.5	0.5	196	400.5	0.5	296	400.1	0.1
97	400.8	0.8	197	400.8	0.8	297	399.9	-0.1
98	400.8	0.8	198	400.8	0.8	298	400.3	0.3
99	401.2	1.2	199	400.6	0.6	299	400.3	0.3
100	401.4	1.4	200	400.8	0.8	300	400.6	0.6

Range for 400°F Signal: +1.4/-0.4

Allowable range: ±2.0

Within specification for this temperature? Yes

Performed by: [signature]

Mgr. Fire Resistance — Title

9/24/04 — Date

Approved by: [signature]

Pres-CTO — Title

9/24/04 — Date

Channel Verification for Yokogawa 300 Channel

Serial No.: 48JF0082

Calibrator Used: Tegam T-207318

Temperature Setting (°F): 1000.0

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	1000.0	0.0	101	1000.2	0.2	201	1000.6	0.6
2	1000.0	0.0	102	1000.2	0.2	202	1000.6	0.6
3	1000.2	0.2	103	1000.2	0.2	203	1000.8	0.8
4	1000.2	0.2	104	1000.4	0.4	204	1000.6	0.6
5	1000.2	0.2	105	1000.6	0.6	205	1000.6	0.6
6	1000.4	0.4	106	1000.6	0.6	206	1000.9	0.9
7	1000.6	0.6	107	1000.6	0.6	207	1000.6	0.6
8	1000.6	0.6	108	1000.9	0.9	208	1000.8	0.8
9	1000.8	0.8	109	1000.9	0.9	209	1001.1	1.1
10	1000.9	0.9	110	1001.1	1.1	210	1000.9	0.9
11	1000.2	0.2	111	1000.4	0.4	211	1000.0	0.0
12	1000.2	0.2	112	1000.2	0.2	212	1000.4	0.4
13	1000.0	0.0	113	1000.6	0.6	213	1000.2	0.2
14	1000.2	0.2	114	1000.6	0.6	214	1000.4	0.4
15	1000.4	0.4	115	1000.6	0.6	215	1000.6	0.6
16	1000.4	0.4	116	1000.6	0.6	216	1000.4	0.4
17	1000.4	0.4	117	1000.8	0.8	217	1000.6	0.6
18	1000.6	0.6	118	1000.8	0.8	218	1000.8	0.8
19	1000.6	0.6	119	1000.9	0.9	219	1000.8	0.8
20	1000.9	0.9	120	1001.3	1.3	220	1000.9	0.9
21	1000.4	0.4	121	1000.6	0.6	221	1000.0	0.0
22	1000.2	0.2	122	1000.6	0.6	222	1000.0	0.0
23	1000.4	0.4	123	1000.6	0.6	223	1000.0	0.0
24	1000.4	0.4	124	1000.6	0.6	224	1000.2	0.2
25	1000.4	0.4	125	1000.6	0.6	225	1000.4	0.4
26	1000.2	0.2	126	1000.6	0.6	226	1000.6	0.6
27	1000.2	0.2	127	1000.6	0.6	227	1000.6	0.6
28	1000.6	0.6	128	1000.9	0.9	228	1000.6	0.6
29	1000.6	0.6	129	1000.9	0.9	229	1000.8	0.8
30	1000.6	0.6	130	1001.3	1.3	230	1000.9	0.9
31	1000.2	0.2	131	1000.0	0.0	231	1000.0	0.0
32	1000.6	0.6	132	1000.0	0.0	232	1000.4	0.4
33	1000.6	0.6	133	1000.0	0.0	233	1000.4	0.4
34	1000.6	0.6	134	1000.0	0.0	234	1000.4	0.4
35	1000.8	0.8	135	1000.0	0.0	235	1000.6	0.6
36	1000.8	0.8	136	1000.2	0.2	236	1000.6	0.6
37	1000.8	0.8	137	1000.2	0.2	237	1000.6	0.6
38	1000.8	0.8	138	1000.2	0.2	238	1000.8	0.8
39	1000.9	0.9	139	1000.6	0.6	239	1000.8	0.8
40	1001.1	1.1	140	1000.6	0.6	240	1001.1	1.1
41	1000.0	0.0	141	1000.0	0.0	241	1000.6	0.6
42	1000.0	0.0	142	1000.0	0.0	242	1000.6	0.6
43	1000.0	0.0	143	1000.0	0.0	243	1000.4	0.4
44	1000.2	0.2	144	1000.0	0.0	244	1000.6	0.6
45	1000.2	0.2	145	1000.2	0.2	245	1000.8	0.8
46	1000.2	0.2	146	1000.0	0.0	246	1000.6	0.6
47	1000.6	0.6	147	1000.2	0.2	247	1000.9	0.9
48	1000.6	0.6	148	1000.4	0.4	248	1000.9	0.9
49	1000.8	0.8	149	1000.8	0.8	249	1000.8	0.8
50	1000.9	0.9	150	1000.9	0.9	250	1001.3	1.3
51	1000.2	0.2	151	1000.8	0.8	251	1000.0	0.0
52	1000.2	0.2	152	1000.8	0.8	252	999.9	-0.1
53	1000.2	0.2	153	1000.6	0.6	253	1000.0	0.0
54	1000.4	0.4	154	1000.8	0.8	254	1000.0	0.0
55	1000.4	0.4	155	1000.8	0.8	255	1000.0	0.0
56	1000.4	0.4	156	1000.6	0.6	256	1000.0	0.0

57	1000.6	0.6	157	1000.8	0.8	257	1000.2	0.2
58	1000.6	0.6	158	1000.9	0.9	258	1000.2	0.2
59	1000.6	0.6	159	1000.9	0.9	259	1000.6	0.6
60	1000.9	0.9	160	1001.3	1.3	260	1000.8	0.8
61	1000.9	0.9	161	1000.4	0.4	261	1000.0	0.0
62	1000.8	0.8	162	1000.6	0.6	262	1000.2	0.2
63	1000.6	0.6	163	1000.6	0.6	263	1000.0	0.0
64	1000.8	0.8	164	1000.6	0.6	264	1000.2	0.2
65	1000.8	0.8	165	1000.6	0.6	265	1000.4	0.4
66	1000.9	0.9	166	1000.8	0.8	266	1000.2	0.2
67	1000.9	0.9	167	1000.8	0.8	267	1000.6	0.6
68	1001.1	1.1	168	1000.8	0.8	268	1000.6	0.6
69	1001.3	1.3	169	1000.9	0.9	269	1000.6	0.6
70	1001.7	1.7	170	1001.3	1.3	270	1001.1	1.1
71	1000.6	0.6	171	1000.0	0.0	271	1000.0	0.0
72	1000.6	0.6	172	1000.0	0.0	272	1000.0	0.0
73	1000.8	0.8	173	1000.2	0.2	273	1000.0	0.0
74	1000.8	0.8	174	1000.2	0.2	274	1000.0	0.0
75	1000.9	0.9	175	1000.2	0.2	275	1000.0	0.0
76	1000.9	0.9	176	1000.6	0.6	276	1000.2	0.2
77	1000.9	0.9	177	1000.6	0.6	277	1000.6	0.6
78	1000.9	0.9	178	1000.8	0.8	278	1000.2	0.2
79	1000.9	0.9	179	1000.8	0.8	279	1000.6	0.6
80	1001.1	1.1	180	1000.9	0.9	280	1000.8	0.8
81	1000.2	0.2	181	1000.9	0.9	281	999.5	-0.5
82	1000.6	0.6	182	1000.6	0.6	282	999.7	-0.3
83	1000.6	0.6	183	1000.6	0.6	283	999.5	-0.5
84	1000.6	0.6	184	1000.8	0.8	284	999.5	-0.5
85	1000.9	0.9	185	1000.6	0.6	285	1000.0	0.0
86	1000.8	0.8	186	1000.8	0.8	286	1000.0	0.0
87	1000.9	0.9	187	1000.9	0.9	287	999.9	-0.1
88	1000.9	0.9	188	1000.8	0.8	288	1000.0	0.0
89	1000.9	0.9	189	1001.1	1.1	289	1000.0	0.0
90	1001.3	1.3	190	1001.5	1.5	290	1000.0	0.0
91	1000.6	0.6	191	1000.8	0.8	291	999.7	-0.3
92	1000.6	0.6	192	1000.6	0.6	292	999.7	-0.3
93	1000.6	0.6	193	1000.8	0.8	293	999.7	-0.3
94	1000.6	0.6	194	1000.9	0.9	294	999.7	-0.3
95	1000.6	0.6	195	1000.6	0.6	295	999.9	-0.1
96	1000.6	0.6	196	1000.8	0.8	296	1000.0	0.0
97	1000.8	0.8	197	1000.9	0.9	297	1000.0	0.0
98	1000.9	0.9	198	1000.8	0.8	298	1000.2	0.2
99	1000.9	0.9	199	1000.9	0.9	299	1000.4	0.4
100	1001.5	1.5	200	1000.9	0.9	300	1000.6	0.6

Range for 1000°F Signal: +1.7/-0.5

Allowable range: ±2.3

Within specification for this temperature? Yes

Performed by: [signature]

Mgr. Fire Resistance — 9/24/04

Title — Date

Approved by: [signature]

Pres-CTO — 9/24/04

Title — Date

Channel Verification for Yokogawa 300 Channel

Serial No.: 48JF0082

Calibrator Used: Tegam T-207318

Temperature Setting (°F): 2000.0

Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-	Channel No.	Reading (°F)	+/-
1	2000.3	0.3	101	2000.7	0.7	201	2001.0	1.0
2	1999.9	-0.1	102	2000.7	0.7	202	2001.0	1.0
3	1999.9	-0.1	103	2000.8	0.8	203	2001.2	1.2
4	1999.9	-0.1	104	2001.0	1.0	204	2001.2	1.2
5	1999.9	-0.1	105	2001.0	1.0	205	2001.4	1.4
6	2000.1	0.1	106	2001.2	1.2	206	2001.6	1.6
7	2000.3	0.3	107	2001.2	1.2	207	2001.6	1.6
8	2000.3	0.3	108	2001.6	1.6	208	2001.6	1.6
9	2000.5	0.5	109	2001.7	1.7	209	2001.7	1.7
10	2000.8	0.8	110	2001.7	1.7	210	2002.1	2.1
11	1999.9	-0.1	111	2000.7	0.7	211	2000.7	0.7
12	1999.9	-0.1	112	2001.0	1.0	212	2000.8	0.8
13	1999.9	-0.1	113	2001.0	1.0	213	2000.8	0.8
14	1999.9	-0.1	114	2001.0	1.0	214	2000.8	0.8
15	2000.1	0.1	115	2001.2	1.2	215	2001.0	1.0
16	2000.1	0.1	116	2001.2	1.2	216	2001.0	1.0
17	2000.3	0.3	117	2001.2	1.2	217	2001.0	1.0
18	2000.5	0.5	118	2001.6	1.6	218	2001.0	1.0
19	2000.5	0.5	119	2001.7	1.7	219	2001.2	1.2
20	2000.7	0.7	120	2001.7	1.7	220	2001.6	1.6
21	2000.1	0.1	121	2001.0	1.0	221	2000.5	0.5
22	1999.9	-0.1	122	2001.0	1.0	222	2000.7	0.7
23	1999.9	-0.1	123	2001.0	1.0	223	2000.7	0.7
24	2000.1	0.1	124	2001.0	1.0	224	2000.8	0.8
25	2000.1	0.1	125	2001.0	1.0	225	2000.8	0.8
26	2000.1	0.1	126	2001.0	1.0	226	2000.8	0.8
27	2000.3	0.3	127	2001.0	1.0	227	2000.8	0.8
28	2000.3	0.3	128	2001.2	1.2	228	2000.8	0.8
29	2000.5	0.5	129	2001.4	1.4	229	2001.0	1.0
30	2000.7	0.7	130	2001.6	1.6	230	2001.2	1.2
31	2001.0	1.0	131	2000.7	0.7	231	2000.7	0.7
32	2001.0	1.0	132	2000.3	0.3	232	2000.7	0.7
33	2001.0	1.0	133	2000.3	0.3	233	2000.7	0.7
34	2001.0	1.0	134	2000.5	0.5	234	2000.8	0.8
35	2001.0	1.0	135	2000.7	0.7	235	2001.0	1.0
36	2001.0	1.0	136	2000.7	0.7	236	2001.0	1.0
37	2001.2	1.2	137	2000.7	0.7	237	2001.0	1.0
38	2001.2	1.2	138	2000.7	0.7	238	2001.2	1.2
39	2001.4	1.4	139	2000.8	0.8	239	2001.4	1.4
40	2001.7	1.7	140	2001.4	1.4	240	2001.6	1.6
41	2000.7	0.7	141	2000.3	0.3	241	2000.5	0.5
42	2000.7	0.7	142	2000.5	0.5	242	2000.7	0.7
43	2000.8	0.8	143	2000.7	0.7	243	2000.7	0.7
44	2000.7	0.7	144	2000.5	0.5	244	2000.5	0.5
45	2001.0	1.0	145	2000.5	0.5	245	2000.8	0.8
46	2001.0	1.0	146	2000.7	0.7	246	2000.8	0.8
47	2001.0	1.0	147	2000.7	0.7	247	2000.7	0.7
48	2001.0	1.0	148	2000.8	0.8	248	2001.0	1.0
49	2001.0	1.0	149	2001.0	1.0	249	2001.2	1.2
50	2001.2	1.2	150	2001.2	1.2	250	2001.7	1.7
51	2000.3	0.3	151	2001.0	1.0	251	2000.7	0.7
52	2000.5	0.5	152	2000.8	0.8	252	2000.7	0.7
53	2000.7	0.7	153	2001.0	1.0	253	2000.7	0.7
54	2000.7	0.7	154	2001.0	1.0	254	2000.7	0.7
55	2000.7	0.7	155	2001.0	1.0	255	2000.7	0.7
56	2001.0	1.0	156	2001.0	1.0	256	2000.7	0.7

57	2001.0	1.0	157	2001.0	1.0	257	2000.7	0.7
58	2001.0	1.0	158	2001.0	1.0	258	2000.8	0.8
59	2001.2	1.2	159	2001.4	1.4	259	2001.0	1.0
60	2001.4	1.4	160	2001.7	1.7	260	2001.0	1.0
61	2001.2	1.2	161	2000.7	0.7	261	2000.5	0.5
62	2001.2	1.2	162	2000.8	0.8	262	2000.3	0.3
63	2001.2	1.2	163	2000.8	0.8	263	2000.7	0.7
64	2001.4	1.4	164	2000.8	0.8	264	2000.5	0.5
65	2001.4	1.4	165	2001.0	1.0	265	2000.7	0.7
66	2001.6	1.6	166	2001.0	1.0	266	2000.8	0.8
67	2001.6	1.6	167	2001.0	1.0	267	2000.7	0.7
68	2001.7	1.7	168	2001.2	1.2	268	2000.8	0.8
69	2001.7	1.7	169	2001.4	1.4	269	2001.0	1.0
70	2002.1	2.1	170	2001.6	1.6	270	2001.0	1.0
71	2001.0	1.0	171	2000.3	0.3	271	1999.8	-0.2
72	2001.0	1.0	172	2000.5	0.5	272	1999.9	-0.1
73	2001.2	1.2	173	2000.7	0.7	273	2000.1	0.1
74	2001.2	1.2	174	2000.7	0.7	274	1999.9	-0.1
75	2001.2	1.2	175	2000.7	0.7	275	1999.9	-0.1
76	2001.4	1.4	176	2001.0	1.0	276	2000.1	0.1
77	2001.4	1.4	177	2001.0	1.0	277	2000.1	0.1
78	2001.4	1.4	178	2001.2	1.2	278	2000.3	0.3
79	2001.6	1.6	179	2001.4	1.4	279	2000.5	0.5
80	2001.7	1.7	180	2001.6	1.6	280	2000.7	0.7
81	2001.0	1.0	181	2001.6	1.6	281	1999.6	-0.4
82	2001.0	1.0	182	2001.7	1.7	282	1999.4	-0.6
83	2001.0	1.0	183	2001.4	1.4	283	1999.4	-0.6
84	2001.0	1.0	184	2001.6	1.6	284	1999.6	-0.4
85	2001.0	1.0	185	2001.7	1.7	285	1999.6	-0.4
86	2001.2	1.2	186	2001.6	1.6	286	1999.6	-0.4
87	2001.2	1.2	187	2001.7	1.7	287	1999.8	-0.2
88	2001.2	1.2	188	2001.7	1.7	288	1999.8	-0.2
89	2001.6	1.6	189	2001.9	1.9	289	1999.9	-0.1
90	2001.7	1.7	190	2002.5	2.5	290	2000.3	0.3
91	2000.7	0.7	191	2001.0	1.0	291	1999.4	-0.6
92	2000.8	0.8	192	2001.2	1.2	292	1999.6	-0.4
93	2001.0	1.0	193	2001.0	1.0	293	1999.9	-0.1
94	2001.0	1.0	194	2001.4	1.4	294	1999.9	-0.1
95	2001.0	1.0	195	2001.6	1.6	295	1999.9	-0.1
96	2001.2	1.2	196	2001.2	1.2	296	1999.9	-0.1
97	2001.4	1.4	197	2001.7	1.7	297	1999.9	-0.1
98	2001.4	1.4	198	2001.7	1.7	298	2000.3	0.3
99	2001.6	1.6	199	2001.7	1.7	299	2000.1	0.1
100	2001.7	1.7	200	2001.9	1.9	300	2000.5	0.5

Range for 2000°F Signal: +2.5/-0.6

Allowable range: ±2.8

Within specification for this temperature? Yes

Performed by: MH Dey

Mgr. Fire Resistance — 9/24/04

Title — Date

Approved by:

Pres-CTO — 9/24/04

Title — Date

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Omega Point Labs
CLIENT/PROJECT NUMBER OPL Equipment
RECEIVED FROM PMC
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2303 - OPL
DATE RECEIVED 3-11-02
DATE INSPECTED 3-11-02
INSPECTED BY: D Sutton

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	Rec'd	B.O.	I.D. NO.	CONT. MATL Y/N	CERT. RECD Y/N	CONTAINER INTEGRITY	EXCEPTION	ACCEPTANCE Accept	Hold	Reject	REMARKS
Chromel TC Wire	13454Q	10#	11#	0	KKP-16 Spool-00395248	Y	Y	Good	None	X			
Alumel TC Wire	13454Q	10#	11#	0	KKN-16 Spool-00395246	Y	Y	Good	None	X			

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER
13454Q Page 237

Date: 1/31/2002
Page: 1 of 1

Order From: PMC
680 Hayward Street
Manchester
NH 03103
603-622-3500

Deliver to: Omega Point Laboratories, Inc
16015 Shady Falls Road
Elmendorf
TX 78112
(210) 635-8100

Vendor No: 0024

Your Item Number / Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
KP-16 Chromel TC Wire	001	10.00	Pounds	$23.20	$232.00
KN-16 Alumel TC Wire	002	10.00	Pounds	$27.00	$270.00
Calibration Services	003	2.00	Each	$8.50	$17.00

Peg

*See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements"
QA Approval C Dalton
Date 1-31-2002

Please Quote Purchase Order Number on all correspondence.

Special Instructions: Please include Certificate of Conformance to attached Specification Sheet and Calibration Data traceable to NIST

Subtotal:	$519.00
Freight:	0.00
Tax Amount:	0.00
Total Value:	$519.00

OMEGA POINT LABORATORIES
MATERIAL PURCHASING SPECIFICATIONS

SPECIFICATION NUMBER: MS-04 - 1345AQ - OPL

VENDOR: PMC Corporation

VENDOR PRODUCT NUMBER	PRODUCT DESCRIPTION
KP-16	Bare Chromel Thermocouple Wire (16 gauge)
KN-16	Bare Alumel Thermocouple Wire (16 gauge)

Material as defined above shall be provided in accordance with the Critical Characteristics as listed below:

TEST	DESCRIPTION	TEMPERATURE RANGES MIN. - MAX
ASTM E220-96	Std. Test Method for Calibration of Thermocouples by Comparison	32°F - 2300°F
Thermocouple Type K	Table 2 "Calibration Uncertainties in Calibrating Thermocouples by Comparison Method – Temperatures in Degrees Fahrenheit	

Note: Temperature deviations above 2000°F are for reference only when using 16 gauge wire.

QUALITY ASSURANCE REQUIREMENTS

1.0 QUALITY PROGRAM

Seller shall furnish this item in accordance with Quality Program approved by Omega Point Laboratories. Material specified herein is to be produced and tested in accordance with vendor quality standards, methods, guidelines and manufacturing instructions as defined in that Quality Program.

2.0 QUALITY VERIFICATION

Receiving Inspection - Buyer shall inspect items upon receipt to verify compliance with purchase order requirements. Rejected items shall be returned at seller's expense.

Document Review - Final acceptance shall be based on satisfactory review of required certifications and/or supporting documents.

3.0 CERTIFICATIONS

3.1 Certification that supplied materials comply with this material specification and listing Critical Characteristics shall be provided. This certificates shall reference Omega Point Labs purchase order number and specification number for all material furnished under this specification. This Certification shall be signed by the appropriate vendor representative.

3.2 The material furnished under this specification shall be a product that complies with the following:

3.2.1 Has been tested and passed all tests specified herein.

3.2.2 Manufacturing methods for this material have not changed. Vendor will advise Omega Point in writing of any changes in the manufacturing prior to material manufacture.

3.2.3 Raw materials used in the manufacture of this material meet Vendor specifications.

4.0 AUDITS/RIGHTS OF ACCESS

Omega Point Labs reserves the right to audit your facility to verify compliance with the purchase order and specification requirements with a minimum ten (10) day notice.

5.0 IDENTIFICATION

Seller shall identify each item with a unique traceability number by physical marking or tagging. These identification numbers shall be traceable to certifications and packing lists.

6.0 PACKING/SHIPPING

All materials shall be packaged in air tight, moisture free containers and shall be free of foreign substances such as dirt, oil, grease or other deleterious materials.

All materials shall be suitably crated, boxed or otherwise prepared for shipment to prevent damage during handling and shipping.

QUALITY ASSURANCE APPROVAL:

T Button

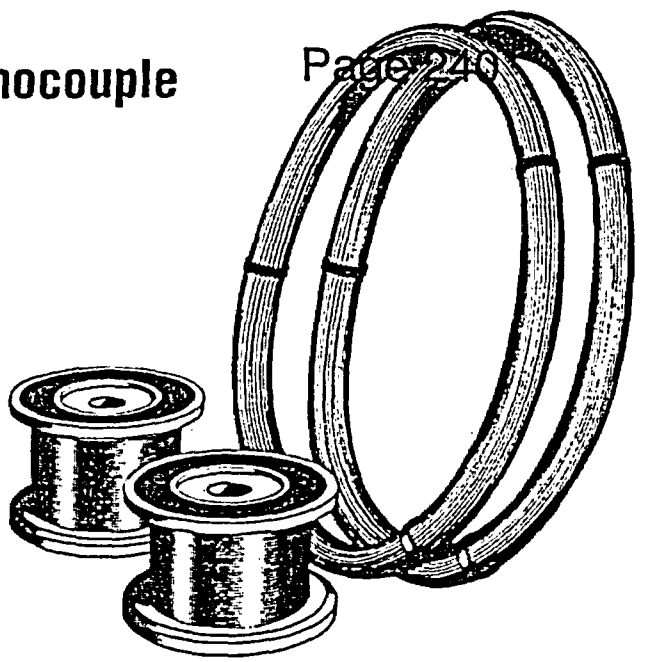
Title QA Assist

Date 1-31-02

AVL Verification

Class: A

Bare Thermocouple Wire



PMC is continuously committed to meet the specific needs of the industry and it's customers. In order to meet this committment, PMC has become a full service company. Therefore along with insulated wire product capabilities, PMC operates high speed stranders and spooling equipment to provide a full line of bare wire items.

Customers may select from the items listed below as matched pairs to meet standard limits of error. On most items, variations are available to meet particular applications, including special limits of error or extension grade tolerances.

You will find our qualified sales and engineering staff eager to assist you in these selections.

— SOLID BARE THERMOCOUPLE WIRE PART NUMBERS —												
		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N		
WIRE GA B&S	WIRE SIZE DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -	STANDARD PACKAGE COIL/REEL LBS
8	.128	JP-8	JN-8	KP-8	KN-8	—	—	EP-8	EN-8	NP-8	NN-8	COIL 50#
14	.064	JP-14	JN-14	KP-14	KN-14	TP-14	TN-14	EP-14	EN-14	NP-14	NN-14	REEL 50#
16	.050	JP-16	JN-16	KP-16	KN-16	TP-16	TN-16	EP-16	EN-16	NP-16	NN-16	REEL 25#
18	.040	JP-18	JN-18	KP-18	KN-18	TP-18	TN-18	EP-18	EN-18	NP-18	NN-18	REEL 10#
20	.032	JP-20	JN-20	KP-20	KN-20	TP-20	TN-20	EP-20	EN-20	NP-20	NN-20	REEL 10#
24	.020	JP-24	JN-24	KP-24	KN-24	TP-24	TN-24	EP-24	EN-24	NP-24	NN-24	REEL 5#
26	.015	JP-26	JN-26	KP-26	KN-26	TP-26	TN-26	EP-26	EN-26	NP-26	NN-26	REEL 5#
28	.012	JP-28	JN-28	KP-28	KN-28	TP-28	TN-28	EP-28	EN-28	NP-28	NN-28	REEL 1#
30	.010	JP-30	JN-30	KP-30	KN-30	TP-30	TN-30	EP-30	EN-30	NP-30	NN-30	REEL 1#
— STRANDED BARE THERMOCOUPLE WIRE PART NUMBERS —												
16 7/24	.060	JP-16F	JN-16F	KP-16F	KN-16F	TP-16F	TN-16F	EP-16F	EN-16F	NP-16F	NN-16F	REEL 40#
18 19/30	.050	JP-1819	JN-1819	KP-1819	KN-1819	TP-1819	TN-1819	EP-1819	EN-1819	NP-1819	NN-1819	REEL 30#
18 7/26	.048	JP-18F	JN-18F	KP-18F	KN-18F	TP-18F	TN-18F	EP-18F	EN-18F	NP-18F	NN-18F	REEL 30#
20 7/28	.037	JP-20F	JN-20F	KP-20F	KN-20F	TP-20F	TN-20F	EP-20F	EN-20F	NP-20F	NN-20F	REEL 15#
24 7/32	.024	JP-24F	JN-24F	KP-24F	KN-24F	TP-24F	TN-24F	EP-24F	EN-24F	NP-24F	NN-24F	REEL 5#

The above part numbers represent the more popular constructions. However, other designs are available upon request.

PMC CORPORATION
57 Harvey Road
Londonderry, NH
03053

Tel. (603) 432-9473
FAX (800) 639-5701

® Registered Trademark of PMC Corporation

© 1995 PMC Corporation

© 1995 PMC Corporation

Upper > temperature limits for bare thermocouple wire

UPPER TEMPERATURE LIMITS FOR BARE THERMOCOUPLE WIRE

THERMOCOUPLE TYPE	ANSI SYMBOL	WIRE GAUGE (A.W.G.)					
		8 GA.	14 GA.	16 GA.	20 GA.	24 GA.	28 GA.
IRON-CONSTANTAN™	J	1400°F (760°C)	1100°F (600°C)	900°F (500°C)	900°F (500°C)	700°F (370°C)	700°F (370°C)
CHROMEL™-ALUMEL™	K	2300°F (1260°C)	2000°F (1100°C)	2000°F (1100°C)	1800°F (1000°C)	1600°F (870°C)	1600°F (870°C)
COPPER-CONSTANTAN™	T	—	700°F (370°C)	500°F (260°C)	500°F (260°C)	400°F (200°C)	400°F (200°C)
CHROMEL™-CONSTANTAN™	E	1600°F (870°C)	1200°F (650°C)	1000°F (550°C)	1000°F (550°C)	800°F (430°C)	800°F (430°C)
NICROSIL™-NISIL™	N	2300°F (1260°C)	2000°F (1100°C)	2000°F (1100°C)	1800°F (1000°C)	1600°F (870°C)	1600°F (870°C)

™ Trademark, Hoskins Mfg Co.

Approximate > yields for bare solid thermocouple wire

— BARE SOLID THERMOCOUPLE WIRE FEET/LB —

		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N	
Wire GA B&S	Wire Size DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -
6	.162	14.2	12.6	13	13	12.6	12.6	13	12.6	13	13
8	.128	22.8	20.2	21	21	19.8	20.2	21	20.2	21	21
14	.064	91.2	80.9	83	83	80.5	80.9	83	80.9	83	83
16	.050	144	127	130	130	128	128	130	127	130	130
18	.040	233	207	212	212	203	203	212	207	212	212
20	.032	365	324	331	331	324	324	331	324	331	331
24	.020	925	821	838	838	820	820	838	821	838	838
26	.015	1478	1312	1340	1340	1299	1299	1340	1312	1340	1340
28	.012	2353	2089	2130	2130	2062	2062	2130	2089	2130	2130
30	.010	3736	3316	3370	3370	3294	3294	3370	3316	3370	3370
36	.005	14940	13260	13500	13500	13250	13250	13500	13260	13500	13500

Approximate > yields for bare stranded thermocouple wire

— BARE STRANDED THERMOCOUPLE WIRE FEET/LB —

		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N	
Wire GA B&S	Wire Size DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -
14 7/22	.073	83	74	75	76	74	74	75	74	75	76
16 7/24	.060	132	117	119	121	117	117	119	117	119	121
18 19/30	.050	197	175	177	180	173	175	177	175	177	180
18 7/26	.048	211	187	190	193	186	187	190	187	190	193
20 7/28	.037	336	298	303	307	295	298	303	298	303	307
22 7/30	.030	534	474	480	488	471	474	480	474	480	488
24 7/32	.024	952	833	833	833	737	833	833	833	833	833

PRICING POLICY > Shipments will be invoiced at PMC's prices in effect at time of shipment. Quotations are given with an escalation clause and prices, terms, and conditions are subject to change without prior notice. PMC will, however, make every attempt to hold to current quoted prices. All prices quoted are in United States currency, and shall be subject to correction for errors. Unless otherwise stated in writing to PMC.

REELS, SPOOLS & COILS > All shipments, unless specified otherwise by PMC, are made on non-returnable reels, spools or coils in one continuous length.

SHORTAGES & RETURNS > All claims for shortage or incorrect material must be made within 10 days after receipt of the goods to which such claim pertains. Goods may only be returned for credit within 1 month of the date of authorization. Goods that are special in any way shall not be returned to PMC. Material returned for any reason, without written authorization will be refused and returned at shipper's expense. A return request must be processed through our Londonderry, N.H. sales office.

TOLERANCES > Due to allowances in manufacturing processes for wire, cable and similar products, PMC reserves the right to ship a variation of ± 10% from the quantity of such goods ordered. Physical tolerances shown are nominal. Shipping weights are an average of all types of conductors and are listed for estimating only. These weights can vary substantially due to different types of spools, reels and/or conductors.

The material contained in this document is presented in good faith and believed to be reliable and accurate. However, because testing conditions may vary and material quality or information that may be provided in whole or part by others may be beyond our control, no warranty, expressed or implied, is given and PMC Corporation can assume no liability for

PMC A DIVISION OF ROCKBESTOS-SURPRENANT CABLE CORPORATION
680 HAYWARD STREET, MANCHESTER, NH 03103 (603) 622-3500
SPECIALIZING IN WIRE & CABLE FOR THE SENSOR INDUSTRY FAX (800) 639-5701

CERTIFICATE OF CALIBRATION

TO: OMEGA POINT LABS
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112

Date: 02/11/02
Cust PO#: 13454Q
Job #: PSO055960-1+2

CALIBRATION RESULTS ARE TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) AND MEET SPECIAL LIMITS DEVIATION TOLERANCES AS DEFINED IN ISA MC96.1 (FORMERLY ANSI) AND ASTM E 230-93, IPTS90, AND AMS 2750 REV C.

TEST RESULTS FOR: SPOOLS PMC P/N: KKP-16 Spool 00395248 TOTAL: 11 LBS.
KKN-16 Spool 00395246 11 LBS

Test Temperature (°F)	Inside End	Outside End	Test Temperature (°F)	Inside End	Outside End
800	-1.9	-2.0	2000	-5.6	-5.2
1000	-0.5	-0.5	2300	-6.4	-5.8
1500	-2.0	-1.9			

REPORTED RESULTS ARE DEVIATIONS FROM TEST TEMPERATURES. FOR CORRECTION FACTORS REVERSE THE SIGNS.

THE MATERIAL REFERENCED ABOVE HAS BEEN CALIBRATED UTILIZING TECHNIQUES CONSISTENT WITH THE GUIDELINES SET FORTH IN ANSI Z540-1 AND ASTM E-220. THIS IS TO CERTIFY THE MATERIAL FURNISHED ON THIS SHIPMENT ARE IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS OF THE ABOVE REFERENCED CUSTOMER PURCHASE ORDER. INSPECTION AND TEST RECORDS ARE ON FILE AND AVAILABLE FOR CUSTOMER REVIEW.

SECONDARY STANDARD THERMOCOUPLE: TYPE K
REEL # POS LEG: 00291335
REEL # NEG LEG: 00291346
CALIBRATION DATE: 3/17/00

NIST #:263094C&A
263094B&D
(SINGLE USE THERMOCOUPLE FROM CALIBRATED REEL)

DIGITAL VOLT METER
MODEL: KAYE INSTRUMENTS: X1525C
SERIAL #: 306172
CALIBRATION DUE DATE: 07/25/02

EDC 100RC SERIAL# 15075
CERTIFICATE # 01-020
DUE 07/10/02

ICE POINT THERMOCOUPLE REFERENCE
MODEL, KAYE INSTRUMENTS: K-170-SR
SERIAL #: 306179
CALIBRATION DUE DATE: 07/25/02

HART DIGITAL THERMOMETER
SERIAL# 15448
DUE 05/21/02

Calibration Certificate Acceptable
Item Alumel & Chromel Wire
SN Spools 00395248 + 00395246
NIST Traceability Adequate
As Found/As Left Verified
Calibration Data Sufficient
Tolerance Range Adequate
Date of Review: 3-11-02 3/11/02
OPL QA/QC Dept. Eng./Dept. Mgr.

QUALITY ASSURANCE TECHNICIAN DATE 2-11-02

PMC Division of RSCC
680 Hayward Street
Manchester, NH 03103
Phone: (603) 622-3500 Fax: (603) 622-7023

Delivery Note

35607

Ship To: OMEGA POINT LABS
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112

Attention: CLEDA

Ship Date	Customer P.O.	Ship Via	Due Date	
Feb 11 2002	13454Q	UPS GROUND	FEB 05 2002	Page : 1

Item and Description	Qty Ordered	Back ordered	Qty Shipped
1. KP-16 Spool#: 00395248-CAR	10	0	11
2. KN-16 Spool#: 00395246-CAR	10	0	11
3. CALIBRATION CHARGE CALIBRATION CHARGE. Item 1 & 2 to be calibrated at 800, 1000, 1500, 2000 & 2300°F I/O to ASTME E220-96	1	0	1

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Omega Point Labs
CLIENT/PROJECT NUMBER OPL Equipment
RECEIVED FROM SSC Lab Division
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2680 - OPL
DATE RECEIVED 11-8-04
DATE INSPECTED 11-8-04
INSPECTED BY: [illegible]

ITEM DESCRIPTION	P.O. NO.	QUANTITY			I.D. NO.	CON'tD MATL Y/N	CERT REC'D Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE			REMARKS
		Order	Rec'd	B.O.						Accept	Hold	Reject	
Pressure Transducer	145860	1	1	0	1379574	Y	Y	N	Good	X			Calibration Service
Torque Wrench	145860	1	1	0	4040229132	Y	Y	N	Good	X			
Pressure Gage 100psi	145860	1	1	0	01LED10	Y	Y	N	Good	X			
6" Dial Caliper	145860	1	1	0	Q623532	Y	Y	N	Good	X			
Load Cell 1000lbs	145860	1	1	0	1121698	Y	Y	N	Good	X			
Platform Scale	145860	1	1	0	12317	Y	Y	N	Good	X			

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER
14586Q

Date 10/12/2004
Page: 1 of 1

Order From: SSC Lab Division
7715 Distribution Dr.
Little Rock
AR 72209
501-562-2900

Vendor No:

Deliver to: Omega Point Laboratories, Inc
16015 Shady Falls Road
Elmendorf
TX 78112
(210) 635-8100
(800) 966-5253

Your Item Number / Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
Pressure Transducer SN: 1379574 ✓ .25" WC	Rec'd 11/8/04 gp 001	1.00	Each	$50.00	$50.00
Torque Wrench SN: 4040229132	Rec'd 11/8/04 gp 002	1.00	Each	$50.00	$50.00
Pressure Gage 1000psi - SN: 01LE010	Rec'd 11/8/04 gp 004	1.00	Each	$45.00	$45.00
6" Dial Caliper SN: Q623532 ✓	Rec'd 11/8/04 gp 005	1.00	Each	$40.00	$40.00
Load Cell 1000 lb. SN: 112698 gp 10-12-04 ✓	Rec'd 11/8/04 gp 006	1.00	Each	$125.00	$125.00
Platform Scale SN: 12317* Will be shipped separately.	Rec'd 11/8/04 gp 003	1.00	Each	$125.00	$125.00

CALIBRATION CERT. REQUIREMENTS
1. Statement of NIST traceability
2. NIST test or I.D. number
3. As Found
4. As Left Values
5. Uncertainties of calibration measurements
6. Calibration data
7. Calibration certificates must show accreditation to ISO/IEC 17025

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."
QA Approval
Date 10/12/04

Please Quote Purchase Order Number on all correspondence.
Special Instructions: Please include Certificate of Conformance to attached Specification Sheet and Calibration Data traceable to NIST.

Subtotal:	$435.00
Freight:	0.00
Tax Amount:	0.00
Total Value:	$435.00

VENDOR PURCHASING SPECIFICATION AND QUALITY ASSURANCE REQUIREMENTS

Vendor: SSC Lab Division
Purchase Order No. 145860

Any of the following Quality Assurance requirements shall be incorporated as conditions to this procurement when corresponding box is marked. Failure to comply with any requirement specified may result in rejection and/or return of shipment at seller's expense.

1.0 QUALITY PROGRAM

☒ Seller shall furnish all items on this Purchase Order in accordance with Quality Program approved by Buyer.

2.0 Quality Verification

When additional quality verification activities are required as a condition to this procurement, invoices will not be paid until satisfactory completion of such activities.

☒ Receiving Inspection- Buyer shall inspect items upon receipt to verify compliance with purchase order requirements. Rejected items shall be returned at seller's expense.

☐ Independent Laboratory Tests- Samples of materials furnished shall be tested independently for conformance to specification requirements prior to final acceptance. Rejected materials shall be returned at seller's expense.

☒ Document Review- Final acceptance shall be based on satisfactory review or required certifications and other supporting documents.

3.0 CERTIFICATIONS

When certifications are required as a condition to this procurement, the seller shall furnish one reproducible copy either with or prior to each shipment. Shipments will not be accepted and invoices will not be paid until certifications are in buyer's possession.

☐ Certificate of Compliance/Conformance Required – Certification that materials and /or services comply with purchase order requirements. Certification shall reference purchase order number and traceability numbers (when applicable).

☐ Certified Test Report Required – Certification that material complies with applicable material specification (s) and the purchase order. Include actual results of required tests.

☒ Certificate of Calibration Required - Certification shall be traceable to National Bureau of Standards. (NIST, Nat'l Inst. of Science & Technology).

4.0 AUDITS/RIGHT OF ACCESS

☒ The buyer reserves the right to audit your facility to verify compliance with purchase order, code and specification requirements with (10) days notice,

☒ Shipments shall only originate form facilities approved by the buyer.

☐ Buyer reserves the right to inspect any or all work included in this order at seller's facility with as early notice as practicable.

5.0 IDENTIFICATION

☐ Seller shall identify each item with a unique traceability number by physical marking or tagging. Traceability numbers shall be traceable to certifications and packing lists.

☒ Seller shall identify each container with a unique identification number. The identification number shall be traceable to certifications and packing lists.

6.0 10CFR,PART 21

☐ The material, equipment and/or services to be furnished under this purchase order are involved in the testing of basic components of a Nuclear Regulatory Commission (NRC) licensed facility. Accordingly, the seller is subject to the provisions of 10 CFR, Part 21 (Reporting of Defects and Noncompliance)

7.0 PACKING/SHIPPING

☒ All materials shall be packaged in air tight, moisture free containers and shall be free from all foreign substance such as dirt, oil, grease or other deleterious material.

☐ All materials and equipment shall be suitable crated, boxed or otherwise prepared for shipment to prevent damage during handling and shipping. Wherever practical, equipment shall be palletized for ease of unloading and storage at destination. Each container shall be clearly marked with buyer's purchase order number.

QUALITY ASSURANCE APPROVAL _____ DATE 10/12/04

SSC LAB DIVISION
a Division of System Scale Corporation
Employee Owned

"Quality You Can Measure"

CERTIFICATE NO: 36719-0004

Page 1 of 1

Page 248

ACCREDITED
Cert. #1754.01
Calibration Laboratory
ISO / IEC / 17025

CERTIFICATE OF CALIBRATION

SSC LAB DIVISION certifies that this instrument conforms to original manufacturers specifications or to tolerances indicated below and has been calibrated using standards with accuracies traceable to a National Measurement Institute, or to accepted values of natural physical constants, or have been derived by ratio techniques. This certificate complies with ISO/IEC 17025 & ANSI Z540. Unless otherwise stated, the M&TE for which this certificate is issued, based on interpretation of data, was found to meet the required specification. Reported uncertainty represents expanded uncertainty at approximately 95% confidence level, coverage factor of k=2.

Customer:	OMEGA POINT LAB.	Date Received:	10/13/04
Location:	16015 SHADY FALLS RD. ELMENDORF TX 78112	Date of Issue/Calibration:	10/15/2004
		Next Calibration Due.	10/15/2005
P.O. #:	14586Q	Metrologist:	S Scharenborg

Manufacturer:	CRAFTSMAN	Model:	9 44593
Nomenclature:	WRENCH- TORQUE	Serial Number:	4040229132
Range:	40 TO 250 IN LBS	Equipment ID:	4040229132

Calibration Data Temp 73°F Humidity 43%

Calibration Accuracy: ± 4% RDG

Note: if the AS LEFT column is blank, no adjustments were required.

Note: Many factors may cause out of calibration condition prior to due date. The Calibration interval has been specified by the Customer. Current procedures and methods utilized by SSC Lab Division are approved by the Customer.

APPLIED	AS FOUND	AS LEFT	UNCERTAINTY	PROCEDURE #
50 IN LBS	50.20	49.85	2.3	TB9-5120-202-35
100 IN LBS	99.84	98.61	4.7	
150 IN LBS	149.8	148.1	7.0	
200 IN LBS	201.6	200.5	9.4	
250 IN LBS	248.8	247.8	12.0	

STANDARDS(S) USED

Identification Number	Description	Calibration Date	Expiration Date	Traceability Number
SSC30M1050	ANALYZER- TORQUE	4/15/2004	4/15/2005	35213-0012
SSC30M1052	TRANSDUCER- TORQUE	4/15/2004	4/15/2005	35213-0014

Calibration Certificate Acceptance

Item Torque Wrench
SN 4040229132
NIST Traceability Adequate QA ___ Eng. ___
As Found / As left Values QA ___ Eng. ___
Calibration Date Sufficient QA ___ Eng. ___
Tolerance Range Adequate QA ___ Eng. ___
Date of Review QA 11-8-04 Eng. 11/8/04

QPL QA/QC Dept. Eng. Dept. Mgr.

Gary McCourt
Chief Metrology Engineer

Comments: _____

This certificate may not be reproduced, except in full, without the written consent of SSC Lab Division.

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Omega Point Labs
CLIENT/PROJECT NUMBER OPL Equipment
RECEIVED FROM SSC Lab Div.
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2435 . OPL
DATE RECEIVED 5-5-04
DATE INSPECTED 5-6-04
INSPECTED BY:

ITEM DESCRIPTION	P.O. NO.	QUANTITY Ordd	Rec'd	B.O.	I.D. NO.	CONID MATL Y/N	CERT. RECD Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	Hold	Reject	REMARKS
200g Weight	143570	1	1	Q	23137	Y	Y	N	Good	X			Dial indicator 5". SN: 013232851 was beyond repair - see Page 249 for more details
200g Weight	143570	1	1	Q	23138	Y	Y	N	Good	X			
0-100psi Pressure Gage	143570	1	1	Q	99LE001	Y	Y	N	Good	X			
0-100psi Pressure Gage	143570	1	1	Q	98LE001	Y	Y	N	Good	X			
5" dial indicator	143570	1	1	Q	013021466	Y	Y	N	Good	X			
0-1000lb. Load Cell	143570	1	1	Q	343765	Y	Y	N	Good	X			
6" digital caliper	143570	1	1	Q	60246504	Y	Y	N	Good	X			
digital Multimeter	143570	1	1	Q	5700109	Y	Y	N	Good	X			

09-010-11/02

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER

14357Q

Date: 04/19/2004
Page: 1 of 1

Order From:	Deliver to:
SSC Lab Division 7715 Distribution Dr. Little Rock AR 72209 501-562-2900/888-278-9292	Omega Point Laboratories, Inc 16015 Shady Falls Road Elmendorf TX 78112 (210) 635-8100

Vendor No:

Your Item Number Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
0-100psi Pressure Gage SN:99LE001	001	1.00	Each	$45.00	$45.00
0-100psi Pressure Gage SN: 98LE001	002	1.00	Each	$75.00	$75.00
Dial Indicator SN: 013021466	003	1.00	Each	$20.00	$20.00
Dial Indicator SN: 013232851 **Calibration&Repair**	004	1.00	Each	$120.00	$120.00
Load Cell 1k pound SN: 343765 **Calibration & Repair**	005	1.00	Each	$175.00	$175.00
Digital Multimeter SN: 5700109 **Calibration & Repair**	006	1.00	Each	$100.00	$100.00
Digital Caliper SN:6Q-2465-04	007	1.00	Each	$70.00	$70.00
200g Weight—SN: 23137	008	1.00	Each	$10.00	$10.00
200g Weight—SN: 23138	009	1.00	Each	$10.00	$10.00

CALIBRATION CERT. REQUIREMENTS
1. Statement of NIST traceability
2. NIST test or I.D. number
3. As Found
4. As Left Values
5. Uncertainties of calibration measurements
6. Calibration data
7. Calibration certificates must show accreditation to ISO/IEC 17025

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."

QA Approval _____

Date 4-19-04

Please Quote Purchase Order Number on all correspondence.

Special Instructions: Please include Certificate of Conformance to attached Specification Sheet and Calibration Data traceable to NIST.

Subtotal:	$620.00
Freight:	0.00
Tax Amount:	0.00
Total Value:	$620.00

VENDOR PURCHASING SPECIFICATION AND QUALITY ASSURANCE REQUIREMENTS

Vendor: SSC Lab-Division
Purchase Order No. 14357 Q

Any of the following Quality Assurance requirements shall be incorporated as conditions to this procurement when corresponding box is marked. Failure to comply with any requirement specified may result in rejection and/or return of shipment at seller's expense.

1.0 QUALITY PROGRAM

☒ Seller shall furnish all items on this Purchase Order in accordance with Quality Program approved by Buyer.

2.0 Quality Verification

When additional quality verification activities are required as a condition to this procurement, invoices will not be paid until satisfactory completion of such activities.

☒ Receiving Inspection- Buyer shall inspect items upon receipt to verify compliance with purchase order requirements. Rejected items shall be returned at seller's expense.

☐ Independent Laboratory Tests- Samples of materials furnished shall be tested independently for conformance to specification requirements prior to final acceptance. Rejected materials shall be returned at seller's expense.

☒ Document Review- Final acceptance shall be based on satisfactory review or required certifications and other supporting documents.

3.0 CERTIFICATIONS

When certifications are required as a condition to this procurement, the seller shall furnish one reproducible copy either with or prior to each shipment. Shipments will not be accepted and invoices will not be paid until certifications are in buyer's possession.

☐ Certificate of Compliance/Conformance Required – Certification that materials and /or services comply with purchase order requirements. Certification shall reference purchase order number and traceability numbers (when applicable).

☐ Certified Test Report Required – Certification that material complies with applicable material specification (s) and the purchase order. Include actual results of required tests.

☒ Certificate of Calibration Required - Certification shall be traceable to National Bureau of Standards. (NIST, Nat'l Inst. of Science & Technology).

4.0 AUDITS/RIGHT OF ACCESS

☒ The buyer reserves the right to audit your facility to verify compliance with purchase order, code and specification requirements with (10) days notice,

☒ Shipments shall only originate form facilities approved by the buyer.

☐ Buyer reserves the right to inspect any or all work included in this order at seller's facility with as early notice as practicable.

5.0 IDENTIFICATION

☐ Seller shall identify each item with a unique traceability number by physical marking or tagging. Traceability numbers shall be traceable to certifications and packing lists.

☒ Seller shall identify each container with a unique identification number. The identification number shall be traceable to certifications and packing lists.

6.0 10CFR,PART 21

☐ The material, equipment and/or services to be furnished under this purchase order are involved in the testing of basic components of a Nuclear Regulatory Commission (NRC) licensed facility. Accordingly, the seller is subject to the provisions of 10 CFR, Part 21 (Reporting of Defects and Noncompliance)

7.0 PACKING/SHIPPING

☒ All materials shall be packaged in air tight, moisture free containers and shall be free from all foreign substance such as dirt, oil, grease or other deleterious material.

☐ All materials and equipment shall be suitable crated, boxed or otherwise prepared for shipment to prevent damage during handling and shipping. Wherever practical, equipment shall be palletized for ease of unloading and storage at destination. Each container shall be clearly marked with buyer's purchase order number.

QUALITY ASSURANCE APPROVAL _____ DATE 4/19/04

SSC LAB DIVISION
a Division of System Scale Corporation
Employee Owned

"Quality You Can Measure"

CERTIFICATE NO: 36283-0003

Page 1 of 1

ACCREDITED
Cert. #1754.01
Calibration Laboratory
ISO / IEC / 17025

CERTIFICATE OF CALIBRATION

SSC LAB DIVISION certifies that this instrument conforms to original manufacturers specifications or to tolerances indicated below and has been calibrated using standards with accuracies traceable to a National Measurement Institute, or to accepted values of natural physical constants, or have been derived by ratio techniques. This certificate complies with ISO / IEC 17025 & ANSI Z540. Unless otherwise stated, the M& T E for which this certificate is issued, based on interpretation of data, was found to meet the required specification. Reported uncertainty represents expanded uncertainty at approximately 95% confidence level, coverage factor of k=2.

Customer:	OMEGA POINT LAB.	Date Received:	4/21/04
Location:	16015 SHADY FALLS RD. ELMENDORF TX 78112	Date of Issue/Calibration:	04/22/2004
		Next Calibration Due:	04/22/2005
P.O. #:	14357Q	Metrologist:	Sean Rainey

Manufacturer:	McDANIEL CONTROLS INC.	Model:	316SS
Nomenclature:	GAGE- PRESSURE	Serial Number:	99LE001
Range:	0-100 PSI	Equipment ID:	99LE001

Calibration Data Temp 68°F Humidity 38%

Calibration Accuracy: ± 2.5% FULL SCALE

Note: if the AS LEFT column is blank, no adjustments were required.

Note: Many factors may cause out of calibration condition prior to due date.The Calibration interval has been specified by the Customer. Current procedures and methods utilized by SSC Lab Division are approved by the Customer.

APPLIED	AS FOUND	AS LEFT	UNCERTAINTY	PROCEDURE #
25 LBS	25.78	25.78	2.9	NA17-20MP-06
50 LBS	51.24	51.24	2.9	
75 LBS	76.38	76.38	2.9	
100 LBS	101.72	101.72	2.9	

STANDARDS(S) USED

Identification Number	Description	Calibration Date	Expiration Date	Traceability Number
SSC30LD029	CALIBRATOR- PRESSURE	7/30/2003	7/30/2004	33426-0044
SSC30LD048	TRANSDUCER- PRESSURE	8/11/2003	8/11/2004	1000154760

Calibration Certificate Acceptance

Item 0-100 psi Pressure Gage

SN 99LE001

	Q/A	Eng.
NIST Traceability Adequate		
As Found/As Left Values		
Calibration Data Sufficient		
Tolerance Range Adequate		
Date of Review	5-6-04	5/11/04

OPL QA/QC Dept. Eng. Dept. Mgr.

Comments

Gary McCourt
Chief Metrology Engineer

This certificate may not be reproduced, except in full, without the written consent of SSC Lab Division.

SSC LAB DIVISION
a Division of System Scale Corporation
Employee Owned
"Quality You Can Measure"

PACKING LIST

ATTN: CLEDA PATTON

Purchase Order: 143570

Date of Shipment: 5-1-04

Ship To: OMEGA POINT LAB.
16015 SHADY FALLS RD.
ELMENDORF, TX 78112

Ship Via: UPS

Phone/Fax #: 210 635 8100/FAX 210 635 8101

Date Received: 4/21/04

Packed by SSC	Cert.	Rec'd	Mfg.	Model	Nomenclature	I.D. #	Work Order No.
☐	☑		TROEMNER	200g	WEIGHT	23138	36283-0001
☐	☑		TROEMNER	200g	WEIGHT	23137	36283-0002
☐	☑		McDANIEL CONTRC	316SS	GAGE- PRESSURE	99LE001	36283-0003
☐	☑		McDANIEL CONTRC	316SS	GAGE- PRESSURE	98LE001	36283-0004
☐	☑		CDI	26504CJ	INDICATOR- DIAL	013232851	36283-0005
☐	☑		CDI	26504CJ	INDICATOR- DIAL	013021466	36283-0006
☐	☑		BROWN & SHARPE	599-571-4	CALIPER- DIGITAL	6Q246504	36283-0007
☐	☑		OMEGA	LCCA-1000	LOAD CELL/ WITH INDI	343765	36283-0008
☐	☐		FLUKE	45	MULTIMETER- DIGITAI	5700109	36283-0009

Number of boxes:	Weight	Shipper No.:
1 of 3	16	1Z71793447356827172
2 of 3	3	1Z71793447355279 9 8 8
3 of 3	3	1Z71793447356458755

Your merchandise left our facility on .

If any product is defective, inform us immediately.

Authorization is required on all returns.

Packed By: Ø314

Received By: _____

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Areva
CLIENT/PROJECT NUMBER 14980-121039
RECEIVED FROM Wescott Safety Systems
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2469-14980
DATE RECEIVED 9-27-04
DATE INSPECTED 9-28-04
INSPECTED BY: [illegible]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B.O.	I.D. NO.	CON'tD MATL Y/N	CERT REC'D Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	ACCEPTANCE Hold	ACCEPTANCE Reject	REMARKS
8C#12 Cable	NA	Q	1	Q	300283E00 40B281	Y	Y	N	Good	X			Receiving verification Page 255
7C#14 Cable	NA	Q	1	Q	300286E00 40B441	Y	Y	N	Good	X			
4C#8 Cable	NA	Q	1	Q	300217E00 40B121	Y	Y	N	Good	X			
7C#10 Cable	NA	Q	1	Q	300208E00 40B461	Y	Y	N	Good	X			

09-016-11/02

MEGGITT

MEGGITT SAFETY
SYSTEMS INC
1915 VOYAGER AVE. SIMI VALLEY, CA. 93063
805-584-4100 FAX 805-584-9157

Packing Slip

Pickslip	86365
Page	1 of 1
Date	09/24/04
Order Number	260500 SO
Related P.O.	
Brn/Plt	200

Ship To: 69444

OMEGA POINT LABORATORIES
ATTN: CONSTANCE HUMPHREY
210-635-8120
16015 SHADY FALLS ROAD
ELMENDORF TX 78112

Invoice To: 69444

IN-HOUSE/MEGGITT SAFETY SYSTEMS
1915 VOYAGER AVENUE
SIMI VALLEY CA 93063

INSP	ASN	REQUIRES
DT	N	

Ord Date	Customer P.O.	F.O.B.	Export Lic	Bar Code	Spec Pkg	Contract Administrator
10/15/03	Fred Rudek	Destination	N	N		Diana Cox #8127

Line	Item Number/Location, Lot	Description	Shipped	UM	Tag	Classified	Ship Code	Customer Req Date	Promised Date	Schedule B
		IN HOUSE SALES ORDER TO PROVIDE TEST CABLES FOR LABORATORY TESTS TO BE PRESENTED TO NRC. MSSI WILL HAVE JOINT RIGHTS SHARING THE QUALIFICATION TO TEST RESULTS								
		TEST FACILITY WILL BE READY END OF NOVEMBER								
		SPLICE REQUIRED AT MIDPOINT IN CABLE								
33.000 FG	300283E0040B28J	FIRE CABLE	1	EA	N	N	E	11/15/04	11/15/04	
	Serial # 004									
34.000 ERI-FG	300286E0040B44J	FIRE CABLE	1	EA	N	N	E	11/15/04	11/15/04	
	Serial # 004									
35.000 ERI-FG	300217E0040B12J	FIRE CABLE	1	EA	N	N	E	11/15/04	11/15/04	
	Serial # 004									

9/24/04

Quality Assurance Packer Track/Airbill # Weight:

Ship Via: BEST WAY PREPAY ONLY
DIANA COX, EXT 8127

MEGGITT

MEGGITT SAFETY
SYSTEMS INC
1915 VOYAGER AVE. SIMI VALLEY, CA. 93063
805-584-4100 FAX 805-584-9157

Packing Slip

Pickslip	86366
Page	1 of 1
Date	09/24/04
Order Number	260500 SO
Related P.O.	
Brn/Plt	200

Ship To: 69444

OMEGA POINT LABORATORIES
ATTN: CONSTANCE HUMPHREY
210-635-8120
16015 SHADY FALLS ROAD
ELMENDORF TX 78112

Invoice To: 69444

IN-HOUSE/MEGGITT SAFETY SYSTEMS
1915 VOYAGER AVENUE
SIMI VALLEY CA 93063

INSP	ASN	REQUIRES
DT	N	

Ord Date	Customer P.O.	F.O.B.	Export Lic	Bar Code	Spec Pkg	Contract Administrator
10/15/03	Fred Rudek	Destination	N	N		Diana Cox #8127

Line	Item Number/Location, Lot	Description	Shipped	UM	Tag	Classified	Ship Code	Customer Req Date	Promised Date	Schedule B
		IN HOUSE SALES ORDER TO PROVIDE TEST CABLES FOR LABORATORY TESTS TO BE PRESENTED TO NRC. MSSI WILL HAVE JOINT RIGHTS SHARING THE QUALIFICATION TO TEST RESULTS								
		TEST FACILITY WILL BE READY END OF NOVEMBER								
		SPLICE REQUIRED AT MIDPOINT IN CABLE								
45.000	300208E0040B46J	FIRE CABLE	1	EA	N	N	E	11/15/03	11/15/04	
	Serial # 002									

Page 257

9/24/04
Quality Assurance

Packer

Track/Airbill #

Weight:

Ship Via: BEST WAY PREPAY ONLY
DIANA COX, EXT 8127

MEGGITT

MEGGITT SAFETY SYSTEMS INC

FILE 5839IR-1

QA: SSD QE 3
05-12-04

ACCEPTANCE TEST DATA SHEET

FOR

FIRE CABLE ASSEMBLY

PART NUMBER: 300208E0040B46J SERIAL NUMBER: 002

TEST PROGRAM NUMBER: 5181 REVISON C

1.0 Dielectric Strength at room temperature per STP 2191, Revision C.

1.1 3200 VDC between conductor and sheath for 60 seconds. No indication of breakdown.

Pass/Fail SSD SEP 24 2004
Tech Stamp/Date

1.2 3200 VDC conductor to conductor for 60 seconds. No indication of breakdown.

Pass/Fail SSD SEP 24 2004
Tech Stamp/Date

2.0 Insulation Resistance at room temperature per STP 2190, Revision C.
(All unused pins connected to sheath. Record values.)

1	3.0	x 10^{11} ohms	7	1.0	x 10^{11} ohms
2	2.0	x 10^{11} ohms	8	N/A	x 10 ohms
3	1.0	x 10^{11} ohms	9		x 10 ohms
4	1.0	x 10^{11} ohms	10		x 10 ohms
5	1.0	x 10^{11} ohms	11		x 10 ohms
6	1.0	x 10^{11} ohms	12	N/A	x 10 ohms

SEP 24 2004
Tech Stamp/Date

3.0 DC Continuity per STP 2207, Revision B. (Limit: Refer to cable drawing.)

3.1 Cable Length: 40 feet

3.2 Conductor Resistance:

1	.062 ohms	5	.062 ohms	9	N/A ohms
2	.061 ohms	6	.061 ohms	10	ohms
3	.064 ohms	7	.066 ohms	11	ohms
4	.062 ohms	8	N/A ohms	12	N/A ohms

Pass/Fail SSD SEP 24 2004
Tech Stamp/Date

4.0 Test Equipment List

Nomenclature	Manufacturer & Model No.	Identification No.	Calibration Due Date
High Resistance Bridge	GR 1644 A	A 14672	6-2-05
Hi-Pot	AR 5205 A	A 14660	7-18-05
Digital Multimeter	KEITHLEY 191	KS 2009	8-9-05

MSSI QA REVIEW: SSD QE 6 DATE: 9/24/04

MEGGITT

MEGGITT SAFETY SYSTEMS INC

FILE 5839IR-1

QA: SSD QE 3 05-12-04

ACCEPTANCE TEST DATA SHEET

FOR

FIRE CABLE ASSEMBLY

PART NUMBER: 300208E0040B46J SERIAL NUMBER: 002

TEST PROGRAM NUMBER: 5181 REVISON C

1.0 Dielectric Strength at room temperature per STP 2191, Revision C.

1.1 3200 VDC between conductor and sheath for 60 seconds. No indication of breakdown.

Pass/Fail SSD 3 SEP 24 2004
Tech Stamp/Date

1.2 3200 VDC conductor to conductor for 60 seconds. No indication of breakdown.

Pass/Fail SSD 3 SEP 24 2004
Tech Stamp/Date

2.0 Insulation Resistance at room temperature per STP 2190, Revision C.
(All unused pins connected to sheath. Record values.)

1	3.0	x 10^{11} ohms	7	1.0	x 10^{11} ohms
2	2.0	x 10^{11} ohms	8	N/A	x 10 ohms
3	1.0	x 10^{11} ohms	9		x 10 ohms
4	1.0	x 10^{11} ohms	10		x 10 ohms
5	1.0	x 10^{11} ohms	11		x 10 ohms
6	1.0	x 10^{11} ohms	12	N/A	x 10 ohms

SEP 24 2004
SSD 3
Tech Stamp/Date

MEGGITT

MEGGITT SAFETY SYSTEMS INC

FILE 5839IR-1 PART NUMBER: 300208-[illegible]

PAGE 2 OF 2 SERIAL NUMBER: 002

3.0 DC Continuity per STP 2207, Revision B. (Limit: Refer to cable drawing.)

3.1 Cable Length: 40 feet

3.2 Conductor Resistance:

1	.062 ohms	5	.062 ohms	9	N/A ohms
2	.061 ohms	6	.061 ohms	10	ohms
3	.064 ohms	7	.066 ohms	11	ohms
4	.062 ohms	8	N/A ohms	12	N/A ohms

Pass/Fail SEP 24 2004

Tech Stamp/Date

4.0 Test Equipment List

Nomenclature	Manufacturer & Model No.	Identification No.	Calibration Due Date
High Resistance Bridge	GR 1644 A	A 14672	6-2-05
Hi-Pot	AR 5205 A	A 14600	7-18-05
Digital Multimeter	KEITHLEY 191	KS 2009	8-9-05

MSSI QA REVIEW: DATE: 9/24/04

MEGGITT

MEGGITT SAFETY SYSTEMS INC

FILE 5839IR-1

QA: SSD QE 3 05-12-04

ACCEPTANCE TEST DATA SHEET

FOR

FIRE CABLE ASSEMBLY

PART NUMBER: 300283E0040B28J SERIAL NUMBER: 004

TEST PROGRAM NUMBER: 5181 REVISON C

1.0 Dielectric Strength at room temperature per STP 2191, Revision C.

1.1 3200 VDC between conductor and sheath for 60 seconds. No indication of breakdown.

(Pass)/Fail SSD 3 SEP 07 2004
Tech Stamp/Date

1.2 3200 VDC conductor to conductor for 60 seconds. No indication of breakdown.

(Pass)/Fail SSD 3 SEP 07 2004
Tech Stamp/Date

2.0 Insulation Resistance at room temperature per STP 2190, Revision C.
(All unused pins connected to sheath. Record values.)

1	7.0	$\times 10^{10}$ ohms	7	1.0	$\times 10^{11}$ ohms
2	1.0	$\times 10^{11}$ ohms	8	3.0	$\times 10^{10}$ ohms
3	1.0	$\times 10^{11}$ ohms	9	N/A	$\times 10$ ohms
4	3.0	$\times 10^{10}$ ohms	10	↑	$\times 10$ ohms
5	1.0	$\times 10^{10}$ ohms	11	↓	$\times 10$ ohms
6	1.0	$\times 10^{10}$ ohms	12	N/A	$\times 10$ ohms

SSD 3 SEP 07 2004
Tech Stamp/Date

FILE 5839IR-1

PART NUMBER: 300283E004 B 269

PAGE 2 OF 2

SERIAL NUMBER: 004

3.0 DC Continuity per STP 2207, Revision B. (Limit: Refer to cable drawing.)

3.1 Cable Length: 40.0 feet

3.2 Conductor Resistance:

1	0.1 ohms	5	0.1 ohms	9	N/A ohms
2	0.1 ohms	6	0.1 ohms	10	ohms
3	0.1 ohms	7	0.1 ohms	11	ohms
4	0.1 ohms	8	0.1 ohms	12	N/A ohms

Pass/Fail SEP 07 2004

Tech Stamp/Date

4.0 Test Equipment List

Nomenclature	Manufacturer & Model No.	Identification No.	Calibration Due Date
High Resistance Bridge	GR 1644 A	A 14672	6-2-05
Hi-Pot	AR 5205 A	A 14600	7-18-05
Digital Multimeter	FLUKE 73	B 131	2-18-05

MSSI QA REVIEW: DATE: SEP 1 1 2004

FILE 5839IR-1

QA: SSD QE 3
05-12-04

ACCEPTANCE TEST DATA SHEET

FOR

FIRE CABLE ASSEMBLY

PART NUMBER: 300286E0040B44J SERIAL NUMBER: 004

TEST PROGRAM NUMBER: 5181 REVISON C

1.0 Dielectric Strength at room temperature per STP 2191, Revision C.

1.1 3200 VDC between conductor and sheath for 60 seconds. No indication of breakdown.

Pass/Fail 3 SSD SEP 09 2004
Tech Stamp/Date

1.2 3200 VDC conductor to conductor for 60 seconds. No indication of breakdown.

Pass/Fail 3 SSD SEP 09 2004
Tech Stamp/Date

2.0 Insulation Resistance at room temperature per STP 2190, Revision C.
(All unused pins connected to sheath. Record values.)

1	1.0	x 10^{11} ohms	7	1.0	x 10^{11} ohms
2	1.0	x 10^{11} ohms	8	N/A	x 10 ohms
3	1.0	x 10^{11} ohms	9		x 10 ohms
4	1.0	x 10^{11} ohms	10		x 10 ohms
5	1.0	x 10^{11} ohms	11		x 10 ohms
6	1.0	x 10^{11} ohms	12	N/A	x 10 ohms

3 SSD SEP 09 2004
Tech Stamp/Date

MEGGITT

MEGGITT SAFETY SYSTEMS INC

FILE 5839IR-1

PART NUMBER: 300286E Page 265

PAGE 2 OF 2

SERIAL NUMBER: 004

3.0 DC Continuity per STP 2207, Revision B. (Limit: Refer to cable drawing.)

3.1 Cable Length: 40.0 feet

3.2 Conductor Resistance:

1	0.1 ohms	5	0.1 ohms	9	N/A ohms
2	0.1 ohms	6	0.1 ohms	10	ohms
3	0.1 ohms	7	0.1 ohms	11	ohms
4	0.1 ohms	8	N/A ohms	12	N/A ohms

Pass/Fail SSD SEP 09 2004
Tech Stamp/Date

4.0 Test Equipment List

Nomenclature	Manufacturer & Model No.	Identification No.	Calibration Due Date
High Resistance Bridge	GR 1644 A	A 14672	6-2-05
Hi-Pot	AR 5205 A	A 14600	7-18-05
Digital Multimeter	FLUKE 73	B 131	2-18-05

MSSI QA REVIEW: SSD QE 3 DATE: 9-15-04

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Areva
CLIENT/PROJECT NUMBER 14980-121039
RECEIVED FROM Texas Specialty Steel
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2467. 14980
DATE RECEIVED 9-22-04
DATE INSPECTED 9-22-04
INSPECTED BY: [signature]

ITEM DESCRIPTION	P.O. NO.	QUANTITY			I.D. NO.	CON'tD MATL Y/N	CERT REC'D Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE			REMARKS
		Order	Rec'd	B.O.						Accept	Hold	Reject	
3"X3"X0.25 Texas Steel	14555Q	lotx	lotx	Q	3x3x1/4"x24	Y	Y	N	Good	X			
3"X3"X0.1875" Texas Steel	14555Q	lotx	lotx	Q	3x3x3/16"x24	Y	Y	N	Good	X			
1"X8" flat bar Steel Plate	14555Q	20'	20'	Q	1x8 flat bar x2	Y	Y	N	Good	X			
1/2"X5" Steel Plate flat bar	14555Q	20'	20'	Q	1/2x5 flat bar	Y	Y	N	Good	X			

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER
14555Q Page 267

Date: 9/15/2004
Page: 1 of 1

Order From:
Texas Specialty Steel
12270 Hwy. 181 S
San Antonio
TX 78223
210-633-0047

Deliver to:
Omega Point Laboratories, Inc
16015 Shady Falls Road
Elmendorf
TX 78112
(210) 635-8100

Vendor No:

Your Item Number / Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
3" x 3" x 0.25" Tube Steel ASTM A500 Grade B	001	24	Feet	$163.80	$587.63
3" x 3" x 0.1875" Tube Steel ASTM A500 Grade B	002	24	Feet	$97.68	$97.68
8" x 1" Steel Plate A36	003	20'	Feet	$255.68	$255.68
5" x 5" 1/2" Steel Plate A36	004	20'	Feet	$64.26	$64.26

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."
QA Approval
Date 9-15-04

Please Quote Purchase Order Number on all correspondence.
Please certify that the items supplied conform to applicable standards and specifications.

Subtotal:	$581.42
Freight:	0.00
Tax Amount:	0.00
Total Value:	$581.42

080625/11-89

TEXAS SPECIALTY STEEL
12270 Hwy 181 So.
San Antonio, Texas 78223
(210) 633-0047
Fax 633-2344

SALES ORDER 5646

Omega Paint Lab

DELIVER TO:

DATE ORDERED	PO #	DATE SHIPPED	SHIPPED VIA	F.O.B.	SALESMAN
9/15/04	14555 Q	9-21-04	OT	OPC	BJ B

QUANTITY		DESCRIPTION	WEIGHT	PRICE	TOTAL
P- (1) ✓		SQ Tube 3 x 3 x 1/4 x 24'		40.00	40.00
TS (1)	Repeat	SQ Tube 3 x 3 x 3/16 x 24'		97.68	97.68
- (1) ✓		1 x 8 Flat Bar 20		255.68	255.68
P (1) ✓		1/2 x 5 Flat Bar @ 57"		10.00	10.00
		Tube - A500B		cut @ 60" — 1 Pc only	
		Plate A36			
		$25.00 Service Charge For Returned Checks			
		☒ TAXABLE ☐ NON-TAXABLE			

RR# 2467
9-22-04

PROLAMSA	Carretera a Colombia km 5.75, Escobedo N. L. México C.P. 66050 Teléfono y Fax (8) 154-0200	CERTIFICADO DE CALIDAD / MILL TEST REPORT			Factura / Invoice 16492 / 36870C	Fecha Factura / Invoice Date Oct/03/2003
Cliente / Customer	Texas Specialty Steel Company	Estado / State	C.P. / ZIP	A.P. / P.O.	O.C. / Order	Página / Page: 1
Dirección / Address	12270 Hwy. 181 South	Texas	78223		K7223-1	De / Of: 1

Pedido / Order	Rollo / Coil	Paquete / Package	Fecha Producción / Date Of Production	Calibre / Gauge	Espesor / Thickness (In)	Producto / Product (In)	Longitud / Length (Ft)	Prueba Cono / Cone Test	Aplastamiento / Bending Test	Análisis Químico / Heat Analysis			
										% C	% Mn	% P	% S
139625 - 3	224994	922644	Aug/01/2003	16	0.0598	1	24.00	Ok	Ok	0.0500	0.2000	0.0090	0.0080
139625 - 3	230407	936507	Aug/13/2003	16	0.0598	1	24.00	Ok	Ok	0.0400	0.1900	0.0080	0.0050
139625 - 3	222637	992504	Sep/29/2003	16	0.0598	1	24.00	Ok	Ok	0.0500	0.1800	0.0080	0.0070
139625 - 3	222637	992508	Sep/29/2003	16	0.0598	1	24.00	Ok	Ok	0.0500	0.1800	0.0080	0.0070
143421 - 1	218497	826149	May/13/2003	0.25	0.2500	4.5	21.00	Ok	Ok	0.0700	0.5900	0.0100	0.0030
143421 - 2	218492	918421	Jul/28/2003	0.25	0.2500	4.5	21.00	Ok	Ok	0.0700	0.5900	0.0100	0.0030
143421 - 2	218492	918424	Jul/28/2003	0.25	0.2500	4.5	21.00	Ok	Ok	0.0700	0.5900	0.0100	0.0030
143421 - 2	218492	918429	Jul/28/2003	0.25	0.2500	4.5	21.00	Ok	Ok	0.0700	0.5900	0.0100	0.0030
143421 - 2	218492	918430	Jul/28/2003	0.25	0.2500	4.5	21.00	Ok	Ok	0.0700	0.5900	0.0100	0.0030
143421 - 2	218492	918471	Jul/28/2003	0.25	0.2500	4.5	21.00	Ok	Ok	0.0700	0.5900	0.0100	0.0030
143421 - 2	220247	944956	Aug/20/2003	0.25	0.2500	4.5	21.00	Ok	Ok	0.0600	0.6000	0.0100	0.0050
143421 - 3	230479	926902	Aug/05/2003	0.188	0.1880	3	24.00	Ok	Ok	0.0980	0.3370	0.0092	-0.0070
143421 - 3	230479	926908	Aug/05/2003	0.188	0.1880	3	24.00	Ok	Ok	0.0980	0.3370	0.0092	0.0070

Propiedades Físicas / Mechanical Properties

Partida / Invoice Item.	Rollo / Coil	Paquete / Package	Dureza / Hardness	Tensión / Tensile (Ksi)	Cedencia / Yield (Ksi)	Elongación / Elongation (%)	Standar / Estandar
139625 - 3	224994	922644	40 HRB	42	30	24	A513
139625 - 3	230407	936507	40 HRB	42	30	24	A513
139625 - 3	222637	992504	40 HRB	42	30	24	A513
139625 - 3	222637	992508	40 HRB	42	30	24	A513
143421 - 1	218497	826149	50 HRB	53	36	21	A513
143421 - 2	218492	918421	50 HRB	53	36	21	A513
143421 - 2	218492	918424	50 HRB	53	36	21	A513
143421 - 2	218492	918429	50 HRB	53	36	21	A513
143421 - 2	218492	918430	50 HRB	53	36	21	A513
143421 - 2	218492	918471	50 HRB	53	36	21	A513
143421 - 2	220247	944956	50 HRB	53	36	21	A513
143421 - 3	230479	926902	77 HRB	61	56	28	A500-B
143421 - 3	230479	926908	77 HRB	61	56	28	A500-B

HANNA Certification 846589 1/12/04 2

Shipped From: Hanna Steel Corporation
Tuscaloosa Division
1701 Boone Blvd
P O Box 428
Northport AL 35476

Cust P.O.: .5263991
Date Shipped 1/09/04
Load Tally S-80526
Invoice # 739220

Send To: [redacted]

Ship To: [redacted]

[redacted]

03 7351112 2X6 11GA HRA500 40.000FT
CONTINUED

3168040	B32002	A500	2001	B	1	48.100	58,100	36.5	B71

Total Weight 6,200

Heat #	C	Mn	P	S	Si	Al	Cr	Cr	Cu	Mo	Ni	V
B32002	.098	.340	.012	.014	.007	.037	.000	.000	.023	.000	.000	.000

Heat# B32002 was melted and manufactured in the USA

04 4300412 2 SQ 1/4GA A500 GR.B 20.000FT

3160176	A33561	A500	2001	B/C	1	64.000	71,000	24.2	B82
3160176	A33559	A500	2001	B/C	1	57.000	67,000	27.4	B79

Total Weight 5,410

Heat #	C	Mn	P	S	Si	Al	Cr	Cr	Cu	Mo	Ni	V
A33561	.180	.670	.008	.012	.011	.055	.000	.020	.019	.005	.010	.003

Heat# A33561 was melted and manufactured in the USA

A33559	.160	.670	.010	.021	.009	.057	.000	.030	.027	.005	.020	.001

Heat# A33559 was melted and manufactured in the USA

05 4450412 3 SQ 1/4 HRA500 20.000FT

3139287	A33236	A500	2001	B/C	1	65,000	70,000	27.2	B81
3139287	A33237	A500	2001	B/C	1	63,000	71,000	24.8	B78

Total Weight 4,933

Cont'd - next page

Hanna Steel Corporation
2812 Commerce Avenue
P.O. Box 538
Fairfield, Alabama 35064
205 788 1711
DUNS No. 80-402-3791

B/L# 254894
Date 4/24/03

NUCOR
BAR MILL GROUP
JEWETT DIVISION

CERTIFIED MILL TEST REPORT

A Division of NUCOR Corporation
Post Office Box 126 Jewett, Texas 75846 Telephone (903) 626-4461 Sales (800) 527-6445

43052
Sold To: [redacted]

ISO 9002 Registered by SRI Quality System Registrar

Ship TO: [redacted]

SIZE / GRADE	HEAT NUMBER	CUSTOMER PO NUMBER	C	Mn	Si	S	P	V	Nb	Cu	Cr	Ni	Mo	Sn	Bend Test
5 X 6.7	333-1118	AUS-241298	.15	.75	.17	.029	.009	.003	.004	.26	.07	.09	.037	.018	
A36-01/A709-01B/SA36-98			Tensile 1: 66000 Yield 1: 45900 Elong% 1: 26												
			Tensile 2: 65600 Yield 2: 46200 Elong% 2: 23												
1/4 X 1 1/3	334-0561	AUS-241189	.10	.63	.19	.043	.006	.004	.[illegible]	.[illegible]	.09	.14	.041	.014	
A36-01/A709-01B/SA36-98			Tensile 1: 64800 Yield 1: 47100 Elong% 1: 27												
			Tensile 2: 65300 Yield 2: 49700 Elong% 2: 27												
3/8 X 4	335-1351	AUS-240742	.14	.60	.20	.035	.004	.004	.007	.40	.16	.19	.050	.014	
A36-01/A709-01B/SA36-98			Tensile 1: 66600 Yield 1: 44800 Elong% 1: 24												
			Tensile 2: 65300 Yield 2: 43200 Elong% 2: 24												
1/2 X 5	325-5402	AUS-241298	.14	.59	.18	.037	.003	.002	.004	.35	.11	.14	.035	.014	
A36-01/A709-01B/SA36-98			Tensile 1: 68900 Yield 1: 44900 Elong% 1: 21												
			Tensile 2: 69300 Yield 2: 45200 Elong% 2: 21												
1/2 X 5	325-5402	AUS-241435	.14	.59	.18	.037	.003	.002	.004	.35	.11	.14	.035	.014	
A36-01/A709-01B/SA36-98			Tensile 1: 68900 Yield 1: 44900 Elong% 1: 21												
[redacted]			Tensile 2: 69300 Yield 2: 45200 Elong% 2: 21												
5/8 X 6	334-1040	AUS-241189	.13	.61	.18	.044	.007	.003	.004	.43	.11	.15	.049	.017	
A36-01/A709-01B/SA36-98			Tensile 1: 64300 Yield 1: 43700 Elong% 1: 22												
			Tensile 2: 64600 Yield 2: 42100 Elong% 2: 25												
3/4 X 2	323-5137	AUS-241298	.15	.82	.25	.031	.003	.003	.004	.33	.07	.13	.034	.011	
A36-01/A709-01B/SA36-98			Tensile 1: 67900 Yield 1: 43800 Elong% 1: 24												
			Tensile 2: 68400 Yield 2: 44100 Elong% 2: 25												

ELONGATION IN 8 INCH SCALE
MELTED AND MANUFACTURED IN U.S.A.

ALL MATERIAL STRAND CAST

Barry R Clem
CHIEF METALLURGIST

B/L# 304745
Date 6/16/04

NUCOR
BAR MILL GROUP
JEWETT DIVISION

CERTIFIED MILL TEST REPO

A Division of NUCOR Corporation
Post Office Box 126 Jewett, Texas 75846 Telephone (903) 626-4461 Sales (800) 527-6445

ISO 9002 Registered by
Quality System Registrar

Sold To:

Ship TO:

SIZE / GRADE	HEAT NUMBER	CUSTOMER PO NUMBER	C	Mn	Si	S	P	V	Mo	Cu	Cr	Ni	Mo	Cb	Bend Test
1/2 X 9	344-0680	AUS-275673	.13	.72	.19	.040	.014	.004	.006	.17	.15	.12	.035	.010	
A36-04/A709-04/SA36-98			Tensile 1: 64600 Yield 1: 43600 Elong% 1: 26												
			Tensile 2: 65000 Yield 2: 44500 Elong% 2: 25												
1/2 X 12	343-1936	AUS-275673	.14	.69	.19	.042	.011	.003	.004	.30	.14	.11	.033	.015	
A36-04/A709-04/SA36-98			Tensile 1: 66300 Yield 1: 45100 Elong% 1: 29												
			Tensile 2: 65200 Yield 2: 43600 Elong% 2: 28												
1 X 8	345-0597	AUS-275673	.19	.72	.22	.043	.022	.006	.006	.49	.17	.12	.034	.016	
A36-04/A709-04/SA36-98			Tensile 1: 60700 Yield 1: 41600 Elong% 1: 21												
			Tensile 2: 62700 Yield 2: 41700 Elong% 2: 21												
1 X 10	344-1594	AUS-275673	.13	.66	.26	.044	.010	.003	.004	.49	.10	.11	.036	.017	
A36-04/A709-04/SA36-98			Tensile 1: 67700 Yield 1: 43800 Elong% 1: 21												
			Tensile 2: 65500 Yield 2: 40200 Elong% 2: 20												
3 X 3 X 1/2	345-2262	AUS-275673	.12	.71	.13	.030	.016	.004	.008	.31	.16	.12	.034	.018	
ASTM A36-04/A529-04 GR 50			Tensile 1: 70400 Yield 1: 50000 Elong% 1: 20												
			Tensile 2: 68700 Yield 2: 50800 Elong% 2: 20												
3 X 2 X 3/16	323-5260	AUS-274406	.15	.91	.29	.034	.002	.006	.004	.46	.10	.14	.045	.011	
A36-04/A709-04/SA36-98			Tensile 1: 73000 Yield 1: 51600 Elong% 1: 23												
			Tensile 2: 74300 Yield 2: 52600 Elong% 2: 23												
3 X 2 X 3/16	323-5260	AUS-275535	.15	.91	.29	.034	.002	.004	.004	.46	.10	.14	.045	.011	
A36-04/A709-04/SA36-98			Tensile 1: 73000 Yield 1: 51600 Elong% 1: 23												
			Tensile 2: 74300 Yield 2: 52600 Elong% 2: 23												

ELONGATION IN 8 INCH SCALE
MELTED AND MANUFACTURED IN U.S.A.

ALL MATERIAL STRAND CAST

CHIEF METALLURGIST

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Areva
CLIENT/PROJECT NUMBER 14980-121039
RECEIVED FROM Nappco
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2465 - 14980
DATE RECEIVED 9-20-04
DATE INSPECTED 9-20-04
INSPECTED BY: [illegible]

ITEM DESCRIPTION	P.O. NO.	QUANTITY			I.D. NO.	CON'TD MATL Y/N	CERT REC'D Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE			REMARKS
		Order	Rec'd	B.O.						Accept	Hold	Reject	
Stainless All Thread Rod 1/2"	14559Q	2	2	0	SATR05DC1000	Y	Y	N	Good	X			
Steel Washers 1/2"	14559Q	50	50	0	SFW050	Y	Y	N	Good	X			
A307 Steel Nut 1/2" X 13 X 3/4 ACFX 7/16 THK	14559Q	50	50	0	SHFN050C	Y	Y	N	Good	X			

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER

~~14559Q~~

Date: 9/16/2004
Page: 1 of 1

Order From: Nappco Fastener Company
4901 Whirlwind
San Antonio
TX 78217
210-646-0341
fax 210-646-7128

Deliver to: Omega Point Laboratories, Inc
16015 Shady Falls Road
Elmendorf
TX 78112
(210) 635-8100

Vendor No: 0142

Your Item Number / Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
Stainless All Thread Rod 1/2" SATR050C1000	001	2.00	Each	$6.00	$12.00
Steel Washer 1/2" SFW050	002	50.00	Each	$.045	$2.25
A-307 Steel Nut 1/2" SHFN050C	003	50.00	Each	$.05	$2.50

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."
QA Approval [signature]
Date 9-16-04

Please Quote Purchase Order Number on all correspondence.

Subtotal:	$16.75
Freight:	0.00
Tax Amount:	0.00
Total Value:	$16.75

NAPPCO

An ISO 9001:2000 Certified Company

PICK TICKET

FASTENER COMPANY
4901 WHIRLWIND
SAN ANTONIO TX 78217
210-646-0341 210-646-7128

See additional TERMS On the back

09/16/04 2:41PM
RELEASE 000

ORDER NUMBER	SHIP NO.	PAGE
00220393	285936	1

SHIP TO
OMEGA POINT LABORATORIES INC
16015 SHADY FALLS
ELMENDORF TX 78112

SOLD TO
OMEGA POINT LABORATORIES INC
16015 SHADY FALLS
ELMENDORF TX 78112

WHSE	CUSTOMER ID.	ORDERED BY	SALESPERSON	ENTERED BY	TERMS	ORDER DATE
03	3OME001	CLEDA P.	GR /JW	johnw	NET 30	09/16/04

PURCHASE ORDER NUMBER	REFERENCE	P.O. DATE	REQ. SHIP DATE	SHIP DATE	SHIP VIA	FOB	FILLED BY
145590		09/16/04	09/17/04	09/17/04	JOHN		EE

ENTRY	ITEM NUMBER / DESCRIPTION	UNIT WEIGHT		BIN	U/M	QUANTITIES ORDERED	SHIPPED	BACKORDERED
	**** This Document (Printed 09/16/04 @ 2:41PM) supersede ALL PREVIOUS documents ****							
00	S4TR050C1000 ST ALL THREAD ROD STEEL 1/2-13x10' LOT# ~~~~~		09/17/04	YA01	EA	2 ** Changed *	2	
00	SFW050* ST 1/2 FLAT WASHER STEEL 1-3/80D 9/16 ID 7/64 THK LOT# 49674		09/17/04	DDF4	EA	50 ** Changed *	50	
00	SHFN050C ST HEX FIN NUT STEEL 1/2-13 3/4 ACF X 7/16 THK AS SPEC FOR A307 BOLTS LOT# N3603416GP10		09/17/04	CJD2	EA	50 ** Changed *	50	

No. of Boxes _____ Total Weight _____ Received By _____

Subject: A307 Specification
Date: Tuesday, September 21, 2004 2:44 PM
From: John White <jwhite@nappco.com>
To: <CPATTON@OPL.COM>

Cleda,

The 1/2-13UNC steel nuts provided to Omega Point Laboratories under Purchase Order 14559Q are the nuts that are specified for A307 bolts.
If there are any questions, please let me know.
Thank you,

John White
Nappco Fastener
San Antonio, Texas
210-646-0341
210-646-7128 fax

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Areva
CLIENT/PROJECT NUMBER 14980-121039
RECEIVED FROM Progress Energy
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2464 . 14980
DATE RECEIVED 9-14-04
DATE INSPECTED 9-14-04
INSPECTED BY: [signature]

ITEM DESCRIPTION	P.O . NO.	QUANTITY			I.D. NO.	CON'tD MATL Y/N	CERT REC'D Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE			REMARKS
		Order	Rec'd	B.O.						Accept	Hold	Reject	
Clamps, Nuts	NA	Q	2 Bags	Q	B-2000	Y	N	N	Good	X			Receiving verification. Page 277
Volts					3/8" TW								Received by Email 9/20/04 parts list
B-Line													from A. Morisi

09-016-11/02

Progress Energy

September 17, 2004

Ms. Cleda Patton
Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas, 78112-9784

Subject: Progress Energy supplied parts for Project No. 14980-121039

Dear Cleda:

The following parts have been pulled from Shearon Harris Nuclear Plant stock and shipped to Omega Point Laboratories, Inc. in support of Meggitt Safety System, Cable Fire Test, Project No. 14980-121039.

Quantity (min)	Unit	Description	Mfg Part No.	Progress Energy Part No.
1	LF	B-Line B 52 Hot Dipped Galvanized Channel	B52 or B52HDG	73314312
4	LF	B-Line B54 SS4 Type 304 Stainless Steel Channel	B54SS4	9220122803
14	EA	B-Line B2000 SS4 Clamp (Stainless Steel includes nut and bolt hardware)	B2000 SS4	9220110902
4	EA	B-Line B2088 SS4 Stainless Steel Single Hole Tubing Clamp	B2088 SS4	9220122822
4	EA	B-Line HHC ¼ x 1 SS6 Stainless Steel Screw, ¼" dia, 1" long	HHC ¼ x 1 SS6	70737507
4	EA	B-Line N224 SS6L Stainless Steel Channel Nut (for use in B54 SS4 Channel with ¼" bolt)	N224 SS6L	9220122828
4	EA	B-Line HHCS 3/8 x ¾ SS6 Stainless Steel Screw, 3/8" dia. ¾" long	HHCS 3/8 x ¾ SS6	70737564
4	EA	B-Line N528 SS6L Stainless Steel Channel Nut, for use in B52 Channel with 3/8" bolt	N528 SS6L	9220122829
2	EA	Stainless Steel Plate 1/8" x 5" x 6"	N/A	73284259

Should you have any questions or comments, please do not hesitate to call me at (919) 362-2305.

Sincerely,

Sean O'Connor
Superintendent Design Engineering

Progress Energy Carolinas, Inc.
Harris Nuclear Plant
P.O. Box 165
New Hill, NC 27562

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Areva
CLIENT/PROJECT NUMBER 14980-121039
RECEIVED FROM Progress Energy
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2463 .14980
DATE RECEIVED 9-13-04
DATE INSPECTED 9-13-04
INSPECTED BY: [redacted]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	Rec'd	B.O.	I.D. NO.	COND MATL Y/N	CERT. REC'D Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	Hold	Reject	REMARKS
Clamps	NA	Ø	5	Ø	B2088SS4 5/8 CD	Y	N	N	Good	X			Receiving Verification Only
Bolts	NA	Ø	6	Ø	HHL 3/8x3/4 SS6	Y	N	N	Good	X			No paper work w/items. Received
Plate SS	NA	Ø	2	Ø	1/8"x5"x6"	Y	N	N	Good	X			9/20/04- A. Morisi emailed parts list
Spring Nuts	NA	Ø	5	Ø	N224 1/4 SS6	Y	N	N	Good	X			the B52SS4 w/weight received should have
Spring Nuts	NA	Ø	6	Ø	N528 3/8 SS6	Y	N	N	Good	X			been labeled B54SS4.
Bolts	NA	Ø	5	Ø	HHC 1/4 x1 SS6	Y	N	N	Good	X			
Strut	NA	Ø	3	Ø	B52SS4	Y	N	N	Good	X			
Strut	NA	Ø	1	Ø	B52	Y	N	N	Good	X			

09-010-11/02

September 17, 2004

Ms. Cleda Patton
Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas, 78112-9784

Subject: Progress Energy supplied parts for Project No. 14980-121039

Dear Cleda:

The following parts have been pulled from Shearon Harris Nuclear Plant stock and shipped to Omega Point Laboratories, Inc. in support of Meggitt Safety System, Cable Fire Test, Project No. 14980-121039.

Quantity (min)	Unit	Description	Mfg Part No.	Progress Energy Part No.
1	LF	B-Line B 52 Hot Dipped Galvanized Channel	B52 or B52HDG	73314312
4	LF	B-Line B54 SS4 Type 304 Stainless Steel Channel	B54SS4	9220122803
14	EA	B-Line B2000 SS4 Clamp (Stainless Steel includes nut and bolt hardware)	B2000 SS4	9220110902
4	EA	B-Line B2088 SS4 Stainless Steel Single Hole Tubing Clamp	B2088 SS4	9220122822
4	EA	B-Line HHC ¼ x 1 SS6 Stainless Steel Screw, ¼" dia, 1" long	HHC ¼ x 1 SS6	70737507
4	EA	B-Line N224 SS6L Stainless Steel Channel Nut (for use in B54 SS4 Channel with ¼" bolt)	N224 SS6L	9220122828
4	EA	B-Line HHCS 3/8 x ¾ SS6 Stainless Steel Screw, 3/8" dia. ¾" long	HHCS 3/8 x ¾ SS6	70737564
4	EA	B-Line N528 SS6L Stainless Steel Channel Nut, for use in B52 Channel with 3/8" bolt	N528 SS6L	9220122829
2	EA	Stainless Steel Plate 1/8" x 5" x 6"	N/A	73284259

Should you have any questions or comments, please do not hesitate to call me at (919) 362-2305.

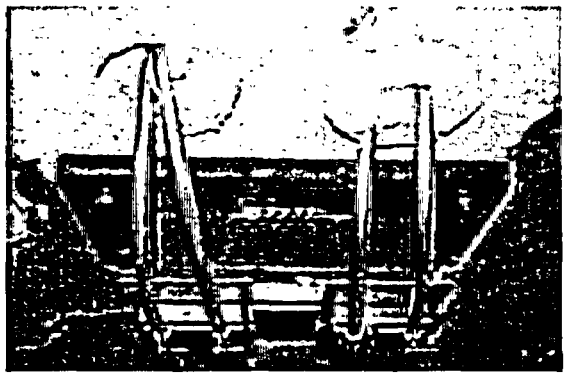
Sincerely,

Sean O'Connor
Superintendent Design Engineering

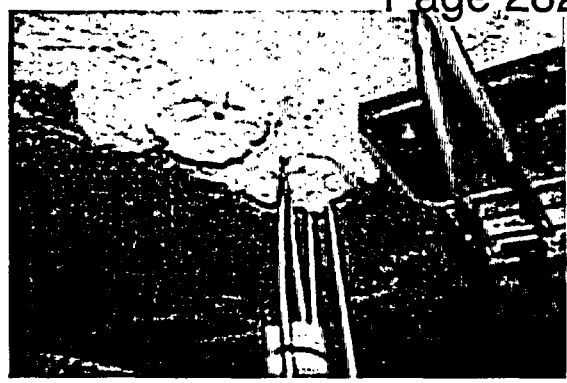
Progress Energy Carolinas, Inc.
Harris Nuclear Plant
P O Box 165
New Hill, NC 27562

Appendix E

PHOTOGRAPHS

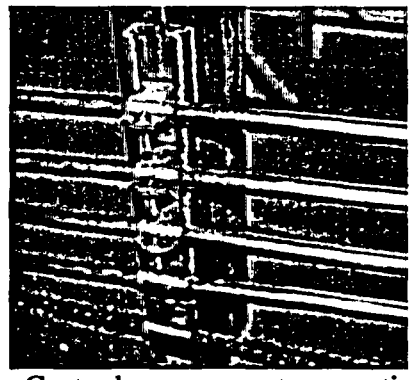


#1: Cables entering heated area.

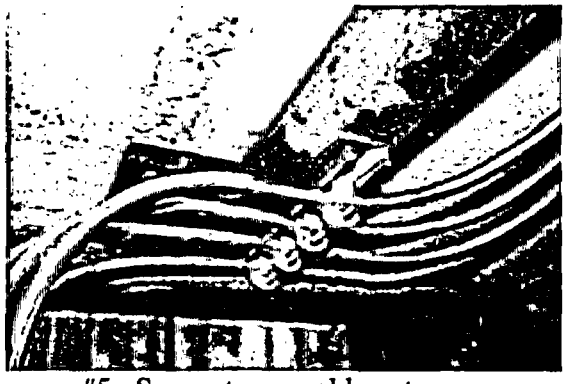


#2: Cables leaving heated area.

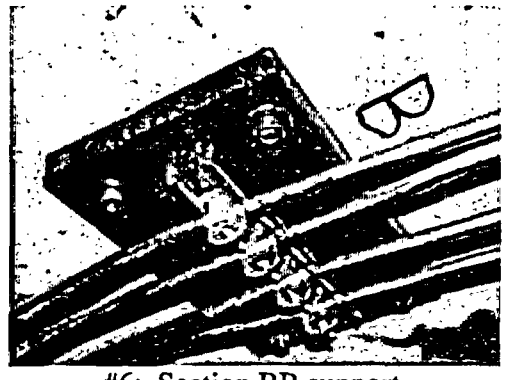
#3: Cables mounted below the slab.



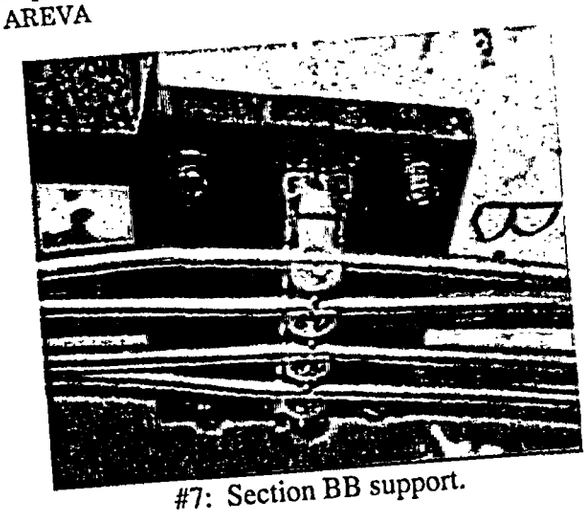
#4: Center lower support connections.



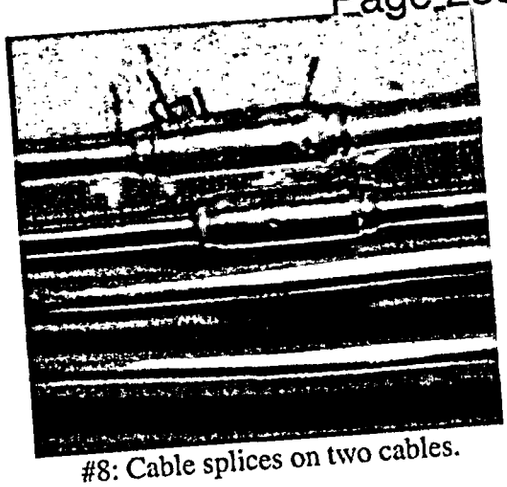
#5: Support near cable entrance.



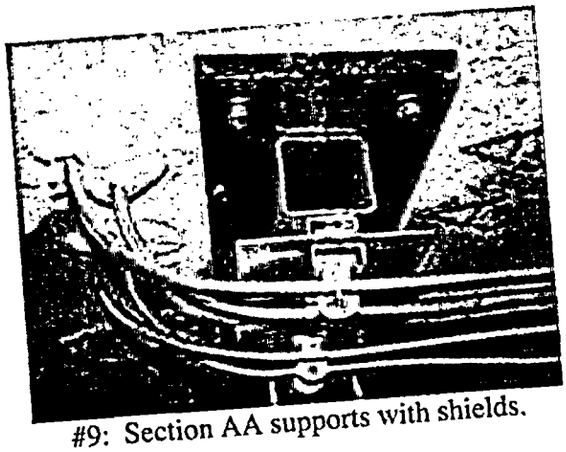
#6: Section BB support.



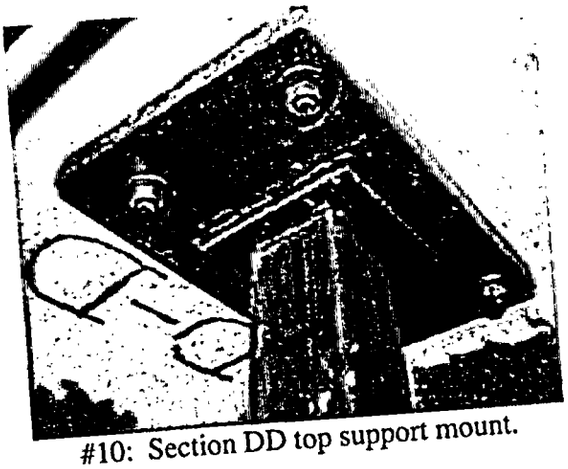
#7: Section BB support.



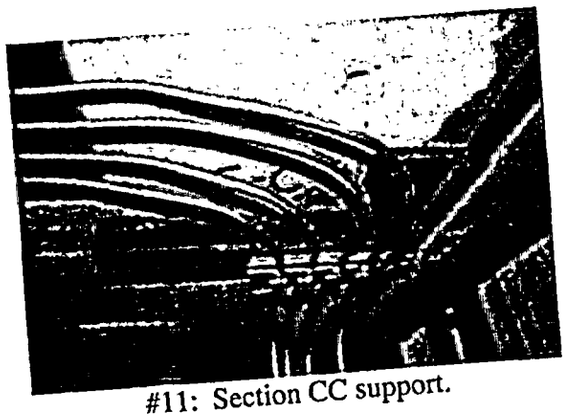
#8: Cable splices on two cables.



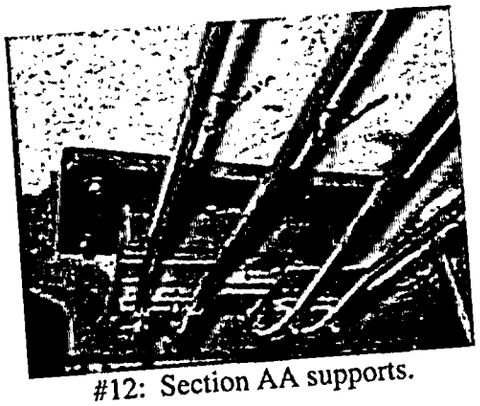
#9: Section AA supports with shields.



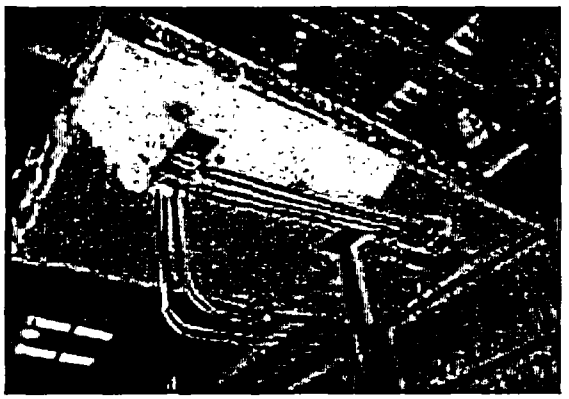
#10: Section DD top support mount.



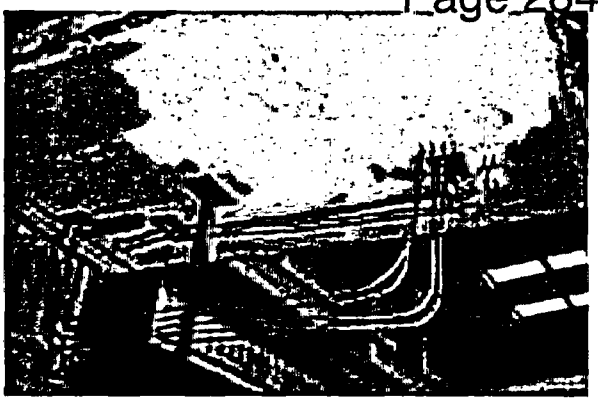
#11: Section CC support.



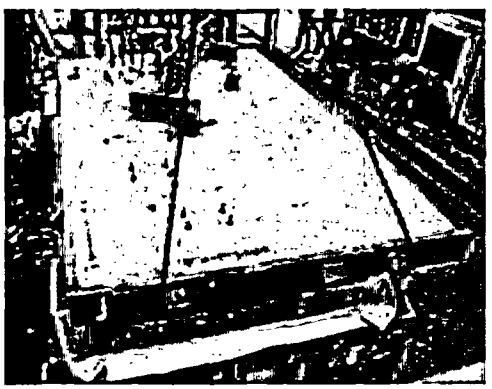
#12: Section AA supports.



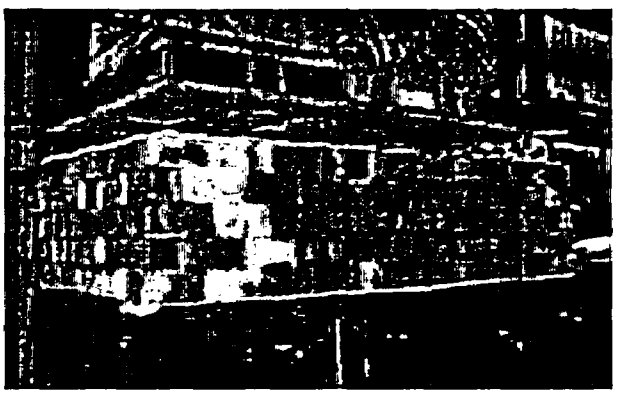
#13: Completed assembly.



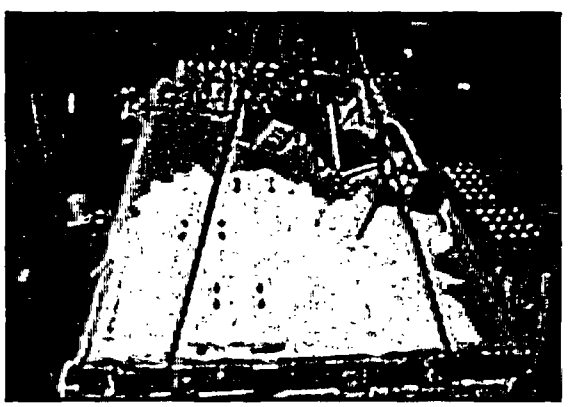
#14: Completed assembly.



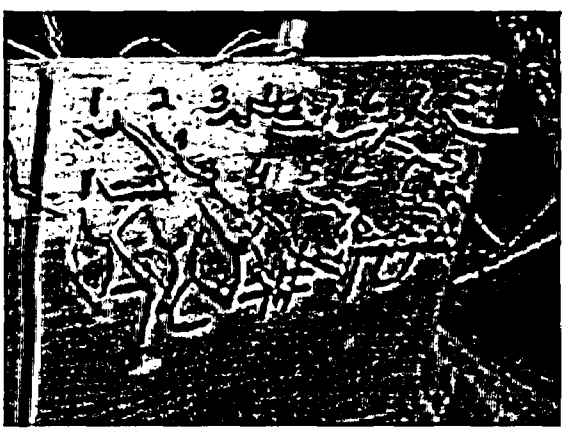
#15: Placing specimen on furnace.



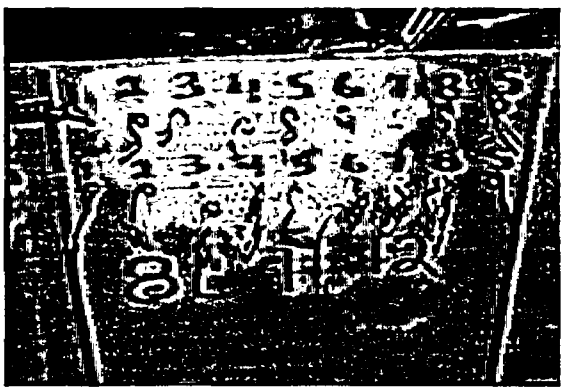
#16: Lowering to final position.



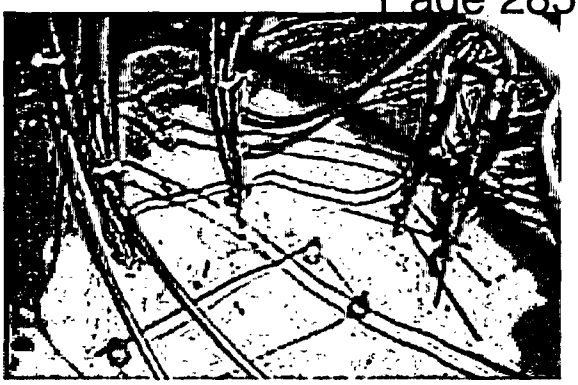
#17: Top surface of mounted specimen.



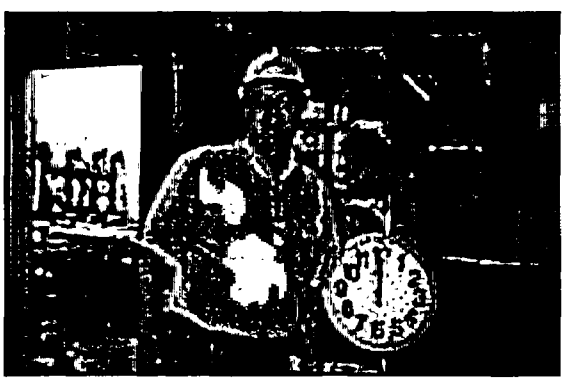
#18: Typical connection board.



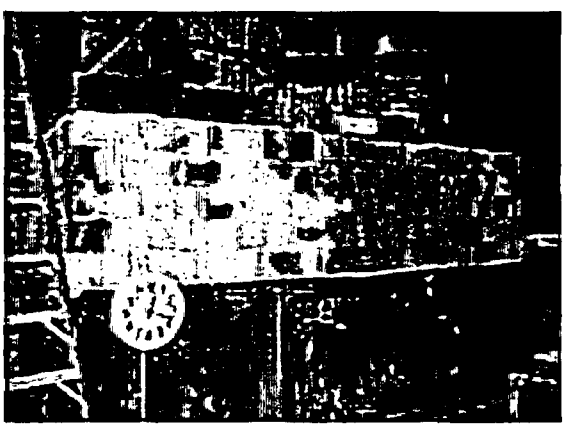
#19: Typical connection board.



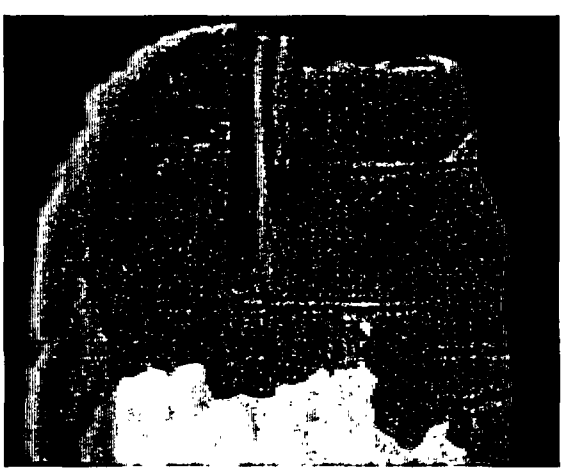
#20: Ground wire connection on top of slab.



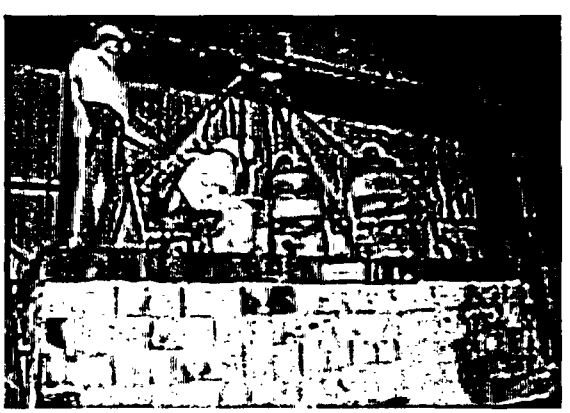
#21: Start of test.



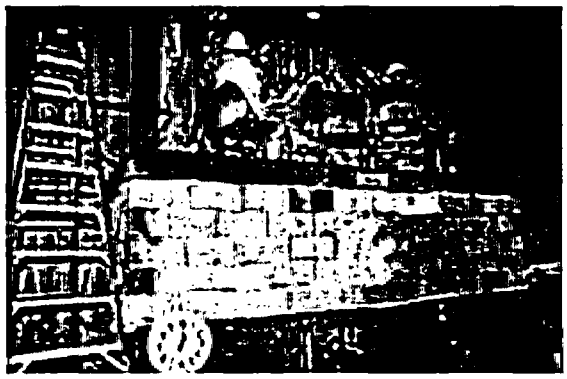
#22: Start of current leakage test.



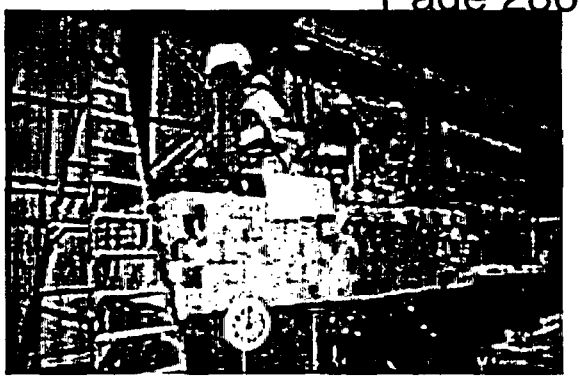
#23: Cable under fire exposure.



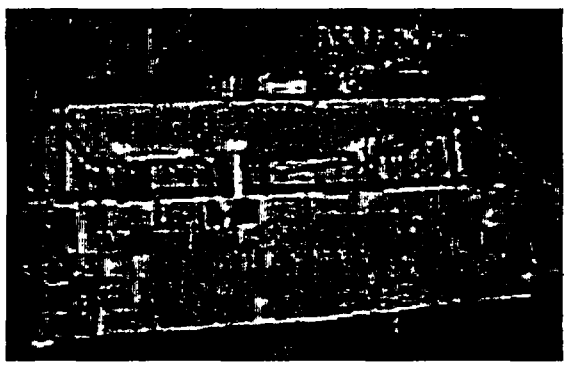
#24: Meggering during fire test.



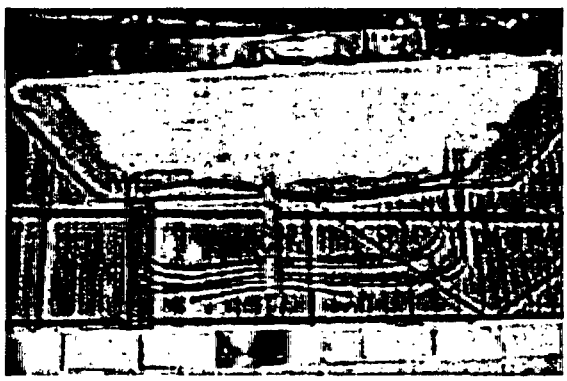
#25: Meggering at one hour.



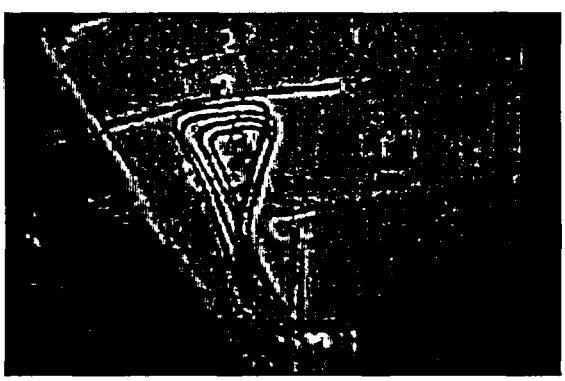
#26: Meggering at two hours.



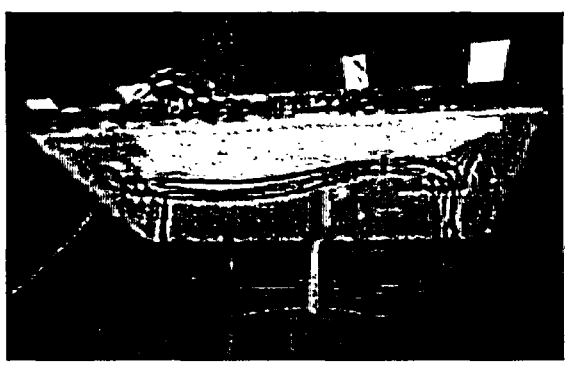
#27: Lifting at end of test.



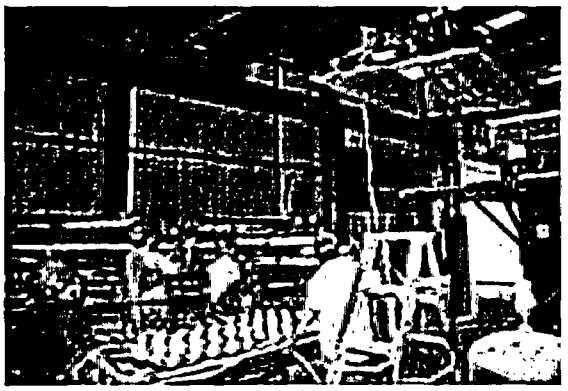
#28: Hot specimen.



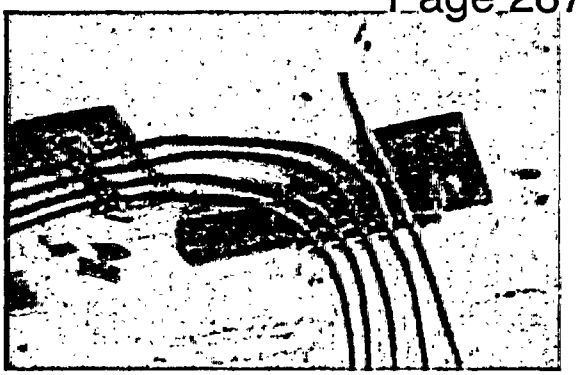
#29: Hot specimen.



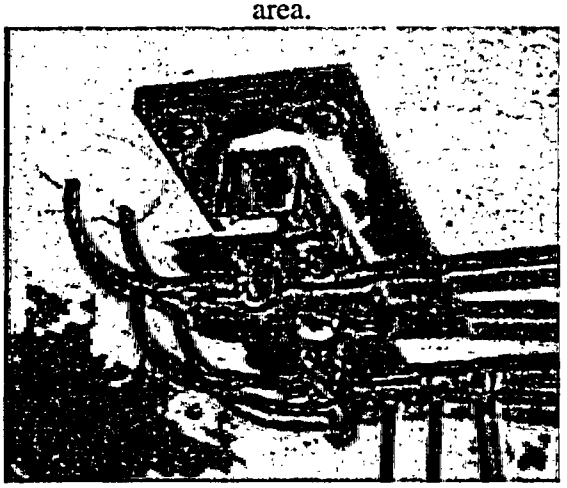
#30: Hot specimen.



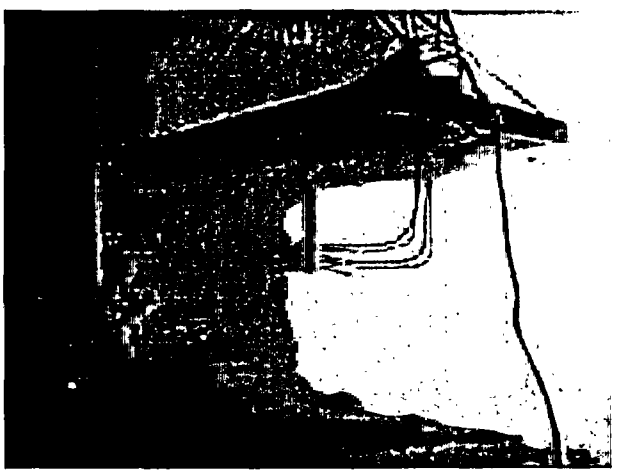
#31: Moving hot specimen to hose stream area.



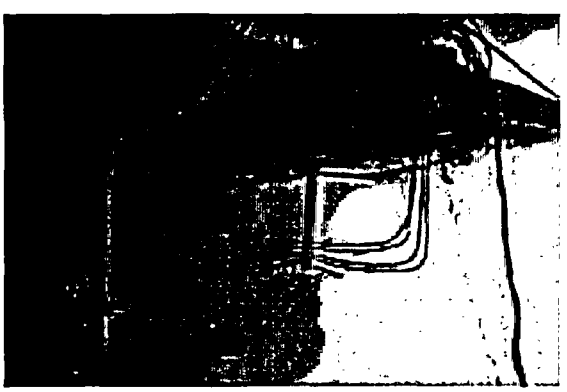
#32: Hot steel mounting plates.



#33: Hot steel mounting plates.

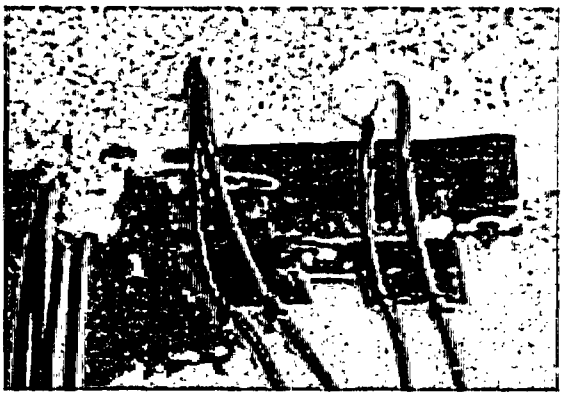


#34: Hose stream test.



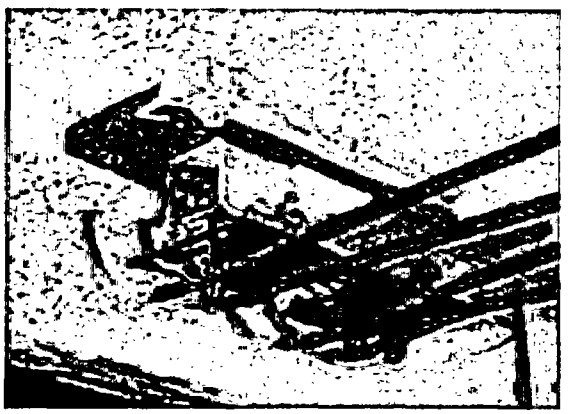
#35: Hose stream test.

#36: Hose stream test.

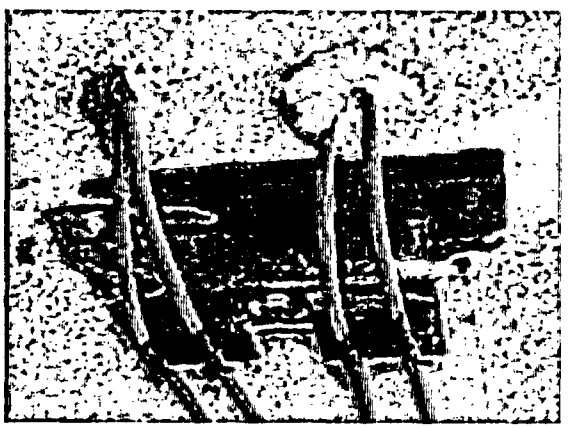


#37: Section AA support after hose stream.

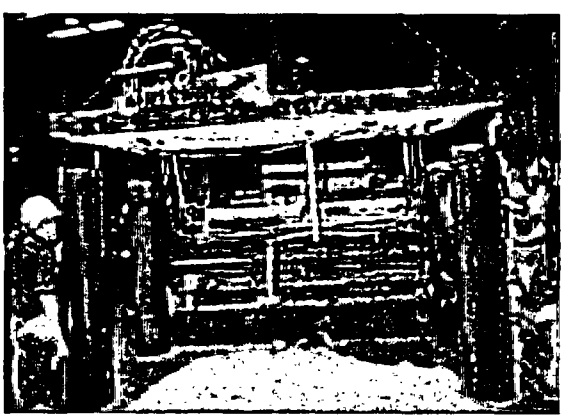
#38: Under side after hose stream.



#39: Section AA support after hose stream.

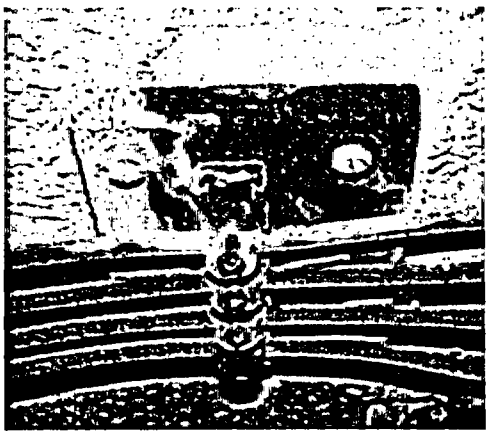


#40: Section AA support after hose stream.

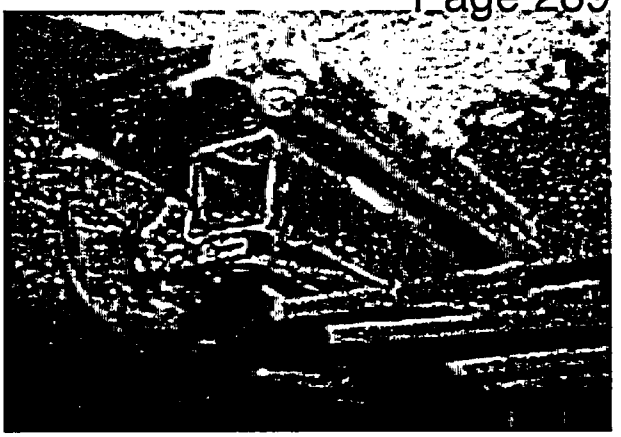


#41: Placing specimen on stand for meggering testing.

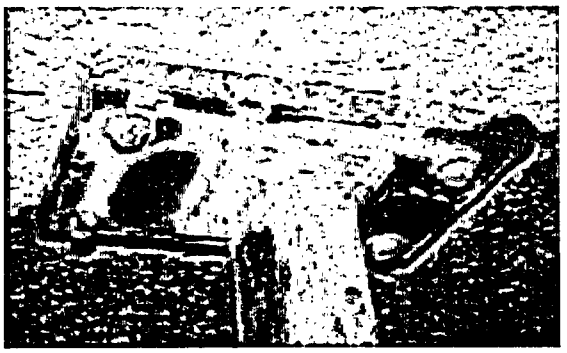
#42: Cables after hose stream test.



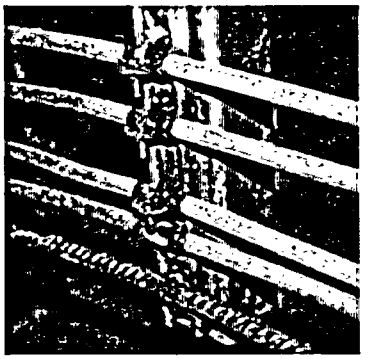
#43: Support against concrete.



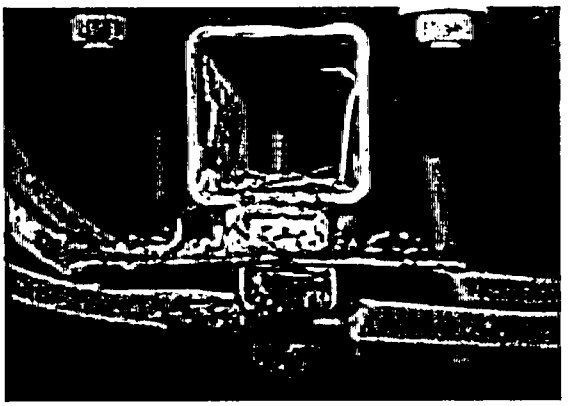
#44: Section AA support.



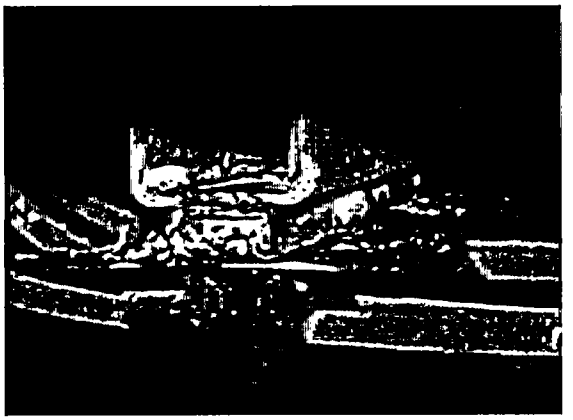
#45: Upper middle support mount.



#46: Lower middle support.



#47: Shield detail.



#48 Shield detail.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
MEGGITT SAFETY SYSTEMS, INC. FIRE TEST REPORT
PROJECT NO. 14980-117047

MEGGITT SAFETY SYSTEMS, INC. FIRE TEST REPORT
PROJECT NO. 14980-117047

TEST REPORT

ASTM E119-00a

Fire Tests of Building Construction and Materials*

MEGGITT SAFETY SYSTEMS, INC. CABLE TEST

Project No. 14980-117047, Revision 1

*Modified in that the test specimen was not one that is described in the standard, but the exposure was in accordance with the E119 time-temperature curve.

July 7, 2004

AREVA	Framatome ANP, Inc., *an AREVA and Siemens company*
58-5046119-00	

Prepared for:
Framatome ANP DE&S
6100 Southwest Blvd., Suite 400
Fort Worth, Texas 76109

OMEGA POINT
LABORATORIES, INC.
16015 Shady Falls Road
Elmendorf, TX 78112
(v) 210-635-8100
(f) 210-635-8101
800-966-5253
www.opl.com

Abstract

This document describes the evaluation of four sizes of Meggitt Safety Systems Inc. electrical cable and several support systems and attachment methods, when exposed to the ASTM E119 time-temperature heating curve. All supports and connections remained firm and secure. Electrical testing was performed on each cable before, during and after the testing, the results of which are contained herein.

The details, procedures and observations reported herein are correct and true within the limits of sound engineering practice. All specimens and test sample assemblies were produced, installed and tested under the surveillance of either the manufacturer's or the testing laboratory's in-house Quality Assurance Program. This report describes the analysis of a distinct assembly and includes descriptions of the test procedure followed, the assembly tested, and all results obtained. All test data are on file and remain available for review by authorized persons.

Deggary N. Priest, President

July 7, 2004
Date

Reviewed and approved:

QA Director

Date: July 7, 2004

Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas 78112-9784
210-635-8100 / FAX: 210-635-8101 / 800-966-5253
www.opl.com / e-mail: dnpriest@ix.netcom.com

ACCREDITED
No. 0689-01

TABLE OF CONTENTS

ITEM		PAGE
INTRODUCTION		4
TEST PROCEDURE		4
Horizontal Test Furnace		4
Furnace Pressure		5
Thermocouple Locations		6
Data Acquisition Systems		6
Correction Factor		6
Hose Stream Test		7
Acceptance Criteria		7
TEST SPECIMEN CONSTRUCTION		8
Test Slab		8
Meggitt Safety Systems, Inc. Cable Installation		8
Calibration of Data Acquisition System		13
TEST RESULTS		15
CONCLUSIONS		24
APPENDICES		
Appendix A:	TEST PLAN & CONSTRUCTION DRAWINGS	25
Appendix B:	MEGGERING & CONDUCTOR RESISTANCE RESULTS	65
Appendix C1:	TEST DATA - PRE-TEST CURRENT LEAKAGE	109
Appendix C2:	TEST DATA - FIRE EXPOSURE	150
Appendix C3:	TEST DATA - POST HOSE STREAM CURRENT LEAKAGE	280
Appendix D:	QUALITY ASSURANCE	297
Appendix E:	PHOTOGRAPHS	367
LAST PAGE OF REPORT		379

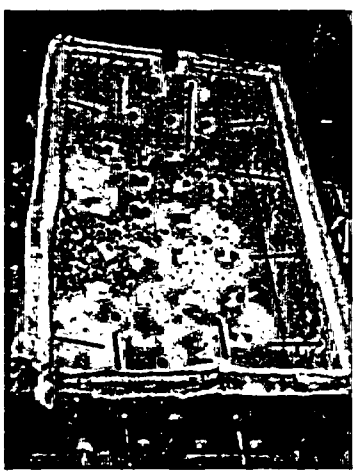
INTRODUCTION

The objective of this test program was to demonstrate the performance of Meggitt Safety Systems, Inc. fire resistive cables and cable support designs during a 3-hour fire exposure and following exposure to a hose stream test. The furnace temperatures, furnace thermocouples, Megger testing and hose stream testing were conducted in accordance with Generic Letter 86-10 Supplement 1. The test also collected electrical characteristic data (leakage current, conductor resistance) for each of the Meggitt Safety Systems, Inc. (MSSI) cable test specimens.

TEST PROCEDURE

Horizontal Test Furnace

The 7' x 12' x 40" deep horizontal test furnace is designed to allow the specimen to be uniformly exposed to the specified time-temperature conditions. It is fitted with 26 symmetrically-located diffuse-flame natural gas pipe burners designed to allow an even heat flux distribution across the under surface of a horizontal test specimen. Furnace pressures may be maintained at any value from +0.03" W.C. to -0.05" W.C. The furnace has been constructed so that the front (40" x 12') wall section can be removed to allow the evaluations of wall/ceiling interfaces and other specific applications.

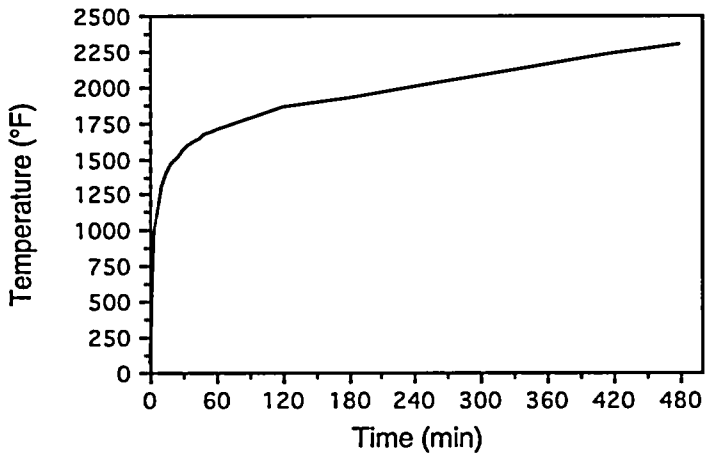


7' x 12' Horizontal Furnace (Plan View)

The temperature within the furnace is determined to be the mathematical average of thermocouples located symmetrically within the furnace and positioned twelve inches away from

the horizontal face of the test specimen. The materials used in the construction of these thermocouples are those suggested in the test standard. During the performance of a fire exposure test, the furnace temperatures are recorded every 15 seconds and displayed for the furnace operator to allow control along the specified temperature curve. For report presentation purposes, the data is saved twice per minute.

The fire exposure is controlled to conform with the standard time-temperature curve shown in Figure 1, as determined by the table below:



Time (min)	Temperature (°F)
0	68
5	1000
10	1300
20	1462
30	1550
60	1700
90	1792
120	1850
180	1925
240	2000
300	2075
360	2150
420	2225
480	2300

Figure 1

The furnace interior temperature during a test is controlled such that the area under the time-temperature curve is within 10% of the corresponding area under the standard time-temperature curve for 1 hour or less tests, 7.5% for those less than 2 hours and 5% for those tests of 2 hours or more duration.

Furnace Pressure

The pressure differential between the inside of the furnace (as measured approximately 3/4" below the exposed surface of the test slab) and the laboratory ambient air was maintained at +0.01 inches

of water column for the duration of the fire exposure test (after the first five minutes, during which furnace stabilization was achieved).

Thermocouple Locations

No temperatures were monitored within the heated area except for those used to monitor and control the furnace interior temperature.

Data Acquisition Systems

The outputs of the voltmeters and ammeters were monitored by a 350 channel Yokogawa, Inc., Model Darwin Data Acquisition Unit, and a Macintosh computer. The furnace control thermocouples were monitored by a 100 channel Yokogawa, Inc. Model Darwin Data Acquisition Unit and a Macintosh computer. The computers were programmed in LabVIEW 5.0 to send the commands to the data acquisition systems to sample the data input lines and to convert the raw data into a usable format for display on screen and storage as an ASCII tab-delimited text file. That files were then, after the test, imported into MS Excel for conversion to user units and tabular and graphical display.

Correction Factor

When the indicated resistance period is $^1/_2$ h or over, determined by the average or maximum temperature rise on the unexposed surface or within the test sample, or by failure under load, a correction shall be applied for variation of the furnace exposure from that prescribed, where it will affect the classification, by multiplying the indicated period by two thirds of the difference in area between the curve of average furnace temperature and the standard curve for the first three fourths of the period and dividing the product by the area between the standard curve and a base line of 68°F (20°C) for the same part of the indicated period, the latter area increased by 3240°F • min to compensate for the thermal lag of the furnace thermocouples during the first part of the test. For a fire exposure in the test higher than standard, the indicated resistance period shall be increased by the amount of the correction. For a fire exposure in the test lower than standard, the indicated resistance period shall be similarly decreased for fire exposure below standard. The correction is accomplished by mathematically adding the correction factor, C, to the indicated resistance period.

The correction can be expressed by the following equation:

$$C = \frac{2I(A - A_s)}{3(A_s + L)}$$

where:

C = correction in the same units as I,
I = indicated fire-resistance period,
A = area under the curve of indicated average furnace temperature for the first three fourths of the indicated period,
A_s = area under the standard furnace curve for the same part of the indicated period, and
L = lag correction in the same units as A and A_s (54°F•h or 30°C•h (3240°F•min or 1800°C•min))

Hose Stream Test

Immediately following the fire endurance test, a hose stream test was performed in accordance with USNRC Generic Letter 86-10, Supplement 1, Enclosure 1, Section VI. The hose stream was "applied at random to all exposed surfaces of the test specimen through a 1-1/2" fog nozzle set at a discharge angle of 30 degrees with a nozzle pressure of not less than 75 psi and a minimum discharge pressure of 75 gpm with the tip of the nozzle at a maximum of 5 feet from the test specimen. Duration of the hose stream application is 5 minutes." Prior to the hose stream application, the laboratory ensured the correct angle spray pattern, pressure and flow was achieved through calibrated gauges and other equipment as required.

Acceptance Criteria

The acceptance criteria for the supports which are supporting Meggitt Safety Systems, Inc. cables, is that they remain attached to the test slab and that the cable remain attached to the support, during the fire endurance test and the hose stream test.

The acceptance criteria for the tube track is that the tube track shall maintain its capability to support the test items during the fire endurance test and the hose stream test.

The seals used for closure of the openings in the test slab are not being tested or considered part of the test assembly.

TEST SPECIMEN CONSTRUCTION

Test Slab

A concrete slab used previously (Framatome-ANP Project No. 14980-111859) was in excellent condition and hence was utilized in this project. The following description of the construction and curing of this slab has been excerpted [in part] from the final report for that project:

The front slab was constructed with a perimeter of 8 in. structural steel channel, welded together into a 156 in. by 132 in. rectangle, with the flanges inward. Steel rebar (#5) was welded to the interior web of the perimeter channel in a grid pattern spaced 12 in. o.c. The rebars were located 4 in. up (i.e., centered) from the bottom of the channel frame. Normal weight concrete was then poured into the slab frame and vibrated into position. The assembly was allowed sufficient curing at elevated temperatures so as not to spall and be severely damaged by the fire exposure.

The slab was retrieved from outdoors and all holes patched with hand-mixed readimix concrete. After several days, the slab was placed in the large horizontal furnace and brought to 350°F for five days to ensure its dryness. It was then cooled and the appropriate holes cored through to receive the cables and the all-thread rod used to attach some of the supports. It should be noted that the slab was wider than necessary, but that had no effect on the test or its results, since the extra slab was simply extended out over the front of the furnace and served as a platform for the megger team to station themselves.

Meggitt Safety Systems, Inc. Cable Installation

The support slab was cored and prepared as described in the drawings supplied by Framatome-ANP (see Appendix A Test Plan), including the installation of the required supports. Four Meggitt Safety Systems Inc. (MSSI) cables were installed, as indicated in the drawings. The cables, and their lengths exposed to the furnace heat were as follows:

CABLE NO.	CABLE	EXPOSED LENGTH (inches)	MSSI PART NO.
1	4/C #8	269	300217-5
2	8/C #12	257	300283-5
3	7/C #14	280	300286-5
4	7/C #10	246.5	300208-5

Each cable passed through a 5" diameter hole in an 8" thick concrete slab, entering the heated area of the assembly. After a series of 90° bends, the cable exited the heated area of the furnace by passing once again through a different 5" diameter hole in the concrete slab. Once the cable was installed, approximately 1/2 of the 8" depth in the hole was sealed from beneath with ceramic fiber and hand-mixed Quik-Crete concrete was trowelled in place from above to fill the remaining void, and was screeded off smoothly with the top of the slab. Two cables passed through each of four holes in the slab. Each cable end was identified as "in" or "out," to differentiate between ends. The "in" ends were those that entered the heated area and traveled along close to the slab. The "out" ends were those that were running horizontally 36" below the slab and then passing out.

CABLE #1 - 4/C #8 AWG

The electrical connections shown in Fig. 7.1 of Appendix A 4/C #8 Wiring Diagram were completed. A random conductor was selected to be energized with 480 volts ac and labeled Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #1), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 600 volts ac in. The signal then passed through Relay #1 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #1 (normally open), through Load Switch #1 (which allowed the circuit to be loaded, if desired), through a load resistor of 576 Ω (consisting of four 120 volts ac, 100 watt light bulbs connected in series) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 600 vac signal in.

The remainder of the conductors were numbered 2 - 4 in clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 480 vac input power. Since all other conductors were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #1 (normally open) and to load resistors and voltage transducers similar to conductor #1. See Fig. 7.1 in Appendix A for a layout of the electrical schematic for this cable.

CABLE #2 - 8/C #12 AWG

The electrical connections shown in Fig. 7.2 in Appendix A 8/C #12 Wiring Diagram were completed. A random conductor was selected to be energized with 120 volts ac and labeled

Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #2), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 150 volts ac in. The signal then passed through Relay #2 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #2 (normally open), through Load Switch #2 (which allowed the circuit to be loaded, if desired), through a load resistor of 144 Ω (consisting of a single 120 volt ac, 100 watt light bulb) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 150 vac signal in.

The remainder of the conductors were numbered 2 - 8 in a clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 120 vac input power. Since conductors #2, 7 & 8 were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #2 (normally open) and to load resistors and voltage transducers similar to conductor #1. The conductors which were not adjacent to conductor #1 were connected together and the combination was then wired to a single load resistor/voltage transducer circuit similar to the ones used on each adjacent conductor. See Fig. 7.2 in Appendix A for a layout of the electrical schematic for this cable.

CABLE #3 - 7/C #14 AWG

The electrical connections shown in Fig. 7.3 in Appendix A 7/C #14 Wiring Diagram were completed. A random conductor was selected to be energized with 120 volts ac and labeled Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #3), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 150 volts ac in. The signal then passed through Relay #3 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #3 (normally open), through Load Switch #3 (which allowed the circuit to be loaded, if desired), through a load resistor of 144 Ω (consisting of a single 120 volt ac, 100 watt light bulb) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 150 vac signal in.

The remainder of the conductors were numbered 2 - 7 in a clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 120 vac input power. Since conductors #2, 6 & 7 were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #3 (normally open) and to load resistors and voltage transducers similar to conductor #1. The conductors which were not adjacent to conductor #1 were connected together and the combination was then wired to a single load resistor/voltage transducer circuit similar to the ones used on each adjacent conductor. See Fig. 7.3 in Appendix A for a layout of the electrical schematic for this cable.

CABLE #4 - 7/C #10 AWG

The electrical connections shown in Fig. 7.4 in Appendix A 7/C #10 Wiring Diagram were completed. A random conductor was selected to be energized with 120 volts ac and labeled Conductor #1. Power was wired through a 3 amp fuse, a safety power switch (Safety Power Switch #4), through a transducer which sent a signal of 0 - 10 volts dc to the computer data acquisition system proportional to an input signal of 0 - 5 amps. At this point, another transducer was connected between the power signal and neutral, which sent a 0 - 10 volts dc signal to the computer proportional to 0 - 150 volts ac in. The signal then passed through Relay #4 (normally open) and to Conductor #1 (in) on the slab. The other end of Conductor #1 (out) was then connected back to a different pole on Relay #4 (normally open), through Load Switch #4 (which allowed the circuit to be loaded, if desired), through a load resistor of 144 Ω (consisting of a single 120 volt ac, 100 watt light bulb) and then to neutral. On the hot side of the load resistor was connected a voltage transducer which sent a 0 - 10 vdc signal to the computer proportional to a 0 - 150 vac signal in.

The remainder of the conductors were numbered 2 - 7 in a clockwise direction, as viewed at the end of the cable labeled "in." None of the remaining conductors were energized by the 120 vac input power. Since conductors #2, 6 & 7 were immediate neighbors to conductor #1, each was connected (on its "out" side) through Relay #4 (normally open) and to load resistors and voltage transducers similar to conductor #1. The conductors which were not adjacent to conductor #1 were connected together and the combination was then wired to a single load resistor/voltage transducer circuit similar to the ones used on each adjacent conductor. See Fig. 7.4 in Appendix A for a layout of the electrical schematic for this cable.

GENERAL

Each cable was grounded to the slab through its metallic connections at all supports. Also, the electrical neutral signal was grounded (for all voltages) and the cable outer stainless steel shields were all grounded together. The support systems that were held in place by all-thread rods passing through the slab were all added to the ground circuit on the cold side of the slab.

The purpose of Relay Switches #1 - #4 was to allow the cables to be switched from a circuit wherein the computer monitored for current leakage between conductors or conductors and shield, to an open circuit where the conductors were not connected to anything, so that meggering tests could be performed. These relays were operated by a 120 vac power, each relay being powered through individual switches, labeled, for example, "120 VAC Control Switch #1."

During megger and conductor resistance testing, the test circuits consisted of the Meggitt cables only. Consequently, the results obtained apply completely to the Meggitt cables and to no degree are affected by the additional circuitry used to determine current leakage.

The Load Switches were included in the circuits for conductor #1 in each cable to allow the functionality of the circuits to be tested prior to and after the fire and hose stream exposures. During the current leakage tests, these switches were left in the open position.

All connections between the circuit board (containing all switches, relays, transducers, etc) and the "in" and "out" ends of the conductors were made using #12 AWG electrical wires with attachments by standard electrical compression connectors. The length of the connecting wires was nominally 40 feet, to allow the circuit board to be brought along with the test slab for performance of the hose stream test without disconnecting the circuits. The signals from the voltage and current transducers were connected to the computer with standard plugs which were disconnected for the hose stream test and re-connected after the slab had cooled and dried.

A piece of plywood was mounted on top of the slab to serve as a panel for making connections when performing megger or conductor resistance testing. The actual conductors from each end of each cable were inserted from the back of the panel and stuck out several inches for the operators to make connections. The signals to and from the electrical panel board (containing all relays, switches, etc) were connected to these conductors using Buchanan copper squeeze connectors. During the performance of some of the megger testing, a question was raised concerning any possible effect of the electrical panel on the megger results. To answer that question, the connections to the electrical panel were broken and the meggering repeated, with no change in results. The connections were then repaired and the testing proceeded.

Each test circuit contained transducers to monitor the AC amperage and AC voltage at specific locations. These transducers were as follows:

Manufacturer: Ohio Semitronics, Inc.

Transducer Model 3VT-3940C	Input: 0 - 600 volts AC	Output: 0 - 10 volts DC
Transducer Model MVT-150A	Input: 0 - 150 volts AC	Output: 0 - 10 volts DC
Transducer Model MCT5-005A	Input: 0 - 5 Amps AC	Output: 0 - 10 volts DC

These transducers were not calibrated, since their outputs were measured in both switch states prior to the test, and those outputs used to monitor the electrical performance of each circuit. During the test, data was monitored and stored to disk at a minimum frequency of once per 30 seconds.

CALIBRATION OF DATA ACQUISITION SYSTEM

March 15, 2004

Following the connection of all electrical circuits (as indicated in Appendix A, Figures 7.1 - 7.4), the outputs of the transducers were connected to the data acquisition system. The circuits were then energized (one at a time) with Safety Power Switches 1 - 4 closed, Relays #1 - 4 closed, and Load Switches #1 - 4 closed. The signal into each transducer was then measured with a calibrated current or voltage meter and the corresponding output for that channel was noted from the computer screen. In this manner, the entire system was verified and calibrated (against NIST-traceable devices), including the data acquisition program, since the software used to perform this calibration was the same used to perform the fire test.

The calculated Calibration Constants were then placed into Excel spreadsheets containing the data collected during the fire exposure and used to convert from machine units to user units for the data presented herein.

CHANNEL	A/C INPUT SIGNAL (units)	DATA ACQUISITION OUTPUT (volts dc)	CALIBRATION CONSTANT (units/volt)
1	0.758 amps	1.586	0.478 amps/volt
2	470.1 volts	7.711	61.0 volts/volt
3	470.9 volts	7.738	60.9 volts/volt
4	464.4 volts	7.642	60.8 volts/volt
5	469.0 volts	7.719	60.8 volts/volt
6	469.8 volts	7.708	61.0 volts/volt
7	0.759 amps	1.584	0.479 amps/volt
8	120.58 volts	7.902	15.26 volts/volt
9	120.80 volts	7.822	15.44 volts/volt
10	121.13 volts	7.920	15.29 volts/volt
11	121.22 volts	7.933	15.28 volts/volt
12	121.21 volts	7.951	15.24 volts/volt
13	121.32 volts	7.964	15.23 volts/volt
14	0.774 amps	1.617	0.479 amps/volt
15	120.90 volts	7.921	15.26 volts/volt
16	121.24 volts	7.954	15.24 volts/volt
17	121.27 volts	7.948	15.26 volts/volt
18	121.29 volts	7.958	15.24 volts/volt
19	121.28 volts	7.943	15.27 volts/volt
20	121.25 volts	7.938	15.27 volts/volt
21	0.781 amps	1.627	0.480 amps/volt
22	121.00 volts	7.885	15.35 volts/volt
23	121.08 volts	7.947	15.24 volts/volt
24	121.20 volts	7.937	15.27 volts/volt
25	121.13 volts	7.941	15.25 volts/volt
26	121.20 volts	7.943	15.26 volts/volt
27	121.14 volts	7.953	15.23 volts/volt

Following the calibration procedures described above, all power was dropped from the cables and all switches and relays placed in their "open" position. Representatives of Grubb Engineering, Inc. then arrived and performed Megger Testing in accordance with the test plan. On this day before the test, Conductor Resistance Testing was also conducted on each conductor in each cable. These results are presented in Appendix B Meggering & Conductor Resistance Results.

TEST RESULTS

The instrumented test article was placed on top of the furnace on March 16, 2004. The thermocouples and voltage measurement channels were connected to the data acquisition system and their outputs verified on March 15, 2004 (see discussion above). The furnace was fired, and computer data collection on the energized cables (current leakage testing) continued for 30 minutes. The load switches were maintained open during the current leakage testing. The cables were then de-energized and disconnected by opening all switches and relays. Meggering was then performed between all conductors of each cable by two teams of operators. Each megger operator read his results to a representative of the OPL QA/QC Department, who noted the reading and the time at which that reading was taken. When the megger teams had disconnected and left the slab, the power was turned back on and computerized current leakage testing continued. Again, the load switches were maintained open The original plan was to megger the cables at 30, 90 and 150 minutes. However, as the test continued, some cables took longer to achieve a steady megger reading than other did. Consequently, the tests were conducted as rapidly as possible and the results are given below and in Appendix B Meggering and Conductor Resistance Results.

The ambient temperature at the start of the test was 68°F, with 88% relative humidity. The furnace was fired at 9:50 AM and the standard time-temperature curve followed for 180 minutes. The pressure differential between the inside of the furnace (as measured approximately 3/4" below the exposed surface of the test slab) and the laboratory ambient air was maintained at +0.01 inches of water column for the duration of the fire exposure test (after the first five minutes, during which furnace stabilization was achieved).

Persons present to perform or witness the test were as follows:

Cal Banning	-	Framatome ANP
John Crowther	-	Framatome ANP
J.C. Vance	-	Southern Companies
Alan Morisi	-	Progress Energy
Mike Fletcher	-	Progress Energy
Tony Maness	-	Progress Energy
Bruce Gerwe	-	Progress Energy
Fred Rudek	-	Meggitt Safety Systems
Dhanesh Butani	-	Bechtel Power
Bobby Grubb	-	Grubb Engineering
Jeff Piel	-	Grubb Engineering
Deggary Priest	-	Omega Point Laboratories, Inc.
Connie Humphrey	-	Omega Point Laboratories, Inc.
Cleda Patton	-	Omega Point Laboratories, Inc.
Mike Dey	-	Omega Point Laboratories, Inc.
Troy Bronstad	-	Omega Point Laboratories, Inc.
Oscar Estrada	-	Omega Point Laboratories, Inc.
Richard Beasley	-	Omega Point Laboratories, Inc.

Observations made during the test were as follows:

TIME	OBSERVATIONS
0:00	Furnace ignited at 9:50 AM.
5:00	Furnace interior pressure adjusted to +0.01" WC at a point 3/4" below the slab, resulting in a neutral pressure plane position approximately 12" below the underside of the slab.
28:00	Power off, all switches and relays open.
30:00	Megger testing began.
45:00	Tubetrack sagging in the middle ~4". Unistrut "wrinkling" from the heat but still firmly attached.
1:27	Megger teams down off the slab. All circuits energized and current leakage testing continued.
1:35	Current leakage testing discontinued, all circuits de-energized and Megger teams began meggering again.

TIME	OBSERVATIONS (continued)
2:15	All megger teams down.
2:17	Current leakage testing continued.
2:20	Power check performed quickly. All light bulbs connected to conductor #1 in each cable lit when Load Switches were momentarily closed.
2:22	Megger teams down off the slab. All circuits energized and current leakage testing continued.
2:23	Megger testing of Cable #1 (4/C #8) is discontinued due to extended equilibrium periods.
2:25(?)	Current leakage testing discontinued, all circuits de-energized and Megger teams began meggering again.
2:30	All fuses on power circuits for each cable remain functional.
2:50	Megger teams down off the slab.
2:51	All circuits energized and current leakage testing continued.
3:00	Furnace extinguished. Power to all cables dropped. Connectors to computer system unplugged. Slab lifted from the furnace and moved to the hose stream location. All Meggitt cables are visually solid and in place. All supports are in position, although some deformation and sagging exists. All steel is red hot.
3:04:42	Hose stream began at a nozzle angle of 30°, pressure at 75 psi and from a distance of 5 ft. Since the test assembly remained connected to the electrical circuit panel, the test assembly was held stationary and the hose stream nozzle moved around below to ensure good water coverage.
3:09:42	Hose stream stopped. The test assembly was then placed on 8' tall 24" pipe stands and readied for the meggering tests.
3:17:02	Meggering began (time between end of hose stream and start of Meggering = 7:20 min:sec). Cable #1 was not meggered due to difficulties in reaching equilibrium.

Other than bits of calcined concrete falling to the laboratory floor, the test assembly showed no visible effect due to the hose stream test. Much steam and dripping hot water remained after the hose stream was stopped.

The next day (March 17, 2004), after the test assembly had been allowed to cool and dry off, the megger teams returned and performed the megger and conductor resistance tests on each cable in the same way they were done on the pre-test testing on March 15, 2004. All megger and conductor resistance test results can be found in Appendix B. Once again, the circuits were

energized, and current leakage testing conducted on all cables. The fuse for Cable #3 was discovered to have been blown, so no usable data was collected for that cable. Cable #3 circuitry was un-energized, the fuse replaced, and then re-energized. The fuse blew immediately.

In accordance with the E119 test standard, a calculation for any correction to the indicated fire resistance period was done. The difference between the area under the E119 time-temperature curve and the area under the furnace average was less than 0.01%, so no correction factor was needed.

Listings and plots of all temperatures and electrical signals may be found in Appendices C1 - C3. A photographic documentation of each test has been included in Appendix E.

OBSERVATIONS AFTER THE FIRE AND HOSE STREAM TESTS

ITEM	POST FIRE TEST	POST HOSE STREAM TEST
Meggitt Cables & Supports	Upon removal from the furnace, the Meggitt cables all cooled to below red heat immediately. The more massive steel supports and loading weights remained bright red. All Meggitt cable supports remained straight and firmly attached, with no obvious effect of the heat. The Meggitt cables remained firmly in position, with slight sagging over their longest horizontal runs.	All Meggitt cable supports remained straight and firmly attached, with no obvious effects from the heat. The Meggitt cables remained firmly in position, with slight sagging over their longest horizontal runs. All items below the slab were covered with wet, calcined concrete (a common occurrence when hot concrete slabs are wetted). All clamps holding Meggitt cables to the supports remained firmly in place. Removal of the (stainless steel) clamps from several locations showed what looked like corrosion of the Meggitt cable outer shield by the zinc on the galvanized support section.

ITEM	POST FIRE TEST	POST HOSE STREAM TEST
Section A-A B-Line B11	The B-Line B11 material remained firmly attached to the concrete slab with only very slight "wavyness" to the lower (open) edges of the material. The Hilti Kwik II Bolts remained firmly attached to the concrete.	No structural change.
Section F-F P1000 Unistrut	The P1000 Unistrut remained firmly attached to the concrete slab and the Hilti Kwik II Bolts remained securely attached to the concrete. The length of Unitstrut that supported a 50 lb weight cantilevered out from the nearest Kwik II Bolt softened and sagged downwards approximately 3".	No structural change.
J.C. White Tubetrack	The supports on each end of the J.C. White Tubetrack remained firmly attached to the concrete with no deformation whatsoever. The Tubetrack had sagged at the middle of its length, but the pipes remained firmly in position and there was no noticeable twisting of the Tubetrack. The connecting device at the center of the Tubetrack span remained firmly attached and secure.	No structural change. Measurement of the cooled specimen showed that the Tubetrack had sagged 4.5" at the center from its original position.

Following the completion of all testing, the concrete was removed from the holes in the slab and all Meggitt cables were removed in one piece and in their tested configuration. Several of the clamp/support systems were removed from the slab without disconnecting them from the Meggitt cable. The cable assembly was then carefully boxed and shipped to Progress Energy for examination by them.

OBSERVATIONS MADE DURING THE MEGGER AND CONDUCTOR RESISTANCE TESTS

The results indicated below do not represent a full and precise analysis of the meggering and conductor resistance data obtained. The actual test data sheets have been included in Appendix B for analysis by qualified and authorized persons.

CABLE #1 - 4/C #8 AWG

Pre-Test

The cable's conductors were tested with a megohmmeter (megger) between all possible combinations of conductors and shield at a voltage of 1500 VDC. The results were obtained in less then 20 seconds for each reading with the resistances running from 900 MΩ (megohms) to 1500 MΩ. The conductor resistances were all around 37 mΩ (milliohms).

During Fire Test (30 minutes)

The megger readings dropped to essentially zero and stabilization began to take long periods of time. The systems behaved like capacitors, in that they slowly charged up to the 1500 VDC before the reading could be taken. Several of the combinations were stopped at between 200 and 400 VDC, due to time constraints. No conductor resistance readings were taken during the fire tests on any cable.

During Fire Test (remainder)

The megger readings were attempted, but were unsuccessful due to the dramatically extended equilibrium times or failure to equilibrate at all.

Post Hose Stream Test

The megger readings were too low to monitor, so the resistance between conductors was measured using a digital voltmeter. The results ranged from a low of 0.07 MΩ to a high of 1.465 MΩ.

Post Test (Cold)

The megger tests were performed with no results, since the resistance was so low. They were repeated with a standard digital voltmeter with results between 3.13 kΩ and 1.9 mΩ. The conductor resistance tests were performed, with results all centering around 38 mΩ.

CABLE #2 – 8/C #12 AWG

Pre-Test

The cable's conductors were tested with a megger between all possible combinations of conductors and shield at a voltage of 500 VDC. The results were obtained in less then 20 seconds for each reading with the resistances running from 25 MΩ to 1200 MΩ. The conductor resistances were all around 93 mΩ (milliohms).

During Fire Test (30 minutes)

The megger readings dropped significantly, to a low of 0.3 MΩ to a high of 1.8 MΩ. The time required for equilibrium did not change from that of the pre-test meggering. No conductor resistance readings were taken during the fire tests on any cable.

During Fire Test (90 minutes)

The megger readings continued to reduce, ranging from a minimum of 0.29 MΩ to a maximum of 0.9 MΩ. The equilibrium times were not significantly longer than before.

During Fire Test (2:25 h:min)

The megger readings remained fairly constant, ranging from a minimum of 0.51 MΩ to a maximum of 1.1 MΩ. Once again, the equilibrium times were not changed.

Post Hose Stream Test

The megger readings were too low to monitor, so the resistance between conductors was measured using a digital voltmeter. The results ranged from a low of 0.02 mΩ to a high of 2.05 mΩ.

Post Test (Cold)

Meggering and conductor resistance tests were repeated the day after the fire exposure test. The megger readings were too low to monitor, so the resistance between conductors was conducted using a digital voltmeter. The results ranged from a low of 0.18 mΩ to a high of 0.9 mΩ.

CABLE #3 – 7/C #14 AWG

Pre-Test

The cable's conductors were tested with a megger between all possible combinations of conductors and shield at a voltage of 500 VDC. The results were obtained in less then 60 seconds for each reading with the resistances running from 750 MΩ to 7500 MΩ. The conductor resistances were all around 142 mΩ (milliohms).

During Fire Test (30 minutes)

The megger readings dropped significantly, to a low of 0.5 MΩ to a high of 3.1 MΩ. The time required for equilibrium did not change from that of the pre-test meggering. No conductor resistance readings were taken during the fire tests on any cable.

During Fire Test (90 minutes)

The megger readings stayed steady, ranging from a minimum of 0.75 MΩ to a maximum of 1.25 MΩ. The equilibrium times were not significantly different than before: if anything, they were lower.

During Fire Test (2:25 h:min)

The megger readings remained fairly constant, ranging from a minimum of 0.55 MΩ to a maximum of 1.3 MΩ. Once again, the equilibrium times were not changed.

Post Hose Stream Test

The megger readings were off the scale low, ranging from zero to a maximum of 0.23 Ω. No conductor resistance checks were performed on any cable after the hose stream test until the assembly cooled.

Post Test (Cold)

Meggering and conductor resistance tests were repeated the day after the fire exposure test. The megger readings were too low to monitor, so the resistance between conductors was conducted using a digital voltmeter. The results ranged from a low of 0.2 Ω to a high of 1.07 MΩ The conductor resistance tests were all centered around 155 Ω.

CABLE #4 - 7/C #10 AWG

Pre-Test

The cable's conductors were tested with a megger between all possible combinations of conductors and shield at a voltage of 500 VDC. The results were obtained in less then 60 seconds for each reading with the resistances running from 225 MΩ to 12,000 MΩ. The conductor resistances were all around 56 mΩ (milliohms).

During Fire Test (30 minutes)

The megger readings dropped significantly, to a low of 0.3 MΩ to a high of 1.5 MΩ. The time required for equilibrium did not change from that of the pre-test meggering. No conductor resistance readings were taken during the fire tests on any cable.

During Fire Test (90 minutes)

The megger readings stayed steady, ranging from a minimum of 0.38 MΩ to a maximum of 0.54 MΩ. The equilibrium times were not significantly different than before: if anything, they were lower.

During Fire Test (2:25 h:min)

The megger readings remained fairly constant, ranging from a minimum of 0.38 MΩ to a maximum of 0.54 MΩ. Once again, the equilibrium times were not changed.

Post Hose Stream Test

The megger readings were off the scale low. For that reason, readings were taken using a digital voltmeter. The results ranged from a low of 0.5 kΩ to a high value of 56 kΩ. No conductor resistance checks were performed on any cable after the hose stream test until the assembly cooled.

Post Test (Cold)

Meggering and conductor resistance tests were repeated the day after the fire exposure test. The megger readings were too low to monitor, so the resistance between conductors was conducted using a digital voltmeter. The results ranged from a low of 55.8 kΩ to a high of 0.62 MΩ The conductor resistance tests were all centered around 58 Ω.

CONCLUSIONS

In accordance with the acceptance criteria listed in the Test Plan, all supports were successful and met the requirements of the Test Plan. None failed to hold up its load and all remained firmly attached to the concrete slab.

Omega Point Laboratories, Inc. has not been requested to analyze the Megger, Conductor Resistance nor Current Leakage data. These data have, therefore, been presented as collected, for review and analysis by authorized, qualified persons.

Appendix A

TEST PLAN & CONSTRUCTION DRAWINGS

AREVA

May 12, 2004
Doc. No.: 5970114-D01-014

Mr. Deg Priest
Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, TX 78112-9784

Subject: Final As-Built Test Drawings and Test Plan for March 16 Test

Reference: HNP Fire Test Performance Support – Meggitt Cable

Dear Deg:

Attached are Revision 2 of the Test Plan and the following drawings for the March 16 Test:

1. 02-5038067A-00
2. 02-5038071A-01
3. 02-5038072A-00
4. 02-5038073A-01
5. 02-5038074A-01
6. 02-5038075A-02
7. 02-5038077A-02
8. 02-5038078A-01
9. 02-5038079A-02
10. 02-5038080A-02
11. 02-5038081A-00
12. 02-5038109A-02
13. 02-5038082A-02
14. 02-5040634A-00
15. 02-5041090A-00

Should you have any questions or comments, please do not hesitate to call me at (817) 737-1162.

Sincerely,

John G. Crowther
Project Manager

Enclosure

cc: Ms. Cleda Patton (OPL)

FRAMATOME ANP, INC.
6100 Southwest Blvd., Suite 400, Fort Worth, TX 76109
Tel.: (817) 738-0300 • Fax: (817) 737-1100

AREVA

ENGINEERING INFORMATION RECORD

Document Identifier 51 5038146 - 02

Title PROGRESS ENERGY MEGGITT CABLE TEST PLAN

PREPARED BY:

Name John G. Crowther

Signature [signature] Date 5/10/2004

REVIEWED BY:

Name Richard L. Dible

Signature [signature] Date 5/10/2004

Technical Manager Statement: Initials [initials]

Reviewer is Independent.

Remarks:

This test plan documents the scope of this test, the objectives, the acceptance criteria, the responsibilities of the client (Progress Energy), Framatome ANP and the test laboratory (Omega Point Laboratories), the prerequisites for the test, the procedure to be followed in conducting the test and the preparation of the test report.

This revision of the Test Plan is to incorporate final as-built changes in the test methodology.

TABLE OF CONTENTS

ITEM		PAGE
Cover Sheet		1
Table of Contents		2
1.0	Scope	3
2.0	Objective	3
3.0	Acceptance Criteria	3
4.0	Definitions	4
5.0	Responsibilities	4
6.0	Prerequisites	7
7.0	Procedure	10
8.0	Fire Test Report	19

1.0 SCOPE

This test plan describes the methods and guidelines to be utilized for the preparation of test specimens, performance of fire and hose stream tests, temperature monitoring, Megger testing (insulation resistance) data collection, leakage current data collection, conductor resistance data collection and all applicable documentation of these tasks and the test results. Management responsibility for all aspects of this program will be performed under the auspices of Framatome ANP (FANP), on behalf of Progress Energy (PE).

2.0 OBJECTIVE

The objective of this test program is to demonstrate the performance of Meggitt Safety Systems, Inc. fire resistive cables and cable support designs during a 3-hour fire exposure and subsequent exposure to a hose stream test. The furnace temperatures, furnace thermocouples, Megger testing and hose stream testing will be conducted in accordance with Generic Letter 86-10, Supplement 1. The test will also collect electrical characteristic data (leakage current, conductor resistance) for each of the Meggitt Safety Systems, Inc. cable test specimens.

3.0 ACCEPTANCE CRITERIA

3.1 The acceptance criteria for the supports which are supporting Meggitt Safety Systems, Inc. cables, is that they remain attached to the test slab and that the cable remain attached to the support, during the fire endurance test and the hose stream test.

3.2 The acceptance criteria for the supports which are not supporting Meggitt Safety Systems, Inc. cables is that they remain attached to the test slab during the fire endurance test and the hose stream test.

3.3 The acceptance criteria for the tube track is that the tube track shall maintain its capability to support the test items during the fire endurance test and the hose stream test.

3.4 The seals used for closure of the openings in the test slab are not being tested or considered part of the test assembly.

4.0 DEFINITIONS

4.1 Test Slab / Deck – An 8' x 13' assembly designed to support the test items in position within the test furnace.

4.2 Test Item – All materials associated with Meggitt Safety Systems, Inc. Cables, including supports.

4.3 Test Assembly – The combination of the test item(s), thermocouples and test deck.

4.4 Thermocouple – An electrical assembly used to measure temperature, consisting of an electrically-welded, fused junction of dissimilar metals and their respective leads to the data acquisition system. The thermocouple leads are insulated with materials capable of withstanding the moisture and heat requirements of the test environment.

5.0 RESPONSIBILITIES

5.1 Progress Energy (PE)

5.1.1 Assume, through its contractor, total management responsibility of this test program.

5.1.2 Coordinate with FANP to provide designs for the specific test items. PE to provide designs for supports.

5.1.3 PE must approve any changes in the test methodology.

5.1.4 Provide the Meggitt Safety Systems, Inc. Cable to be tested.

5.1.5 Provide a representative to be present for installation and to witness the fire endurance and hose stream tests.

5.1.6 Provide review of DRAFT test report including one set of "consolidated" comments.

5.2 Framatome ANP (FANP)

5.2.1 In coordination with PE, establish the criteria, guidelines, drawings, bill of materials, recommendations, etc., to govern the construction of the Test Assembly.

5.2.2 Provide the test item installation drawings / instructions and QC instructions.

5.2.3 Provide scheduling of personnel, equipment and material necessary to perform the installation.

5.2.4 Coordinate all phases of the fire test preparation with the testing organization including approval of any changes to the test methodology described herein.

5.2.5 Contract testing laboratory services.

5.3 Omega Point Laboratories, Inc. (OPL)

5.3.1 OPL shall coordinate with FANP for the development of the Test Plan.

5.3.2 Provide and prepare the test furnace, test slab, test items and provide required test instrumentation in accordance with the Laboratory's Quality Assurance Program and Quality Control Program.

5.3.3 Provide furnace thermocouples and thermocouple calibration and instrumentation.

5.3.4 Provide all test equipment necessary to provide Megger testing data collection, leakage current data collection and conductor resistance data collection. Megger testing shall be conducted in accordance with GL 86-10, Supplement 1 and as specified herein.

5.3.5 Procure the support materials as specified by FANP as required to construct the test assemblies. Such materials may include, but are not limited to, tools and equipment, fasteners, supports, structural steel, etc., as shown on FANP test assembly drawings.

5.3.6 Assemble, install and document the installation of all Meggitt Safety Systems, Inc. Cable, supports, etc. This includes installing the post applied attachment plates sufficient to hold the test articles during the test.

5.3.7 Provide computer-generated drawing showing location of furnace thermocouples.

5.3.8 Record and overview, using the Laboratory Event Log, the QC documentation for the installation of all test items.

5.3.9 Conduct the fire endurance and hose stream test including performing all Megger testing data collection, leakage current data collection and conductor resistance data collection in accordance with this test plan.

5.3.10 Inspect and document the physical condition of all test items following completion of the post-hose stream test.

5.3.11 Document the test parameters and provide a formal detailed written report of the test program and test results (provide 5 copies).

5.3.12 Provide photographic coverage of the test items, the fire and hose stream tests and the post-test activities. Provide VHS video coverage of the test items during the fire and hose stream test and post-test.

5.4 Laboratory (OPL) Quality Assurance / Quality Control

5.4.1 Receive, inspect, and record all materials associated with the test items. The quality control documentation for these materials provided by the Laboratory will be documented in the final test report.

5.4.2 Inspect and document that the materials used and construction of test items comply with applicable drawings.

5.4.3 Witness the process utilized in the installation of the test assembly and suitably document observations in event logs, inspection reports, etc.

5.4.4 Inspect and document the instrumentation of the test items.

5.4.5 Provide written calibration documentation of all thermocouples, measurement devices and data acquisition systems used in this test program.

5.4.6 Witness the fire endurance test and hose stream test to document test performance and confirm test results.

5.4.7 Complete the Test Article Attribute Checklist (Drawing 02-5040634A-00) prior to the start of the test.

6.0 PREREQUISITES

6.1 General Test Configuration Requirements

The test items used in this test program shall be representative of plant configurations or intended plant configurations and shall be specified and designed by FANP / PE and its contractors. The test items to be subjected to fire endurance and hose stream tests shall be in accordance with FANP assembly drawings and instructions. The following are the assembly drawings and instructions:

- Drawing 02-5038067A-00 (Revision 0)
- Drawing 02-5038071A-01 (Revision 1)
- Drawing 02-5038072A-00 (Revision 0)
- Drawing 02-5038073A-01 (Revision 1)
- Drawing 02-5038074A-01 (Revision 1)
- Drawing 02-5038075A-02 (Revision 2)
- Drawing 02-5038077A-02 (Revision 2)
- Drawing 02-5038078A-01 (Revision 1)
- Drawing 02-5038079A-02 (Revision 2)
- Drawing 02-5038080A-02 (Revision 2)
- Drawing 02-5038081A-00 (Revision 0)
- Drawing 02-5038082A-02 (Revision 2)
- Drawing 02-5038109A-02 (Revision 2)
- Drawing 02-5040634A-00 (Revision 0)
- Drawing 02-5041090A-00 (Revision 0)

6.2 Traceability Requirements

All thermocouples used in this test program shall be traceable to the respective thermocouple manufacturer, with calibration certification, provided by Omega Point Laboratories.

6.3 Dimensioned Drawings

6.3.1 All test articles shall conform to the dimensioned drawings provided by FANP. All changes to these drawings shall be implemented and controlled by FANP and approved by PE. Final revisions of all drawings shall be implemented and controlled by FANP. Final revisions of all drawings shall be provided by FANP for inclusion into and use in preparing the final test report.

6.3.2 Final, dimensioned drawings depicting layout of the furnace thermocouples will be prepared by OPL, for inclusion in the final test report.

6.4 Electrical Wiring Diagrams

6.4.1 All test articles shall conform to the Electrical Wiring Diagrams provided by OPL (See figures 7.1 through 7.4 in this test plan). All changes to these diagrams shall be implemented and controlled by FANP and approved by PE. Final revisions of all diagrams shall be implemented and controlled by FANP. Final revisions of all diagrams shall be provided by FANP in this Test Plan for inclusion into and use in preparing the final test report.

6.5 Test Configurations

6.5.1 General

6.5.1.1 The test articles shall be sufficiently secured to the test deck and/or sealed by Laboratory personnel, in accordance with instructions and drawings. The test deck will consist of 8' x 13', 8" thick concrete slab, reinforced with structural steel elements sufficient to carry the load of the test items.

6.5.1.2 The concrete test slab is to be cured and conditioned to reduce the risk of spalling. Where an existing test slab is to be reused, it shall be inspected to ensure that it is in good condition. The slab will be conditioned to moisture equilibrium at indoor conditions or drier to ensure no spalling.

6.5.2 Test Articles

All test items will be constructed in accordance with drawings provided by FANP.

6.5.3 Grounding of Supports

Meggitt Safety Systems, Inc. cable supports will be grounded by attaching grounding cables on top of the slab to the through slab all thread rod which attaches the surface mounted steel plates for each of the hangers to the slab.

6.6 Thermocouple Installation

6.6.1 Furnace thermocouples shall be provided and installed in accordance with GL 86-10, Supplement 1. All thermocouples used in this test program shall be provided and installed by OPL, with QC surveillance by Laboratory personnel.

6.6.2 The measured temperature to be compared with the standard time-temperature curve is to be the average temperature obtained from the reading of thermocouples symmetrically disposed and distributed to indicate the temperature near all parts of the specimen.

6.6.3 At least three thermocouples are to be used with no fewer than five thermocouples per 100 square feet of test slab area. The junctions of the thermocouples are to be placed approximately 12 inches from the exposed surface of the test assembly.

6.6.4 Each furnace thermocouple is to be enclosed in a sealed protection tube. The exposed combined length of protection tube and thermocouple in the furnace chamber is to be not less than 12 inches.

6.6.5 The time constant of the protected thermocouple assembly is to be within the range of 5.0 to 7.2 minutes. A typical thermocouple assembly complying with this time constant requirement is fabricated by fusion-welding the twisted ends of No. 18 AWG chromel-alumel wires, mounting the leads in porcelain insulators and inserting the assembly into a standard weight ½ inch (0.84 inch outside diameter) black wrought iron, black wrought steel or Inconel pipe, and sealing the end of the pipe that is inside the furnace. The thermocouple junction is to be inside the pipe, 1/2 inch from the sealed end.

6.6.6 The temperatures are to be read at intervals not exceeding 1 minute throughout the fire test.

6.6.7 The temperature of the furnace is to be controlled so that the area under the measured time-temperature curve, obtained by averaging the results from the thermocouple readings, is within 5 percent of the corresponding area under the standard time-temperature curve at the end of 3 hours.

6.7 Preburn Inspection

6.7.1 Prior to the commencement of the fire endurance test, a thorough check of the test assembly and associated equipment (including data recording equipment, megohmeter for Megger testing, leakage current testing equipment and conductor resistance testing equipment) and completion of applicable Laboratory QA/QC checklists shall be performed and documented by the testing laboratory. This will include the completion of the Test Article Attribute Checklist (FANP Drawing 02-5040634A-00).

6.7.2 Written approval of the construction, assembly, installation and instrumentation will be supplied by FANP and OPL prior to performance of the fire exposure test (a sign-off sheet for this purpose will be supplied by the Laboratory).

7.0 PROCEDURE

7.1 General

7.1.1 The testing sequence will be as follows:

7.1.1.1 After construction and connection of the test assembly and prior to the start of the fire endurance test: Megger testing data collection shall be conducted in accordance with Section 7.2. Leakage current monitoring and data collection shall be performed in accordance with Section 7.3. Conductor resistance data collection shall be performed in accordance with Section 7.4.

7.1.1.2 During the conduct of the 3-hour fire endurance test, Megger testing data collection shall be performed at approximately 30 minutes, 90 minutes and 150 minutes during the fire test. The test may be extended past 3-hours as necessary to finalize the data collection. Megger testing data collection shall be conducted in accordance with Section 7.2. The conductors designated to be energized will be energized whenever Megger testing is not in progress. Leakage current monitoring and data collection shall be performed in accordance with Section 7.3.

7.1.1.3 At the completion of the fire endurance test and after the cables are de-energized, the test assembly shall be subjected to a hose stream test in accordance with Section 7.5.

7.1.1.4 Immediately after the hose stream test, Megger testing data collection shall be conducted in accordance with Section 7.2.

7.1.1.5 After the hose stream test, and after the test assembly has been allowed time to cool and dry the following monitoring/data collection shall be performed: Megger testing data collection shall be is conducted in accordance with Section 7.2. Leakage current monitoring and data collection shall be performed in accordance with Section 7.3. Conductor resistance data collection shall be performed in accordance with Section 7.4.

7.2 Megger Testing Data Collection

7.2.1 The Megger testing is to be performed with a megohmeter. The power cable (4/C #8) shall be tested at 1500 VDC. The control cables (7/C #10, 8/C #12 and 7/C #14) shall be tested at 500 VDC.

7.2.2 The Megger testing is to be performed on each adjacent conductor-to-conductor path and on each conductor-to-ground path.

7.2.3 The Megger testing data collection results shall be corrected to reflect only that portion of insulation resistance which is contributed to by the Meggitt Safety Systems, Inc. cable.

7.2.4 The results from each of the Megger testing data collections along with a detailed explanation of the data correction and the final corrected results shall be documented in the final test report.

7.3 Leakage Current Data Collection

7.3.1 Leakage current data collection will be performed prior to the beginning of the Fire Endurance Test, during the Fire Endurance Test when Megger testing is not being performed and after the hose stream test when the test assembly has cooled and dried. One conductor in each of the Meggitt Safety Systems, Inc. cables shall be energized from an AC electrical supply source. The energized conductor will not be terminated. The switch for the conductor between the Megger point and the resistor will be left open.

7.3.2 Leakage current data collection will be performed at intervals not exceeding 1 minute.

7.3.3 The 4/C #8 power cable is to be energized from a 480 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.1 for the electrical connection diagram.

7.3.4 The 8/C # 12 control cable is to be energized from a 120 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.2 for the electrical connection diagram.

7.3.5 The 7/C # 14 control cable is to be energized from a 120 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.3 for the electrical connection diagram.

7.3.6 The 7/C # 10 control cable is to be energized from a 120 VAC electrical supply source. The adjacent conductors of this cable shall be connected in such a manner as to monitor for leakage current. Refer to figure 7.4 for the electrical connection diagram.

7.3.7 The non-energized conductors adjacent to the energized conductor in each cable shall be monitored for voltage drop across a resistor to detect current leakage to each conductor.

7.3.8 All non-energized conductors which are not adjacent to the energized conductor in each cable will be tied together and monitored for voltage drop across a resistor as a group to detect current leakage.

7.3.9 Resistors will be sized to result in a maximum current flow of equal to or less than 1.0 amp.

7.3.10 The results from each leakage current data collection along with a detailed explanation of the data correction shall be documented in the final test report.

7.4 Conductor Resistance Data Collection

7.4.1 Conductor resistance data collection will occur prior to the beginning of the Fire Endurance and after the hose stream test when the test assembly has cooled and dried. Conductor resistance shall be measured for each conductor in each cable. Conductor resistance will be measured utilizing an Ohmmeter.

7.4.2 Perform correction to eliminate any resistance which is contributed from sources other than the Meggitt Safety Systems, Inc. cable conductors.

7.4.3 The results from each conductor resistance data collection along with a detailed explanation of the data correction and the final corrected results shall be documented in the final test report.

7.5 Water Hose Stream Test

7.5.1 Immediately following the fire endurance test, a hose stream test will be performed in accordance with USNRC Generic Letter 86-10, Supplement 1, Enclosure 1, Section VI. The hose stream will be "applied at random to all exposed surfaces of the test specimen through a 1-1/2" fog nozzle set at a discharge angle of 30 degrees with a nozzle pressure of not less than 75 psi and a minimum discharge pressure of 75 gpm with the tip of the nozzle at a maximum of 5 feet from the test specimen. Duration of the hose stream application is 5 minutes." Prior to the hose stream application, the laboratory will ensure the correct angle spray pattern, pressure and flow is being achieved through calibrated gauges and other equipment as required. This is to be documented by OPL.

7.6 Fire Endurance Test

7.6.1 The test equipment and test assembly are to be protected from any condition of wind or weather that influences the test results. The air temperature at the beginning of the test is to be within the range of 50 to 90°F, unless otherwise approved by PE.

7.6.2 The test item shall be exposed to the standard time/temperature curve found in ASTM E119 (88) for a minimum period of one hundred eighty (180) minutes, unless directed by FANP to conclude the test.

7.6.3 Furnace pressure shall be controlled to be as nearly neutral as possible with respect to the surrounding laboratory atmosphere, measured at the vertical mid-point of the test specimen.

7.6.4 The testing organization shall adapt their testing procedures to assure the fire test complies with the requirements established in all referenced portions of referenced standards. Any changes, revisions, or deviations required to comply with this requirement shall be documented and properly justified and included as a part of the final test report.

7.7 Furnace Thermocouple monitoring

7.7.1 During the fire exposure period, the thermocouples will be scanned at one minute intervals or less. Data storage for reporting purposes will be at one minute intervals, although the furnace thermocouples will be scanned and displayed every 15 seconds, to allow close control of the furnace. The test report will contain thermocouple data at one minute intervals.

7.7.2 Monitoring of all thermocouples will be terminated upon completion of the fire endurance test.

Figure 7.1

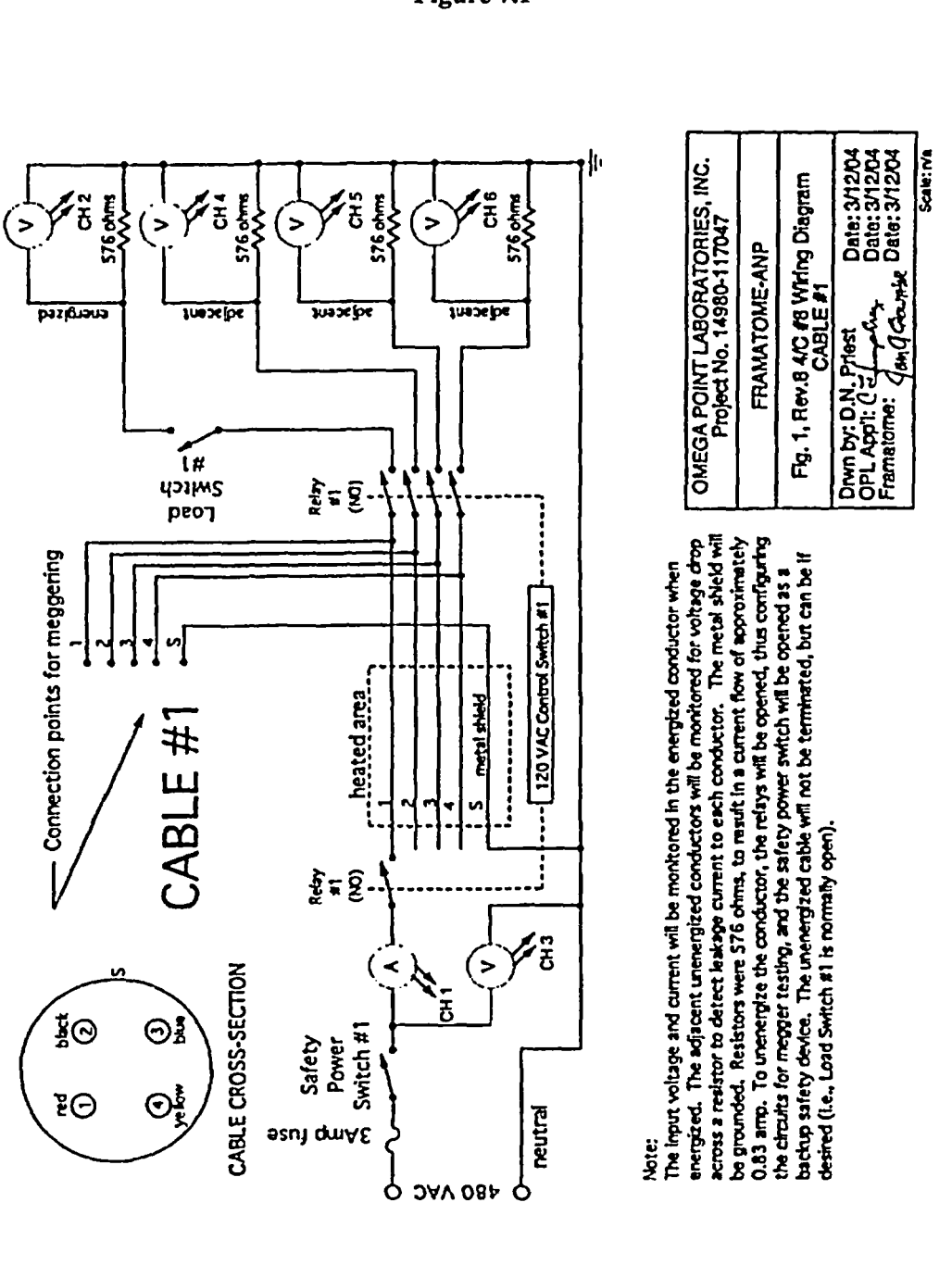

CABLE #1
Connection points for meggering
CABLE CROSS-SECTION
red
black
blue
yellow
S
CH 1
CH 2
CH 3
CH 4
CH 5
CH 6
576 ohms
energized
adjacent
heated area
metal shield
Load Switch #1
Relay #1 (NO)
120 VAC Control Switch #1
Safety Power Switch #1
3Amp fuse
480 VAC
neutral
OMEGA POINT LABORATORIES, INC.
Project No. 14980-117047
FRAMATOME-ANP
Fig. 1, Rev.8 4/C #8 Wiring Diagram
CABLE #1
Drwn by: D.N. Priest Date: 3/12/04
OPL Appl: Date: 3/12/04
Framatome: Date: 3/12/04
Scale: n/a
Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 576 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #1 is normally open).

Figure 7.2

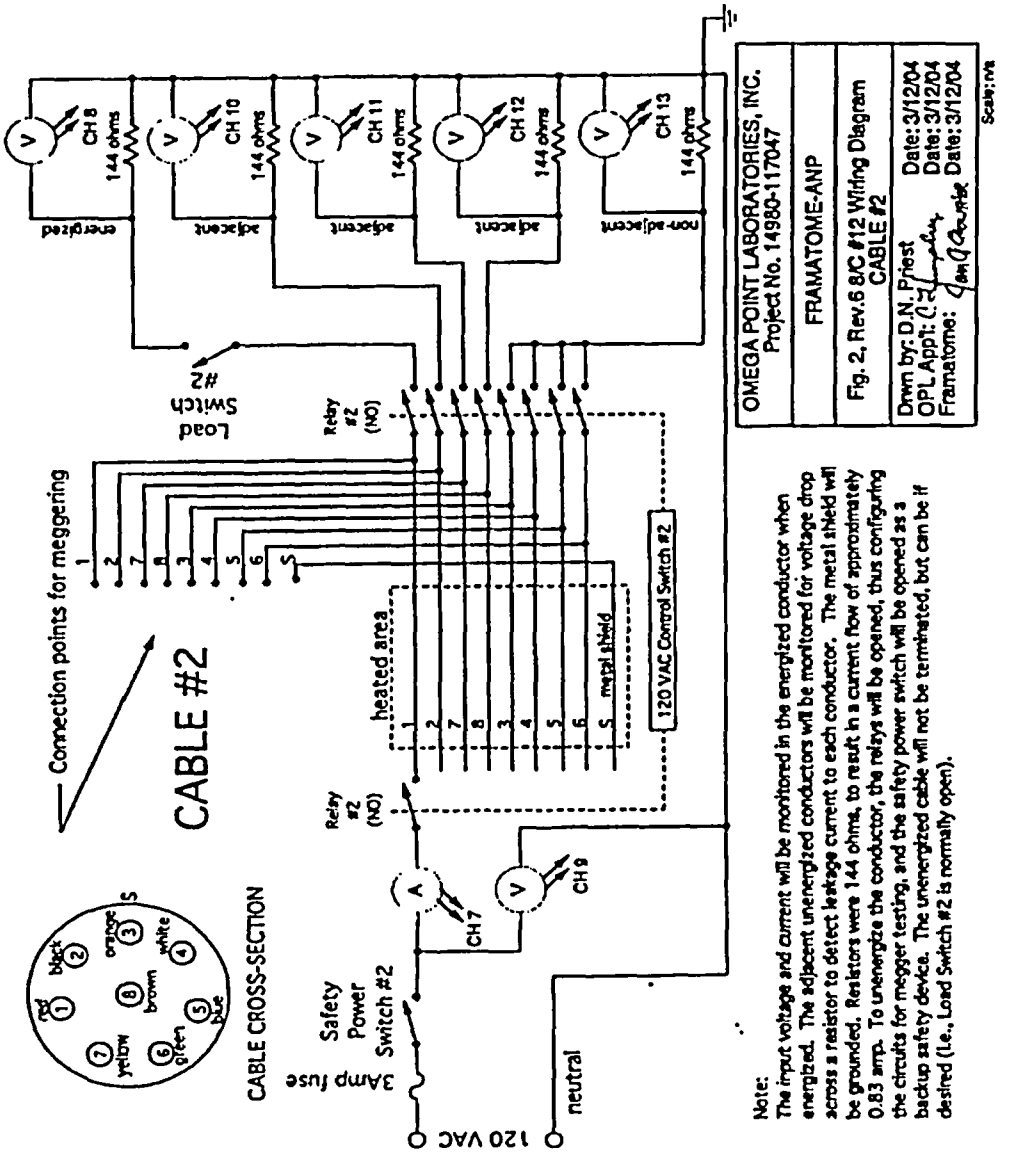

CH 8
144 ohms
CH 10
144 ohms
CH 11
144 ohms
CH 12
144 ohms
CH 13
144 ohms
energized
adjacent
adjacent
adjacent
non-adjacent
Load Switch #2
Relay #2 (NO)
Connection points for meggering
CABLE #2
heated area
metal shield
120 VAC Control Switch #2
Relay #2 (NO)
CH 7
CH 9
Safety Power Switch #2
3Amp fuse
120 VAC
neutral
CABLE CROSS-SECTION
red
black
orange
white
brown
blue
green
yellow
OMEGA POINT LABORATORIES, INC.
Project No. 14980-117047
FRAMATOME-ANP
Fig. 2, Rev. 6 8/C #12 Wiring Diagram
CABLE #2
Drwn by: D.N. Priest Date: 3/12/04
OPL Appr: Date: 3/12/04
Framatome: Date: 3/12/04
Scale: n/a
Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #2 is normally open).

Figure 7.3

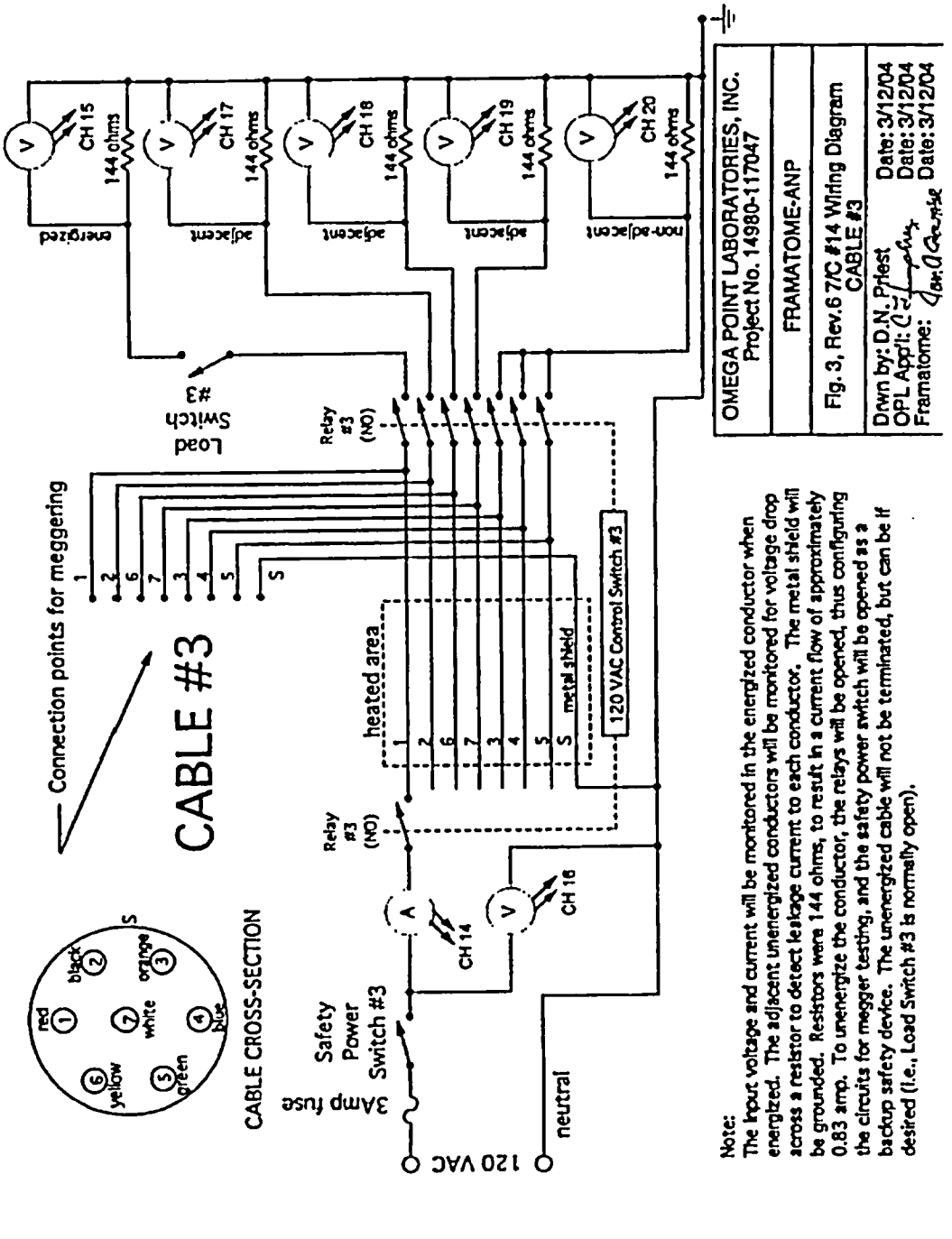
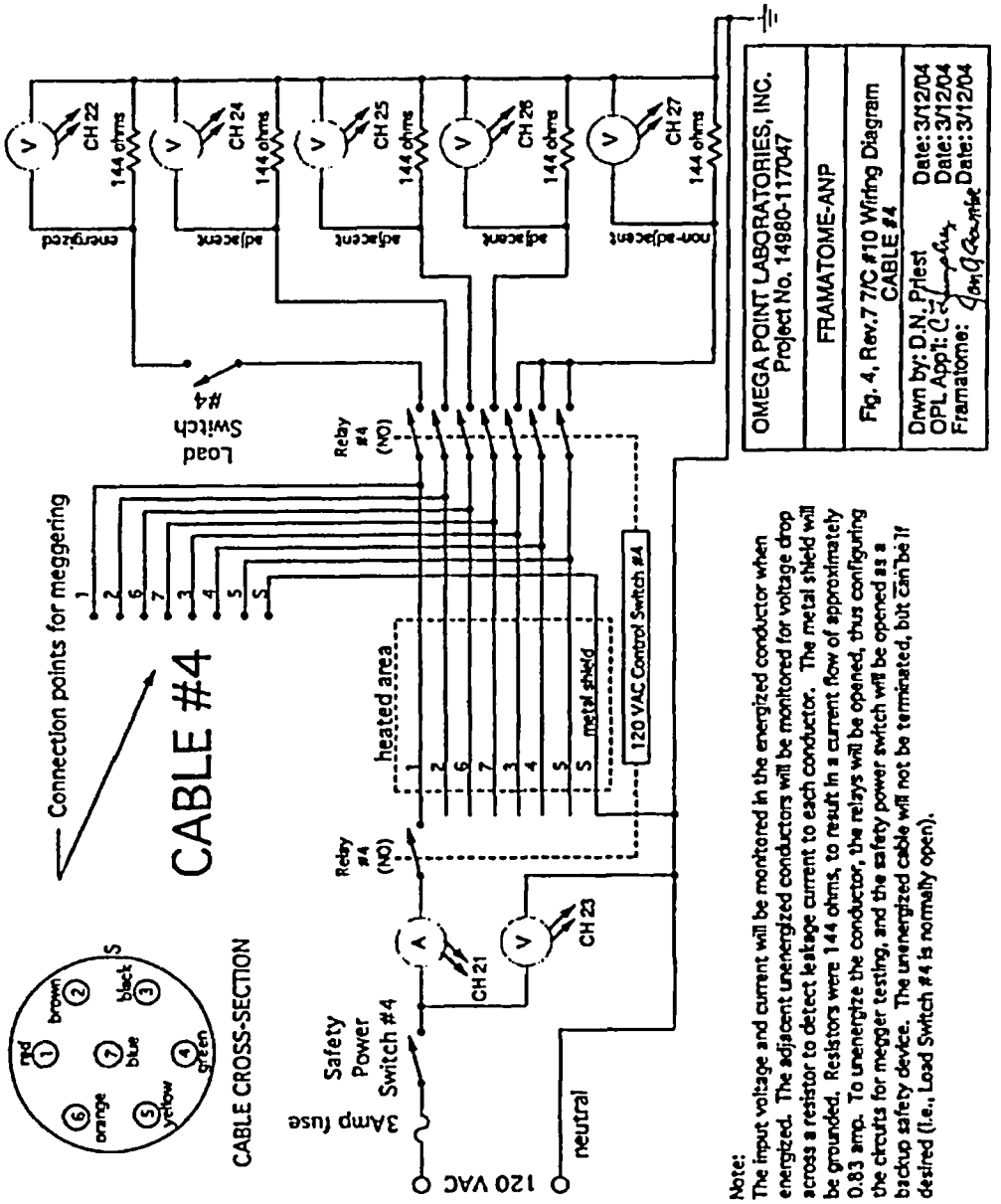

OMEGA POINT LABORATORIES, INC.
Project No. 14980-117047
FRAMATOME-ANP
Fig. 3, Rev.6 7/C #14 Wiring Diagram
CABLE #3
Drwn by: D.N. Priest Date: 3/12/04
OPL Appr: Date: 3/12/04
Framatome: Date: 3/12/04
CH 15
CH 17
CH 18
CH 19
CH 20
144 ohms
energized
adjacent
non-adjacent
Load Switch #3
Relay #3 (NO)
Connection points for meggering
CABLE #3
heated area
metal shield
120 VAC Control Switch #3
CH 14
CH 16
Safety Power Switch #3
3Amp fuse
120 VAC
neutral
CABLE CROSS-SECTION
red
black
orange
white
blue
green
yellow
Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #3 is normally open).

Figure 7.4


CH 22
144 ohms
energized
CH 24
144 ohms
adjacent
CH 25
144 ohms
adjacent
CH 26
144 ohms
adjacent
CH 27
144 ohms
non-adjacent
Load Switch #4
Relay #4 (NO)
Connection points for meggering
CABLE #4
heated area
metal shield
120 VAC Control Switch #4
Relay #4 (NO)
CH 21
CH 23
Safety Power Switch #4
3Amp fuse
120 VAC
neutral
CABLE CROSS-SECTION
red
brown
black
blue
green
orange
yellow
OMEGA POINT LABORATORIES, INC.
Project No. 14980-117047
FRAMATOME-ANP
Fig. 4, Rev.7 7/C #10 Wiring Diagram
CABLE #4
Drwn by: D.N. Priest Date: 3/12/04
OPL Appr: Date: 3/12/04
Framatome: Date: 3/12/04
Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #4 is normally open).

8.0 FIRE TEST REPORT

8.1 The Laboratory will submit a report on the results of the test including whether the acceptance criteria for fire test were met. Initially a DRAFT report will be sent within 14 days of test completion for one set of consolidated review comments by PE and FANP.

8.2 The Laboratory will assemble the final test report, containing the collected data and required quality control documentation. Five (5) hard copy sets of the final report along with (5) CD's of test reports will be provided to FANP. The CD's will contain the test report in pdf format, all test data in Excel® format and all photographs (whether or not they were selected for use in the final report) in high resolution jpeg format.

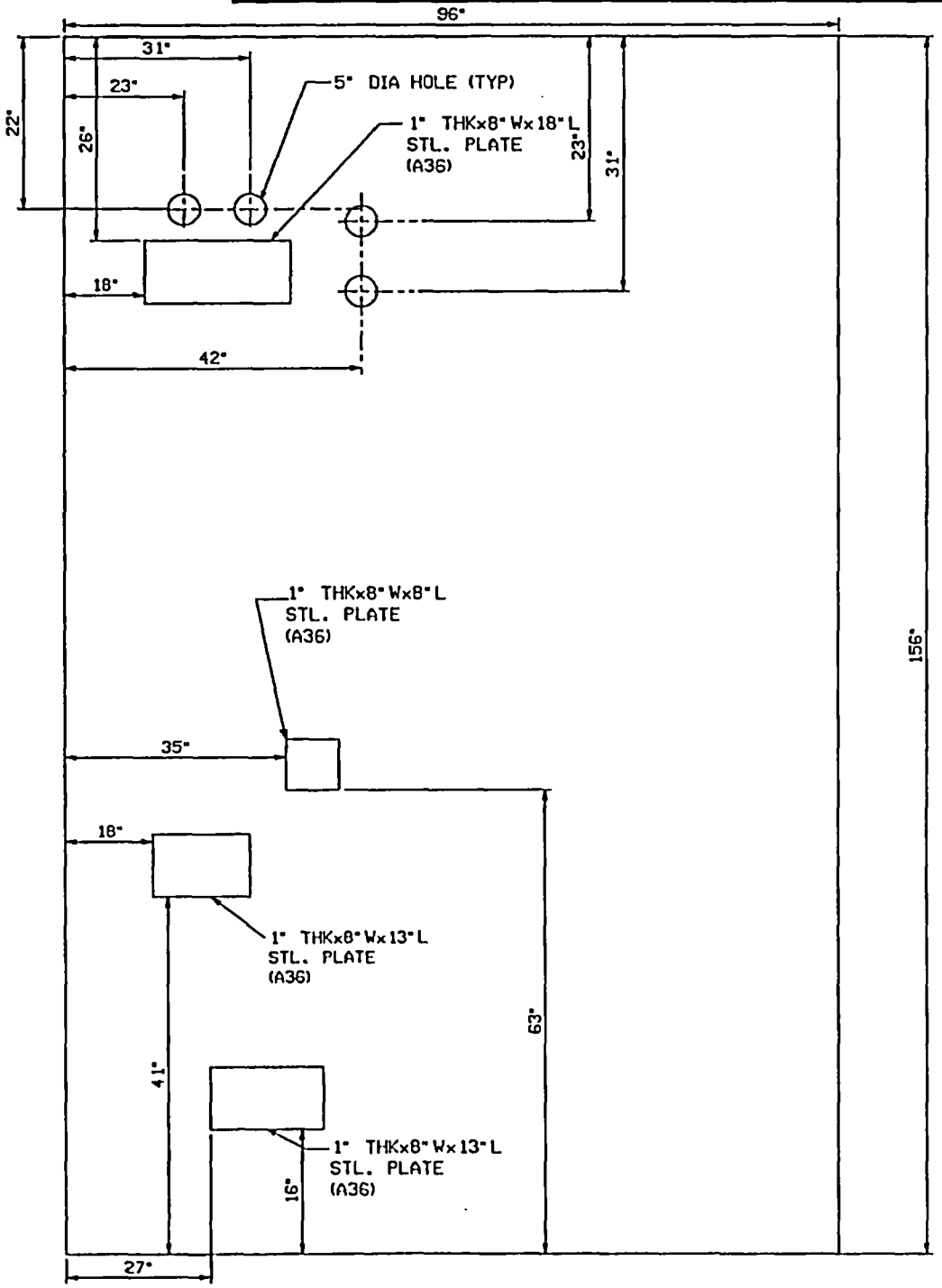
8.3 The test report shall be prepared in sufficient detail to summarize the total testing activity. The report shall include as a minimum:

a) Identification of the testing laboratory and identification of the employer of the personnel who witnessed the preparation of the test samples
b) A description of the assembly, materials and installation of the fire resistive cable including drawings depicting the geometry and location of the fire resistive cable within the test assembly.
c) The type of fire resistive cable including description and manufacturers part number.
d) Complete description of the electrical circuit.
e) A record of the test instruments used and calibration verification.
f) A record of the voltage and current applied to the fire resistive cable.
g) The temperature of the furnace during the fire test.
h) A description of the equipment used for the hose stream test.
i) A record of the hose stream test.
j) A record of the Megger test measurements and the elapsed time between the end of the hose stream test and the beginning of the Megger test.
k) A record of the leakage current data collection.
l) Observations on the behavior of the cable during the fire endurance test and during the hose stream test.
m) Observation on the behavior of the supports and tube track during the fire endurance test and during the hose stream test.
n) A record of the conductor resistance data collected.

FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	
0	ORIGINAL ISSUE	12/17/03	CA BANNING	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

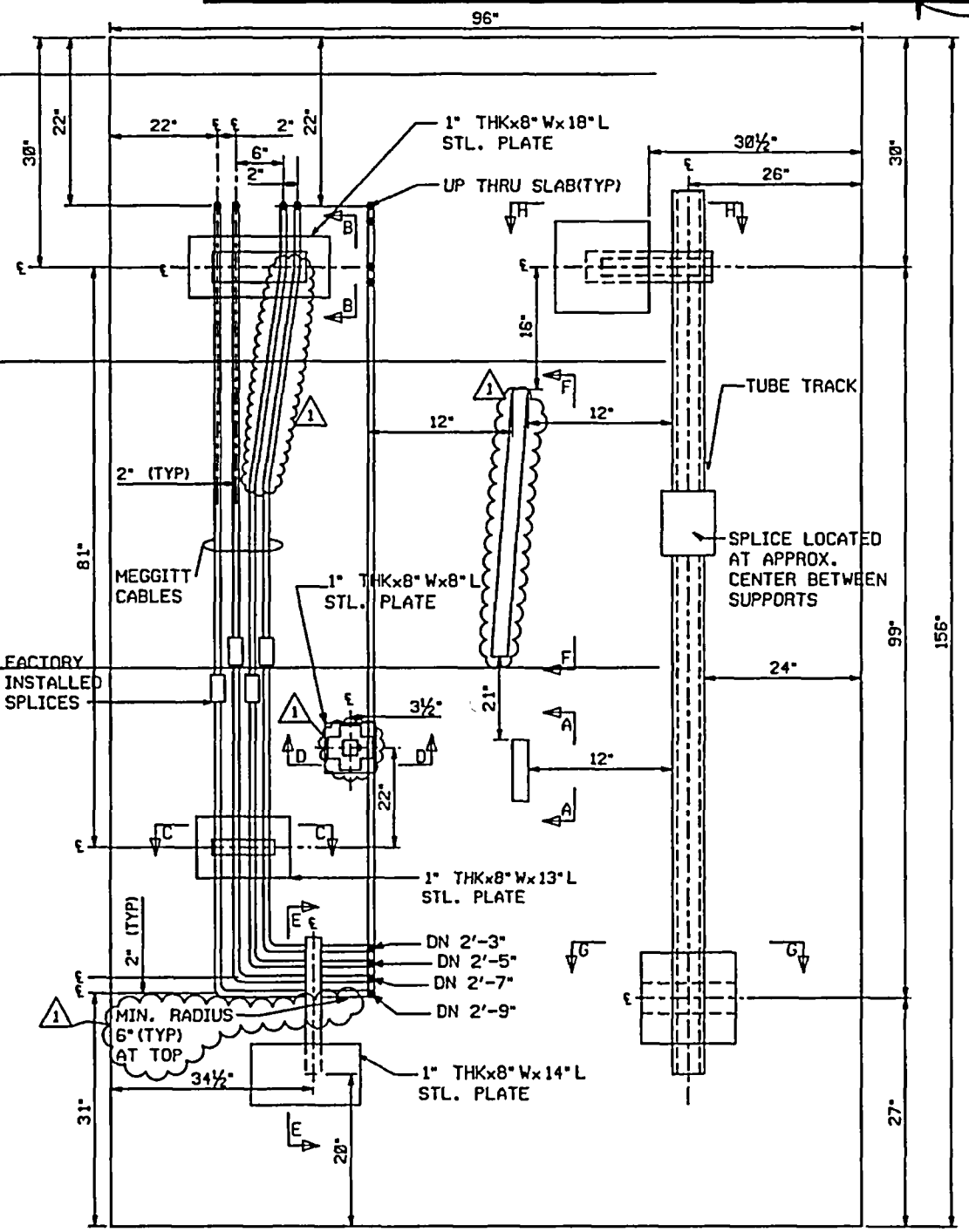


DRAWN BY K GROSZEK	CHECKED BY JOHN G. CROWTHER		
PASSED BY R.L. DIBLE	APPROVED BY CA Banning	PROGRESS ENERGY MEGGITT CABLE TEST TEST SLAB PLAN VIEW	SCALE NONE / DATE 12/17/03
			DWG. NO. 02-5038067A-00
			CAD FILE 5038067 .DGN

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	12/17/03	CABanning	
1	INCORPORATE AS BUILT CONDITION	5/10/04	CABanning	

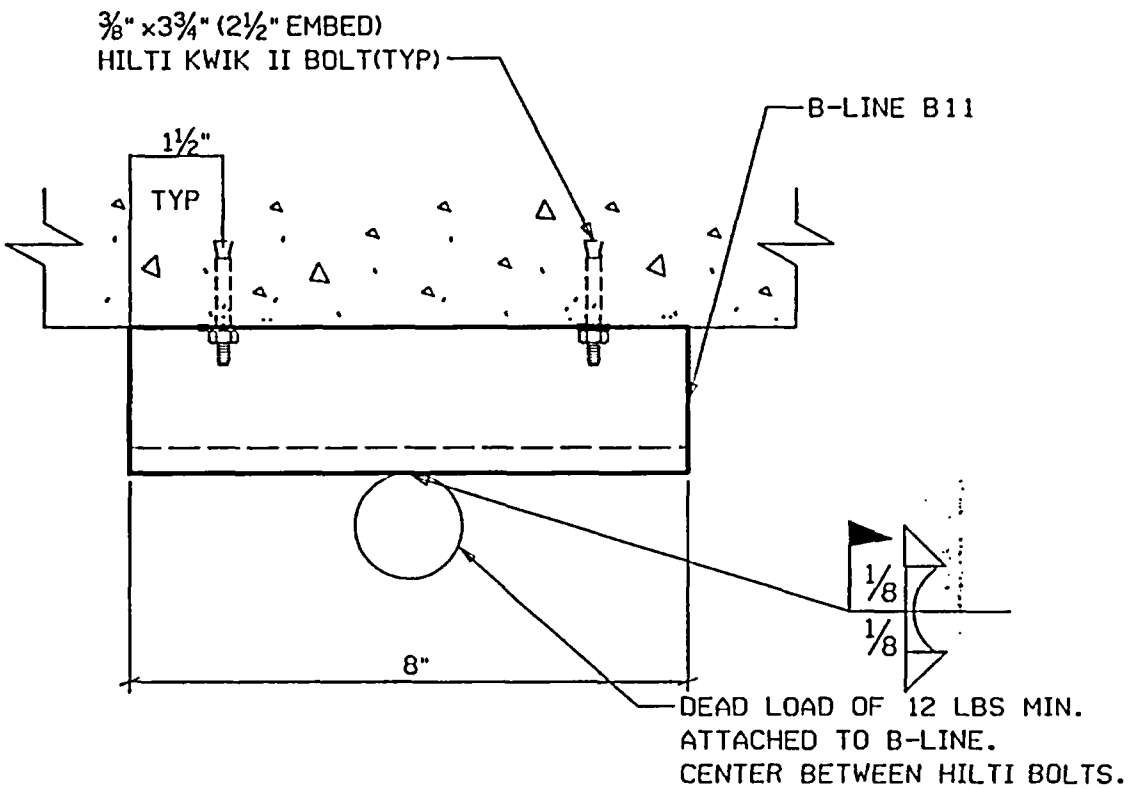


DRAWN BY K GROSZEK	CHECKED BY JOHN G. CROWTHER		
PASSED BY R L DIBLE	APPROVED BY CABanning	PROGRESS ENERGY MEGGITT CABLE TEST PLAN VIEW BELOW SLAB	SCALE NONE / DATE 12/17/03
			DWG. NO. 02-5038071A-01
			CAD FILE 5038071 .DGN

FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	12/17/03	[illegible]	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



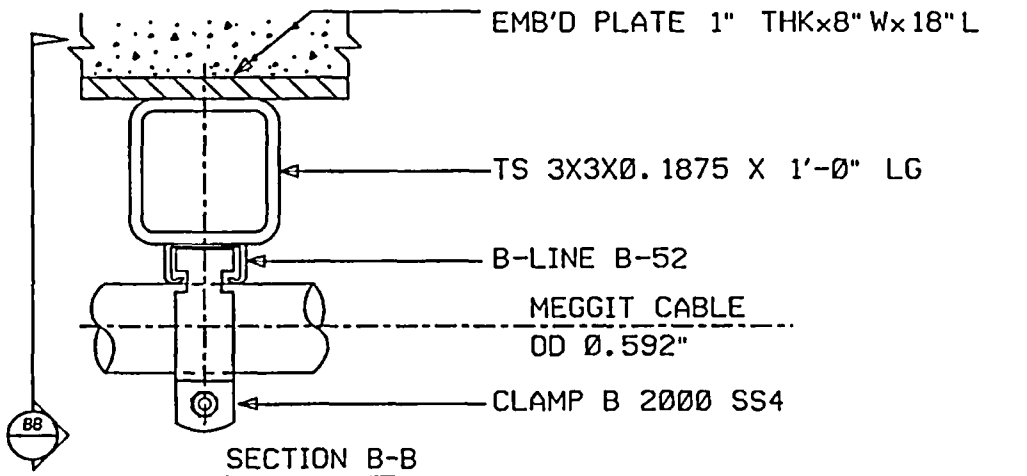
SECTION A-A

DRAWN BY K GROSZEK	CHECKED BY [illegible]		
PASSED BY R.L.DIBLE	APPROVED BY C.A. Banning	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION A-A	SCALE NONE / DATE 12/17/03
			DWG. NO. 02-5038072A -00
			CAD FILE 5038072 .DGN

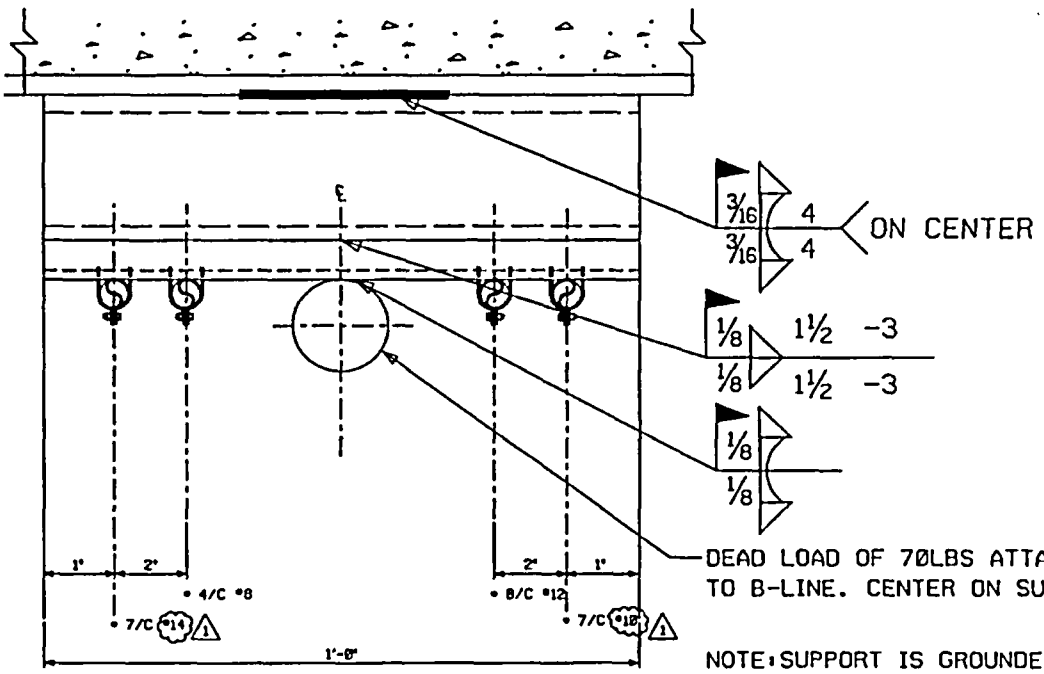
FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	12/17/03	C. BANNING	
1	INCORPORATED DESIGN CHANGES	2/27/04	CABanning	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



SECTION B-B



SECTION BB-BB

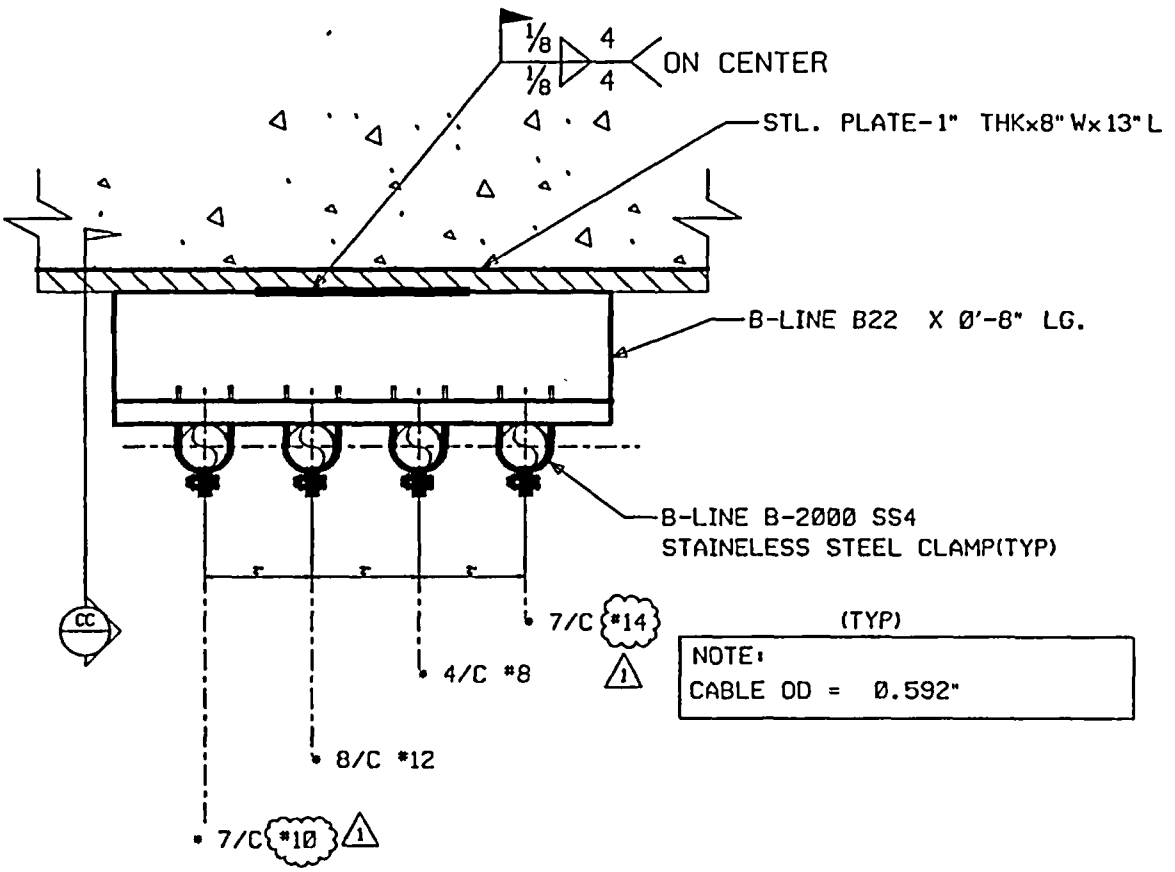
NOTE: SUPPORT IS GROUNDED BY ATTACHING GROUND CABLES ON TOP OF THE TEST SLAB TO THE ATR WHICH ATTACHES THE EMBED PLATE TO THE TEST SLAB.

DRAWN BY K GROSZEK	CHECKED BY JOHN G. CROWTHER		
PASSED BY R.L. DIBBLE	APPROVED BY CABanning	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION B-B	SCALE NONE / DATE 12/17/03
			DWG. NO. 02-5038073A-01
			CAD FILE 5038073 .DGN

FRAMATOME ANP

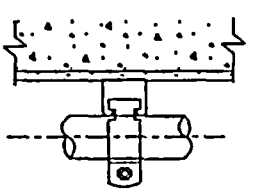
REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE		CABanning	
1	INCORPORATED DESIGN CHANGES	2/27/04		

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



NOTE:
CABLE OD = 0.592"

SECTION C-C



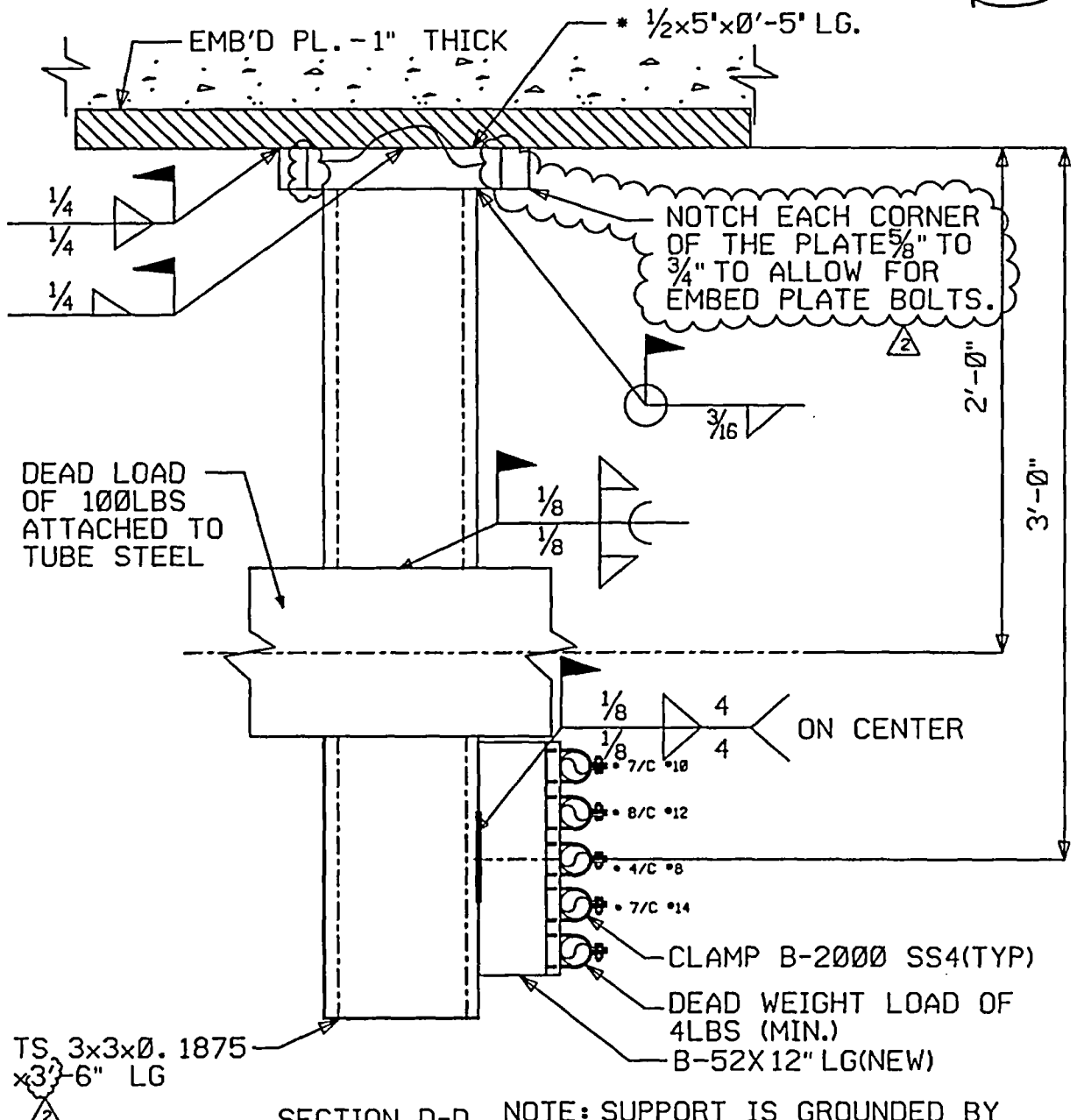
SECTION CC-CC

DRAWN BY K GROSZEK	CHECKED BY JOHN G. CROWTHER		
PASSED BY R L DIBLE	APPROVED BY	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION C-C	SCALE NONE / DATE 12/17/03
			DWG. NO. 02-5038074A-01
			CAD FILE · 8038074 .DGN

A FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	N F
0	ORIGINAL ISSUE	12/17/03	C. BANNING	
1	INCORPORATED DESIGN CHANGES	2/27/04	C. BANNING	
2	INCORPORATE AS BUILT CONDITIONS	5/10/04	C.A Banning	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



SECTION D-D

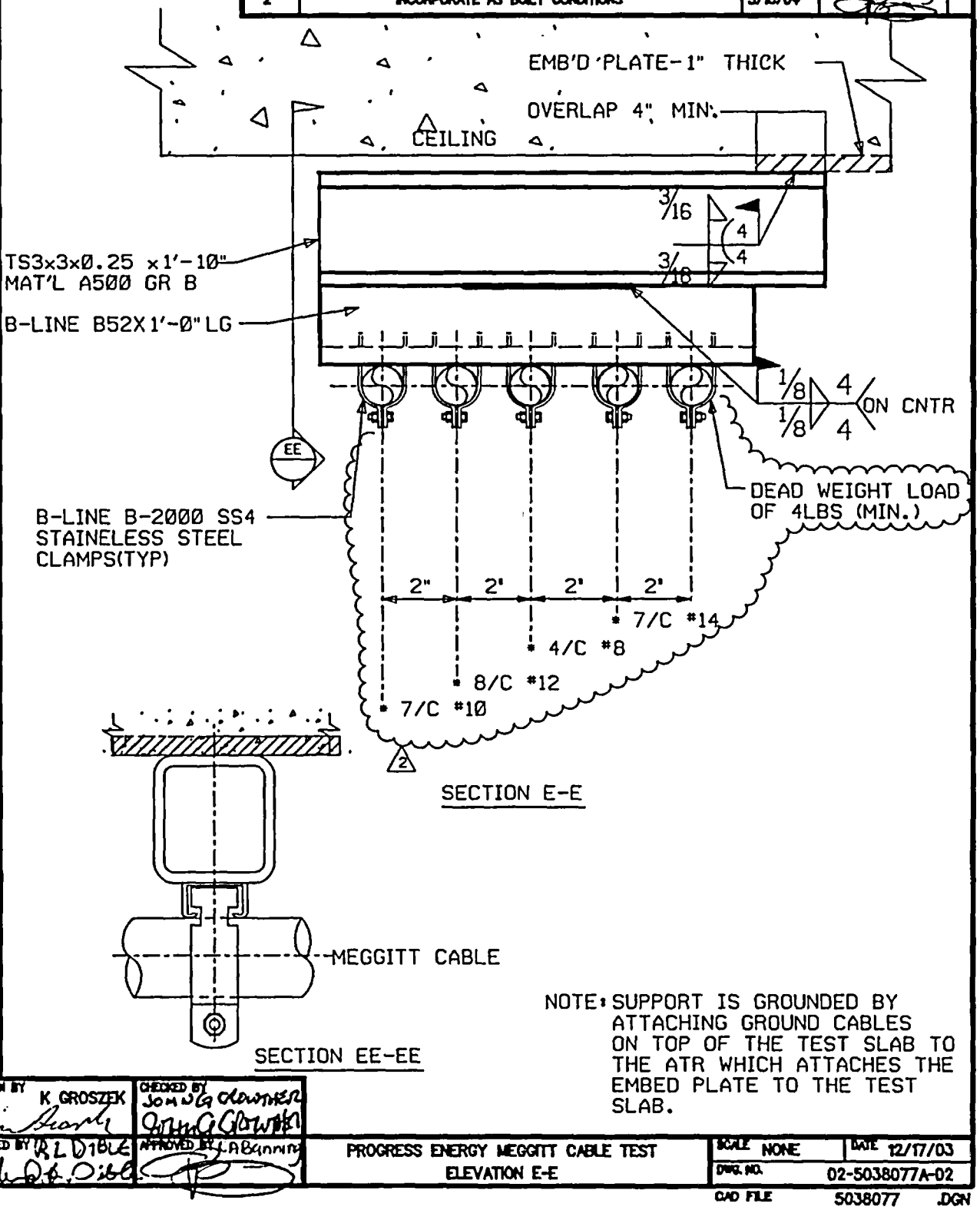
NOTE: SUPPORT IS GROUNDED BY ATTACHING GROUND CABLES ON TOP OF THE TEST SLAB TO THE ATR WHICH ATTACHES THE EMBED PLATE TO THE TEST SLAB.

DRAWN BY K GROSZEK	CHECKED BY John G Crowther	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION D-D	SCALE NONE / DATE 12/17/03
PASSED BY R. L. Bible	APPROVED BY C A Banning		DWG. NO. 02-5038075A-02
			CAD FILE 5038075 .DGN

FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	NF
0	ORIGINAL ISSUE	12/17/03	C. BANNING	
1	INCORPORATED DESIGN CHANGES	2/27/04	C. BANNING	
2	INCORPORATE AS BUILT CONDITIONS	5/10/04	C.A. Banning	

THE DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



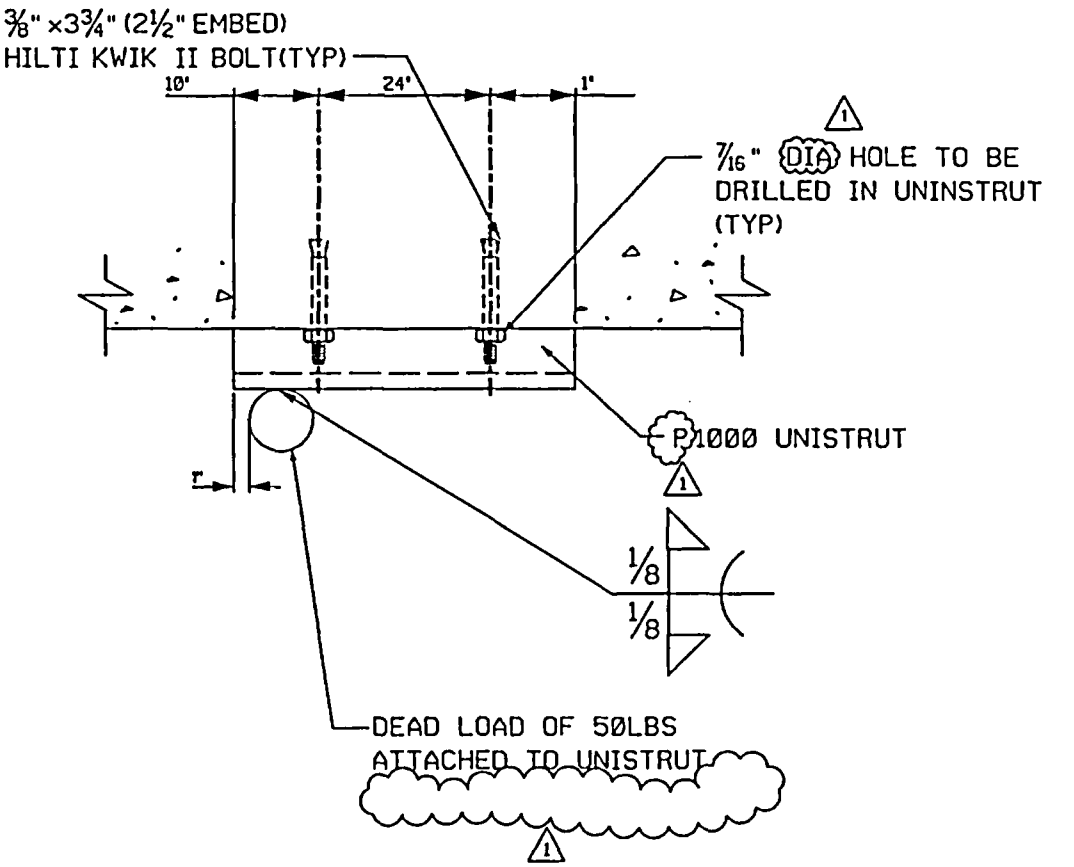
NOTE: SUPPORT IS GROUNDED BY ATTACHING GROUND CABLES ON TOP OF THE TEST SLAB TO THE ATR WHICH ATTACHES THE EMBED PLATE TO THE TEST SLAB.

DRAWN BY K. GROSZEK	CHECKED BY John J. Gawthrop	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION E-E	SCALE NONE / DATE 12/17/03
PASSED BY R L Dible	APPROVED BY C.A. Banning		DWG. NO. 02-5038077A-02
			CAD FILE 5038077 .DGN

FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	12/17/03	C.A. BAMMING	
1	INCORPORATED DESIGN CHANGES	2/27/04	C.A. Bamming	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

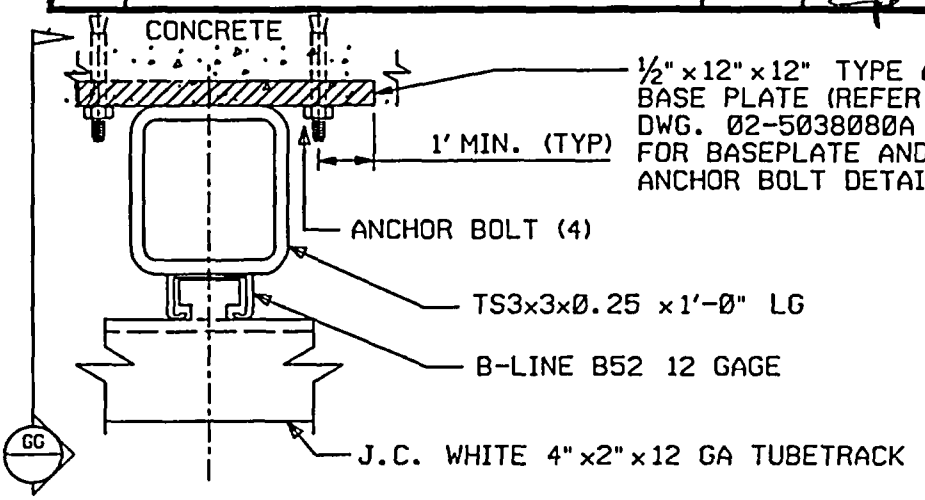


SECTION F-F

DRAWN BY K GROSZEK	CHECKED BY John G. Crawthee		
PASSED BY R L Dible	APPROVED BY C A Bamming	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION F-F	SCALE NONE / DATE 12/17/03
			DWG. NO. 02-5038078A-01
			CAD FILE 5038078 .DGN

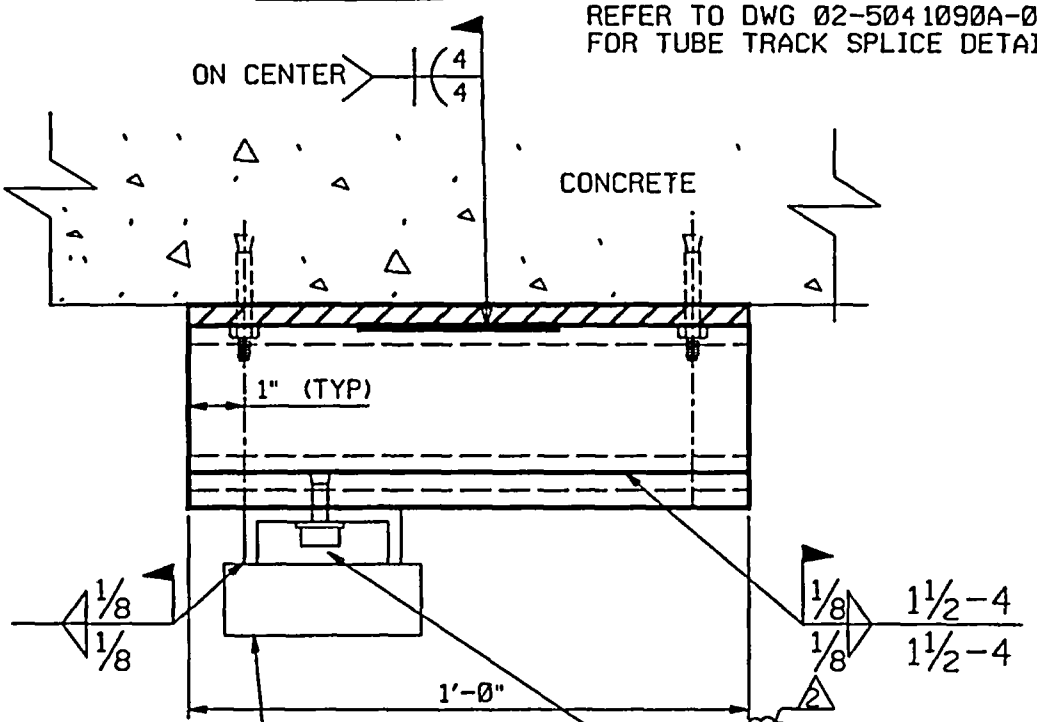
FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	12/17/03	CA BANNING	
1	INCORPORATED DESIGN CHANGES	2/27/04	CA BANNING	
2	INCORPORATE AS BUILT CONDITIONS	5/10/04	CA Banning	



SECTION G-G

NOTE:
REFER TO DWG 02-5041090A-00 FOR TUBE TRACK SPLICE DETAIL



DEAD LOAD OF 30LBS ATTACHED TO TUBE TRACK AT SUPPORT

½-13x¾" (MIN.) HEX HEAD BOLT AND ½" LOCK WASHER W/ 1/2 -13 B-LINE SPRING NUT

SECTION GG-GG

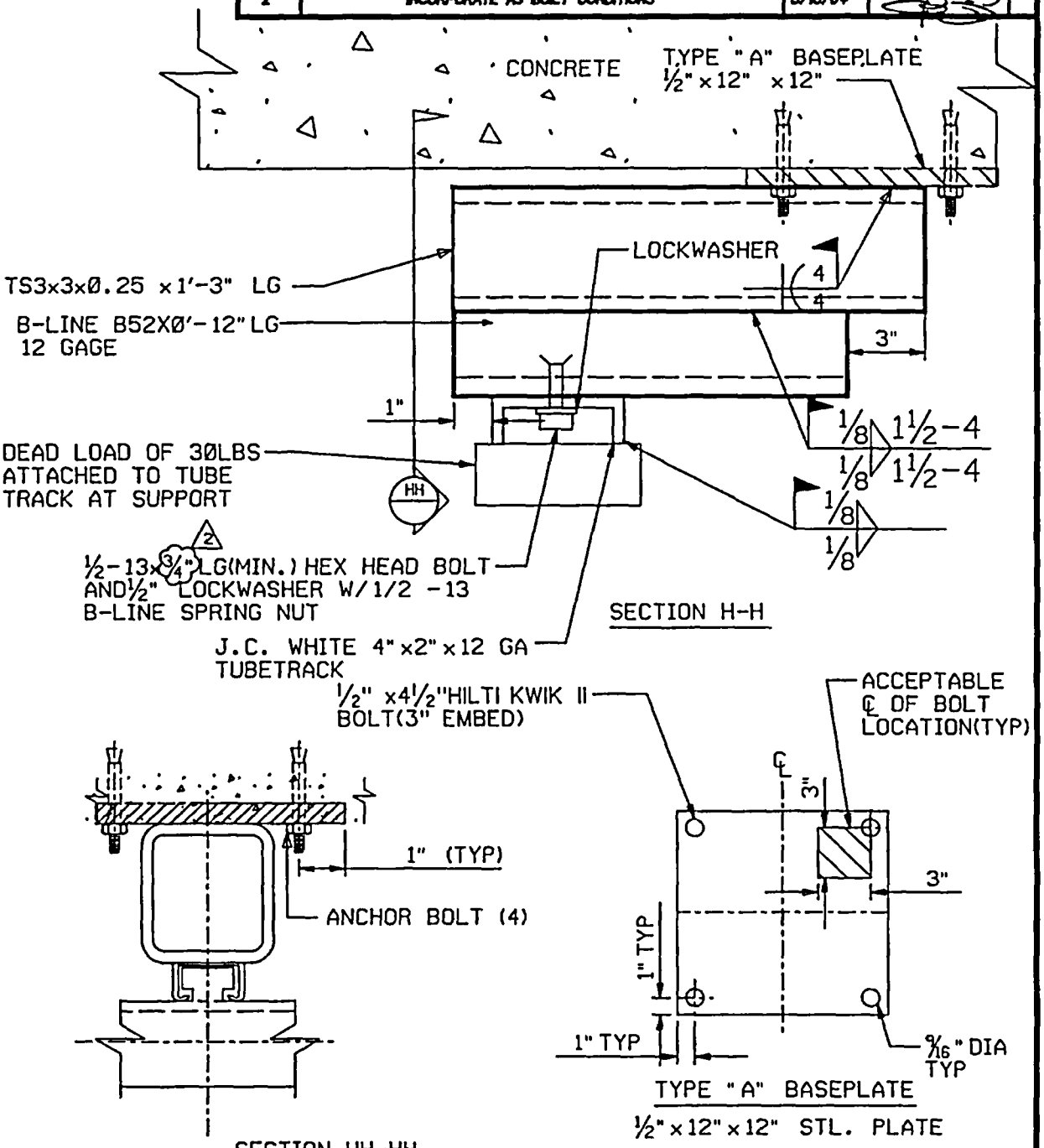
DRAWN BY K GROSZEK	CHECKED BY John G Crowther		
PASSED BY R.J. DIBLE	APPROVED BY CA Banning	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION G-G	SCALE NONE / DATE 12/17/03
			DWG. NO. 02-5038079A-02
			CAD FILE 5038079 .DGN

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.

FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	12/17/03	C. BANNING	
1	INCORPORATED DESIGN CHANGES	2/27/04	C. BANNING	
2	INCORPORATE AS BUILT CONDITIONS	5/10/04	CABanning	



NOTE:
REFER TO DRAWING 02-5041090A FOR TUBE TRACK SPLICE DETAIL.

DRAWN BY K GROSZEK	CHECKED BY JOHN G CROWTHER	PROGRESS ENERGY MEGGITT CABLE TEST ELEVATION H-H	SCALE NONE / DATE 12/17/03
PASSED BY R L DIBLE	APPROVED BY CABANNING		DWG. NO. 02-5038080A-02
			CAD FILE 5038080 .DGN

GENERAL NOTES

1. Meggitt Si 2400 Cable Installation:

   a) Cables must be uncoiled as the cable is fed out along the routing path. Whether on a reel or in factory coils, the cable must be unrolled in a tangential (circular) manner. DO NOT UNCOIL BY PULLING ON THE END AND HELICALLY STRETCHING.
   b) Minimum bend radius is 6 inches. At least one bend shall be installed with a minimum bend radius as indicated on Drawing No. 02-5038071A.
   c) Each cable contains a factory installed splice located approximately 12' from one end of the cable sample. The factory installed splice shall be located between Section B-B (Drawing 02-5038073A) and Section C-C (Drawing 02-5038074A) supports at approximately the midpoint between the supports.
   d) Each cable has factory installed terminations at each end of the cable. Each termination has pigtails approximately 3' long.
   e) Repeated bending and straightening of the cable should be avoided.
   f) Any smooth surface or appropriate radius may be used to form the cable. EMT tube benders are suitable. In many cases the cable can be hand formed.
   g) Smooth contour changes such as dents, digs, ripples, or wrinkles are acceptable.
   h) Gouges or cuts in the cable sheath which exceed 10% of cable wall thickness may be cause for rejection. Wall thickness is nominally .015".
   i) Outside diameter for all Meggitt cables is 0.592"

2. Installation of Hilti Kwik Bolt Type II shall be in accordance with manufacturer requirements. Holes are drilled into the concrete using carbide-tipped masonry drill bits complying with ANSI B212.15-1994. The drill bit diameter must be the same as that of the anchors. The drilled holes must exceed the depth of anchor embedment by at least one anchor diameters to permit overdriving of anchors and to provide a dust free area. The anchor must be hammered into the predrilled hole to the minimum required embed depth. At least six threads are to be below the surface. Embed must not exceed the values shown on 02-5038072A, 02-5038078A, 02-5038079A and 02-50380080A. The nut must be tightened against the washer until torque values are attained. Torque values for 3/8 inch Hilti bolts is 25-26 ft-lbs and 65-68 ft-lbs for 1/2 inch Hilti bolts.

3. The Meggitt cable shall be attached to the B-Line strut using B-Line B2000 SS4 clamps. Place the clamp halves around the item to be secured to strut with the hooks on the edges of the clamp catching on the underside of the strut lips. Tighten the square nut finger-tight onto the machine screw. While preventing the square nut from rotating, tighten the machine screw until the clamp ears are parallel, approximately 1/8" apart. If the object being clamped is larger than the 0.577 inch o.d. this will produce a gap larger than the 1/8 inch. The applied torque when the ears are approximately parallel should be approximately 50 lbf-in. Keep the clamp a minimum of ½ inch from the end of the strut.

4. Installation of J.C. White tube track:

   a) Tube track shall be installed to B-Line B52 strut as shown on Drawings 02-5038079A and 02-5038080A utilizing a ½-13 x ¾" hex head bolt, 1/2 inch lock washer and a ½ - 13 B-Line Spring Nut. Supports spacing shall be 8' 3" which is the maximum allowable span.
   b) 3/8" pipe (2 lengths) shall be installed in the tube track to simulate the weight of 2 Meggitt Cables. Pipe will be held in place in the tube track using J.C. White 3-Dir. Tube Clamps. Maximum spacing for the tube clamps is 6' and the installation shall have this maximum 6' spacing at one location (min.) Add shim at clamp/pipe interface to ensure pipe is securely fastened by clamp.
   c) Since the tube track cannot be extended the maximum distance in each direction due to furnace size, additional weight shall be added at each support to simulate the weight at the support with maximum support spacing on each side of the support.
   d) A splice shall be installed in the tube track at approximately the midpoint between supports. See drawing 02-5041090A for splice detail.

5. 1" thick plate steel shall be installed against the test slab to simulate embed plates. The plates shall be bolted to the test slab utilizing ½" ATR extending through the test slab to ensure that the plate stays in place. ATR shall be placed at least at each of the 4 corners of the plate, no closer than 1" to the edge of the plate. Additional ATR may be utilized if necessary to ensure that the plate remains in place.

6. Where the drawings indicate that additional dead load weight is to be added to a support, this additional weight will be achieved by appropriately sizing a piece of steel and then attaching it to the support.

FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	M F
0	ORIGINAL ISSUE	12/17/2003	C. BANNING	
1	INCORPORATED DESIGN CHANGES	2/12/2004	C. BANNING	
2	INCORPORATE AS BUILT CONDITIONS	5/18/2004	C. BANNING	

Page 6B

BILL OF MATERIALS

QUANTITY	UNIT	ITEM
SUPPLIED BY PROGRESS ENERGY		
40	LF	4C #8 AWG MEGGITT SI 2400 FIRE CABLE, PART NO. 300217-5
34	LF	7C #10 AWG MEGGITT SI 2400 FIRE CABLE, PART NO. 300208-5
40	LF	8C #12 AWG MEGGITT SI 2400 FIRE CABLE, PART NO. 300283-5
40	LF	7C #14 AWG MEGGITT SI 2400 FIRE CABLE PART NO. 300286-5
		NOTE: EACH CABLE TO HAVE FACTORY SPLICE INSTALLED APPROXIMATELY 12' FROM ONE END. EACH CABLE TO HAVE FACTORY INSTALLED CABLE TERMINATIONS AT EACH END.
SUPPLIED BY OMEGA POINT LABORATORIES		
11	LF	J.C. WHITE 4" X 2" X 12 GA TUBETRACK, PART #CH4-GC-2.0
2	EA	½-13 X 3/4" LG (MIN) HEX HEAD BOLT (A307 GR. A)
2	EA	½" LOCKWASHER B18.22.1
2	EA	½-13 B-LINE SPRING NUT, PART NO. N225
6	EA	J.C. WHITE 3-DIR. TUBE CLAMP, PART NO. NC-2-750-3D
12	EA	¼-20 HEX NUT (A563 GR A)
6	EA	¼-20 X 2" LG. (MIN) HEX HEAD BOLT (A307, GR A)
1	LF	B-LINE B11 STRUT
6	LF	B-LINE B52 STRUT
1	LF	B-LINE B22 STRUT
18	EA	B-LINE B2000 SS4 STAINLESS STEEL CLAMPS
3	LF	UNISTRUT P1000 SUPPORT CHANNEL
4	EA	3/8" X 3 ¼" HILTI CARBON STEEL KWIK BOLT TYPE II, EXPANSION ANCHOR (WITH CARBON STEEL NUTS AND WASHERS)
8	EA	1/2" X 4 1/2" HILTI CARBON STEEL KWIK BOLT TYPE II, EXPANSION ANCHOR (WITH CARBON STEEL NUTS AND WASHERS)
5	LF	3" X 3" X 0.25" TUBE STEEL, ASTM A500 GR B
6	LF	3" X 3" X 0.1875" TUBE STEEL, ASTM A500 GR B
44	LF	3/8" SCHEDULE 40 STEEL PIPE, A120 OR EQUIVALENT
5	LF	8" X 1" STEEL PLATE A36
2	EA	12" X 12" X ½" STEEL PLATE A36
1	EA	5" X 5" X ½" STEEL PLATE A36
20	LF	½" ATR
32	EA	½" STEEL WASHER
32	EA	½" A-307 STEEL NUT
12	EA	½"-13" X ¾"HEX HEAD BOLT W/NUT & LOCKWASHER A307, GRA
1	LF	JC WHITE 4" CHANNEL SPLICE PART # SC 4 GC-2
		MISCELLANEOUS STEEL (FOR USE AS DEAD WEIGHT LOADS)

DRAWN BY	CHECKED BY		
K GROSZEK	JOHN G. CROUTHER		
PASSED BY	APPROVED BY	PROGRESS ENERGY MEGGITT CABLE TEST BILL OF MATERIAL	SCALE NONE / DATE 12/17/03
R DIBLE	C BANNING		DWG. NO. 02-5038082A-02
			CAD FILE

TEST ARTICLE ATTRIBUTE CHECKLIST

PROJECT NUMBER: 14980-117047
PROJECT TITLE: MEGGITT FIRE RESISTIVE CABLE TESTING

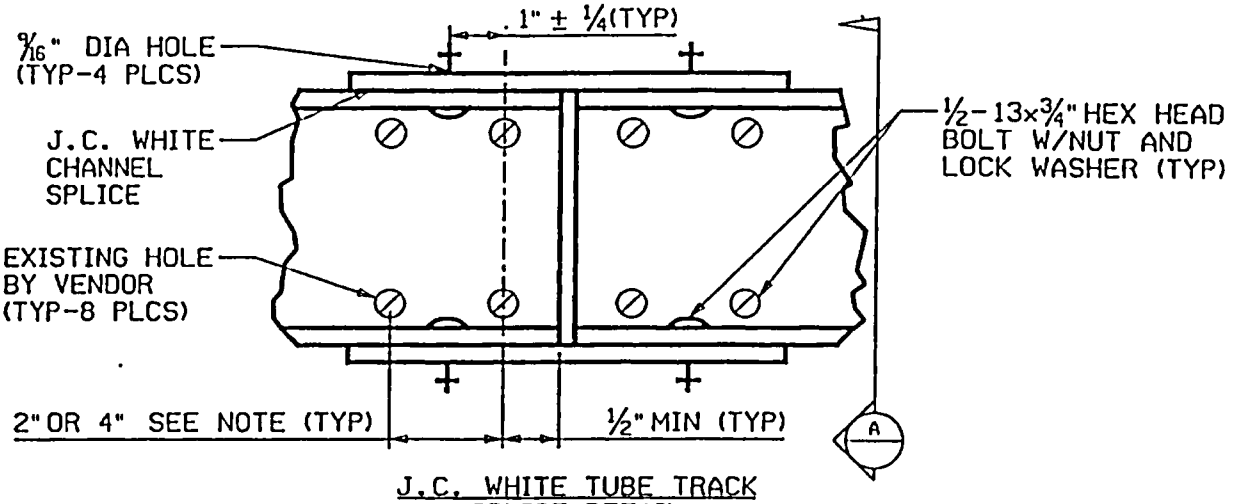
		ATTRIBUTE	SAT	UNSAT
I	TEST DECK			
	A	Test deck configuration and dimensions per approved drawings		
	B	Condition of test deck		
	C	Test deck conditioned to moisture equilibrium at indoor conditions		
II	SUPPORTS/STEEL PLATES/TUBE TRACK			
	A.	Correct materials used		
	B.	Installed per approved drawings		
	C.	Spacing between supports B-B and C-C equal to or greater than shown on approved drawings		
	D.	Spacing between supports G-G and H-H equal to or greater than dimension shown on approved drawings		
	E.	Supports for Meggitt cable are properly grounded		
	F.	Applied torque values for strut clamps per approved drawings		
	G.	Welds per approved drawings		
	H.	Tube track installed per approved drawings		
	I.	Tube track splice installed per approved drawings		
	J.	Dead loads for supports sized and installed per approved drawings		
III	HILTI BOLTS			
	A.	Correct materials used		
	B.	Anchor embedment per approved drawings		
	C.	Applied torque values per approved drawings		
IV	MEGGITT CABLES			
	A.	Cables installed per approved drawings		
	B.	Minimum bend radius installed where shown on approved drawings		
	C.	Factory installed splices installed as shown on approved drawings		
	D.	Factory installed terminations provided at each end of cable		
	E.	No gouges or cuts in the cable sheath which exceed 10% of cable wall thickness		
V	TEST EQUIPMENT			
	A.	Wiring of test articles conform to the Figures 7.1 through 7.4 in the approved Test Plan		
	B.	Fuses, amp meters, volt meters, resistors and switches installed per Figures 7.1 through 7.4 of the approved Test Plan		
	C.	All electrical devices and equipment have been tested prior to the start of the test to ensure that they are properly connected and functioning as required, showing proper readings on data acquisition equipment		
	D.	Furnace thermocouples are the correct type and are installed per the Test Plan		

NOTE: Verification to be made using initials of OPI. Quality Assurance Personnel

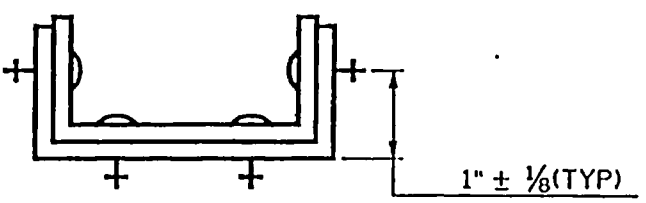
FRAMATOME ANP

REVISIONS				
REV	DESCRIPTION	DATE	APPROVAL	
0	ORIGINAL ISSUE	3/1/04	CA Gehring	

THIS DRAWING IS THE PROPERTY OF FRAMATOME ANP AND IS LOANED UPON THE CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO OTHERS, OR FOR ANY PURPOSE DETRIMENTAL TO THE INTEREST OF FRAMATOME ANP AND IS TO BE RETURNED UPON REQUEST. DO NOT SCALE - USE DIMENSIONS ONLY.



J.C. WHITE TUBE TRACK SPLICE DETAIL

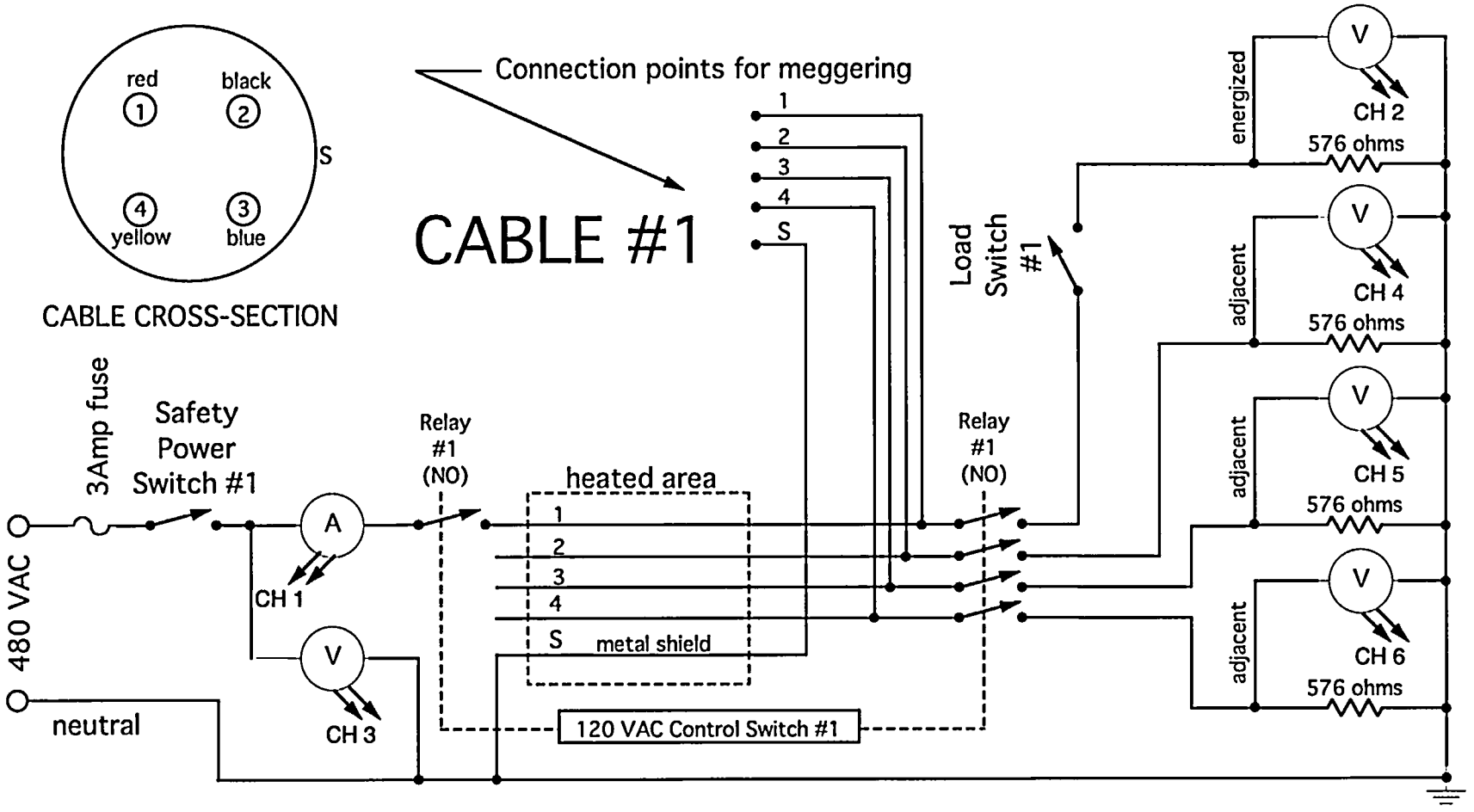


SECTION A-A

NOTE:

J.C. WHITE SPLICES ARE SUPPLIED WITH EXTRA HOLES. INSTALLER MAY USE VARIOUS ARRANGMENTS AS LONG AS QUANTITY OF FASTENERS AND RELATIVE LOCATIONS AGREE WITH THIS DETAIL.

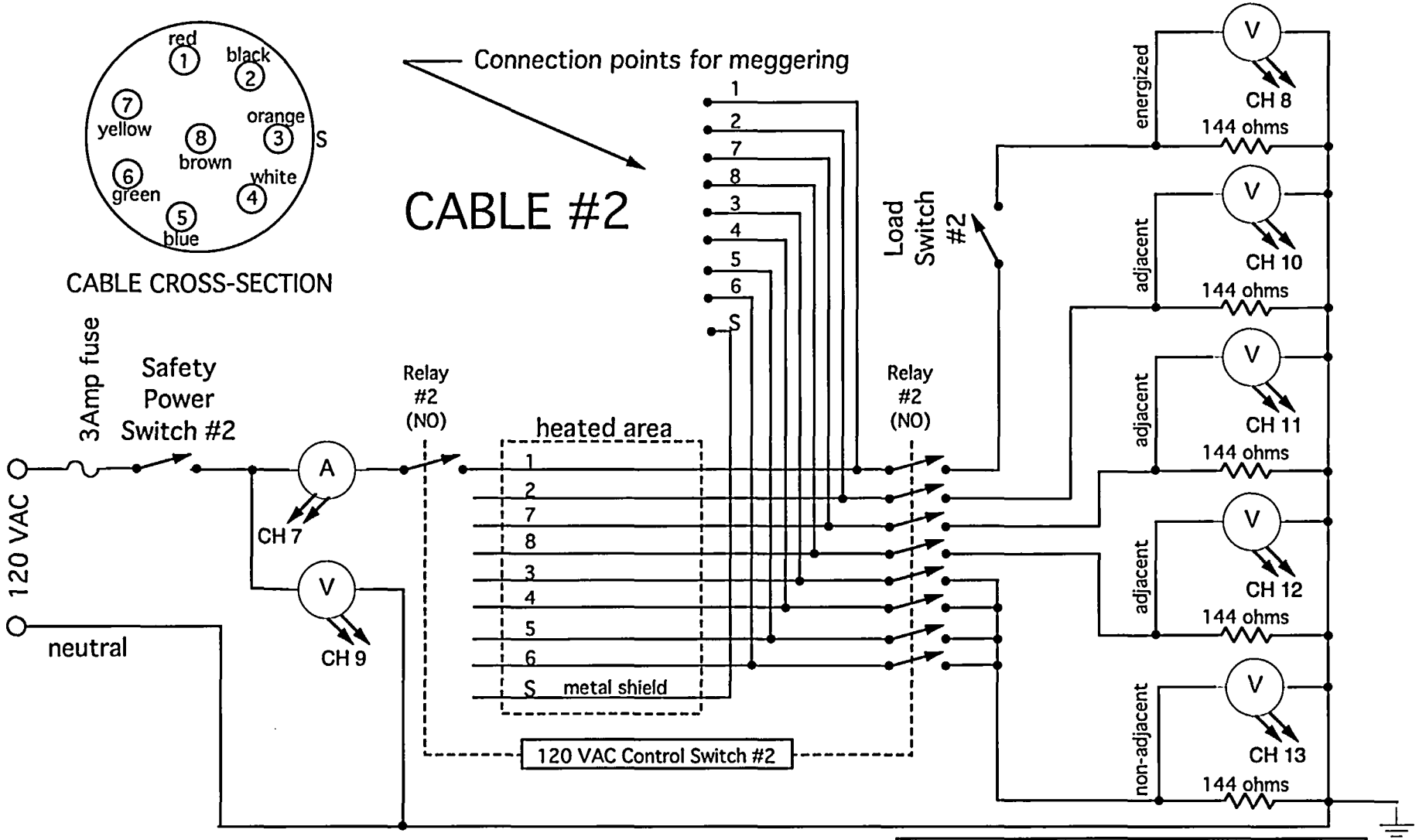
DRAWN BY K GROSZEK	CHECKED BY J.G. Crawford	PROGRESS ENERGY MEGGITT CABLE TEST TUBE TRACK SPLICE DETAIL	SCALE NONE / DATE 3/1/04
PASSED BY R.L. Dible	APPROVED BY C.A. Gehring		DWG. NO. 02-5041090A-00
			CAD FILE 5041090. .DGN



Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 576 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #1 is normally open).

OMEGA POINT LABORATORIES, INC. Project No. 14980-117047
FRAMATOME-ANP
Fig. 1, Rev.8 4/C #8 Wiring Diagram CABLE #1
Drwn by: D.N. Priest Date: 3/12/04 OPL App'l: C Humphrey Date: 3/12/04 Framatome: Jam G Crowther Date: 3/12/04

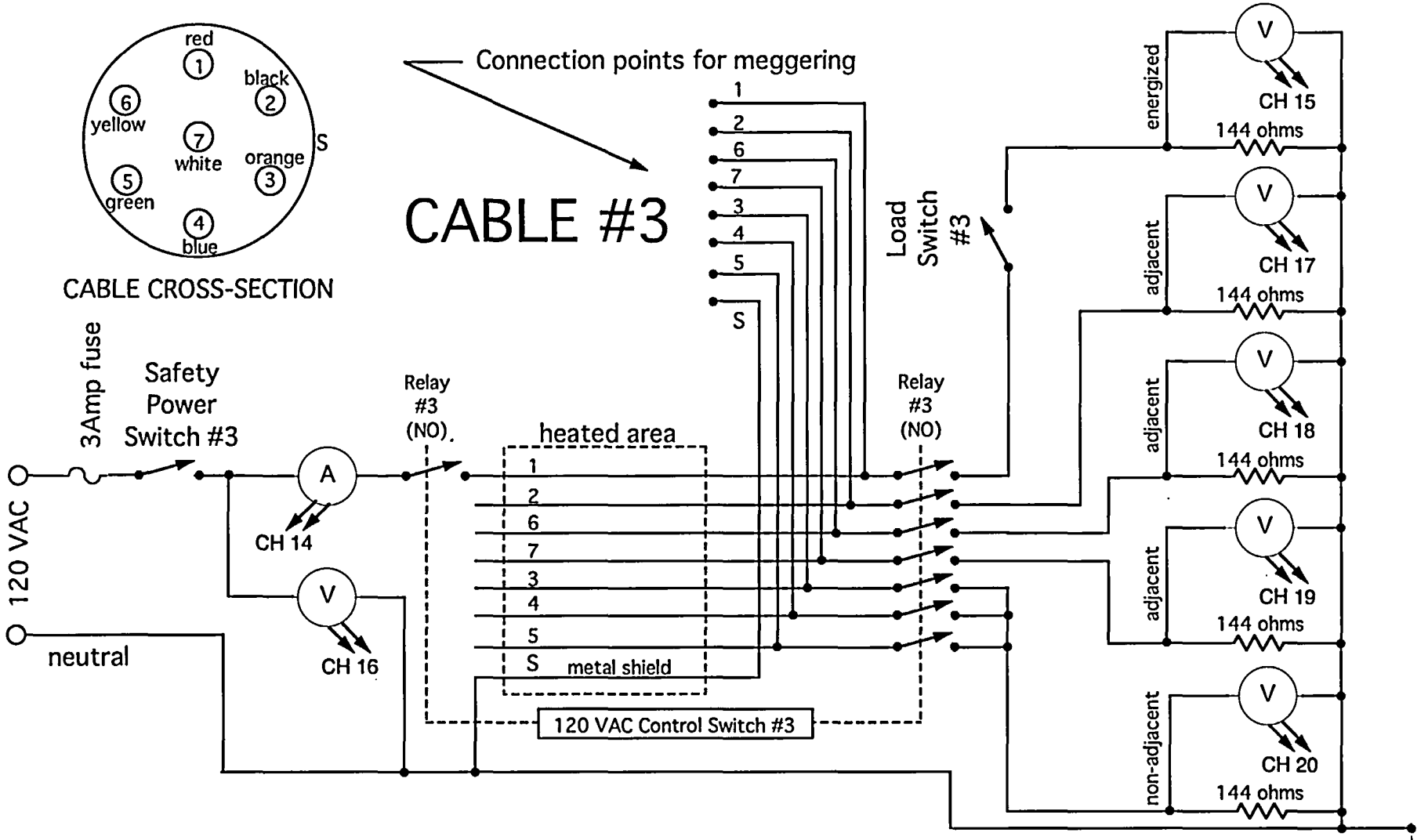
Scale: n/a



Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #2 is normally open).

OMEGA POINT LABORATORIES, INC. Project No. 14980-117047	
FRAMATOME-ANP	
Fig. 2, Rev.6 8/C #12 Wiring Diagram CABLE #2	
Drwn by: D.N. Priest	Date: 3/12/04
OPL App'l: C Z Humphrey	Date: 3/12/04
Framatome: John G Crowther	Date: 3/12/04

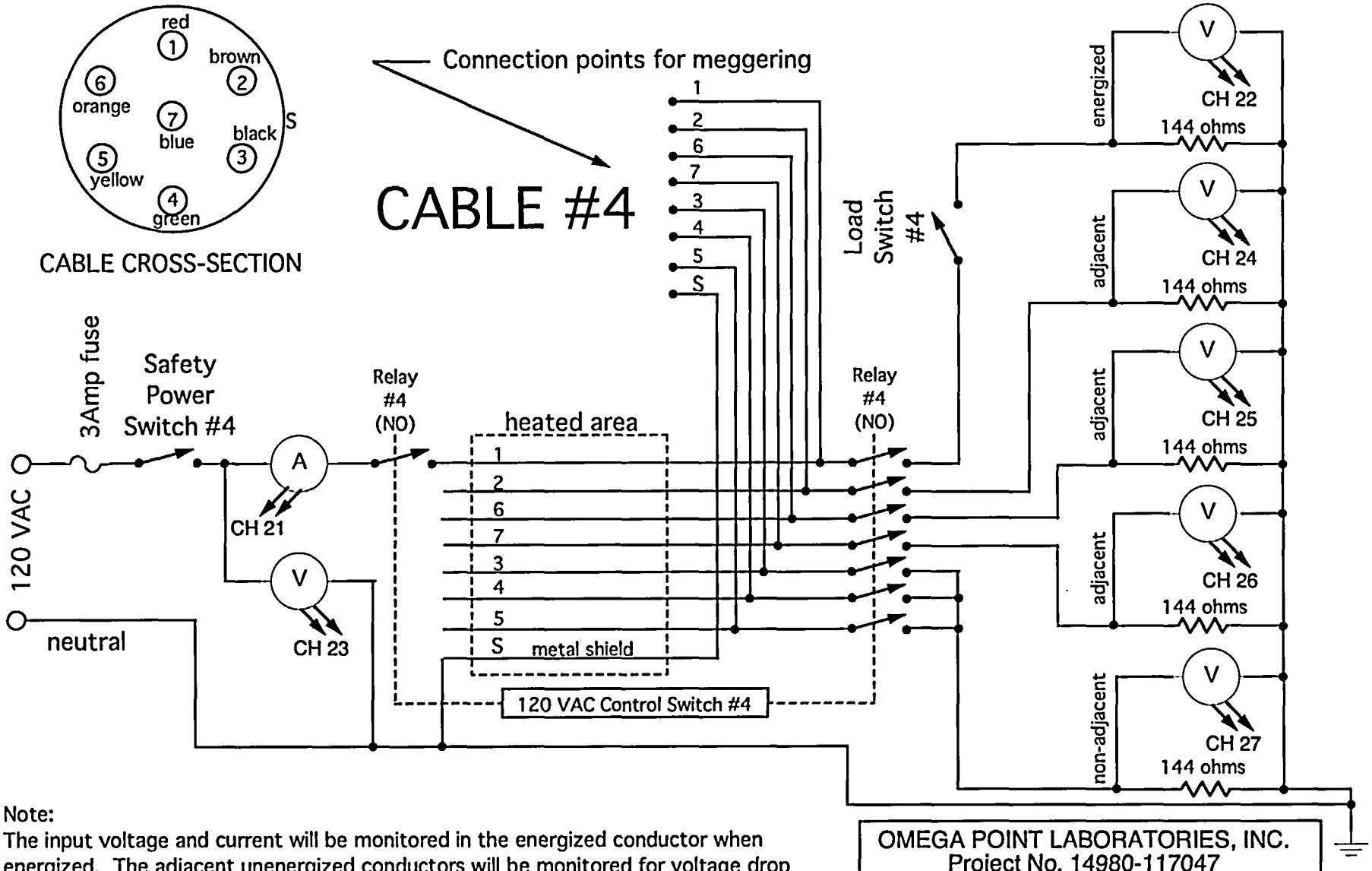
Scale: n/a



Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #3 is normally open).

OMEGA POINT LABORATORIES, INC. Project No. 14980-117047
FRAMATOME-ANP
Fig. 3, Rev.6 7/C #14 Wiring Diagram CABLE #3
Drwn by: D.N. Priest Date: 3/12/04 OPL App'l: C Humphrey Date: 3/12/04 Framatome: John J Crowther Date: 3/12/04

Scale: n/a



Note:
The input voltage and current will be monitored in the energized conductor when energized. The adjacent unenergized conductors will be monitored for voltage drop across a resistor to detect leakage current to each conductor. The metal shield will be grounded. Resistors were 144 ohms, to result in a current flow of approximately 0.83 amp. To unenergize the conductor, the relays will be opened, thus configuring the circuits for megger testing, and the safety power switch will be opened as a backup safety device. The unenergized cable will not be terminated, but can be if desired (i.e., Load Switch #4 is normally open).

OMEGA POINT LABORATORIES, INC. Project No. 14980-117047
FRAMATOME-ANP
Fig. 4, Rev.7 7/C #10 Wiring Diagram CABLE #4
Drwn by: D.N. Priest Date: 3/12/04 OPL App'l: C Humphrey Date: 3/12/04 Framatome: John J Grouther Date: 3/12/04

Appendix B

MEGGERING AND CONDUCTOR RESISTANCE RESULTS

BASELINE DATA ACQUISITION DATA SHEET

Client: Framatome-ANP Date: 3-16-04
Project No: 14980-117047

Test Condition: Voltages were applied to all cables and the current and voltage in each conductor were accurately measured. Also, the outputs of the data acquisition channels were observed and noted.

DVM Operator: Laudencio Computer Observer: Cleda
DVM ID: 4405196 Calibration Due: 8/18/04
Current Probe ID:85730020 Calibration Due: 3/20/05

CHANNEL NO.	APPLIED SIGNAL	UNIT	DATA ACQUISITION SIGNAL (Volts DC)
1	0.758 amps	Amperes	1.586
2	470.1 volts	Volts DC	7.711
3	470.9 volts	Volts DC	7.738
4	464.4 volts	Volts DC	7.642
5	469.0 volts	Volts DC	7.719
6	469.8 volts	Volts DC	7.708
7	0.759 amps	Amperes	1.584
8	120.58 volts	Volts DC	7.902
9	120.80 volts	Volts DC	7.822
10	121.13 volts	Volts DC	7.920
11	121.22 volts	Volts DC	7.933
12	121.21 volts	Volts DC	7.951
13	121.32 volts	Volts DC	7.964
14	0.774 amps	Amperes	1.617
15	120.90 volts	Volts DC	7.921
16	121.24 volts	Volts DC	7.954
17	121.27 volts	Volts DC	7.948
18	121.29 volts	Volts DC	7.958
19	121.28 volts	Volts DC	7.943
20	121.25 volts	Volts DC	7.938
21	0.781 amps	Amperes	1.627
22	121.00 volts	Volts DC	7.885
23	121.08 volts	Volts DC	7.947
24	121.20 volts	Volts DC	7.937
25	121.13 volts	Volts DC	7.941
26	121.20 volts	Volts DC	7.943
27	121.14 volts	Volts DC	7.953

Data Acquisition ID: 48JF0082 Calibration Due: 9-15-04

BASELINE DATA ACQUISITION DATA SHEET

Client: Framatome-ANP Date: 3-15-04
Project No: 14980-117047

Test Condition: Voltages were applied to all cables and the current and voltage in each conductor were accurately measured. Also, the outputs of the data acquisition channels were observed and noted.

DVM Operator: John G Computer Observer: D Batton
DVM ID: 4465196 Calibration Due: 8-18-04
Current Probe ID: 92LE008 Calibration Due: 2-18-05

CHANNEL NO.	APPLIED SIGNAL	UNIT	DATA ACQUISITION SIGNAL (Volts DC)
1		Amperes	1.586
2		Volts DC	7.711
3		Volts DC	7.738
4		Volts DC	7.642
5		Volts DC	~~7.788~~ 7.719
6		Volts DC	7.708
7		Amperes	1.584
8		Volts DC	7.902
9		Volts DC	7.922
10		Volts DC	7.920
11		Volts DC	7.933
12		Volts DC	7.951
13		Volts DC	7.964
14		Amperes	1.617
15		Volts DC	7.921
16		Volts DC	7.954
17		Volts DC	7.948
18		Volts DC	7.958
19		Volts DC	7.943
20		Volts DC	7.938
21		Amperes	~~7.885~~ 1.627
22		Volts DC	~~7.947~~ 7.885
23		Volts DC	7.947
24		Volts DC	7.937
25		Volts DC	7.941
26		Volts DC	7.943
27		Volts DC	7.953

Data Acquisition ID: 48JF0082 Calibration Due: 9-15-04

BASELINE DATA ACQUISITION DATA SHEET

Client: Framatome-ANP Date: 3-15-04
Project No: 14980-117047

Test Condition: Voltages were applied to all cables and the current and voltage in each conductor were accurately measured. Also, the outputs of the data acquisition channels were observed and noted.

DVM Operator: [signature] Computer Observer: [signature]
DVM ID: 44D5196 Calibration Due: 8-18-04
Current Probe ID: 92CE008 Calibration Due: 2-18-05

CHANNEL NO.	APPLIED SIGNAL	UNIT	DATA ACQUISITION SIGNAL (Volts DC)
1	.758	Amperes	
2	470.1	Volts DC	
3	470.9	Volts DC	
4	464.4	Volts DC	
5	469.0	Volts DC	
6	469.8	Volts DC	
7	.759	Amperes	
8	120.58	Volts DC	
9	120.80	Volts DC	
10	121.13	Volts DC	
11	121.22	Volts DC	
12	121.21	Volts DC	
13	121.32	Volts DC	
14	.774 ~~121.82~~	Amperes	
15	120.90	Volts DC	
16	121.24	Volts DC	
17	121.27	Volts DC	
18	121.29	Volts DC	
19	121.28	Volts DC	
20	121.25	Volts DC	
21	.781 ~~121.00~~	Amperes	
22	121.00	Volts DC	
23	121.08	Volts DC	
24	121.20	Volts DC	
25	121.13	Volts DC	
26	121.20	Volts DC	
27	121.14	Volts DC	

Data Acquisition ID: 48JF0082 Calibration Due: 9-15-04

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3-15-04
Project No: 14980-117047

Test Condition (Pre Test) During Test Post Hose Stream Post Test Cold (circle one)

Megger Operator: Jeffrey Piel 3-15-04 Scribe: Oleda Patton
Megger ID: 837 Calibration Due: 7-27-04
Calibrated on 1-27-04 sp

POWER OFF VERIFIED: _____

4/C #8 - CABLE #1

1500 V dc

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	900	1:35
1	Red	3	Blue	900	1:35
1	Red	4	Yellow	1200	1:35
1	Red	Shield	-	1200	1:36
2	Black	3	Blue	225	1:36
2	Black	4	Yellow	225	1:37
2	Black	Shield	-	240	1:37
3	Blue	4	Yellow	1200	1:37
3	Blue	Shield	-	1500	1:37
4	Yellow	Shield	-	1200	1:38

CONDUCTOR RESISTANCE

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	36.6 mΩ	
2	Black	2	Black	36.7 mΩ	
3	Blue	3	Blue	36.4 mΩ	
4	Yellow	4	Yellow	36.4 mΩ	

Digital Low Resistance Ohmmeter SN: 7386
1-5-2004 calibration date
1-5-2005 due date

Patton QA/QC

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3-16-04
Project No: 14980-117047

Test Condition: Pre Test (During Test) Post Hose Stream Post Test Cold (circle one)

Megger Operator: Jeff D. P.E. 30 min Scribe:
Megger ID: 837 Calibration Due: 7-27-04

POWER OFF VERIFIED: JJ

4/C #8 - CABLE #1

FROM		TO		RESISTANCE	TIME	
COND. #	COLOR	COND. #	COLOR	(Megohms)		
1	Red	2	Black	0 .28	10:21	10:51
1	Red	3	Blue	0 .28	10:22	10:51
1	Red	4	Yellow	0 .29	10:23	10:51
1	Red	Shield	-	0 .29	10:23	10:51
2	Black	3	Blue	0 200V DC 1300V .22 .23	10:23	11:00 12I
2	Black	4	Yellow	0 1500V .23	10:23	11:06
2	Black	Shield	-	0 .23	10:24	11:06
3	Blue	4	Yellow	0 400V .32	10:24	11:16
3	Blue	Shield	-	0	10:24	
4	Yellow	Shield	-	0	10:24	

CONDUCTOR RESISTANCE

computer
10:49 = 10:57

FROM		TO		RESISTANCE	TIME
COND. #	COLOR	COND. #	COLOR	(Ohms)	
1	Red	1	Red		
2	Black	2	Black		
3	Blue	3	Blue		
4	Yellow	4	Yellow		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3-16-04
Project No: 14980-117047

Test Condition: Pre-Test (During Test) Post Hose Stream Post Test Cold (circle one)

Megger Operator: Jeff D. Pyron
Megger ID: 837
Scribe: [signature]
Calibration Due: 7-27-04

POWER OFF VERIFIED: [signature]

4/C #8 - CABLE #1

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black		12:30
1	Red	3	Blue		
1	Red	4	Yellow		
1	Red	Shield	-		
2	Black	3	Blue		
2	Black	4	Yellow		
2	Black	Shield	-		
3	Blue	4	Yellow	.23	11:45
3	Blue	Shield	-	.23	11:45
4	Yellow	Shield	-		

CONDUCTOR RESISTANCE

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Blue	3	Blue		
4	Yellow	4	Yellow		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3-17-04
Project No: 14980-117047

Test Condition: Pre Test / During Test Post Hose Stream (Post Test Cold) (circle one)

Megger Operator: [signature] Scribe: [signature]
Megger ID: 720 Calibration Due: 1-7-2005

POWER OFF VERIFIED: [signature]

Digital Voltmeter
Inst# 18911
due: 1-5-05

4/C #8 - CABLE #1

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	~~TIME~~
1	Red	2	Black	∅ 1.4	.534 MΩ
1	Red	3	Blue	∅ 1.6	1.483 MΩ
1	Red	4	Yellow	0	.675 MΩ
1	Red	Shield	-	0	1.636 MΩ
2	Black	3	Blue	1.2	1.482 MΩ
2	Black	4	Yellow	1.2	.635 MΩ
2	Black	Shield	-	1.2	1.637 MΩ
3	Blue	4	Yellow	1.2	3.13 ~~KMΩ~~
3	Blue	Shield	-	1.4	.826 MΩ
4	Yellow	Shield	-	0	1.939 MΩ

CONDUCTOR RESISTANCE

SN: due:
Digital Low Resistance Ohmmeter

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	mΩ (Ohms)	TIME
1	Red	1	Red	38.4	
2	Black	2	Black	38.5	
3	Blue	3	Blue	38.1	
4	Yellow	4	Yellow	38.0	

MEGGERING DATA SHEET

Client: Framatome-ANP
Project No: 14980-117047

Date: 3-15-04

Test Condition: (Pre Test) During Test Post Hose Stream Post Test Cold (circle one)

Megger Operator: Jeffrey Piel
Megger ID: 837

Scribe: Oleda Patton
Calibration Due: 7-27-04

POWER OFF VERIFIED: _____

8/C #12 - CABLE #2

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	250	1:39
1	Red	3	Orange	250	1:39
1	Red	4	White	700	1:39
1	Red	5	Blue	800	1:40
1	Red	6	Green	900	1:40
1	Red	7	Yellow	700	1:40
1	Red	8	Brown	900	1:40
1	Red	Shield	-	925	1:41
2	Black	3	Orange	2000	1:41
2	Black	4	White	3200	1:41
2	Black	5	Blue	1100	1:42
2	Black	6	Green	1100	1:42
2	Black	7	Yellow	1100	1:42
2	Black	8	Brown	1100	1:42
2	Black	Shield	-	700	1:43
3	Orange	4	White	25	1:45
3	Orange	5	Blue	1100	1:45
3	Orange	6	Green	1200	1:45
3	Orange	7	Yellow	1100	1:46
3	Orange	8	Brown	850	1:46
3	Orange	Shield	-	700	1:46
4	White	5	Blue	45	1:48
4	White	6	Green	58	1:48
4	White	7	Yellow	74	1:48
4	White	8	Brown	80	1:50
4	White	Shield	-	110	1:50
5	Blue	6	Green	32	1:51
5	Blue	7	Yellow	36	1:51
5	Blue	8	Brown	65	1:51
5	Blue	Shield	-	65	1:52

8/C #12 – CABLE #2 (continued)

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
6	Green	7	Yellow	75	1:51
6	Green	8	Brown	200	1:53
6	Green	Shield	-	200	1:53
7	Yellow	8	Brown	55	1:53
7	Yellow	Shield	-	51	1:53
8	Brown	Shield	-	2300	1:54

CONDUCTOR RESISTANCE

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	93.8 mΩ	
2	Black	2	Black	93.1 mΩ	
3	Orange	3	Orange	92.5 mΩ	
4	White	4	White	93.1 mΩ	
5	Blue	5	Blue	92.4 mΩ	
6	Green	6	Green	91.6 mΩ	
7	Yellow	7	Yellow	93.3 mΩ	
8	Brown	8	Brown	92.9 mΩ	

Digital Low Resistance Ohmmeter
SN:7386 calibration date 1-5-2004
due date 1-5-2005

[signature] QA/QC

MEGGERING DATA SHEET

Client: Framatome-ANP
Project No: 14980-117047

Date: 3-16-04

Test Condition: Pre Test (During Test) Post Hose Stream Post Test Cold (circle one)

Megger Operator: J. Hug D. P. O 30 min
Megger ID: #37

Scribe: C Dutton
Calibration Due: 7-27-04

POWER OFF VERIFIED: ---

8/C #12 - CABLE #2

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	.6	10:26
1	Red	3	Orange	1.6	10:27
1	Red	4	White	1.6	10:27
1	Red	5	Blue	1.7	10:27
1	Red	6	Green	1.7	10:28
1	Red	7	Yellow	1.7	10:28
1	Red	8	Brown	1.75	10:28
1	Red	Shield	-	1.8	10:28
2	Black	3	Orange	.6	10:30
2	Black	4	White	.65	10:30
2	Black	5	Blue	.7	10:30
2	Black	6	Green	.75	10:31
2	Black	7	Yellow	.75	10:31
2	Black	8	Brown	.75	10:31
2	Black	Shield	-	.8	10:31
3	Orange	4	White	.34	10:33
3	Orange	5	Blue	.36	10:33
3	Orange	6	Green	.38	10:33
3	Orange	7	Yellow	.4	10:33
3	Orange	8	Brown	.42	10:33
3	Orange	Shield	-	.6	10:34
4	White	5	Blue	.3	10:36
4	White	6	Green	.32	10:36
4	White	7	Yellow	.33	10:36
4	White	8	Brown	.34	10:36
4	White	Shield	-	.36	10:36
5	Blue	6	Green	.5	10:38
5	Blue	7	Yellow	.5	10:38
5	Blue	8	Brown	.52	10:38
5	Blue	Shield	-	.54	10:39

3-16-04
gp page 2 of 2

8/C #12 – CABLE #2 (continued)

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
6	Green	7	Yellow	.38	10:39
6	Green	8	Brown	.4	10:40
6	Green	Shield	-	.43	10:40
7	Yellow	8	Brown	.38	10:42
7	Yellow	Shield	-	.42	10:42
8	Brown	Shield	-	.36	10:43

CONDUCTOR RESISTANCE

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	White	4	White		
5	Blue	5	Blue		
6	Green	6	Green		
7	Yellow	7	Yellow		
8	Brown	8	Brown		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: Pre Test (During Test 90 min) Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Stubbs Scribe: Connie Humphrey
Megger ID: #720 Calibration Due: 1/7/05

POWER OFF VERIFIED: CH

8/C #12 - CABLE #2

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	.65	11:28:23
1	Red	3	Orange	.7	11:28:34
1	Red	4	White	.7	11:28:43
1	Red	5	Blue	.75	11:29:01
1	Red	6	Green	.8	11:29:10
1	Red	7	Yellow	.85	11:29:21
1	Red	8	Brown	.9	11:29:42
1	Red	Shield	-	.9	11:29:53
2	Black	3	Orange	.45	11:31:42
2	Black	4	White	.47	11:31:53
2	Black	5	Blue	.5	11:32:03
2	Black	6	Green	.54	11:32:12
2	Black	7	Yellow	.55	11:32:20
2	Black	8	Brown	.55	11:32:29
2	Black	Shield	-	.6	11:32:37
3	Orange	4	White	.4	11:34:59
3	Orange	5	Blue	.41	11:35:05
3	Orange	6	Green	.43	11:35:13
3	Orange	7	Yellow	.45	11:35:21
3	Orange	8	Brown	.47	11:35:31
3	Orange	Shield	-	.48	11:35:38
4	White	5	Blue	.33	11:37:58
4	White	6	Green	.34	11:38:07
4	White	7	Yellow	.36	11:38:16
4	White	8	Brown	.38	11:38:26
4	White	Shield	-	.39	11:38:34
5	Blue	6	Green	.34	11:40:59
5	Blue	7	Yellow	.35	11:41:10
5	Blue	8	Brown	.36	11:41:15
5	Blue	Shield	-	.37	11:41:24

14980-117047

07

8/C #12 – CABLE #2 (continued)

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
6	Green	7	Yellow	.29	11:43:09
6	Green	8	Brown	.3	11:43:17
6	Green	Shield	-	.32	11:43:27
7	Yellow	8	Brown	.39	11:45:30
7	Yellow	Shield	-	.42	11:45:36
8	Brown	Shield	-	.28	11:47:00

CONDUCTOR RESISTANCE

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	White	4	White		
5	Blue	5	Blue		
6	Green	6	Green		
7	Yellow	7	Yellow		
8	Brown	8	Brown		

MEGGERING DATA SHEET

Client: Framatome-ANP
Project No: 14980-117047

Date: 3-16-04

Test Condition: Pre Test (During Test) Post Hose Stream Post Test Cold (circle one)
start 2:05 min

Megger Operator: Jeffrey D. Pirl
Megger ID: 8150

Scribe: D. Bartley
Calibration Due: 7-27-04

POWER OFF VERIFIED SP

8/C #12 - CABLE #2

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	.92	12:17
1	Red	3	Orange	.92	12:17
1	Red	4	White	.95	12:17
1	Red	5	Blue	.98	12:18
1	Red	6	Green	1.0	12:18
1	Red	7	Yellow	1.0	12:18
1	Red	8	Brown	1.0	12:18
1	Red	Shield	-	1.1	12:18
2	Black	3	Orange	.72	12:20
2	Black	4	White	.74	12:21
2	Black	5	Blue	.74	12:21
2	Black	6	Green	.75	12:21
2	Black	7	Yellow	.75	12:21
2	Black	8	Brown	.75	12:21
2	Black	Shield	-	.77	12:21
3	Orange	4	White	.51	12:23
3	Orange	5	Blue	.53	12:23
3	Orange	6	Green	.55	12:24
3	Orange	7	Yellow	.55	12:24
3	Orange	8	Brown	.55	12:24
3	Orange	Shield	-	.56	12:24
4	White	5	Blue	.57	12:26
4	White	6	Green	.57	12:26
4	White	7	Yellow	.57	12:26
4	White	8	Brown	.58	12:27
4	White	Shield	-	.58	12:27
5	Blue	6	Green	.92	12:31
5	Blue	7	Yellow	.92	12:31
5	Blue	8	Brown	.93	12:31
5	Blue	Shield	-	.93	12:31

14980-117047
3-16-04
Page 2 of 2

8/C #12 – CABLE #2 (continued)

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
6	Green	7	Yellow	.58	12:33
6	Green	8	Brown	.58	12:34
6	Green	Shield	-	.59	12:34
7	Yellow	8	Brown	.8	12:36
7	Yellow	Shield	-	.84	12:36
8	Brown	Shield	-	.96	12:38

CONDUCTOR RESISTANCE

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	White	4	White		
5	Blue	5	Blue		
6	Green	6	Green		
7	Yellow	7	Yellow		
8	Brown	8	Brown		

MEGGERING DATA SHEET

Client: Framatome-ANP
Project No: 14980-117047

Date: 3-17-04

Test Condition: Pre Test / During Test Post Hose Stream Post Test Cold (circle one)

Megger Operator: [signature]
Megger ID: T20

Scribe: [signature]
Calibration Due: 1-7-2005

POWER OFF VERIFIED: [signature]

Digital Volt Mete
Unit # 18911
due: 1-5-05

8/C #12 - CABLE #2

FROM		TO		RESISTANCE (Megohms)	~~TIME~~
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black	0	.325 MΩ
1	Red	3	Orange	0	.327 MΩ
1	Red	4	White	0	195.6 kΩ
1	Red	5	Blue	0	.376 MΩ
1	Red	6	Green	0	.514 MΩ
1	Red	7	Yellow	0	.411 MΩ
1	Red	8	Brown	0	163.3 kΩ
1	Red	Shield	-	0	.783 MΩ
2	Black	3	Orange	0	.363 MΩ
2	Black	4	White	0	.284 MΩ
2	Black	5	Blue	0	.288 MΩ
2	Black	6	Green	0	.418 MΩ
2	Black	7	Yellow	0	.311 MΩ
2	Black	8	Brown	0	182.3 kΩ
2	Black	Shield	-	0	.765 MΩ
3	Orange	4	White	0	198.0 kΩ
3	Orange	5	Blue	0	207.9 kΩ
3	Orange	6	Green	0	.403 MΩ
3	Orange	7	Yellow	0	248.9 kΩ
3	Orange	8	Brown	0	175.8 kΩ
3	Orange	Shield	-	0	.757 MΩ
4	White	5	Blue	0	.369 MΩ
4	White	6	Green	0	.477 MΩ
4	White	7	Yellow	0	.366 MΩ
4	White	8	Brown	0	183.8 kΩ
4	White	Shield	-	0	.911 MΩ
5	Blue	6	Green	0	.344 MΩ
5	Blue	7	Yellow	0	247.6 kΩ
5	Blue	8	Brown	0	183.4 kΩ
5	Blue	Shield	-	0	.888 MΩ

3-17-04
Carlton

Page 82

8/C #12 – CABLE #2 (continued)

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
6	Green	7	Yellow	0	306.9 kΩ
6	Green	8	Brown	0	244.8 kΩ
6	Green	Shield	-	0	1.010 MΩ
7	Yellow	8	Brown	0	188.6 kΩ
7	Yellow	Shield	-	0	.867 MΩ
8	Brown	Shield	-	0	1.092 MΩ

Digital Volt meter
Inst# 1891
Due : 1-5-05

CONDUCTOR RESISTANCE SN: due:

Digital Low Resistance Ohmmeter

FROM		TO		RESISTANCE	TIME
COND. #	COLOR	COND. #	COLOR	(Ohms)	
1	Red	1	Red	99.2	
2	Black	2	Black	98.8	
3	Orange	3	Orange	98.5	
4	White	4	White	99.1	
5	Blue	5	Blue	98.6	
6	Green	6	Green	97.3	
7	Yellow	7	Yellow	98.9	
8	Brown	8	Brown	98.7	

MEGGERING DATA SHEET

Client: Framatome-ANP
Project No: 14980-117047

Date: 3/15/04

Test Condition: (Pre Test) During Test Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Grubbs
Megger ID: #720

Scribe: Connie Humphrey
Calibration Due: 1/07/05
Test Cal. 1/07/04

POWER OFF VERIFIED: CH

7/C #14 - CABLE #3

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	1500	1:32
1	Red	3	Orange	2000	1:33
1	Red	4	Blue	2000	1:33.5
1	Red	5	Green	2000	1:34
1	Red	6	Yellow	1500	1:34.5
1	Red	7	White	3000	1:34.5
1	Red	Shield	-	3000	1:35
2	Black	3	Orange	3000	1:35
2	Black	4	Blue	3000	1:35.3
2	Black	5	Green	4000	1:35.7
2	Black	6	Yellow	4000	1:36
2	Black	7	White	4000	1:36.3
2	Black	Shield	-	4000	1:36.7
3	Orange	4	Blue	4000	1:37
3	Orange	5	Green	4000	
3	Orange	6	Yellow	5000	
3	Orange	7	White	7500	
3	Orange	Shield	-	7500	1:37.7
4	Blue	5	Green	4000	
4	Blue	6	Yellow	4000	1:38
4	Blue	7	White	6000	
4	Blue	Shield	-	6000	
5	Green	6	Yellow	3000	
5	Green	7	White	4000	1:39
5	Green	Shield	-	5000	
6	Yellow	7	White	750	
6	Yellow	Shield	-	800	
7	White	Shield	-	3000	1:40

Proj. #14980-117047
3/15/04

CONDUCTOR RESISTANCE

7/C #14 – CABLE #3 (continued)

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Ohms)	TIME
1	Red	1	Red	142.6 mΩ	2:06pm
2	Black	2	Black	142.5 mΩ	
3	Orange	3	Orange	144.3 mΩ	2:07
4	Blue	4	Blue	140.8 mΩ	
5	Green	5	Green	143.5 mΩ	
6	Yellow	6	Yellow	141.2 mΩ	
7	White	7	White	140.8 mΩ	2:08

CH

Equipment:
Digital Low Resistance Ohmeter
Ser. Number 7386
last calibrated 1/5/04
cal due date 1/5/05

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: (Pre Test) During Test Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Grubbs Scribe: Connie Humphrey
Megger ID: # 720 Calibration Due: 1/7/05

POWER OFF VERIFIED: CH

7/C #14 - CABLE #3

Reverification Pre Test

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Black		
1	Red	3	Orange		
1	Red	4	Blue		
1	Red	5	Green		
1	Red	6	Yellow		
1	Red	7	White		
1	Red	Shield	-		
2	Black	3	Orange		
2	Black	4	Blue		
2	Black	5	Green		
2	Black	6	Yellow		
2	Black	7	White		
2	Black	Shield	-		
3	Orange	4	Blue		
3	Orange	5	Green		
3	Orange	6	Yellow		
3	Orange	7	White		
3	Orange	Shield	-		
4	Blue	5	Green		
4	Blue	6	Yellow		
4	Blue	7	White		
4	Blue	Shield	-		
5	Green	6	Yellow		
5	Green	7	White		
5	Green	Shield	-		
6	Yellow	7	White	700 / 700 (4/c sword)	8:55 am / 9:02
6	Yellow	Shield	-		
7	White	Shield	-	700 / 700	8:56 / 9:02

CH

CONDUCTOR RESISTANCE

7/C #14 – CABLE #3 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	Blue	4	Blue		
5	Green	5	Green		
6	Yellow	6	Yellow		
7	White	7	White		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: Pre Test (During Test) Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Crubbs 30 min Scribe: Connie Humphrey
Megger ID: #720 Calibration Due: 1/7/05

POWER OFF VERIFIED: CH

7/C #14 - CABLE #3

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	2	10:20:30
1	Red	3	Orange	2.5	10:20:50
1	Red	4	Blue	2.7	10:21:05
1	Red	5	Green	2.9	10:21:22
1	Red	6	Yellow	3	10:21:32
1	Red	7	White	3	10:21:47
1	Red	Shield	-	3.1	10:21:58
2	Black	3	Orange	2	10:23:15
2	Black	4	Blue	2.3	10:23:31
2	Black	5	Green	2.6	10:23:44
2	Black	6	Yellow	2.6	10:23:55
2	Black	7	White	2.8	10:24:08
2	Black	Shield	-	2.8	10:24:25
3	Orange	4	Blue	1.2	10:25:20
3	Orange	5	Green	1.4	10:25:35
3	Orange	6	Yellow	1.7	10:25:47
3	Orange	7	White	1.8	10:25:59
3	Orange	Shield	-	1.9	10:26:09
4	Blue	5	Green	1.2	10:26:27 :15 CH 3/16/04
4	Blue	6	Yellow	1.4	10:27:25
4	Blue	7	White	1.5	10:27:41
4	Blue	Shield	-	1.7	10:27:52
5	Green	6	Yellow	.5	10:29:01
5	Green	7	White	.7	10:29:15
5	Green	Shield	-	.75	10:29:27
6	Yellow	7	White	.9	10:30:28
6	Yellow	Shield	-	1.2	10:30:40
7	White	Shield	-	.6	10:31:15

CONDUCTOR RESISTANCE

7/C #14 – CABLE #3 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	Blue	4	Blue		
5	Green	5	Green		
6	Yellow	6	Yellow		
7	White	7	White		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3-16-04
Project No: 14980-117047

Test Condition: Pre Test (During Test 90 min) Post Hose Stream Post Test Cold (circle one)

Megger Operator: [illegible] Scribe: [illegible]
Megger ID: 837 Calibration Due: 7-27-04

POWER OFF VERIFIED: [illegible]

7/C #14 - CABLE #3

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	1.2	11:51
1	Red	3	Orange	1.2	11:51
1	Red	4	Blue	1.2	11:51
1	Red	5	Green	1.2	11:52
1	Red	6	Yellow	1.2	11:52
1	Red	7	White	1.25	11:52
1	Red	Shield	-	1.25	11:52
2	Black	3	Orange	1.1	11:54
2	Black	4	Blue	1.1	11:54
2	Black	5	Green	1.15	11:54
2	Black	6	Yellow	1.2	11:54
2	Black	7	White	1.2	11:54
2	Black	Shield	-	1.2	11:55
3	Orange	4	Blue	1.1	11:57
3	Orange	5	Green	1.1	11:57
3	Orange	6	Yellow	1.1	11:57
3	Orange	7	White	1.15	11:58
3	Orange	Shield	-	1.15	11:58
4	Blue	5	Green	.9	12:00
4	Blue	6	Yellow	.9	12:00
4	Blue	7	White	.92	12:00
4	Blue	Shield	-	.95	12:00
5	Green	6	Yellow	.91	12:04
5	Green	7	White	.9	12:04
5	Green	Shield	-	.9	12:04
6	Yellow	7	White	1.1	12:06
6	Yellow	Shield	-	1.1	12:07
7	White	Shield	-	.75	12:08

CONDUCTOR RESISTANCE

7/C #14 – CABLE #3 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	Blue	4	Blue		
5	Green	5	Green		
6	Yellow	6	Yellow		
7	White	7	White		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: Pre Test (During Test) 2 hrs 25 min Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Stubbs Scribe: Connie Humphrey
Megger ID: #728 Calibration Due: 1/7/05

POWER OFF VERIFIED: CH

7/C #14 - CABLE #3

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	.89	12:15:12
1	Red	3	Orange	.91	12:15:20
1	Red	4	Blue	.99	12:15:31
1	Red	5	Green	1.0	12:15:48
1	Red	6	Yellow	1.2	12:15:59
1	Red	7	White	1.3	12:16:06
1	Red	Shield	-	1.3	12:16:20
2	Black	3	Orange	.79	12:17:28
2	Black	4	Blue	.81	12:17:35
2	Black	5	Green	.86	12:17:50
2	Black	6	Yellow	.89	12:17:58
2	Black	7	White	.9	12:18:06
2	Black	Shield	-	.91	12:18:15
3	Orange	4	Blue	.71	12:19:18
3	Orange	5	Green	.75	12:19:25
3	Orange	6	Yellow	.78	12:19:35
3	Orange	7	White	.79	12:19:42
3	Orange	Shield	-	.80	12:19:51
4	Blue	5	Green	.66	12:21:01
4	Blue	6	Yellow	.68	12:21:09
4	Blue	7	White	.71	12:21:20
4	Blue	Shield	-	.74	12:21:27
5	Green	6	Yellow	.55	12:22:37
5	Green	7	White	.56	12:22:44
5	Green	Shield	-	.58	12:22:56
6	Yellow	7	White	.66	12:23:58
6	Yellow	Shield	-	.68	12:24:06
7	White	Shield	-	.6	12:24:58

CONDUCTOR RESISTANCE

7/C #14 – CABLE #3 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	Blue	4	Blue		
5	Green	5	Green		
6	Yellow	6	Yellow		
7	White	7	White		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: Pre Test During Test (Post Hose Stream) Post Test Cold (circle one)

Megger Operator: Bobby Grubbs Scribe: Connie Humphrey
Megger ID: #720 Calibration Due: 1/5/05
Digital Low Resistance Ohmeter S/N# 7386
POWER OFF VERIFIED: CH

Start 1:07:00
* Restart 1:28:50

7/C #14 - CABLE #3

* CONDUCTOR TO CONDUCTOR RESISTANCE TEST

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	~~(Megohms)~~	TIME
1	Red	2	Black	.230 Ω	1:29:05
1	Red	3	Orange	.232 Ω	1:29:20
1	Red	4	Blue	~~0~~	1:29:38
1	Red	5	Green	0	1:30:06
1	Red	6	Yellow	0	1:30:12
1	Red	7	White	.225Ω	1:30:22
1	Red	Shield	-	.201Ω	1:30:30
2	Black	3	Orange	.228Ω	1:30:49
2	Black	4	Blue	0	1:30:57
2	Black	5	Green	0	1:31:03
2	Black	6	Yellow	0	1:31:10
2	Black	7	White	.223Ω	1:31:17
2	Black	Shield	-	.211Ω	1:31:24
3	Orange	4	Blue	0	1:31:33
3	Orange	5	Green	0	1:31:39
3	Orange	6	Yellow	0	1:31:43
3	Orange	7	White	.226Ω	1:31:54
3	Orange	Shield	-	.212Ω	1:32:03
4	Blue	5	Green	0	1:32:17
4	Blue	6	Yellow	0	1:32:25
4	Blue	7	White	0	1:32:29
4	Blue	Shield	-	0	1:32:34
5	Green	6	Yellow	0	1:32:49
5	Green	7	White	0	1:32:57
5	Green	Shield	-	0	1:33:03
6	Yellow	7	White	0	1:33:14
6	Yellow	Shield	-	0	1:33:21
7	White	Shield	-	.204 Ω	1:33:29

R+D DM

CONDUCTOR RESISTANCE

7/C #14 – CABLE #3 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Black	2	Black		
3	Orange	3	Orange		
4	Blue	4	Blue		
5	Green	5	Green		
6	Yellow	6	Yellow		
7	White	7	White		

MEGGERING DATA SHEET

Client: Framatome-ANP
Project No: 14980-117047

Date: 3-17-04

Test Condition: Pre Test / During Test / Post Hose Stream / Post Test Cold (circle one)

Megger Operator: [signature]
Megger ID: 720

Scribe: [signature]
Calibration Due: 1-7-2005

POWER OFF VERIFIED: [signature]

Digital Volt Meter
Inst# 18911
due 1-5-05

7/C #14 - CABLE #3

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Black	0	.2 Ω
1	Red	3	Orange	0	.2 Ω
1	Red	4	Blue	0	.825 MΩ
1	Red	5	Green	0	.965 MΩ
1	Red	6	Yellow	0	1.002 MΩ
1	Red	7	White	0	.2 Ω
1	Red	Shield	-	0	.3 Ω
2	Black	3	Orange	0	.2 Ω
2	Black	4	Blue	0	.850 MΩ
2	Black	5	Green	0	.994 MΩ
2	Black	6	Yellow	0	1.028 MΩ
2	Black	7	White	0	.2 Ω
2	Black	Shield	-	0	.2 Ω
3	Orange	4	Blue	0	.868 MΩ
3	Orange	5	Green	0	1.037 MΩ
3	Orange	6	Yellow	0	1.067 MΩ
3	Orange	7	White	0	.2 Ω
3	Orange	Shield	-	0	.2 Ω
4	Blue	5	Green	0	.561 MΩ
4	Blue	6	Yellow	0	.594 MΩ
4	Blue	7	White	0	84.7 kΩ
4	Blue	Shield	-	0	85.4 kΩ
5	Green	6	Yellow	0	.553 MΩ
5	Green	7	White	0	91.2 kΩ
5	Green	Shield	-	0	94.8 kΩ
6	Yellow	7	White	0	47.9 kΩ
6	Yellow	Shield	-	0	51.8 kΩ
7	White	Shield	-	0	.2 Ω

14980-117047
Page 2 of 2
3-17-04
SP

CONDUCTOR RESISTANCE

7/C #14 – CABLE #3 (continued)

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	m (Ohms)	TIME
1	Red	1	Red	161.1	
2	Black	2	Black	164.2	
3	Orange	3	Orange	161.3	
4	Blue	4	Blue	152.2	
5	Green	5	Green	154.6	
6	Yellow	6	Yellow	151.7	
7	White	7	White	153.8	

Digital Low Resistance Ohmmeter
S:N: 7386 due: 1-5-2005

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/15/04
Project No: 14980-117047

Test Condition (Pre Test) During Test Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Grubbs Scribe: Constance Humphrey
Megger ID: #720 Calibration Due: 1/07/05
Last Cal. 1/07/04

POWER OFF VERIFIED: CH

7/C #10 - CABLE #4

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Brown	500	1:42.5
1	Red	3	Black	300	
1	Red	4	Green	225	1:43
1	Red	5	Yellow	380	1:44
1	Red	6	Orange	380	
1	Red	7	Blue	380	
1	Red	Shield	-	380	1:45
2	Brown	3	Black	8000	1:47
2	Brown	4	Green	8000	
2	Brown	5	Yellow	12,000	
2	Brown	6	Orange	12,000	1:48
2	Brown	7	Blue	12,000	
2	Brown	Shield	-	12,000	
3	Black	4	Green	800	1:48.5
3	Black	5	Yellow	2200	
3	Black	6	Orange	2000	1:49
3	Black	7	Blue	1800	
3	Black	Shield	-	1700	
4	Green	5	Yellow	600	1:50
4	Green	6	Orange	750	
4	Green	7	Blue	800	
4	Green	Shield	-	1600	
5	Yellow	6	Orange	500	1:51
5	Yellow	7	Blue	500	
5	Yellow	Shield	-	500	
6	Orange	7	Blue	3000	1:52
6	Orange	Shield	-	4000	
7	Blue	Shield	-	3000	1:52.5

Proj. #14980-117047

3/15/04

CONDUCTOR RESISTANCE

7/C #10 – CABLE #4 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red	55.0 mΩ	2:08.5
2	Brown	2	Brown	55.2 mΩ	
3	Black	3	Black	54.8 mΩ	
4	Green	4	Green	59.4 mΩ	2:09
5	Yellow	5	Yellow	55.2 mΩ	
6	Orange	6	Orange	57.1 mΩ	
7	Blue	7	Blue	56.3 mΩ	2:09.7

Equipment:
Digital Low Resistance Ohmeter CH

Ser. Number 7386

last calibrated 1/5/04

cal due date 1/5/05

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: Pre Test (During Test) Post Hose Stream Post Test Cold (circle one)
30 min

Megger Operator: Bobby Grubbs Scribe: Connie Humphrey
Megger ID: #720 Calibration Due: 1/7/05

POWER OFF VERIFIED: CH

time check 57.0 min
10:47:03 CH

7/C #10 - CABLE #4

FROM		TO		RESISTANCE	
COND. #	COLOR	COND. #	COLOR	(Megohms)	TIME
1	Red	2	Brown	.35	10:32:30
1	Red	3	Black	.6	10:32:55
1	Red	4	Green	.65	10:33:10
1	Red	5	Yellow	.75	10:33:28
1	Red	6	Orange	.75	10:33:38
1	Red	7	Blue	.8	10:33:49
1	Red	Shield	-	.8	10:33:57
2	Brown	3	Black	1.0	10:34:35:58 CH 3/16/04
2	Brown	4	Green	1.0	10:36:09
2	Brown	5	Yellow	1.0	10:36:19
2	Brown	6	Orange	1.2	10:36:33
2	Brown	7	Blue	1.5	10:36:48
2	Brown	Shield	-	1.2	10:36:59
3	Black	4	Green	.4	10:38:35
3	Black	5	Yellow	.7	10:38:55
3	Black	6	Orange	.75	10:39:09
3	Black	7	Blue	.75	10:39:17
3	Black	Shield	-	.8	10:39:23
4	Green	5	Yellow	.3	10:40:38
4	Green	6	Orange	.42	10:40:53
4	Green	7	Blue	.45	10:41:01
4	Green	Shield	-	.45	10:41:10
5	Yellow	6	Orange	.53	10:42:52
5	Yellow	7	Blue	.55	10:43:04
5	Yellow	Shield	-	.55	10:43:10
6	Orange	7	Blue	.6	10:44:42
6	Orange	Shield	-	.65	10:44:56
7	Blue	Shield	-	.3	10:46:10

CONDUCTOR RESISTANCE

7/C #10 – CABLE #4 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Brown	2	Brown		
3	Black	3	Black		
4	Green	4	Green		
5	Yellow	5	Yellow		
6	Orange	6	Orange		
7	Blue	7	Blue		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: Pre Test (During Test) Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Tumbs Scribe: Connie Humphrey
Megger ID: #720 Calibration Due: 11/7/05

POWER OFF VERIFIED: CH

7/C #10 - CABLE #4

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Brown	.42	11:49:22
1	Red	3	Black	.44	11:49:30
1	Red	4	Green	.45	11:49:37
1	Red	5	Yellow	.45	11:49:45
1	Red	6	Orange	.46	11:49:52
1	Red	7	Blue	.48	11:50:07
1	Red	Shield	-	.49	11:50:15
2	Brown	3	Black	.43	11:51:41
2	Brown	4	Green	.44	11:51:48
2	Brown	5	Yellow	.44	11:51:57
2	Brown	6	Orange	.44	11:52:07
2	Brown	7	Blue	.46	11:52:19
2	Brown	Shield	-	.48	11:52:27
3	Black	4	Green	.51	11:54:50
3	Black	5	Yellow	.52	11:54:59
3	Black	6	Orange	.53	11:55:06
3	Black	7	Blue	.54	11:55:15
3	Black	Shield	-	.54	11:55:23
4	Green	5	Yellow	.39	11:57:20
4	Green	6	Orange	.39	11:57:28
4	Green	7	Blue	.4	11:57:35
4	Green	Shield	-	.41	11:57:43
5	Yellow	6	Orange	.36	11:59:48
5	Yellow	7	Blue	.38	12:00:06
5	Yellow	Shield	-	.4	12:00:23
6	Orange	7	Blue	.38	12:02:03
6	Orange	Shield	-	.39	12:02:11
7	Blue	Shield	-	.4	12:04:14

CONDUCTOR RESISTANCE

7/C #10 – CABLE #4 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Brown	2	Brown		
3	Black	3	Black		
4	Green	4	Green		
5	Yellow	5	Yellow		
6	Orange	6	Orange		
7	Blue	7	Blue		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

2 Hrs. 25 min.

Test Condition: Pre Test (During Test) Post Hose Stream Post Test Cold (circle one)

Megger Operator: Bobby Stubbs Scribe: Connie Humphrey
Megger ID: #720 Calibration Due: 11/7/05

POWER OFF VERIFIED: CH

7/C #10 - CABLE #4

FROM		TO		RESISTANCE (Megohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Brown	.40	12:26:17
1	Red	3	Black	.41	12:26:24
1	Red	4	Green	.43	12:26:31
1	Red	5	Yellow	~~.43~~ .44	12:26:41 CH 3/16/04
1	Red	6	Orange	.48	12:27:22
1	Red	7	Blue	.49	12:27:30
1	Red	Shield	-	.51	12:27:39
2	Brown	3	Black	.48	12:29:20
2	Brown	4	Green	.49	12:29:29
2	Brown	5	Yellow	.51	12:29:37
2	Brown	6	Orange	.52	12:29:49
2	Brown	7	Blue	.53	12:29:57
2	Brown	Shield	-	.54	12:30:05
3	Black	4	Green	.44	12:31:47
3	Black	5	Yellow	.45	12:31:57
3	Black	6	Orange	.46	12:32:08
3	Black	7	Blue	.46	12:32:14
3	Black	Shield	-	.48	12:32:26
4	Green	5	Yellow	.4	12:34:19
4	Green	6	Orange	.4	12:34:26
4	Green	7	Blue	.41	12:34:37
4	Green	Shield	-	.43	12:34:46
5	Yellow	6	Orange	.39	12:36:12
5	Yellow	7	Blue	.39	12:36:21
5	Yellow	Shield	-	.41	12:36:30
6	Orange	7	Blue	.38	12:37:54
6	Orange	Shield	-	.38	12:38:03
7	Blue	Shield	-	.4	12:39:38

CONDUCTOR RESISTANCE

7/C #10 – CABLE #4 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Brown	2	Brown		
3	Black	3	Black		
4	Green	4	Green		
5	Yellow	5	Yellow		
6	Orange	6	Orange		
7	Blue	7	Blue		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3/16/04
Project No: 14980-117047

Test Condition: Pre Test During Test (Post Hose Stream) Post Test Cold (circle one)

Megger Operator: Bobby Grubbs Scribe: C Humphrey
Megger ID: SN 7386 Calibration Due: 1/5/05
C# 3/16/04 Low Resistance Ohmeter
POWER OFF VERIFIED: CJ

7/C #10 - CABLE #4

* CONDUCTOR TO CONDUCTOR RESISTANCE TEST

FROM		TO		RESISTANCE ~~(Megohms)~~ Ω	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	2	Brown	0	1:36:34
1	Red	3	Black	0	1:36:39
1	Red	4	Green	0	1:36:43
1	Red	5	Yellow	0	1:36:48
1	Red	6	Orange	0	1:36:57
1	Red	7	Blue	0	1:37:04
1	Red	Shield	-	0	1:37:11
2	Brown	3	Black	0	1:37:15
2	Brown	4	Green	0	1:37:20
2	Brown	5	Yellow	0	1:37:27
2	Brown	6	Orange	0	1:37:33
2	Brown	7	Blue	0	1:37:37
2	Brown	Shield	-	0	1:38:39
3	Black	4	Green	0	1:38:47
3	Black	5	Yellow	0	1:38:52
3	Black	6	Orange	0	1:38:57
3	Black	7	Blue	0	1:39:01
3	Black	Shield	-	0	1:39:04
4	Green	5	Yellow	0	1:39:13
4	Green	6	Orange	0	1:39:17
4	Green	7	Blue	0	1:39:20
4	Green	Shield	-	0	1:39:26
5	Yellow	6	Orange	0	1:39:34
5	Yellow	7	Blue	0	1:39:37
5	Yellow	Shield	-	0	1:39:41
6	Orange	7	Blue	0	1:39:44
6	Orange	Shield	-	0	1:39:49
7	Blue	Shield	-	0	1:39:53

CONDUCTOR RESISTANCE

7/C #10 – CABLE #4 (continued)

FROM		TO		RESISTANCE (Ohms)	TIME
COND. #	COLOR	COND. #	COLOR		
1	Red	1	Red		
2	Brown	2	Brown		
3	Black	3	Black		
4	Green	4	Green		
5	Yellow	5	Yellow		
6	Orange	6	Orange		
7	Blue	7	Blue		

MEGGERING DATA SHEET

Client: Framatome-ANP Date: 3-17-04
Project No: 14980-117047

Test Condition: Pre Test During Test Post Hose Stream Post Test Cold (circle one)

Megger Operator: [signature] Scribe: [signature]
Megger ID: 720 Calibration Due: 1-7-2006

POWER OFF VERIFIED: [signature]

Digital Volt Meter
Smart #18911
due 1-5-05

7/C #10 - CABLE #4

FROM		TO		RESISTANCE	TIME
COND. #	COLOR	COND. #	COLOR	(Megohms)	
1	Red	2	Brown	0	.612 MΩ
1	Red	3	Black	0	.553 MΩ
1	Red	4	Green	0	.474 MΩ
1	Red	5	Yellow	0	.495 MΩ
1	Red	6	Orange	0	.543 MΩ
1	Red	7	Blue	0	.534 MΩ
1	Red	Shield	-	0	55.8 kΩ
2	Brown	3	Black	0	204.2 kΩ
2	Brown	4	Green	0	188.7 kΩ
2	Brown	5	Yellow	0	182.2 kΩ
2	Brown	6	Orange	0	223.8 kΩ
2	Brown	7	Blue	0	.281 MΩ
2	Brown	Shield	-	0	84.1 kΩ
3	Black	4	Green	0	223.6 kΩ
3	Black	5	Yellow	0	.316 MΩ
3	Black	6	Orange	0	.341 MΩ
3	Black	7	Blue	0	222.7 kΩ
3	Black	Shield	-	0	94.3 kΩ
4	Green	5	Yellow	0	203.3 kΩ
4	Green	6	Orange	0	.391 MΩ
4	Green	7	Blue	0	.319 MΩ
4	Green	Shield	-	0	79.0 kΩ
5	Yellow	6	Orange	0	.280 MΩ
5	Yellow	7	Blue	0	228.3 kΩ
5	Yellow	Shield	-	0	.421 MΩ
6	Orange	7	Blue	0	.369 MΩ
6	Orange	Shield	-	0	.357 MΩ
7	Blue	Shield	-	0	146.5 kΩ

14980-117047
Page 2 of 2
3-17-04

CONDUCTOR RESISTANCE

7/C #10 – CABLE #4 (continued)

FROM		TO		RESISTANCE	TIME
COND. #	COLOR	COND. #	COLOR	m (Ohms)	
1	Red	1	Red	57.4	
2	Brown	2	Brown	58.0	
3	Black	3	Black	57.1	
4	Green	4	Green	61.9	
5	Yellow	5	Yellow	57.9	
6	Orange	6	Orange	55.8	
7	Blue	7	Blue	59.6	

Digital Low Resistance Ohmmeter
SN: 7386 due: 1-5-2005

Appendix C1

TEST DATA - PRE-TEST CURRENT LEAKAGE

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
0.0	0.00	0.0	0.0	-0.1	0.0	0.0
0.1	0.00	0.0	0.0	-0.1	0.0	0.0
0.2	0.00	-0.1	0.0	-0.1	-0.1	0.0
0.3	0.00	0.0	0.0	-0.1	-0.1	0.0
0.4	0.00	-0.1	0.0	-0.1	-0.1	0.0
0.5	0.00	-0.1	0.0	0.0	-0.1	0.0
0.6	0.00	-0.1	0.0	-0.1	-0.1	0.0
0.7	0.00	-0.1	0.0	-0.1	-0.1	0.0
0.8	0.00	-0.1	0.0	-0.1	-0.1	0.0
0.9	0.00	-0.1	0.0	-0.1	-0.1	0.0
1.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
1.1	0.00	0.0	0.0	0.0	0.0	0.0
1.2	0.00	-0.1	0.0	-0.1	-0.1	0.0
1.3	0.00	0.0	0.0	0.1	0.0	0.0
1.4	0.00	-0.1	0.0	-0.1	0.0	0.0
1.5	0.00	0.0	0.0	-0.1	-0.1	0.0
1.6	0.00	-0.1	0.0	-0.1	-0.1	0.0
1.7	0.00	-0.1	0.0	-0.1	-0.1	0.0
1.8	0.00	-0.1	0.0	-0.1	0.0	0.0
1.9	0.00	-0.1	0.0	0.0	-0.1	0.0
2.0	0.00	-0.1	0.0	-0.1	0.0	0.0
2.1	0.76	470.7	0.8	470.7	0.1	0.0
2.2	0.76	470.4	0.8	470.4	0.2	0.0
2.3	0.76	470.6	0.8	470.4	0.2	0.0
2.4	0.76	470.8	0.8	470.7	0.2	0.0
2.5	0.76	471.0	0.8	470.8	0.2	0.0
2.6	0.76	471.2	0.8	470.9	0.2	0.0
2.7	0.76	471.0	0.8	470.8	0.2	0.0
2.8	0.76	470.8	0.8	470.5	0.2	0.0
2.9	0.76	470.6	0.8	470.5	0.2	0.0
3.0	0.76	470.5	0.8	470.2	0.2	0.0
3.1	0.76	470.1	0.8	469.8	0.2	0.0
3.2	0.76	470.0	0.8	469.8	0.2	0.0
3.3	0.76	469.8	0.8	469.4	0.3	0.0
3.4	0.76	469.7	0.8	469.3	0.2	0.0
3.5	0.76	470.1	0.8	469.7	0.2	0.0
3.6	0.76	470.2	0.8	469.9	0.2	0.0
3.7	0.76	469.7	0.8	469.4	0.3	0.0
3.8	0.76	470.2	0.8	469.9	0.3	0.0
3.9	0.76	470.0	0.8	469.7	0.3	0.0
4.0	0.76	470.0	0.8	469.7	0.2	0.0
4.1	0.76	470.0	0.8	469.6	0.3	0.0
4.2	0.76	470.0	0.8	469.6	0.3	0.0
4.3	0.76	469.6	0.8	469.2	0.2	0.0
4.4	0.76	470.0	0.8	469.6	0.3	0.0
4.5	0.76	471.1	0.8	470.7	0.2	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
4.6	0.76	471.3	0.8	470.9	0.2	0.0
4.7	0.76	471.3	0.8	470.9	0.3	0.0
4.8	0.76	471.4	0.8	471.0	0.2	0.0
4.9	0.76	471.5	0.8	471.1	0.3	0.0
5.0	0.76	471.4	0.8	471.0	0.3	0.0
5.1	0.76	471.4	0.8	471.0	0.3	0.0
5.2	0.76	471.2	0.8	470.8	0.3	0.0
5.3	0.76	471.4	0.8	470.9	0.2	0.0
5.4	0.76	471.4	0.8	471.0	0.2	0.0
5.5	0.76	471.4	0.8	471.0	0.3	0.0
5.6	0.76	471.6	0.8	471.2	0.3	0.0
5.7	0.76	471.3	0.8	470.9	0.2	0.0
5.8	0.76	471.4	0.8	470.9	0.3	0.0
5.9	0.76	471.4	0.8	470.8	0.3	0.0
6.0	0.76	471.4	0.8	470.9	0.3	0.0
6.1	0.76	471.4	0.8	471.0	0.3	0.0
6.2	0.75	465.3	0.8	464.9	462.2	0.8
6.3	0.75	465.2	0.8	464.7	464.4	0.8
6.4	0.75	465.0	0.8	464.5	464.3	0.8
6.5	0.75	464.7	0.8	464.1	464.0	0.8
6.6	0.75	464.9	0.8	464.5	464.3	0.8
6.7	0.75	464.9	0.8	464.4	464.2	0.8
6.8	0.76	471.2	0.8	470.7	0.4	0.0
6.9	0.00	0.3	0.0	476.7	0.2	0.0
7.0	0.00	0.2	0.0	476.6	0.1	0.0
7.1	0.00	0.2	0.0	476.7	0.1	0.0
7.2	0.00	0.2	0.0	476.7	0.2	0.0
7.3	0.00	0.2	0.0	476.7	0.2	0.0
7.4	0.00	0.2	0.0	476.6	0.1	0.0
7.5	0.00	0.2	0.0	476.2	0.1	0.0
7.6	0.00	0.2	0.0	473.5	0.1	0.0
7.7	0.00	0.2	0.0	469.2	0.2	0.0
7.8	0.00	0.3	0.0	469.0	0.2	0.0
7.9	0.00	0.3	0.0	469.1	0.2	0.0
8.0	0.00	0.3	0.0	469.8	0.2	0.0
8.1	0.00	0.2	0.0	475.7	0.1	0.0
8.2	0.00	0.2	0.0	475.8	0.1	0.0
8.3	0.00	0.3	0.0	469.7	0.2	0.0
8.4	0.00	0.3	0.0	469.6	0.2	0.0
8.5	0.00	0.2	0.0	469.6	0.2	0.0
8.6	0.00	0.2	0.0	469.7	0.2	0.0
8.7	0.00	0.2	0.0	470.4	0.1	0.0
8.8	0.00	0.1	0.0	475.9	0.1	0.0
8.9	0.00	0.1	0.0	3.2	0.0	0.0
9.0	0.00	0.0	0.0	0.1	0.0	0.0
9.1	0.00	0.0	0.0	0.1	0.0	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
9.2	0.00	0.0	0.0	0.0	0.0	0.0
9.3	0.00	0.0	0.0	0.0	0.0	0.0
9.4	0.00	0.0	0.0	0.0	0.0	0.0
9.5	0.00	0.0	0.0	0.0	0.0	0.0
9.6	0.00	-0.1	0.0	0.0	-0.1	0.0
9.7	0.00	-0.1	0.0	0.0	0.0	0.0
9.8	0.00	-0.1	0.0	0.0	0.0	0.0
9.9	0.00	0.0	0.0	0.0	0.0	0.0
10.0	0.00	-0.1	0.0	0.0	0.0	0.0
10.1	0.00	0.0	0.0	-0.1	0.0	0.0
10.2	0.00	0.0	0.0	0.0	0.0	0.0
10.3	0.00	0.0	0.0	0.0	0.0	0.0
10.4	0.00	0.0	0.0	0.0	0.0	0.0
10.5	0.00	0.0	0.0	0.0	-0.1	0.0
10.6	0.00	0.1	0.0	475.8	0.1	0.0
10.7	0.00	0.1	0.0	476.0	0.1	0.0
10.8	0.00	0.1	0.0	476.0	0.1	0.0
10.9	0.00	0.1	0.0	475.9	0.1	0.0
11.0	0.00	0.1	0.0	0.5	0.0	0.0
11.1	0.00	0.0	0.0	0.1	0.0	0.0
11.2	0.00	0.0	0.0	0.0	0.0	0.0
11.3	0.00	0.0	0.0	0.0	-0.1	0.0
11.4	0.00	0.0	0.0	0.0	0.0	0.0
11.5	0.00	0.0	0.0	0.0	0.0	0.0
11.6	0.00	0.0	0.0	0.0	0.0	0.0
11.7	0.00	0.0	0.0	0.0	0.0	0.0
11.8	0.00	0.0	0.0	0.0	0.0	0.0
11.9	0.00	0.0	0.0	0.0	0.0	0.0
12.0	0.00	0.0	0.0	0.0	0.0	0.0
12.1	0.00	0.0	0.0	0.0	-0.1	0.0
12.2	0.00	0.0	0.0	0.0	0.0	0.0
12.3	0.00	0.0	0.0	0.0	0.0	0.0
12.4	0.00	0.0	0.0	0.0	-0.1	0.0
12.5	0.00	0.0	0.0	0.0	-0.1	0.0
12.6	0.00	0.0	0.0	-0.1	-0.1	0.0
12.7	0.00	0.0	0.0	0.0	-0.1	0.0
12.8	0.00	0.0	0.0	0.0	0.0	0.0
12.9	0.00	0.0	0.0	0.0	0.0	0.0
13.0	0.00	-0.1	0.0	-0.1	0.0	0.0
13.1	0.00	0.0	0.0	-0.1	0.0	0.0
13.2	0.00	0.0	0.0	0.0	0.0	0.0
13.3	0.00	0.0	0.0	0.0	0.0	0.0
13.4	0.00	0.0	0.0	0.0	0.0	0.0
13.5	0.00	0.0	0.0	0.0	0.0	0.0
13.6	0.00	0.0	0.0	0.0	0.0	0.0
13.7	0.00	0.1	0.0	0.0	0.0	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
13.8	0.00	0.0	0.0	0.0	0.0	0.0
13.9	0.00	0.0	0.0	0.0	0.0	0.0
14.0	0.00	0.0	0.0	0.0	0.0	0.0
14.1	0.00	0.0	0.0	-0.1	0.0	0.0
14.2	0.00	0.0	0.0	0.0	0.0	0.0
14.3	0.00	0.0	0.0	0.0	0.0	0.0
14.4	0.00	0.0	0.0	-0.1	0.0	0.0
14.5	0.00	0.0	0.0	0.0	0.0	0.0
14.6	0.00	-0.1	0.0	0.0	0.0	0.0
14.7	0.00	0.0	0.0	0.0	-0.1	0.0
14.8	0.00	0.0	0.0	0.0	0.0	0.0
14.9	0.00	0.0	0.0	0.0	0.0	0.0
15.0	0.00	0.0	0.0	-0.1	0.0	0.0
15.1	0.00	-0.1	0.0	0.0	-0.1	0.0
15.2	0.00	0.0	0.0	0.0	-0.1	0.0
15.3	0.00	-0.1	0.0	0.0	0.0	0.0
15.4	0.00	0.0	0.0	0.0	0.0	0.0
15.5	0.00	0.0	0.0	0.0	-0.1	0.0
15.6	0.00	0.0	0.0	0.0	0.0	0.0
15.7	0.00	0.0	0.0	0.0	-0.1	0.0
15.8	0.00	0.0	0.0	0.0	-0.1	0.0
15.9	0.00	-0.1	0.0	-0.1	-0.1	0.0
16.0	0.00	-0.1	0.0	0.0	-0.1	0.0
16.1	0.00	0.0	0.0	0.0	0.0	0.0
16.2	0.00	0.0	0.0	0.0	0.0	0.0
16.3	0.00	0.0	0.0	0.0	0.0	0.0
16.4	0.00	0.0	0.0	0.0	0.0	0.0
16.5	0.00	0.0	0.0	0.0	0.0	0.0
16.6	0.00	0.0	0.0	-0.1	-0.1	0.0
16.7	0.00	0.0	0.0	-0.1	0.0	0.0
16.8	0.00	0.0	0.0	0.0	0.0	0.0
16.9	0.00	0.0	0.0	0.0	0.0	0.0
17.0	0.00	0.0	0.0	0.0	0.0	0.0
17.1	0.00	0.0	0.0	0.0	0.0	0.0
17.2	0.00	0.0	0.0	-0.1	-0.1	0.0
17.3	0.00	0.0	0.0	0.0	0.0	0.0
17.4	0.00	0.0	0.0	0.0	-0.1	0.0
17.5	0.00	0.0	0.0	0.0	0.0	0.0
17.6	0.00	0.0	0.0	0.0	0.0	0.0
17.7	0.00	0.0	0.0	0.0	0.0	0.0
17.8	0.00	0.0	0.0	0.0	0.0	0.0
17.9	0.00	0.0	0.0	0.0	0.0	0.0
18.0	0.00	0.0	0.0	-0.1	0.0	0.0
18.1	0.00	0.0	0.0	0.0	0.0	0.0
18.2	0.00	0.0	0.0	-0.1	0.0	0.0
18.3	0.00	0.0	0.0	0.0	-0.1	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
18.4	0.00	0.0	0.0	0.0	0.0	0.0
18.5	0.00	0.0	0.0	0.0	0.0	0.0
18.6	0.00	0.0	0.0	0.0	-0.1	0.0
18.7	0.00	0.0	0.0	0.0	0.0	0.0
18.8	0.00	-0.1	0.0	0.0	0.0	0.0
18.9	0.00	0.0	0.0	0.0	-0.1	0.0
19.0	0.00	-0.1	0.0	0.0	0.0	0.0
19.1	0.00	0.0	0.0	0.0	-0.1	0.0
19.2	0.00	-0.1	0.0	-0.1	-0.1	0.0
19.3	0.00	0.0	0.0	0.0	0.0	0.0
19.4	0.00	0.0	0.0	-0.1	0.0	0.0
19.5	0.00	0.0	0.0	0.0	0.0	0.0
19.6	0.00	0.0	0.0	0.0	0.0	0.0
19.7	0.00	-0.1	0.0	0.0	0.0	0.0
19.8	0.00	0.1	0.0	477.5	0.1	0.0
19.9	0.76	471.4	0.8	471.3	0.2	0.0
20.0	0.76	471.5	0.8	471.3	0.2	0.0
20.1	0.76	471.5	0.8	471.3	0.2	0.0
20.2	0.76	471.6	0.8	471.4	0.2	0.0
20.3	0.76	471.6	0.8	471.3	0.2	0.0
20.4	0.76	471.8	0.8	471.5	0.2	0.0
20.5	0.76	471.2	0.8	471.0	0.2	0.0
20.6	0.76	471.8	0.8	471.4	0.2	0.0
20.7	0.76	471.6	0.8	471.3	0.3	0.0
20.8	0.75	467.4	0.8	467.9	0.3	0.0
20.9	0.76	471.0	0.8	470.7	0.3	0.0
21.0	0.01	1.3	0.0	477.5	0.2	0.0
21.1	0.00	0.1	0.0	0.2	0.0	0.0
21.2	0.00	0.1	0.0	0.1	0.0	0.0
21.3	0.00	0.0	0.0	0.0	0.0	0.0
21.4	0.00	0.0	0.0	0.0	0.0	0.0
21.5	0.00	0.0	0.0	0.0	0.0	0.0
21.6	0.00	0.0	0.0	0.0	-0.1	0.0
21.7	0.00	0.0	0.0	0.0	0.0	0.0
21.8	0.00	0.0	0.0	0.0	0.0	0.0
21.9	0.00	0.0	0.0	0.0	0.0	0.0
22.0	0.00	-0.1	0.0	0.0	0.0	0.0
22.1	0.00	0.0	0.0	0.0	-0.1	0.0
22.2	0.00	0.0	0.0	0.0	0.0	0.0
22.3	0.00	0.0	0.0	0.0	0.0	0.0
22.4	0.00	0.0	0.0	0.0	-0.1	0.0
22.5	0.00	0.0	0.0	0.0	-0.1	0.0
22.6	0.00	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
0.0	-0.1	0.0	0.0	0.0	0.00	0.0
0.1	-0.1	0.0	0.0	0.0	0.00	0.0
0.2	0.0	0.0	0.0	0.0	0.00	0.0
0.3	-0.1	0.0	-0.1	0.0	0.00	0.0
0.4	-0.1	0.0	-0.1	0.0	0.00	0.0
0.5	-0.1	0.0	0.0	0.0	0.00	0.0
0.6	-0.1	0.0	0.0	0.0	0.00	0.0
0.7	-0.1	0.0	-0.1	0.0	0.00	0.0
0.8	0.0	0.0	-0.1	0.0	0.00	0.0
0.9	-0.1	0.0	-0.1	0.0	0.00	0.0
1.0	-0.1	0.0	0.0	0.0	0.00	0.0
1.1	0.0	0.0	0.0	0.0	0.00	0.0
1.2	-0.1	0.0	-0.1	0.0	0.00	0.0
1.3	0.0	0.0	0.0	0.0	0.00	0.0
1.4	0.0	0.0	-0.1	0.0	0.00	0.0
1.5	-0.1	0.0	0.0	0.0	0.00	0.0
1.6	-0.1	0.0	-0.1	0.0	0.00	0.0
1.7	0.0	0.0	-0.1	0.0	0.00	0.0
1.8	-0.1	0.0	-0.1	0.0	0.00	0.0
1.9	0.0	0.0	-0.1	0.0	0.00	0.0
2.0	-0.1	0.0	0.0	0.0	0.00	0.0
2.1	0.1	0.0	0.1	0.0	0.00	0.0
2.2	0.2	0.0	0.2	0.0	0.00	0.0
2.3	0.2	0.0	0.2	0.0	0.00	0.0
2.4	0.2	0.0	0.2	0.0	0.00	0.0
2.5	0.2	0.0	0.2	0.0	0.00	0.0
2.6	0.2	0.0	0.1	0.0	0.00	0.0
2.7	0.2	0.0	0.1	0.0	0.00	0.0
2.8	0.2	0.0	0.1	0.0	0.00	0.0
2.9	0.2	0.0	0.2	0.0	0.00	0.0
3.0	0.2	0.0	0.2	0.0	0.00	0.0
3.1	0.2	0.0	0.2	0.0	0.00	0.0
3.2	0.2	0.0	0.2	0.0	0.00	0.0
3.3	0.2	0.0	0.2	0.0	0.00	0.0
3.4	0.2	0.0	0.2	0.0	0.00	0.0
3.5	0.2	0.0	0.2	0.0	0.00	0.0
3.6	0.2	0.0	0.2	0.0	0.00	0.0
3.7	0.2	0.0	0.2	0.0	0.00	0.0
3.8	0.3	0.0	0.3	0.0	0.00	0.0
3.9	0.2	0.0	0.2	0.0	0.00	0.0
4.0	0.2	0.0	0.2	0.0	0.00	0.0
4.1	0.2	0.0	0.2	0.0	0.00	0.0
4.2	0.2	0.0	0.2	0.0	0.00	0.0
4.3	0.2	0.0	0.2	0.0	0.00	0.0
4.4	0.2	0.0	0.2	0.0	0.00	0.0
4.5	0.2	0.0	0.2	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
4.6	0.2	0.0	0.2	0.0	0.00	0.0
4.7	0.2	0.0	0.2	0.0	0.00	0.0
4.8	0.2	0.0	0.2	0.0	0.00	0.0
4.9	0.2	0.0	0.2	0.0	0.00	0.0
5.0	0.2	0.0	0.2	0.0	0.00	0.0
5.1	0.2	0.0	0.2	0.0	0.00	0.0
5.2	0.2	0.0	0.2	0.0	0.00	0.0
5.3	0.2	0.0	0.2	0.0	0.00	0.0
5.4	0.2	0.0	0.2	0.0	0.00	0.0
5.5	0.2	0.0	0.2	0.0	0.00	0.0
5.6	0.2	0.0	0.2	0.0	0.00	0.0
5.7	0.2	0.0	0.2	0.0	0.00	0.0
5.8	0.2	0.0	0.2	0.0	0.00	0.0
5.9	0.2	0.0	0.2	0.0	0.00	0.0
6.0	0.2	0.0	0.2	0.0	0.00	0.0
6.1	0.2	0.0	0.2	0.0	0.00	0.0
6.2	0.4	0.0	0.3	0.0	0.00	0.0
6.3	0.4	0.0	0.3	0.0	0.00	0.0
6.4	0.4	0.0	0.4	0.0	0.00	0.0
6.5	0.4	0.0	0.3	0.0	0.00	0.0
6.6	0.4	0.0	0.3	0.0	0.00	0.0
6.7	0.4	0.0	0.4	0.0	0.00	0.0
6.8	0.2	0.0	0.2	0.0	0.00	0.0
6.9	0.1	0.0	0.1	0.0	0.00	0.0
7.0	0.1	0.0	0.1	0.0	0.00	0.0
7.1	0.1	0.0	0.1	0.0	0.00	0.0
7.2	0.1	0.0	0.1	0.0	0.00	0.0
7.3	0.2	0.0	0.2	0.0	0.00	0.0
7.4	0.1	0.0	0.1	0.0	0.00	0.0
7.5	0.1	0.0	0.1	0.0	0.00	0.0
7.6	0.1	0.0	0.1	0.0	0.00	0.0
7.7	412.4	0.7	0.2	0.0	0.00	0.0
7.8	468.8	0.8	0.2	0.0	0.00	0.0
7.9	469.0	0.8	0.2	0.0	0.00	0.0
8.0	469.7	0.8	0.2	0.0	0.00	0.0
8.1	0.2	0.0	0.1	0.0	0.00	0.0
8.2	0.2	0.0	0.1	0.0	0.00	0.0
8.3	469.5	0.8	0.2	0.0	0.00	0.0
8.4	469.5	0.8	0.2	0.0	0.00	0.0
8.5	0.3	0.0	469.8	0.8	0.00	0.0
8.6	0.2	0.0	470.2	0.8	0.00	0.0
8.7	0.1	0.0	118.7	0.2	0.00	0.0
8.8	0.1	0.0	0.2	0.0	0.00	0.0
8.9	0.1	0.0	0.1	0.0	0.00	0.0
9.0	0.0	0.0	0.0	0.0	0.00	0.0
9.1	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
9.2	0.0	0.0	0.0	0.0	0.00	0.0
9.3	0.0	0.0	0.0	0.0	0.00	0.0
9.4	0.0	0.0	0.0	0.0	0.00	0.0
9.5	-0.1	0.0	0.0	0.0	0.00	0.0
9.6	-0.1	0.0	0.0	0.0	0.00	0.0
9.7	-0.1	0.0	0.0	0.0	0.00	0.0
9.8	0.0	0.0	0.0	0.0	0.00	0.0
9.9	-0.1	0.0	0.0	0.0	0.00	0.0
10.0	0.0	0.0	0.0	0.0	0.00	0.0
10.1	-0.1	0.0	0.0	0.0	0.00	0.0
10.2	0.0	0.0	0.0	0.0	0.00	0.0
10.3	-0.1	0.0	-0.1	0.0	0.00	0.0
10.4	0.0	0.0	0.0	0.0	0.00	0.0
10.5	-0.1	0.0	0.0	0.0	0.00	0.0
10.6	0.1	0.0	0.1	0.0	0.00	0.0
10.7	0.1	0.0	0.1	0.0	0.00	0.0
10.8	0.1	0.0	0.1	0.0	0.00	0.0
10.9	0.1	0.0	0.1	0.0	0.00	0.0
11.0	0.0	0.0	0.0	0.0	0.76	120.5
11.1	0.0	0.0	0.0	0.0	0.76	120.5
11.2	-0.1	0.0	0.0	0.0	0.76	120.5
11.3	0.0	0.0	0.0	0.0	0.76	120.6
11.4	0.0	0.0	-0.1	0.0	0.76	120.5
11.5	0.0	0.0	0.0	0.0	0.76	120.6
11.6	0.0	0.0	0.0	0.0	0.76	120.5
11.7	-0.1	0.0	0.0	0.0	0.76	120.5
11.8	0.0	0.0	0.0	0.0	0.76	120.9
11.9	0.0	0.0	0.0	0.0	0.76	120.9
12.0	0.0	0.0	0.0	0.0	0.76	120.9
12.1	0.0	0.0	0.0	0.0	0.76	120.6
12.2	0.0	0.0	0.0	0.0	0.76	120.6
12.3	-0.1	0.0	-0.1	0.0	0.00	0.1
12.4	0.0	0.0	0.0	0.0	0.00	0.0
12.5	0.0	0.0	0.0	0.0	0.00	0.0
12.6	0.0	0.0	0.0	0.0	0.00	0.0
12.7	0.0	0.0	-0.1	0.0	0.00	0.0
12.8	0.0	0.0	0.0	0.0	0.00	0.0
12.9	-0.1	0.0	0.0	0.0	0.00	0.0
13.0	-0.1	0.0	0.0	0.0	0.00	0.0
13.1	-0.1	0.0	0.0	0.0	0.00	0.0
13.2	0.0	0.0	-0.1	0.0	0.00	0.0
13.3	0.0	0.0	0.0	0.0	0.00	0.0
13.4	-0.1	0.0	0.0	0.0	0.00	0.0
13.5	-0.1	0.0	0.0	0.0	0.00	0.0
13.6	0.0	0.0	-0.1	0.0	0.00	0.0
13.7	0.1	0.0	0.1	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
13.8	-0.1	0.0	-0.1	0.0	0.00	0.0
13.9	0.0	0.0	0.0	0.0	0.00	0.0
14.0	0.0	0.0	0.0	0.0	0.00	0.0
14.1	-0.1	0.0	0.0	0.0	0.00	0.0
14.2	-0.1	0.0	0.0	0.0	0.00	0.0
14.3	0.0	0.0	0.0	0.0	0.00	0.0
14.4	0.0	0.0	-0.1	0.0	0.00	0.0
14.5	0.0	0.0	-0.1	0.0	0.00	0.0
14.6	-0.1	0.0	0.0	0.0	0.00	0.0
14.7	-0.1	0.0	0.0	0.0	0.00	0.0
14.8	-0.1	0.0	0.0	0.0	0.00	0.0
14.9	0.0	0.0	-0.1	0.0	0.00	0.0
15.0	0.0	0.0	-0.1	0.0	0.00	0.0
15.1	-0.1	0.0	0.0	0.0	0.00	0.0
15.2	-0.1	0.0	-0.1	0.0	0.00	0.0
15.3	-0.1	0.0	-0.1	0.0	0.00	0.0
15.4	0.0	0.0	0.0	0.0	0.00	0.0
15.5	-0.1	0.0	-0.1	0.0	0.00	0.0
15.6	-0.1	0.0	0.0	0.0	0.00	0.0
15.7	0.0	0.0	-0.1	0.0	0.00	0.0
15.8	-0.1	0.0	0.0	0.0	0.00	0.0
15.9	-0.1	0.0	-0.1	0.0	0.00	0.0
16.0	0.0	0.0	-0.1	0.0	0.00	0.0
16.1	0.0	0.0	-0.1	0.0	0.00	0.0
16.2	0.0	0.0	-0.1	0.0	0.00	0.0
16.3	0.0	0.0	0.0	0.0	0.00	0.0
16.4	0.0	0.0	-0.1	0.0	0.00	0.0
16.5	-0.1	0.0	0.0	0.0	0.00	0.0
16.6	-0.1	0.0	-0.1	0.0	0.00	0.0
16.7	0.0	0.0	0.0	0.0	0.00	0.0
16.8	0.0	0.0	0.0	0.0	0.00	0.0
16.9	0.0	0.0	-0.1	0.0	0.00	0.0
17.0	0.0	0.0	0.0	0.0	0.00	0.0
17.1	-0.1	0.0	0.0	0.0	0.00	0.0
17.2	0.0	0.0	0.0	0.0	0.00	0.0
17.3	-0.1	0.0	0.0	0.0	0.00	0.0
17.4	0.0	0.0	0.0	0.0	0.00	0.0
17.5	0.0	0.0	-0.1	0.0	0.00	0.0
17.6	0.0	0.0	0.0	0.0	0.00	0.0
17.7	0.0	0.0	0.0	0.0	0.00	0.0
17.8	-0.1	0.0	-0.1	0.0	0.00	0.0
17.9	0.0	0.0	-0.1	0.0	0.00	0.0
18.0	0.0	0.0	0.0	0.0	0.00	0.0
18.1	-0.1	0.0	0.0	0.0	0.00	0.0
18.2	0.0	0.0	-0.1	0.0	0.00	0.0
18.3	-0.1	0.0	-0.1	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
18.4	-0.1	0.0	-0.1	0.0	0.00	0.0
18.5	0.0	0.0	0.0	0.0	0.00	0.0
18.6	-0.1	0.0	0.0	0.0	0.00	0.0
18.7	0.0	0.0	0.0	0.0	0.00	0.0
18.8	-0.1	0.0	0.0	0.0	0.00	0.0
18.9	0.0	0.0	0.0	0.0	0.00	0.0
19.0	0.0	0.0	-0.1	0.0	0.00	0.0
19.1	0.0	0.0	0.0	0.0	0.00	0.0
19.2	-0.1	0.0	-0.1	0.0	0.00	0.0
19.3	0.0	0.0	0.0	0.0	0.00	0.0
19.4	0.0	0.0	0.0	0.0	0.00	0.0
19.5	-0.1	0.0	0.0	0.0	0.00	0.0
19.6	0.0	0.0	0.0	0.0	0.00	0.0
19.7	0.0	0.0	0.0	0.0	0.00	0.0
19.8	0.1	0.0	0.1	0.0	0.00	0.0
19.9	0.2	0.0	0.2	0.0	0.00	0.0
20.0	0.2	0.0	0.2	0.0	0.00	0.0
20.1	0.2	0.0	0.1	0.0	0.00	0.0
20.2	0.2	0.0	0.1	0.0	0.00	0.0
20.3	0.2	0.0	0.1	0.0	0.00	0.0
20.4	0.2	0.0	0.2	0.0	0.00	0.0
20.5	0.2	0.0	0.2	0.0	0.00	0.0
20.6	0.2	0.0	0.2	0.0	0.00	0.0
20.7	0.2	0.0	0.2	0.0	0.00	0.0
20.8	0.2	0.0	0.2	0.0	0.00	0.0
20.9	0.2	0.0	0.2	0.0	0.00	0.0
21.0	0.1	0.0	0.1	0.0	0.00	0.0
21.1	0.0	0.0	0.0	0.0	0.00	0.0
21.2	0.0	0.0	0.0	0.0	0.76	120.9
21.3	0.0	0.0	0.0	0.0	0.76	120.9
21.4	0.0	0.0	0.0	0.0	0.76	121.0
21.5	0.0	0.0	0.0	0.0	0.76	121.0
21.6	0.0	0.0	0.0	0.0	0.01	0.5
21.7	0.0	0.0	0.0	0.0	0.00	0.0
21.8	0.0	0.0	0.0	0.0	0.00	0.0
21.9	0.0	0.0	0.0	0.0	0.00	0.0
22.0	-0.1	0.0	0.0	0.0	0.00	0.0
22.1	-0.1	0.0	0.0	0.0	0.00	0.0
22.2	0.0	0.0	0.0	0.0	0.00	0.0
22.3	0.0	0.0	0.0	0.0	0.00	0.0
22.4	0.0	0.0	0.0	0.0	0.00	0.0
22.5	0.0	0.0	0.0	0.0	0.00	0.0
22.6	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0	0.0	0.0
2.4	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0
2.6	0.0	0.0	0.0	0.0	0.0	0.0
2.7	0.0	0.0	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0
3.1	0.0	0.0	0.0	0.0	0.0	0.0
3.2	0.0	0.0	0.0	0.0	0.0	0.0
3.3	0.0	0.0	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0
3.6	0.0	0.0	0.0	0.0	0.0	0.0
3.7	0.0	0.0	0.0	0.0	0.0	0.0
3.8	0.0	0.0	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0
4.1	0.0	0.0	0.0	0.0	0.0	0.0
4.2	0.0	0.0	0.0	0.0	0.0	0.0
4.3	0.0	0.0	0.0	0.0	0.0	0.0
4.4	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
4.6	0.0	0.0	0.0	0.0	0.0	0.0
4.7	0.0	0.0	0.0	0.0	0.0	0.0
4.8	0.0	0.0	0.0	0.0	0.0	0.0
4.9	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0
5.1	0.0	0.0	0.0	0.0	0.0	0.0
5.2	0.0	0.0	0.0	0.0	0.0	0.0
5.3	0.0	0.0	0.0	0.0	0.0	0.0
5.4	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0
5.6	0.0	0.0	0.0	0.0	0.0	0.0
5.7	0.0	0.0	0.0	0.0	0.0	0.0
5.8	0.0	0.0	0.0	0.0	0.0	0.0
5.9	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0
6.1	0.0	0.0	0.0	0.0	0.0	0.0
6.2	0.0	0.0	0.0	0.0	0.0	0.0
6.3	0.0	0.0	0.0	0.0	0.0	0.0
6.4	0.0	0.0	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0
6.6	0.0	0.0	0.0	0.0	0.0	0.0
6.7	0.0	0.0	0.0	0.0	0.0	0.0
6.8	0.0	0.0	0.0	0.0	0.0	0.0
6.9	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0	0.0	0.0
7.1	0.0	0.0	0.0	0.0	0.0	0.0
7.2	0.0	0.0	0.0	0.0	0.0	0.0
7.3	0.0	0.0	0.0	0.0	0.0	0.0
7.4	0.0	0.0	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0
7.6	0.0	0.0	0.0	0.0	0.0	0.0
7.7	0.0	0.0	0.0	0.0	0.0	0.0
7.8	0.0	0.0	0.0	0.0	0.0	0.0
7.9	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0
8.1	0.0	0.0	0.0	0.0	0.0	0.0
8.2	0.0	0.0	0.0	0.0	0.0	0.0
8.3	0.0	0.0	0.0	0.0	0.0	0.0
8.4	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0
8.6	0.0	0.0	0.0	0.0	0.0	0.0
8.7	0.0	0.0	0.0	0.0	0.0	0.0
8.8	0.0	0.0	0.0	0.0	0.0	0.0
8.9	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0
9.1	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
9.2	0.0	0.0	0.0	0.0	0.0	0.0
9.3	0.0	0.0	0.0	0.0	0.0	0.0
9.4	0.0	0.0	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0
9.6	0.0	0.0	0.0	0.0	0.0	0.0
9.7	0.0	0.0	0.0	0.0	0.0	0.0
9.8	0.0	0.0	0.0	0.0	0.0	0.0
9.9	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0
10.1	0.0	0.0	0.0	0.0	0.0	0.0
10.2	0.0	0.0	0.0	0.0	0.0	0.0
10.3	0.0	0.0	0.0	0.0	0.0	0.0
10.4	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0
10.6	0.0	0.0	0.0	0.0	0.0	0.0
10.7	0.0	0.0	0.0	0.0	0.0	0.0
10.8	0.0	0.0	0.0	0.0	0.0	0.0
10.9	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.8	122.2	0.0	0.0	0.0	0.0
11.1	0.8	122.3	0.0	0.0	0.0	0.0
11.2	0.8	122.3	0.0	0.0	0.0	0.0
11.3	0.8	122.3	0.0	0.0	0.0	0.0
11.4	0.8	122.3	0.0	0.0	0.0	0.0
11.5	0.8	122.3	0.0	0.0	0.0	0.0
11.6	0.8	122.3	0.0	0.0	0.0	0.0
11.7	0.8	122.3	0.0	0.0	0.0	0.0
11.8	0.8	122.6	0.0	0.0	0.0	0.0
11.9	0.8	122.7	0.0	0.0	0.0	0.0
12.0	0.8	122.7	0.0	0.0	0.0	0.0
12.1	0.8	122.4	121.1	0.8	0.0	0.0
12.2	0.8	122.3	121.2	0.8	0.0	0.0
12.3	0.0	122.7	121.4	0.8	0.0	0.0
12.4	0.0	122.7	121.5	0.8	0.0	0.0
12.5	0.0	122.7	121.5	0.8	0.0	0.0
12.6	0.0	122.8	0.1	0.0	0.0	0.0
12.7	0.0	122.7	0.0	0.0	0.0	0.0
12.8	0.0	122.8	0.0	0.0	0.0	0.0
12.9	0.0	122.8	0.0	0.0	0.0	0.0
13.0	0.0	122.8	0.0	0.0	0.0	0.0
13.1	0.0	122.7	0.0	0.0	121.2	0.8
13.2	0.0	122.7	0.0	0.0	121.3	0.8
13.3	0.0	122.7	0.0	0.0	121.3	0.8
13.4	0.0	122.8	0.0	0.0	121.4	0.8
13.5	0.0	122.8	0.0	0.0	121.4	0.8
13.6	0.0	122.7	0.0	0.0	121.3	0.8
13.7	0.0	122.8	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
13.8	0.0	122.7	0.0	0.0	0.0	0.0
13.9	0.0	122.8	0.0	0.0	0.0	0.0
14.0	0.0	123.0	0.0	0.0	0.0	0.0
14.1	0.0	0.1	0.0	0.0	0.0	0.0
14.2	0.0	0.0	0.0	0.0	0.0	0.0
14.3	0.0	0.0	0.0	0.0	0.0	0.0
14.4	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0
14.6	0.0	0.0	0.0	0.0	0.0	0.0
14.7	0.0	0.0	0.0	0.0	0.0	0.0
14.8	0.0	0.0	0.0	0.0	0.0	0.0
14.9	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0
15.1	0.0	0.0	0.0	0.0	0.0	0.0
15.2	0.0	0.0	0.0	0.0	0.0	0.0
15.3	0.0	0.0	0.0	0.0	0.0	0.0
15.4	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0
15.6	0.0	0.0	0.0	0.0	0.0	0.0
15.7	0.0	0.0	0.0	0.0	0.0	0.0
15.8	0.0	0.0	0.0	0.0	0.0	0.0
15.9	0.0	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0
16.1	0.0	0.0	0.0	0.0	0.0	0.0
16.2	0.0	0.0	0.0	0.0	0.0	0.0
16.3	0.0	0.0	0.0	0.0	0.0	0.0
16.4	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0
16.6	0.0	0.0	0.0	0.0	0.0	0.0
16.7	0.0	0.0	0.0	0.0	0.0	0.0
16.8	0.0	0.0	0.0	0.0	0.0	0.0
16.9	0.0	0.0	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0
17.1	0.0	0.0	0.0	0.0	0.0	0.0
17.2	0.0	0.0	0.0	0.0	0.0	0.0
17.3	0.0	0.0	0.0	0.0	0.0	0.0
17.4	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0
17.6	0.0	0.0	0.0	0.0	0.0	0.0
17.7	0.0	0.0	0.0	0.0	0.0	0.0
17.8	0.0	0.0	0.0	0.0	0.0	0.0
17.9	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0
18.1	0.0	0.0	0.0	0.0	0.0	0.0
18.2	0.0	0.0	0.0	0.0	0.0	0.0
18.3	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
18.4	0.0	0.0	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0
18.6	0.0	0.0	0.0	0.0	0.0	0.0
18.7	0.0	0.0	0.0	0.0	0.0	0.0
18.8	0.0	0.0	0.0	0.0	0.0	0.0
18.9	0.0	0.0	0.0	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0
19.1	0.0	0.0	0.0	0.0	0.0	0.0
19.2	0.0	0.0	0.0	0.0	0.0	0.0
19.3	0.0	0.0	0.0	0.0	0.0	0.0
19.4	0.0	0.0	0.0	0.0	0.0	0.0
19.5	0.0	0.0	0.0	0.0	0.0	0.0
19.6	0.0	0.0	0.0	0.0	0.0	0.0
19.7	0.0	0.0	0.0	0.0	0.0	0.0
19.8	0.0	0.0	0.0	0.0	0.0	0.0
19.9	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0
20.1	0.0	0.0	0.0	0.0	0.0	0.0
20.2	0.0	0.0	0.0	0.0	0.0	0.0
20.3	0.0	0.0	0.0	0.0	0.0	0.0
20.4	0.0	0.0	0.0	0.0	0.0	0.0
20.5	0.0	0.0	0.0	0.0	0.0	0.0
20.6	0.0	0.0	0.0	0.0	0.0	0.0
20.7	0.0	0.0	0.0	0.0	0.0	0.0
20.8	0.0	0.0	0.0	0.0	0.0	0.0
20.9	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0
21.1	0.0	123.0	0.0	0.0	0.0	0.0
21.2	0.8	122.8	0.0	0.0	0.0	0.0
21.3	0.8	122.8	0.0	0.0	0.0	0.0
21.4	0.8	122.8	0.0	0.0	0.0	0.0
21.5	0.8	122.8	0.0	0.0	0.0	0.0
21.6	0.0	123.2	0.0	0.0	0.0	0.0
21.7	0.0	0.0	0.0	0.0	0.0	0.0
21.8	0.0	0.0	0.0	0.0	0.0	0.0
21.9	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0
22.1	0.0	0.0	0.0	0.0	0.0	0.0
22.2	0.0	0.0	0.0	0.0	0.0	0.0
22.3	0.0	0.0	0.0	0.0	0.0	0.0
22.4	0.0	0.0	0.0	0.0	0.0	0.0
22.5	0.0	0.0	0.0	0.0	0.0	0.0
22.6	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
0.0	0.0	0.0	0.0	0.0	0.00	0.0
0.1	0.0	0.0	0.0	0.0	0.00	0.0
0.2	0.0	0.0	0.0	0.0	0.00	0.0
0.3	0.0	0.0	0.0	0.0	0.00	0.0
0.4	0.0	0.0	0.0	0.0	0.00	0.0
0.5	0.0	0.0	0.0	0.0	0.00	0.0
0.6	0.0	0.0	0.0	0.0	0.00	0.0
0.7	0.0	0.0	0.0	0.0	0.00	0.0
0.8	0.0	0.0	0.0	0.0	0.00	0.0
0.9	0.0	0.0	0.0	0.0	0.00	0.0
1.0	0.0	0.0	0.0	0.0	0.00	0.0
1.1	0.0	0.0	0.0	0.0	0.00	0.0
1.2	0.0	0.0	0.0	0.0	0.00	0.0
1.3	0.0	0.0	0.0	0.0	0.00	0.0
1.4	0.0	0.0	0.0	0.0	0.00	0.0
1.5	0.0	0.0	0.0	0.0	0.00	0.0
1.6	0.0	0.0	0.0	0.0	0.00	0.0
1.7	0.0	0.0	0.0	0.0	0.00	0.0
1.8	0.0	0.0	0.0	0.0	0.00	0.0
1.9	0.0	0.0	0.0	0.0	0.00	0.0
2.0	0.0	0.0	0.0	0.0	0.00	0.0
2.1	0.0	0.0	0.0	0.0	0.00	0.0
2.2	0.0	0.0	0.0	0.0	0.00	0.0
2.3	0.0	0.0	0.0	0.0	0.00	0.0
2.4	0.0	0.0	0.0	0.0	0.00	0.0
2.5	0.0	0.0	0.0	0.0	0.00	0.0
2.6	0.0	0.0	0.0	0.0	0.00	0.0
2.7	0.0	0.0	0.0	0.0	0.00	0.0
2.8	0.0	0.0	0.0	0.0	0.00	0.0
2.9	0.0	0.0	0.0	0.0	0.00	0.0
3.0	0.0	0.0	0.0	0.0	0.00	0.0
3.1	0.0	0.0	0.0	0.0	0.00	0.0
3.2	0.0	0.0	0.0	0.0	0.00	0.0
3.3	0.0	0.0	0.0	0.0	0.00	0.0
3.4	0.0	0.0	0.0	0.0	0.00	0.0
3.5	0.0	0.0	0.0	0.0	0.00	0.0
3.6	0.0	0.0	0.0	0.0	0.00	0.0
3.7	0.0	0.0	0.0	0.0	0.00	0.0
3.8	0.0	0.0	0.0	0.0	0.00	0.0
3.9	0.0	0.0	0.0	0.0	0.00	0.0
4.0	0.0	0.0	0.0	0.0	0.00	0.0
4.1	0.0	0.0	0.0	0.0	0.00	0.0
4.2	0.0	0.0	0.0	0.0	0.00	0.0
4.3	0.0	0.0	0.0	0.0	0.00	0.0
4.4	0.0	0.0	0.0	0.0	0.00	0.0
4.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
4.6	0.0	0.0	0.0	0.0	0.00	0.0
4.7	0.0	0.0	0.0	0.0	0.00	0.0
4.8	0.0	0.0	0.0	0.0	0.00	0.0
4.9	0.0	0.0	0.0	0.0	0.00	0.0
5.0	0.0	0.0	0.0	0.0	0.00	0.0
5.1	0.0	0.0	0.0	0.0	0.00	0.0
5.2	0.0	0.0	0.0	0.0	0.00	0.0
5.3	0.0	0.0	0.0	0.0	0.00	0.0
5.4	0.0	0.0	0.0	0.0	0.00	0.0
5.5	0.0	0.0	0.0	0.0	0.00	0.0
5.6	0.0	0.0	0.0	0.0	0.00	0.0
5.7	0.0	0.0	0.0	0.0	0.00	0.0
5.8	0.0	0.0	0.0	0.0	0.00	0.0
5.9	0.0	0.0	0.0	0.0	0.00	0.0
6.0	0.0	0.0	0.0	0.0	0.00	0.0
6.1	0.0	0.0	0.0	0.0	0.00	0.0
6.2	0.0	0.0	0.0	0.0	0.00	0.0
6.3	0.0	0.0	0.0	0.0	0.00	0.0
6.4	0.0	0.0	0.0	0.0	0.00	0.0
6.5	0.0	0.0	0.0	0.0	0.00	0.0
6.6	0.0	0.0	0.0	0.0	0.00	0.0
6.7	0.0	0.0	0.0	0.0	0.00	0.0
6.8	0.0	0.0	0.0	0.0	0.00	0.0
6.9	0.0	0.0	0.0	0.0	0.00	0.0
7.0	0.0	0.0	0.0	0.0	0.00	0.0
7.1	0.0	0.0	0.0	0.0	0.00	0.0
7.2	0.0	0.0	0.0	0.0	0.00	0.0
7.3	0.0	0.0	0.0	0.0	0.00	0.0
7.4	0.0	0.0	0.0	0.0	0.00	0.0
7.5	0.0	0.0	0.0	0.0	0.00	0.0
7.6	0.0	0.0	0.0	0.0	0.00	0.0
7.7	0.0	0.0	0.0	0.0	0.00	0.0
7.8	0.0	0.0	0.0	0.0	0.00	0.0
7.9	0.0	0.0	0.0	0.0	0.00	0.0
8.0	0.0	0.0	0.0	0.0	0.00	0.0
8.1	0.0	0.0	0.0	0.0	0.00	0.0
8.2	0.0	0.0	0.0	0.0	0.00	0.0
8.3	0.0	0.0	0.0	0.0	0.00	0.0
8.4	0.0	0.0	0.0	0.0	0.00	0.0
8.5	0.0	0.0	0.0	0.0	0.00	0.0
8.6	0.0	0.0	0.0	0.0	0.00	0.0
8.7	0.0	0.0	0.0	0.0	0.00	0.0
8.8	0.0	0.0	0.0	0.0	0.00	0.0
8.9	0.0	0.0	0.0	0.0	0.00	0.0
9.0	0.0	0.0	0.0	0.0	0.00	0.0
9.1	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
9.2	0.0	0.0	0.0	0.0	0.00	0.0
9.3	0.0	0.0	0.0	0.0	0.00	0.0
9.4	0.0	0.0	0.0	0.0	0.00	0.0
9.5	0.0	0.0	0.0	0.0	0.00	0.0
9.6	0.0	0.0	0.0	0.0	0.00	0.0
9.7	0.0	0.0	0.0	0.0	0.00	0.0
9.8	0.0	0.0	0.0	0.0	0.00	0.0
9.9	0.0	0.0	0.0	0.0	0.00	0.0
10.0	0.0	0.0	0.0	0.0	0.00	0.0
10.1	0.0	0.0	0.0	0.0	0.00	0.0
10.2	0.0	0.0	0.0	0.0	0.00	0.0
10.3	0.0	0.0	0.0	0.0	0.00	0.0
10.4	0.0	0.0	0.0	0.0	0.00	0.0
10.5	0.0	0.0	0.0	0.0	0.00	0.0
10.6	0.0	0.0	0.0	0.0	0.00	0.0
10.7	0.0	0.0	0.0	0.0	0.00	0.0
10.8	0.0	0.0	0.0	0.0	0.00	0.0
10.9	0.0	0.0	0.0	0.0	0.00	0.0
11.0	0.0	0.0	0.0	0.0	0.00	0.0
11.1	0.0	0.0	0.0	0.0	0.00	0.0
11.2	0.0	0.0	0.0	0.0	0.00	0.0
11.3	0.0	0.0	0.0	0.0	0.00	0.0
11.4	0.0	0.0	0.0	0.0	0.00	0.0
11.5	0.0	0.0	0.0	0.0	0.00	0.0
11.6	0.0	0.0	0.0	0.0	0.00	0.0
11.7	0.0	0.0	0.0	0.0	0.00	0.0
11.8	0.0	0.0	0.0	0.0	0.00	0.0
11.9	0.0	0.0	0.0	0.0	0.00	0.0
12.0	0.0	0.0	0.0	0.0	0.00	0.0
12.1	0.0	0.0	0.0	0.0	0.00	0.0
12.2	0.0	0.0	0.0	0.0	0.00	0.0
12.3	0.0	0.0	0.0	0.0	0.00	0.0
12.4	0.0	0.0	0.0	0.0	0.00	0.0
12.5	0.0	0.0	0.0	0.0	0.00	0.0
12.6	0.0	0.0	121.3	0.8	0.00	0.0
12.7	0.0	0.0	121.3	0.8	0.00	0.0
12.8	0.0	0.0	121.4	0.8	0.00	0.0
12.9	0.0	0.0	121.3	0.8	0.00	0.0
13.0	0.0	0.0	121.3	0.8	0.00	0.0
13.1	0.0	0.0	0.1	0.0	0.00	0.0
13.2	0.0	0.0	0.0	0.0	0.00	0.0
13.3	0.0	0.0	0.0	0.0	0.00	0.0
13.4	0.0	0.0	0.0	0.0	0.00	0.0
13.5	0.0	0.0	0.0	0.0	0.00	0.0
13.6	0.0	0.0	0.0	0.0	0.00	0.0
13.7	121.2	0.8	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
13.8	121.1	0.8	0.0	0.0	0.00	0.0
13.9	121.2	0.8	0.0	0.0	0.00	0.0
14.0	0.1	0.0	0.0	0.0	0.00	0.0
14.1	0.0	0.0	0.0	0.0	0.70	105.9
14.2	0.0	0.0	0.0	0.0	0.77	120.8
14.3	0.0	0.0	0.0	0.0	0.77	120.9
14.4	0.0	0.0	0.0	0.0	0.77	120.9
14.5	0.0	0.0	0.0	0.0	0.77	120.9
14.6	0.0	0.0	0.0	0.0	0.77	120.9
14.7	0.0	0.0	0.0	0.0	0.77	120.9
14.8	0.0	0.0	0.0	0.0	0.77	120.9
14.9	0.0	0.0	0.0	0.0	0.77	120.9
15.0	0.0	0.0	0.0	0.0	0.77	120.8
15.1	0.0	0.0	0.0	0.0	0.02	0.7
15.2	0.0	0.0	0.0	0.0	0.00	0.0
15.3	0.0	0.0	0.0	0.0	0.00	0.0
15.4	0.0	0.0	0.0	0.0	0.00	0.0
15.5	0.0	0.0	0.0	0.0	0.00	0.0
15.6	0.0	0.0	0.0	0.0	0.00	0.0
15.7	0.0	0.0	0.0	0.0	0.00	0.0
15.8	0.0	0.0	0.0	0.0	0.00	0.0
15.9	0.0	0.0	0.0	0.0	0.00	0.0
16.0	0.0	0.0	0.0	0.0	0.00	0.0
16.1	0.0	0.0	0.0	0.0	0.00	0.0
16.2	0.0	0.0	0.0	0.0	0.00	0.0
16.3	0.0	0.0	0.0	0.0	0.00	0.0
16.4	0.0	0.0	0.0	0.0	0.00	0.0
16.5	0.0	0.0	0.0	0.0	0.00	0.0
16.6	0.0	0.0	0.0	0.0	0.00	0.0
16.7	0.0	0.0	0.0	0.0	0.00	0.0
16.8	0.0	0.0	0.0	0.0	0.00	0.0
16.9	0.0	0.0	0.0	0.0	0.00	0.0
17.0	0.0	0.0	0.0	0.0	0.00	0.0
17.1	0.0	0.0	0.0	0.0	0.00	0.0
17.2	0.0	0.0	0.0	0.0	0.00	0.0
17.3	0.0	0.0	0.0	0.0	0.00	0.0
17.4	0.0	0.0	0.0	0.0	0.00	0.0
17.5	0.0	0.0	0.0	0.0	0.00	0.0
17.6	0.0	0.0	0.0	0.0	0.00	0.0
17.7	0.0	0.0	0.0	0.0	0.00	0.0
17.8	0.0	0.0	0.0	0.0	0.00	0.0
17.9	0.0	0.0	0.0	0.0	0.00	0.0
18.0	0.0	0.0	0.0	0.0	0.00	0.0
18.1	0.0	0.0	0.0	0.0	0.00	0.0
18.2	0.0	0.0	0.0	0.0	0.00	0.0
18.3	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
18.4	0.0	0.0	0.0	0.0	0.00	0.0
18.5	0.0	0.0	0.0	0.0	0.00	0.0
18.6	0.0	0.0	0.0	0.0	0.00	0.0
18.7	0.0	0.0	0.0	0.0	0.00	0.0
18.8	0.0	0.0	0.0	0.0	0.00	0.0
18.9	0.0	0.0	0.0	0.0	0.00	0.0
19.0	0.0	0.0	0.0	0.0	0.00	0.0
19.1	0.0	0.0	0.0	0.0	0.00	0.0
19.2	0.0	0.0	0.0	0.0	0.00	0.0
19.3	0.0	0.0	0.0	0.0	0.00	0.0
19.4	0.0	0.0	0.0	0.0	0.00	0.0
19.5	0.0	0.0	0.0	0.0	0.00	0.0
19.6	0.0	0.0	0.0	0.0	0.00	0.0
19.7	0.0	0.0	0.0	0.0	0.00	0.0
19.8	0.0	0.0	0.0	0.0	0.00	0.0
19.9	0.0	0.0	0.0	0.0	0.00	0.0
20.0	0.0	0.0	0.0	0.0	0.00	0.0
20.1	0.0	0.0	0.0	0.0	0.00	0.0
20.2	0.0	0.0	0.0	0.0	0.00	0.0
20.3	0.0	0.0	0.0	0.0	0.00	0.0
20.4	0.0	0.0	0.0	0.0	0.00	0.0
20.5	0.0	0.0	0.0	0.0	0.00	0.0
20.6	0.0	0.0	0.0	0.0	0.00	0.0
20.7	0.0	0.0	0.0	0.0	0.00	0.0
20.8	0.0	0.0	0.0	0.0	0.00	0.0
20.9	0.0	0.0	0.0	0.0	0.00	0.0
21.0	0.0	0.0	0.0	0.0	0.00	0.0
21.1	0.0	0.0	0.0	0.0	0.00	0.0
21.2	0.0	0.0	0.0	0.0	0.00	0.0
21.3	0.0	0.0	0.0	0.0	0.00	0.0
21.4	0.0	0.0	0.0	0.0	0.00	0.0
21.5	0.0	0.0	0.0	0.0	0.00	0.0
21.6	0.0	0.0	0.0	0.0	0.00	0.0
21.7	0.0	0.0	0.0	0.0	0.00	0.0
21.8	0.0	0.0	0.0	0.0	0.77	120.9
21.9	0.0	0.0	0.0	0.0	0.77	120.9
22.0	0.0	0.0	0.0	0.0	0.77	120.9
22.1	0.0	0.0	0.0	0.0	0.77	121.0
22.2	0.0	0.0	0.0	0.0	0.00	0.1
22.3	0.0	0.0	0.0	0.0	0.00	0.0
22.4	0.0	0.0	0.0	0.0	0.00	0.0
22.5	0.0	0.0	0.0	0.0	0.00	0.0
22.6	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0	0.0	0.0
2.4	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0
2.6	0.0	0.0	0.0	0.0	0.0	0.0
2.7	0.0	0.0	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0
3.1	0.0	0.0	0.0	0.0	0.0	0.0
3.2	0.0	0.0	0.0	0.0	0.0	0.0
3.3	0.0	0.0	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0
3.6	0.0	0.0	0.0	0.0	0.0	0.0
3.7	0.0	0.0	0.0	0.0	0.0	0.0
3.8	0.0	0.0	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0
4.1	0.0	0.0	0.0	0.0	0.0	0.0
4.2	0.0	0.0	0.0	0.0	0.0	0.0
4.3	0.0	0.0	0.0	0.0	0.0	0.0
4.4	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
4.6	0.0	0.0	0.0	0.0	0.0	0.0
4.7	0.0	0.0	0.0	0.0	0.0	0.0
4.8	0.0	0.0	0.0	0.0	0.0	0.0
4.9	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0
5.1	0.0	0.0	0.0	0.0	0.0	0.0
5.2	0.0	0.0	0.0	0.0	0.0	0.0
5.3	0.0	0.0	0.0	0.0	0.0	0.0
5.4	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0
5.6	0.0	0.0	0.0	0.0	0.0	0.0
5.7	0.0	0.0	0.0	0.0	0.0	0.0
5.8	0.0	0.0	0.0	0.0	0.0	0.0
5.9	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0
6.1	0.0	0.0	0.0	0.0	0.0	0.0
6.2	0.0	0.0	0.0	0.0	0.0	0.0
6.3	0.0	0.0	0.0	0.0	0.0	0.0
6.4	0.0	0.0	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0
6.6	0.0	0.0	0.0	0.0	0.0	0.0
6.7	0.0	0.0	0.0	0.0	0.0	0.0
6.8	0.0	0.0	0.0	0.0	0.0	0.0
6.9	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0	0.0	0.0
7.1	0.0	0.0	0.0	0.0	0.0	0.0
7.2	0.0	0.0	0.0	0.0	0.0	0.0
7.3	0.0	0.0	0.0	0.0	0.0	0.0
7.4	0.0	0.0	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0
7.6	0.0	0.0	0.0	0.0	0.0	0.0
7.7	0.0	0.0	0.0	0.0	0.0	0.0
7.8	0.0	0.0	0.0	0.0	0.0	0.0
7.9	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0
8.1	0.0	0.0	0.0	0.0	0.0	0.0
8.2	0.0	0.0	0.0	0.0	0.0	0.0
8.3	0.0	0.0	0.0	0.0	0.0	0.0
8.4	0.0	0.0	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0	0.0	0.0
8.6	0.0	0.0	0.0	0.0	0.0	0.0
8.7	0.0	0.0	0.0	0.0	0.0	0.0
8.8	0.0	0.0	0.0	0.0	0.0	0.0
8.9	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0
9.1	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
9.2	0.0	0.0	0.0	0.0	0.0	0.0
9.3	0.0	0.0	0.0	0.0	0.0	0.0
9.4	0.0	0.0	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0
9.6	0.0	0.0	0.0	0.0	0.0	0.0
9.7	0.0	0.0	0.0	0.0	0.0	0.0
9.8	0.0	0.0	0.0	0.0	0.0	0.0
9.9	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0
10.1	0.0	0.0	0.0	0.0	0.0	0.0
10.2	0.0	0.0	0.0	0.0	0.0	0.0
10.3	0.0	0.0	0.0	0.0	0.0	0.0
10.4	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0
10.6	0.0	0.0	0.0	0.0	0.0	0.0
10.7	0.0	0.0	0.0	0.0	0.0	0.0
10.8	0.0	0.0	0.0	0.0	0.0	0.0
10.9	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0
11.1	0.0	0.0	0.0	0.0	0.0	0.0
11.2	0.0	0.0	0.0	0.0	0.0	0.0
11.3	0.0	0.0	0.0	0.0	0.0	0.0
11.4	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0
11.6	0.0	0.0	0.0	0.0	0.0	0.0
11.7	0.0	0.0	0.0	0.0	0.0	0.0
11.8	0.0	0.0	0.0	0.0	0.0	0.0
11.9	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0
12.1	0.0	0.0	0.0	0.0	0.0	0.0
12.2	0.0	0.0	0.0	0.0	0.0	0.0
12.3	0.0	0.0	0.0	0.0	0.0	0.0
12.4	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0
12.6	0.0	0.0	0.0	0.0	0.0	0.0
12.7	0.0	0.0	0.0	0.0	0.0	0.0
12.8	0.0	0.0	0.0	0.0	0.0	0.0
12.9	0.0	0.0	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0
13.1	0.0	0.0	0.0	0.0	0.0	0.0
13.2	0.0	0.0	0.0	0.0	0.0	0.0
13.3	0.0	0.0	0.0	0.0	0.0	0.0
13.4	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0
13.6	0.0	0.0	0.0	0.0	0.0	0.0
13.7	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
13.8	0.0	0.0	0.0	0.0	0.0	0.0
13.9	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0
14.1	0.7	112.2	0.0	0.0	0.0	0.0
14.2	0.8	121.2	0.0	0.0	0.0	0.0
14.3	0.8	121.2	0.0	0.0	0.0	0.0
14.4	0.8	121.2	0.0	0.0	0.0	0.0
14.5	0.8	121.3	0.0	0.0	0.0	0.0
14.6	0.8	121.2	0.0	0.0	0.0	0.0
14.7	0.8	121.2	0.0	0.0	0.0	0.0
14.8	0.8	121.2	0.0	0.0	0.0	0.0
14.9	0.8	121.3	0.0	0.0	0.0	0.0
15.0	0.8	121.1	0.0	0.0	0.0	0.0
15.1	0.0	121.6	0.0	0.0	0.0	0.0
15.2	0.0	121.3	121.3	0.8	0.0	0.0
15.3	0.0	121.3	121.4	0.8	0.0	0.0
15.4	0.0	121.3	121.4	0.8	0.0	0.0
15.5	0.0	121.4	121.4	0.8	0.0	0.0
15.6	0.0	121.4	0.0	0.0	121.3	0.8
15.7	0.0	121.3	0.0	0.0	121.3	0.8
15.8	0.0	121.3	0.0	0.0	121.3	0.8
15.9	0.0	121.3	0.0	0.0	0.1	0.0
16.0	0.0	121.3	0.0	0.0	0.0	0.0
16.1	0.0	121.4	0.0	0.0	0.0	0.0
16.2	0.0	121.3	0.0	0.0	0.0	0.0
16.3	0.0	121.3	0.0	0.0	0.0	0.0
16.4	0.0	121.4	0.0	0.0	0.0	0.0
16.5	0.0	121.6	0.0	0.0	0.0	0.0
16.6	0.0	121.6	0.0	0.0	0.0	0.0
16.7	0.0	0.1	0.0	0.0	0.0	0.0
16.8	0.0	0.0	0.0	0.0	0.0	0.0
16.9	0.0	0.0	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0	0.0	0.0
17.1	0.0	0.0	0.0	0.0	0.0	0.0
17.2	0.0	0.0	0.0	0.0	0.0	0.0
17.3	0.0	0.0	0.0	0.0	0.0	0.0
17.4	0.0	0.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0	0.0	0.0
17.6	0.0	0.0	0.0	0.0	0.0	0.0
17.7	0.0	0.0	0.0	0.0	0.0	0.0
17.8	0.0	0.0	0.0	0.0	0.0	0.0
17.9	0.0	0.0	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0	0.0	0.0
18.1	0.0	0.0	0.0	0.0	0.0	0.0
18.2	0.0	0.0	0.0	0.0	0.0	0.0
18.3	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
18.4	0.0	0.0	0.0	0.0	0.0	0.0
18.5	0.0	0.0	0.0	0.0	0.0	0.0
18.6	0.0	0.0	0.0	0.0	0.0	0.0
18.7	0.0	0.0	0.0	0.0	0.0	0.0
18.8	0.0	0.0	0.0	0.0	0.0	0.0
18.9	0.0	0.0	0.0	0.0	0.0	0.0
19.0	0.0	0.0	0.0	0.0	0.0	0.0
19.1	0.0	0.0	0.0	0.0	0.0	0.0
19.2	0.0	0.0	0.0	0.0	0.0	0.0
19.3	0.0	0.0	0.0	0.0	0.0	0.0
19.4	0.0	0.0	0.0	0.0	0.0	0.0
19.5	0.0	0.0	0.0	0.0	0.0	0.0
19.6	0.0	0.0	0.0	0.0	0.0	0.0
19.7	0.0	0.0	0.0	0.0	0.0	0.0
19.8	0.0	0.0	0.0	0.0	0.0	0.0
19.9	0.0	0.0	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0	0.0	0.0
20.1	0.0	0.0	0.0	0.0	0.0	0.0
20.2	0.0	0.0	0.0	0.0	0.0	0.0
20.3	0.0	0.0	0.0	0.0	0.0	0.0
20.4	0.0	0.0	0.0	0.0	0.0	0.0
20.5	0.0	0.0	0.0	0.0	0.0	0.0
20.6	0.0	0.0	0.0	0.0	0.0	0.0
20.7	0.0	0.0	0.0	0.0	0.0	0.0
20.8	0.0	0.0	0.0	0.0	0.0	0.0
20.9	0.0	0.0	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0
21.1	0.0	0.0	0.0	0.0	0.0	0.0
21.2	0.0	0.0	0.0	0.0	0.0	0.0
21.3	0.0	0.0	0.0	0.0	0.0	0.0
21.4	0.0	0.0	0.0	0.0	0.0	0.0
21.5	0.0	0.0	0.0	0.0	0.0	0.0
21.6	0.0	0.0	0.0	0.0	0.0	0.0
21.7	0.0	121.6	0.0	0.0	0.0	0.0
21.8	0.8	121.3	0.0	0.0	0.0	0.0
21.9	0.8	121.3	0.0	0.0	0.0	0.0
22.0	0.8	121.3	0.0	0.0	0.0	0.0
22.1	0.8	121.3	0.0	0.0	0.0	0.0
22.2	0.0	0.1	0.0	0.0	0.0	0.0
22.3	0.0	0.0	0.0	0.0	0.0	0.0
22.4	0.0	0.0	0.0	0.0	0.0	0.0
22.5	0.0	0.0	0.0	0.0	0.0	0.0
22.6	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
0.0	0.0	0.0	0.0	0.0	0.00	0.0
0.1	0.0	0.0	0.0	0.0	0.00	0.0
0.2	0.0	0.0	0.0	0.0	0.00	0.0
0.3	0.0	0.0	0.0	0.0	0.00	0.0
0.4	0.0	0.0	0.0	0.0	0.00	0.0
0.5	0.0	0.0	0.0	0.0	0.00	0.0
0.6	0.0	0.0	0.0	0.0	0.00	0.0
0.7	0.0	0.0	0.0	0.0	0.00	0.0
0.8	0.0	0.0	0.0	0.0	0.00	0.0
0.9	0.0	0.0	0.0	0.0	0.00	0.0
1.0	0.0	0.0	0.0	0.0	0.00	0.0
1.1	0.0	0.0	0.0	0.0	0.00	0.0
1.2	0.0	0.0	0.0	0.0	0.00	0.0
1.3	0.0	0.0	0.0	0.0	0.00	0.0
1.4	0.0	0.0	0.0	0.0	0.00	0.0
1.5	0.0	0.0	0.0	0.0	0.00	0.0
1.6	0.0	0.0	0.0	0.0	0.00	0.0
1.7	0.0	0.0	0.0	0.0	0.00	0.0
1.8	0.0	0.0	0.0	0.0	0.00	0.0
1.9	0.0	0.0	0.0	0.0	0.00	0.0
2.0	0.0	0.0	0.0	0.0	0.00	0.0
2.1	0.0	0.0	0.0	0.0	0.00	0.0
2.2	0.0	0.0	0.0	0.0	0.00	0.0
2.3	0.0	0.0	0.0	0.0	0.00	0.0
2.4	0.0	0.0	0.0	0.0	0.00	0.0
2.5	0.0	0.0	0.0	0.0	0.00	0.0
2.6	0.0	0.0	0.0	0.0	0.00	0.0
2.7	0.0	0.0	0.0	0.0	0.00	0.0
2.8	0.0	0.0	0.0	0.0	0.00	0.0
2.9	0.0	0.0	0.0	0.0	0.00	0.0
3.0	0.0	0.0	0.0	0.0	0.00	0.0
3.1	0.0	0.0	0.0	0.0	0.00	0.0
3.2	0.0	0.0	0.0	0.0	0.00	0.0
3.3	0.0	0.0	0.0	0.0	0.00	0.0
3.4	0.0	0.0	0.0	0.0	0.00	0.0
3.5	0.0	0.0	0.0	0.0	0.00	0.0
3.6	0.0	0.0	0.0	0.0	0.00	0.0
3.7	0.0	0.0	0.0	0.0	0.00	0.0
3.8	0.0	0.0	0.0	0.0	0.00	0.0
3.9	0.0	0.0	0.0	0.0	0.00	0.0
4.0	0.0	0.0	0.0	0.0	0.00	0.0
4.1	0.0	0.0	0.0	0.0	0.00	0.0
4.2	0.0	0.0	0.0	0.0	0.00	0.0
4.3	0.0	0.0	0.0	0.0	0.00	0.0
4.4	0.0	0.0	0.0	0.0	0.00	0.0
4.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
4.6	0.0	0.0	0.0	0.0	0.00	0.0
4.7	0.0	0.0	0.0	0.0	0.00	0.0
4.8	0.0	0.0	0.0	0.0	0.00	0.0
4.9	0.0	0.0	0.0	0.0	0.00	0.0
5.0	0.0	0.0	0.0	0.0	0.00	0.0
5.1	0.0	0.0	0.0	0.0	0.00	0.0
5.2	0.0	0.0	0.0	0.0	0.00	0.0
5.3	0.0	0.0	0.0	0.0	0.00	0.0
5.4	0.0	0.0	0.0	0.0	0.00	0.0
5.5	0.0	0.0	0.0	0.0	0.00	0.0
5.6	0.0	0.0	0.0	0.0	0.00	0.0
5.7	0.0	0.0	0.0	0.0	0.00	0.0
5.8	0.0	0.0	0.0	0.0	0.00	0.0
5.9	0.0	0.0	0.0	0.0	0.00	0.0
6.0	0.0	0.0	0.0	0.0	0.00	0.0
6.1	0.0	0.0	0.0	0.0	0.00	0.0
6.2	0.0	0.0	0.0	0.0	0.00	0.0
6.3	0.0	0.0	0.0	0.0	0.00	0.0
6.4	0.0	0.0	0.0	0.0	0.00	0.0
6.5	0.0	0.0	0.0	0.0	0.00	0.0
6.6	0.0	0.0	0.0	0.0	0.00	0.0
6.7	0.0	0.0	0.0	0.0	0.00	0.0
6.8	0.0	0.0	0.0	0.0	0.00	0.0
6.9	0.0	0.0	0.0	0.0	0.00	0.0
7.0	0.0	0.0	0.0	0.0	0.00	0.0
7.1	0.0	0.0	0.0	0.0	0.00	0.0
7.2	0.0	0.0	0.0	0.0	0.00	0.0
7.3	0.0	0.0	0.0	0.0	0.00	0.0
7.4	0.0	0.0	0.0	0.0	0.00	0.0
7.5	0.0	0.0	0.0	0.0	0.00	0.0
7.6	0.0	0.0	0.0	0.0	0.00	0.0
7.7	0.0	0.0	0.0	0.0	0.00	0.0
7.8	0.0	0.0	0.0	0.0	0.00	0.0
7.9	0.0	0.0	0.0	0.0	0.00	0.0
8.0	0.0	0.0	0.0	0.0	0.00	0.0
8.1	0.0	0.0	0.0	0.0	0.00	0.0
8.2	0.0	0.0	0.0	0.0	0.00	0.0
8.3	0.0	0.0	0.0	0.0	0.00	0.0
8.4	0.0	0.0	0.0	0.0	0.00	0.0
8.5	0.0	0.0	0.0	0.0	0.00	0.0
8.6	0.0	0.0	0.0	0.0	0.00	0.0
8.7	0.0	0.0	0.0	0.0	0.00	0.0
8.8	0.0	0.0	0.0	0.0	0.00	0.0
8.9	0.0	0.0	0.0	0.0	0.00	0.0
9.0	0.0	0.0	0.0	0.0	0.00	0.0
9.1	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
9.2	0.0	0.0	0.0	0.0	0.00	0.0
9.3	0.0	0.0	0.0	0.0	0.00	0.0
9.4	0.0	0.0	0.0	0.0	0.00	0.0
9.5	0.0	0.0	0.0	0.0	0.00	0.0
9.6	0.0	0.0	0.0	0.0	0.00	0.0
9.7	0.0	0.0	0.0	0.0	0.00	0.0
9.8	0.0	0.0	0.0	0.0	0.00	0.0
9.9	0.0	0.0	0.0	0.0	0.00	0.0
10.0	0.0	0.0	0.0	0.0	0.00	0.0
10.1	0.0	0.0	0.0	0.0	0.00	0.0
10.2	0.0	0.0	0.0	0.0	0.00	0.0
10.3	0.0	0.0	0.0	0.0	0.00	0.0
10.4	0.0	0.0	0.0	0.0	0.00	0.0
10.5	0.0	0.0	0.0	0.0	0.00	0.0
10.6	0.0	0.0	0.0	0.0	0.00	0.0
10.7	0.0	0.0	0.0	0.0	0.00	0.0
10.8	0.0	0.0	0.0	0.0	0.00	0.0
10.9	0.0	0.0	0.0	0.0	0.00	0.0
11.0	0.0	0.0	0.0	0.0	0.00	0.0
11.1	0.0	0.0	0.0	0.0	0.00	0.0
11.2	0.0	0.0	0.0	0.0	0.00	0.0
11.3	0.0	0.0	0.0	0.0	0.00	0.0
11.4	0.0	0.0	0.0	0.0	0.00	0.0
11.5	0.0	0.0	0.0	0.0	0.00	0.0
11.6	0.0	0.0	0.0	0.0	0.00	0.0
11.7	0.0	0.0	0.0	0.0	0.00	0.0
11.8	0.0	0.0	0.0	0.0	0.00	0.0
11.9	0.0	0.0	0.0	0.0	0.00	0.0
12.0	0.0	0.0	0.0	0.0	0.00	0.0
12.1	0.0	0.0	0.0	0.0	0.00	0.0
12.2	0.0	0.0	0.0	0.0	0.00	0.0
12.3	0.0	0.0	0.0	0.0	0.00	0.0
12.4	0.0	0.0	0.0	0.0	0.00	0.0
12.5	0.0	0.0	0.0	0.0	0.00	0.0
12.6	0.0	0.0	0.0	0.0	0.00	0.0
12.7	0.0	0.0	0.0	0.0	0.00	0.0
12.8	0.0	0.0	0.0	0.0	0.00	0.0
12.9	0.0	0.0	0.0	0.0	0.00	0.0
13.0	0.0	0.0	0.0	0.0	0.00	0.0
13.1	0.0	0.0	0.0	0.0	0.00	0.0
13.2	0.0	0.0	0.0	0.0	0.00	0.0
13.3	0.0	0.0	0.0	0.0	0.00	0.0
13.4	0.0	0.0	0.0	0.0	0.00	0.0
13.5	0.0	0.0	0.0	0.0	0.00	0.0
13.6	0.0	0.0	0.0	0.0	0.00	0.0
13.7	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
13.8	0.0	0.0	0.0	0.0	0.00	0.0
13.9	0.0	0.0	0.0	0.0	0.00	0.0
14.0	0.0	0.0	0.0	0.0	0.00	0.0
14.1	0.0	0.0	0.0	0.0	0.00	0.0
14.2	0.0	0.0	0.0	0.0	0.00	0.0
14.3	0.0	0.0	0.0	0.0	0.00	0.0
14.4	0.0	0.0	0.0	0.0	0.00	0.0
14.5	0.0	0.0	0.0	0.0	0.00	0.0
14.6	0.0	0.0	0.0	0.0	0.00	0.0
14.7	0.0	0.0	0.0	0.0	0.00	0.0
14.8	0.0	0.0	0.0	0.0	0.00	0.0
14.9	0.0	0.0	0.0	0.0	0.00	0.0
15.0	0.0	0.0	0.0	0.0	0.00	0.0
15.1	0.0	0.0	0.0	0.0	0.00	0.0
15.2	0.0	0.0	0.0	0.0	0.00	0.0
15.3	0.0	0.0	0.0	0.0	0.00	0.0
15.4	0.0	0.0	0.0	0.0	0.00	0.0
15.5	0.0	0.0	0.0	0.0	0.00	0.0
15.6	0.0	0.0	0.0	0.0	0.00	0.0
15.7	0.0	0.0	0.0	0.0	0.00	0.0
15.8	0.0	0.0	0.0	0.0	0.00	0.0
15.9	121.3	0.8	0.0	0.0	0.00	0.0
16.0	121.3	0.8	0.0	0.0	0.00	0.0
16.1	121.4	0.8	0.0	0.0	0.00	0.0
16.2	0.0	0.0	121.3	0.8	0.00	0.0
16.3	0.0	0.0	121.3	0.8	0.00	0.0
16.4	0.0	0.0	121.3	0.8	0.00	0.0
16.5	0.0	0.0	0.0	0.0	0.00	0.0
16.6	0.0	0.0	0.0	0.0	0.00	0.0
16.7	0.0	0.0	0.0	0.0	0.78	121.0
16.8	0.0	0.0	0.0	0.0	0.78	121.6
16.9	0.0	0.0	0.0	0.0	0.78	121.7
17.0	0.0	0.0	0.0	0.0	0.78	121.7
17.1	0.0	0.0	0.0	0.0	0.78	121.7
17.2	0.0	0.0	0.0	0.0	0.78	121.6
17.3	0.0	0.0	0.0	0.0	0.78	121.6
17.4	0.0	0.0	0.0	0.0	0.02	0.6
17.5	0.0	0.0	0.0	0.0	0.00	0.0
17.6	0.0	0.0	0.0	0.0	0.00	0.0
17.7	0.0	0.0	0.0	0.0	0.00	0.0
17.8	0.0	0.0	0.0	0.0	0.00	0.0
17.9	0.0	0.0	0.0	0.0	0.00	0.0
18.0	0.0	0.0	0.0	0.0	0.00	0.0
18.1	0.0	0.0	0.0	0.0	0.00	0.0
18.2	0.0	0.0	0.0	0.0	0.00	0.0
18.3	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
18.4	0.0	0.0	0.0	0.0	0.00	0.0
18.5	0.0	0.0	0.0	0.0	0.00	0.0
18.6	0.0	0.0	0.0	0.0	0.00	0.0
18.7	0.0	0.0	0.0	0.0	0.00	0.0
18.8	0.0	0.0	0.0	0.0	0.00	0.0
18.9	0.0	0.0	0.0	0.0	0.00	0.0
19.0	0.0	0.0	0.0	0.0	0.00	0.0
19.1	0.0	0.0	0.0	0.0	0.00	0.0
19.2	0.0	0.0	0.0	0.0	0.00	0.0
19.3	0.0	0.0	0.0	0.0	0.00	0.0
19.4	0.0	0.0	0.0	0.0	0.00	0.0
19.5	0.0	0.0	0.0	0.0	0.00	0.0
19.6	0.0	0.0	0.0	0.0	0.00	0.0
19.7	0.0	0.0	0.0	0.0	0.00	0.0
19.8	0.0	0.0	0.0	0.0	0.00	0.0
19.9	0.0	0.0	0.0	0.0	0.00	0.0
20.0	0.0	0.0	0.0	0.0	0.00	0.0
20.1	0.0	0.0	0.0	0.0	0.00	0.0
20.2	0.0	0.0	0.0	0.0	0.00	0.0
20.3	0.0	0.0	0.0	0.0	0.00	0.0
20.4	0.0	0.0	0.0	0.0	0.00	0.0
20.5	0.0	0.0	0.0	0.0	0.00	0.0
20.6	0.0	0.0	0.0	0.0	0.00	0.0
20.7	0.0	0.0	0.0	0.0	0.00	0.0
20.8	0.0	0.0	0.0	0.0	0.00	0.0
20.9	0.0	0.0	0.0	0.0	0.00	0.0
21.0	0.0	0.0	0.0	0.0	0.00	0.0
21.1	0.0	0.0	0.0	0.0	0.00	0.0
21.2	0.0	0.0	0.0	0.0	0.00	0.0
21.3	0.0	0.0	0.0	0.0	0.00	0.0
21.4	0.0	0.0	0.0	0.0	0.00	0.0
21.5	0.0	0.0	0.0	0.0	0.00	0.0
21.6	0.0	0.0	0.0	0.0	0.00	0.0
21.7	0.0	0.0	0.0	0.0	0.00	0.0
21.8	0.0	0.0	0.0	0.0	0.00	0.0
21.9	0.0	0.0	0.0	0.0	0.00	0.0
22.0	0.0	0.0	0.0	0.0	0.00	0.0
22.1	0.0	0.0	0.0	0.0	0.00	0.0
22.2	0.0	0.0	0.0	0.0	0.00	0.0
22.3	0.0	0.0	0.0	0.0	0.78	121.7
22.4	0.0	0.0	0.0	0.0	0.78	121.8
22.5	0.0	0.0	0.0	0.0	0.78	121.7
22.6	0.0	0.0	0.0	0.0	0.78	121.7

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0	0.0	0.0
2.4	0.0	0.1	0.0	0.0	0.0	0.0
2.5	0.0	0.1	0.0	0.0	0.0	0.0
2.6	0.0	0.1	0.0	0.0	0.0	0.0
2.7	0.0	0.1	0.0	0.0	0.0	0.0
2.8	0.0	0.1	0.0	0.0	0.0	0.0
2.9	0.0	0.1	0.0	0.0	0.0	0.0
3.0	0.0	0.1	0.0	0.0	0.0	0.0
3.1	0.0	0.1	0.0	0.0	0.0	0.0
3.2	0.0	0.1	0.0	0.0	0.0	0.0
3.3	0.0	0.1	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.1	0.0	0.0	0.0	0.0
3.6	0.0	0.1	0.0	0.0	0.0	0.0
3.7	0.0	0.1	0.0	0.0	0.0	0.0
3.8	0.0	0.1	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.1	0.0	0.0	0.0	0.0
4.1	0.0	0.1	0.0	0.0	0.0	0.0
4.2	0.0	0.1	0.0	0.0	0.0	0.0
4.3	0.0	0.1	0.0	0.0	0.0	0.0
4.4	0.0	0.1	0.0	0.0	0.0	0.0
4.5	0.0	0.1	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
4.6	0.0	0.1	0.0	0.0	0.0	0.0
4.7	0.0	0.1	0.0	0.0	0.0	0.0
4.8	0.0	0.1	0.0	0.0	0.0	0.0
4.9	0.0	0.1	0.0	0.0	0.0	0.0
5.0	0.0	0.1	0.0	0.0	0.0	0.0
5.1	0.0	0.1	0.0	0.0	0.0	0.0
5.2	0.0	0.1	0.0	0.0	0.0	0.0
5.3	0.0	0.1	0.0	0.0	0.0	0.0
5.4	0.0	0.1	0.0	0.0	0.0	0.0
5.5	0.0	0.1	0.0	0.0	0.0	0.0
5.6	0.0	0.1	0.0	0.0	0.0	0.0
5.7	0.0	0.1	0.0	0.0	0.0	0.0
5.8	0.0	0.1	0.0	0.0	0.0	0.0
5.9	0.0	0.1	0.0	0.0	0.0	0.0
6.0	0.0	0.1	0.0	0.0	0.0	0.0
6.1	0.0	0.1	0.0	0.0	0.0	0.0
6.2	0.0	0.1	0.0	0.0	0.0	0.0
6.3	0.0	0.1	0.0	0.0	0.0	0.0
6.4	0.0	0.1	0.0	0.0	0.0	0.0
6.5	0.0	0.1	0.0	0.0	0.0	0.0
6.6	0.0	0.1	0.0	0.0	0.0	0.0
6.7	0.0	0.1	0.0	0.0	0.0	0.0
6.8	0.0	0.1	0.0	0.0	0.0	0.0
6.9	0.0	0.1	0.0	0.0	0.0	0.0
7.0	0.0	0.1	0.0	0.0	0.0	0.0
7.1	0.0	0.1	0.0	0.0	0.0	0.0
7.2	0.0	0.0	0.0	0.0	0.0	0.0
7.3	0.0	0.1	0.0	0.0	0.0	0.0
7.4	0.0	0.1	0.0	0.0	0.0	0.0
7.5	0.0	0.1	0.0	0.0	0.0	0.0
7.6	0.0	0.1	0.0	0.0	0.0	0.0
7.7	0.0	0.1	0.0	0.0	0.0	0.0
7.8	0.0	0.1	0.0	0.0	0.0	0.0
7.9	0.0	0.1	0.0	0.0	0.0	0.0
8.0	0.0	0.1	0.0	0.0	0.0	0.0
8.1	0.0	0.0	0.0	0.0	0.0	0.0
8.2	0.0	0.1	0.0	0.0	0.0	0.0
8.3	0.0	0.1	0.0	0.0	0.0	0.0
8.4	0.0	0.1	0.0	0.0	0.0	0.0
8.5	0.0	0.1	0.0	0.0	0.0	0.0
8.6	0.0	0.1	0.0	0.0	0.0	0.0
8.7	0.0	0.1	0.0	0.0	0.0	0.0
8.8	0.0	0.0	0.0	0.0	0.0	0.0
8.9	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0	0.0	0.0
9.1	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
9.2	0.0	0.0	0.0	0.0	0.0	0.0
9.3	0.0	0.0	0.0	0.0	0.0	0.0
9.4	0.0	0.0	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0	0.0	0.0
9.6	0.0	0.0	0.0	0.0	0.0	0.0
9.7	0.0	0.0	0.0	0.0	0.0	0.0
9.8	0.0	0.0	0.0	0.0	0.0	0.0
9.9	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.0	0.0
10.1	0.0	0.0	0.0	0.0	0.0	0.0
10.2	0.0	0.0	0.0	0.0	0.0	0.0
10.3	0.0	0.0	0.0	0.0	0.0	0.0
10.4	0.0	0.0	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0	0.0	0.0
10.6	0.0	0.0	0.0	0.0	0.0	0.0
10.7	0.0	0.0	0.0	0.0	0.0	0.0
10.8	0.0	0.0	0.0	0.0	0.0	0.0
10.9	0.0	0.0	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0	0.0	0.0
11.1	0.0	0.0	0.0	0.0	0.0	0.0
11.2	0.0	0.0	0.0	0.0	0.0	0.0
11.3	0.0	0.0	0.0	0.0	0.0	0.0
11.4	0.0	0.0	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0	0.0	0.0
11.6	0.0	0.0	0.0	0.0	0.0	0.0
11.7	0.0	0.0	0.0	0.0	0.0	0.0
11.8	0.0	0.0	0.0	0.0	0.0	0.0
11.9	0.0	0.0	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0	0.0	0.0
12.1	0.0	0.0	0.0	0.0	0.0	0.0
12.2	0.0	0.0	0.0	0.0	0.0	0.0
12.3	0.0	0.0	0.0	0.0	0.0	0.0
12.4	0.0	0.0	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0
12.6	0.0	0.0	0.0	0.0	0.0	0.0
12.7	0.0	0.0	0.0	0.0	0.0	0.0
12.8	0.0	0.0	0.0	0.0	0.0	0.0
12.9	0.0	0.0	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0	0.0	0.0
13.1	0.0	0.0	0.0	0.0	0.0	0.0
13.2	0.0	0.0	0.0	0.0	0.0	0.0
13.3	0.0	0.0	0.0	0.0	0.0	0.0
13.4	0.0	0.0	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0	0.0	0.0
13.6	0.0	0.0	0.0	0.0	0.0	0.0
13.7	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
13.8	0.0	0.0	0.0	0.0	0.0	0.0
13.9	0.0	0.0	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0	0.0	0.0
14.1	0.0	0.0	0.0	0.0	0.0	0.0
14.2	0.0	0.0	0.0	0.0	0.0	0.0
14.3	0.0	0.0	0.0	0.0	0.0	0.0
14.4	0.0	0.0	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0	0.0	0.0
14.6	0.0	0.0	0.0	0.0	0.0	0.0
14.7	0.0	0.0	0.0	0.0	0.0	0.0
14.8	0.0	0.0	0.0	0.0	0.0	0.0
14.9	0.0	0.0	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0	0.0	0.0
15.1	0.0	0.0	0.0	0.0	0.0	0.0
15.2	0.0	0.0	0.0	0.0	0.0	0.0
15.3	0.0	0.0	0.0	0.0	0.0	0.0
15.4	0.0	0.0	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0	0.0	0.0
15.6	0.0	0.0	0.0	0.0	0.0	0.0
15.7	0.0	0.0	0.0	0.0	0.0	0.0
15.8	0.0	0.0	0.0	0.0	0.0	0.0
15.9	0.0	0.0	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0	0.0	0.0
16.1	0.0	0.0	0.0	0.0	0.0	0.0
16.2	0.0	0.0	0.0	0.0	0.0	0.0
16.3	0.0	0.0	0.0	0.0	0.0	0.0
16.4	0.0	0.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0	0.0	0.0
16.6	0.0	0.0	0.0	0.0	0.0	0.0
16.7	0.8	121.0	0.0	0.0	0.0	0.0
16.8	0.8	121.1	0.0	0.0	0.0	0.0
16.9	0.8	121.1	0.0	0.0	0.0	0.0
17.0	0.8	121.1	0.0	0.0	0.0	0.0
17.1	0.8	121.1	0.0	0.0	0.0	0.0
17.2	0.8	121.1	0.0	0.0	0.0	0.0
17.3	0.8	121.1	0.0	0.0	0.0	0.0
17.4	0.0	121.1	121.2	0.8	0.0	0.0
17.5	0.0	121.1	121.3	0.8	0.0	0.0
17.6	0.0	121.1	121.3	0.8	0.0	0.0
17.7	0.0	121.1	121.3	0.8	0.0	0.0
17.8	0.0	121.1	0.1	0.0	121.1	0.8
17.9	0.0	121.1	0.0	0.0	121.2	0.8
18.0	0.0	121.1	0.0	0.0	121.2	0.8
18.1	0.0	121.1	0.0	0.0	121.2	0.8
18.2	0.0	121.1	0.0	0.0	121.2	0.8
18.3	0.0	121.1	0.0	0.0	121.2	0.8

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
18.4	0.0	121.1	0.0	0.0	0.1	0.0
18.5	0.0	121.1	0.0	0.0	0.0	0.0
18.6	0.0	121.1	0.0	0.0	0.0	0.0
18.7	0.0	121.1	0.0	0.0	0.0	0.0
18.8	0.0	121.1	0.0	0.0	0.0	0.0
18.9	0.0	121.4	0.0	0.0	0.0	0.0
19.0	0.0	121.4	0.0	0.0	0.0	0.0
19.1	0.0	0.1	0.0	0.0	0.0	0.0
19.2	0.0	121.4	0.0	0.0	0.0	0.0
19.3	0.0	0.3	0.0	0.0	0.0	0.0
19.4	0.0	0.0	0.0	0.0	0.0	0.0
19.5	0.0	0.0	0.0	0.0	0.0	0.0
19.6	0.0	0.0	0.0	0.0	0.0	0.0
19.7	0.0	0.0	0.0	0.0	0.0	0.0
19.8	0.0	0.0	0.0	0.0	0.0	0.0
19.9	0.0	0.1	0.0	0.0	0.0	0.0
20.0	0.0	0.1	0.0	0.0	0.0	0.0
20.1	0.0	0.1	0.0	0.0	0.0	0.0
20.2	0.0	0.1	0.0	0.0	0.0	0.0
20.3	0.0	0.1	0.0	0.0	0.0	0.0
20.4	0.0	0.1	0.0	0.0	0.0	0.0
20.5	0.0	0.1	0.0	0.0	0.0	0.0
20.6	0.0	0.1	0.0	0.0	0.0	0.0
20.7	0.0	0.1	0.0	0.0	0.0	0.0
20.8	0.0	0.1	0.0	0.0	0.0	0.0
20.9	0.0	0.1	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0	0.0	0.0
21.1	0.0	0.0	0.0	0.0	0.0	0.0
21.2	0.0	0.0	0.0	0.0	0.0	0.0
21.3	0.0	0.0	0.0	0.0	0.0	0.0
21.4	0.0	0.0	0.0	0.0	0.0	0.0
21.5	0.0	0.0	0.0	0.0	0.0	0.0
21.6	0.0	0.0	0.0	0.0	0.0	0.0
21.7	0.0	0.0	0.0	0.0	0.0	0.0
21.8	0.0	0.0	0.0	0.0	0.0	0.0
21.9	0.0	0.0	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0	0.0	0.0
22.1	0.0	0.0	0.0	0.0	0.0	0.0
22.2	0.0	0.0	0.0	0.0	0.0	0.0
22.3	0.8	121.2	0.0	0.0	0.0	0.0
22.4	0.8	121.2	0.0	0.0	0.0	0.0
22.5	0.8	121.2	0.0	0.0	0.0	0.0
22.6	0.8	121.2	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0
2.4	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0
2.6	0.0	0.0	0.0	0.0
2.7	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0
3.1	0.0	0.0	0.0	0.0
3.2	0.0	0.0	0.0	0.0
3.3	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0
3.6	0.0	0.0	0.0	0.0
3.7	0.0	0.0	0.0	0.0
3.8	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0
4.1	0.0	0.0	0.0	0.0
4.2	0.0	0.0	0.0	0.0
4.3	0.0	0.0	0.0	0.0
4.4	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
4.6	0.0	0.0	0.0	0.0
4.7	0.0	0.0	0.0	0.0
4.8	0.0	0.0	0.0	0.0
4.9	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0
5.1	0.0	0.0	0.0	0.0
5.2	0.0	0.0	0.0	0.0
5.3	0.0	0.0	0.0	0.0
5.4	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0
5.6	0.0	0.0	0.0	0.0
5.7	0.0	0.0	0.0	0.0
5.8	0.0	0.0	0.0	0.0
5.9	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0
6.1	0.0	0.0	0.0	0.0
6.2	0.0	0.0	0.0	0.0
6.3	0.0	0.0	0.0	0.0
6.4	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0
6.6	0.0	0.0	0.0	0.0
6.7	0.0	0.0	0.0	0.0
6.8	0.0	0.0	0.0	0.0
6.9	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0
7.1	0.0	0.0	0.0	0.0
7.2	0.0	0.0	0.0	0.0
7.3	0.0	0.0	0.0	0.0
7.4	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0
7.6	0.0	0.0	0.0	0.0
7.7	0.0	0.0	0.0	0.0
7.8	0.0	0.0	0.0	0.0
7.9	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0
8.1	0.0	0.0	0.0	0.0
8.2	0.0	0.0	0.0	0.0
8.3	0.0	0.0	0.0	0.0
8.4	0.0	0.0	0.0	0.0
8.5	0.0	0.0	0.0	0.0
8.6	0.0	0.0	0.0	0.0
8.7	0.0	0.0	0.0	0.0
8.8	0.0	0.0	0.0	0.0
8.9	0.0	0.0	0.0	0.0
9.0	0.0	0.0	0.0	0.0
9.1	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
9.2	0.0	0.0	0.0	0.0
9.3	0.0	0.0	0.0	0.0
9.4	0.0	0.0	0.0	0.0
9.5	0.0	0.0	0.0	0.0
9.6	0.0	0.0	0.0	0.0
9.7	0.0	0.0	0.0	0.0
9.8	0.0	0.0	0.0	0.0
9.9	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0
10.1	0.0	0.0	0.0	0.0
10.2	0.0	0.0	0.0	0.0
10.3	0.0	0.0	0.0	0.0
10.4	0.0	0.0	0.0	0.0
10.5	0.0	0.0	0.0	0.0
10.6	0.0	0.0	0.0	0.0
10.7	0.0	0.0	0.0	0.0
10.8	0.0	0.0	0.0	0.0
10.9	0.0	0.0	0.0	0.0
11.0	0.0	0.0	0.0	0.0
11.1	0.0	0.0	0.0	0.0
11.2	0.0	0.0	0.0	0.0
11.3	0.0	0.0	0.0	0.0
11.4	0.0	0.0	0.0	0.0
11.5	0.0	0.0	0.0	0.0
11.6	0.0	0.0	0.0	0.0
11.7	0.0	0.0	0.0	0.0
11.8	0.0	0.0	0.0	0.0
11.9	0.0	0.0	0.0	0.0
12.0	0.0	0.0	0.0	0.0
12.1	0.0	0.0	0.0	0.0
12.2	0.0	0.0	0.0	0.0
12.3	0.0	0.0	0.0	0.0
12.4	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0
12.6	0.0	0.0	0.0	0.0
12.7	0.0	0.0	0.0	0.0
12.8	0.0	0.0	0.0	0.0
12.9	0.0	0.0	0.0	0.0
13.0	0.0	0.0	0.0	0.0
13.1	0.0	0.0	0.0	0.0
13.2	0.0	0.0	0.0	0.0
13.3	0.0	0.0	0.0	0.0
13.4	0.0	0.0	0.0	0.0
13.5	0.0	0.0	0.0	0.0
13.6	0.0	0.0	0.0	0.0
13.7	0.0	0.0	0.0	0.0

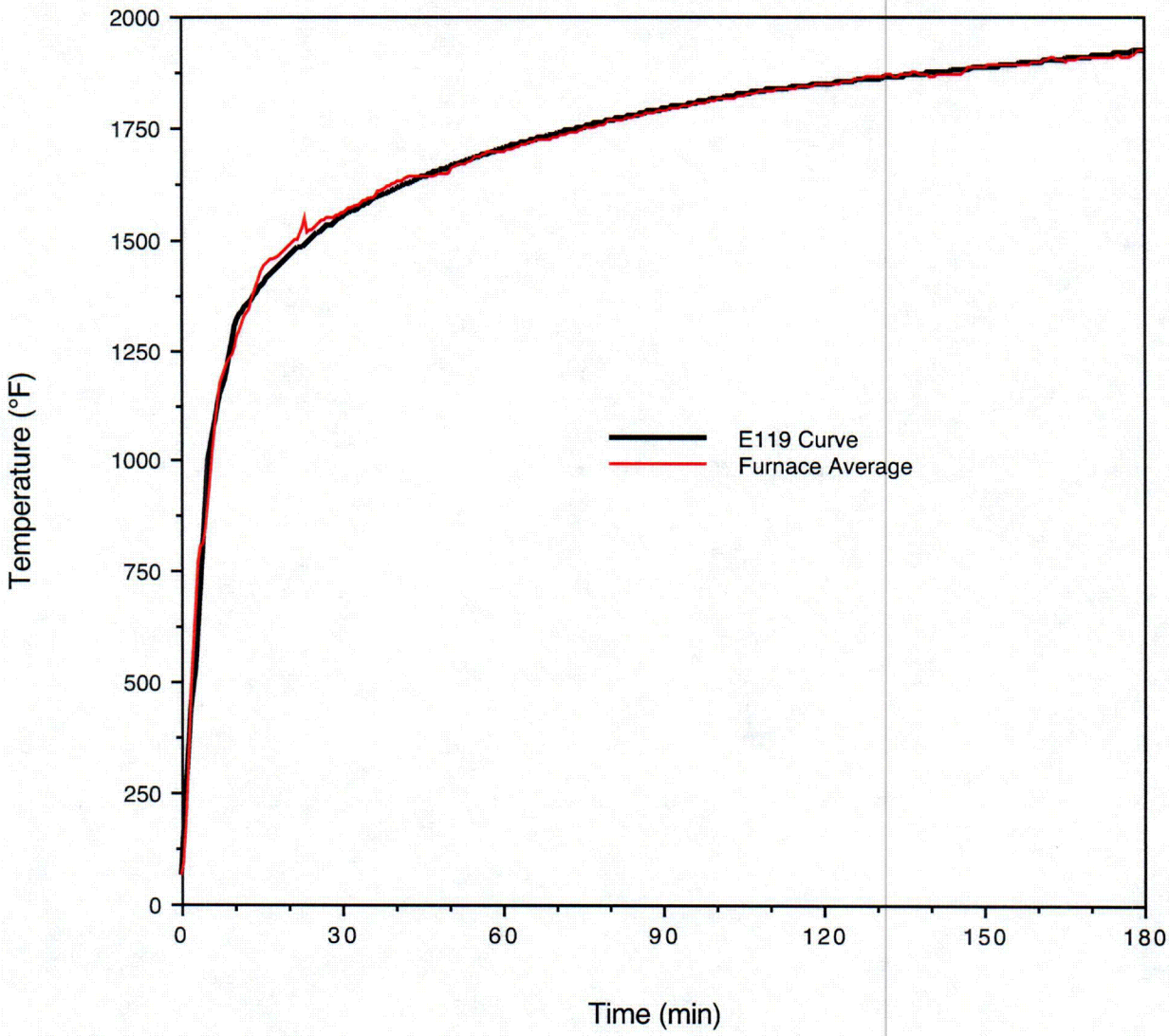
Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
13.8	0.0	0.0	0.0	0.0
13.9	0.0	0.0	0.0	0.0
14.0	0.0	0.0	0.0	0.0
14.1	0.0	0.0	0.0	0.0
14.2	0.0	0.0	0.0	0.0
14.3	0.0	0.0	0.0	0.0
14.4	0.0	0.0	0.0	0.0
14.5	0.0	0.0	0.0	0.0
14.6	0.0	0.0	0.0	0.0
14.7	0.0	0.0	0.0	0.0
14.8	0.0	0.0	0.0	0.0
14.9	0.0	0.0	0.0	0.0
15.0	0.0	0.0	0.0	0.0
15.1	0.0	0.0	0.0	0.0
15.2	0.0	0.0	0.0	0.0
15.3	0.0	0.0	0.0	0.0
15.4	0.0	0.0	0.0	0.0
15.5	0.0	0.0	0.0	0.0
15.6	0.0	0.0	0.0	0.0
15.7	0.0	0.0	0.0	0.0
15.8	0.0	0.0	0.0	0.0
15.9	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0
16.1	0.0	0.0	0.0	0.0
16.2	0.0	0.0	0.0	0.0
16.3	0.0	0.0	0.0	0.0
16.4	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0
16.6	0.0	0.0	0.0	0.0
16.7	0.0	0.0	0.0	0.0
16.8	0.0	0.0	0.0	0.0
16.9	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0
17.1	0.0	0.0	0.0	0.0
17.2	0.0	0.0	0.0	0.0
17.3	0.0	0.0	0.0	0.0
17.4	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.0	0.0
17.6	0.0	0.0	0.0	0.0
17.7	0.0	0.0	0.0	0.0
17.8	0.0	0.0	0.0	0.0
17.9	0.0	0.0	0.0	0.0
18.0	0.0	0.0	0.0	0.0
18.1	0.0	0.0	0.0	0.0
18.2	0.0	0.0	0.0	0.0
18.3	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
18.4	121.2	0.8	0.0	0.0
18.5	121.2	0.8	0.0	0.0
18.6	0.1	0.0	121.1	0.8
18.7	0.0	0.0	121.2	0.8
18.8	0.0	0.0	121.2	0.8
18.9	0.0	0.0	0.2	0.0
19.0	0.0	0.0	0.0	0.0
19.1	0.0	0.0	0.0	0.0
19.2	0.0	0.0	0.0	0.0
19.3	0.0	0.0	0.0	0.0
19.4	0.0	0.0	0.0	0.0
19.5	0.0	0.0	0.0	0.0
19.6	0.0	0.0	0.0	0.0
19.7	0.0	0.0	0.0	0.0
19.8	0.0	0.0	0.0	0.0
19.9	0.0	0.0	0.0	0.0
20.0	0.0	0.0	0.0	0.0
20.1	0.0	0.0	0.0	0.0
20.2	0.0	0.0	0.0	0.0
20.3	0.0	0.0	0.0	0.0
20.4	0.0	0.0	0.0	0.0
20.5	0.0	0.0	0.0	0.0
20.6	0.0	0.0	0.0	0.0
20.7	0.0	0.0	0.0	0.0
20.8	0.0	0.0	0.0	0.0
20.9	0.0	0.0	0.0	0.0
21.0	0.0	0.0	0.0	0.0
21.1	0.0	0.0	0.0	0.0
21.2	0.0	0.0	0.0	0.0
21.3	0.0	0.0	0.0	0.0
21.4	0.0	0.0	0.0	0.0
21.5	0.0	0.0	0.0	0.0
21.6	0.0	0.0	0.0	0.0
21.7	0.0	0.0	0.0	0.0
21.8	0.0	0.0	0.0	0.0
21.9	0.0	0.0	0.0	0.0
22.0	0.0	0.0	0.0	0.0
22.1	0.0	0.0	0.0	0.0
22.2	0.0	0.0	0.0	0.0
22.3	0.0	0.0	0.0	0.0
22.4	0.0	0.0	0.0	0.0
22.5	0.0	0.0	0.0	0.0
22.6	0.0	0.0	0.0	0.0

Appendix C2

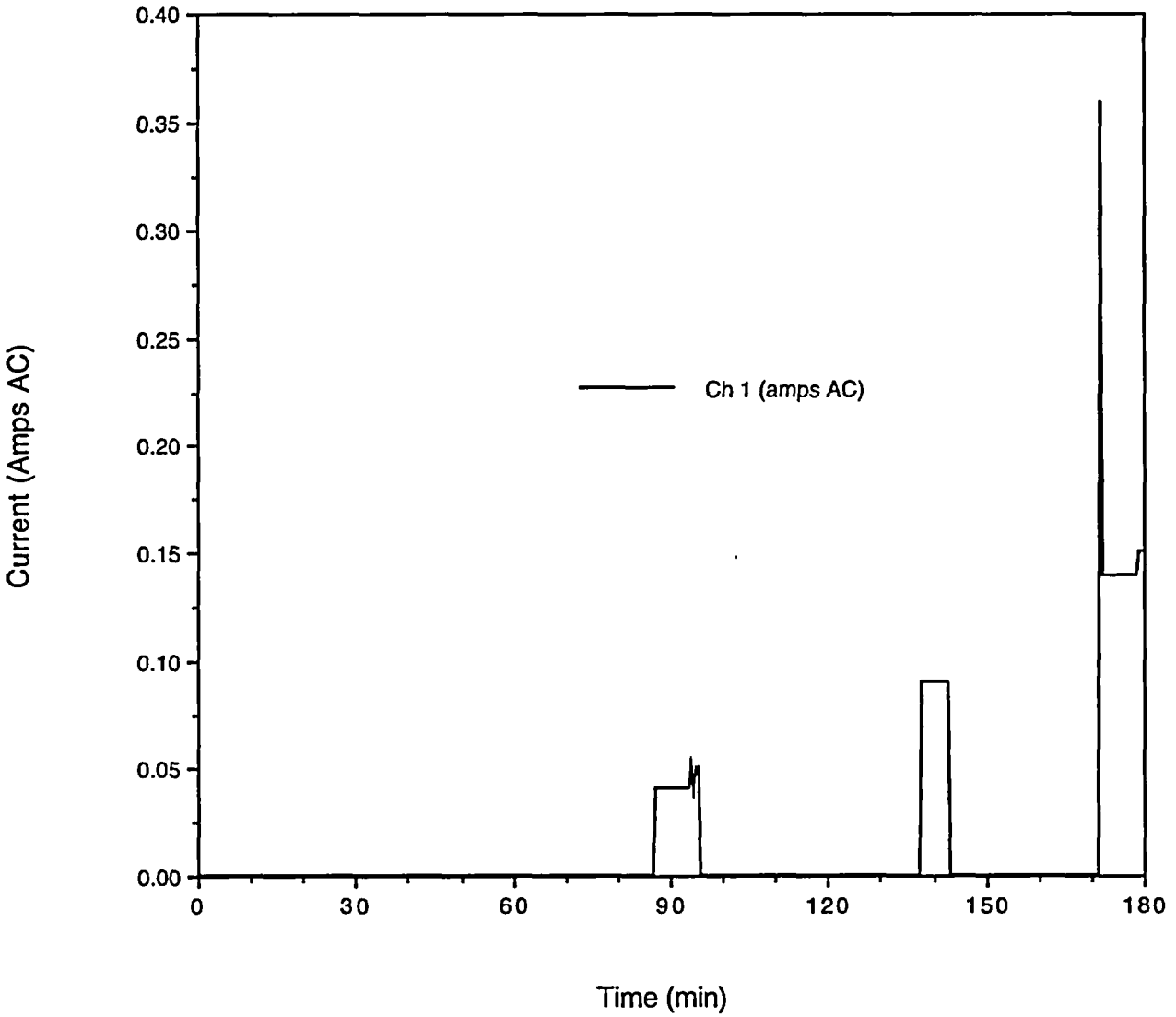
TEST DATA - FIRE EXPOSURE

Project No. 14980-117047
Framatome-ANP
Average Furnace Temperature

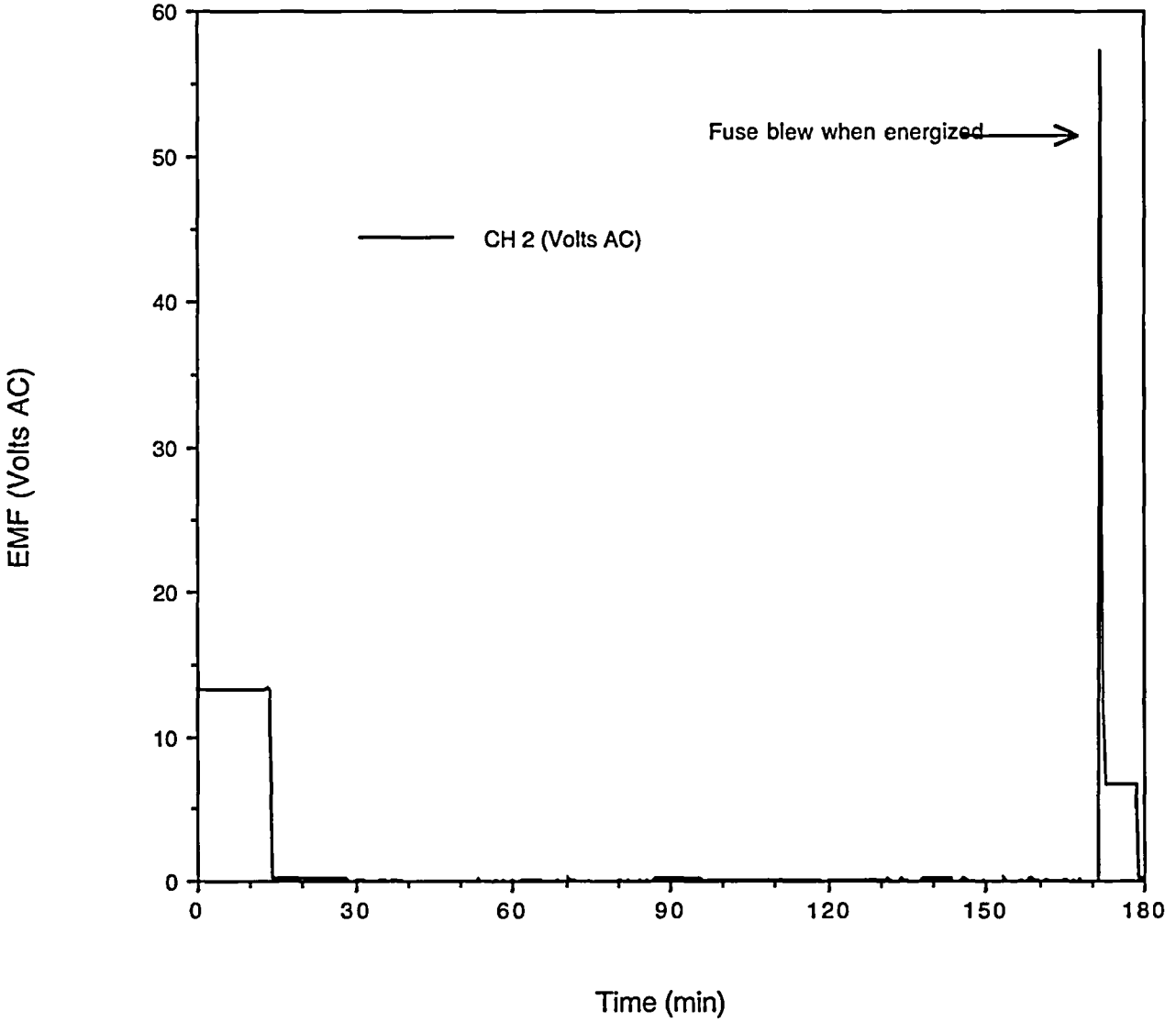


C03

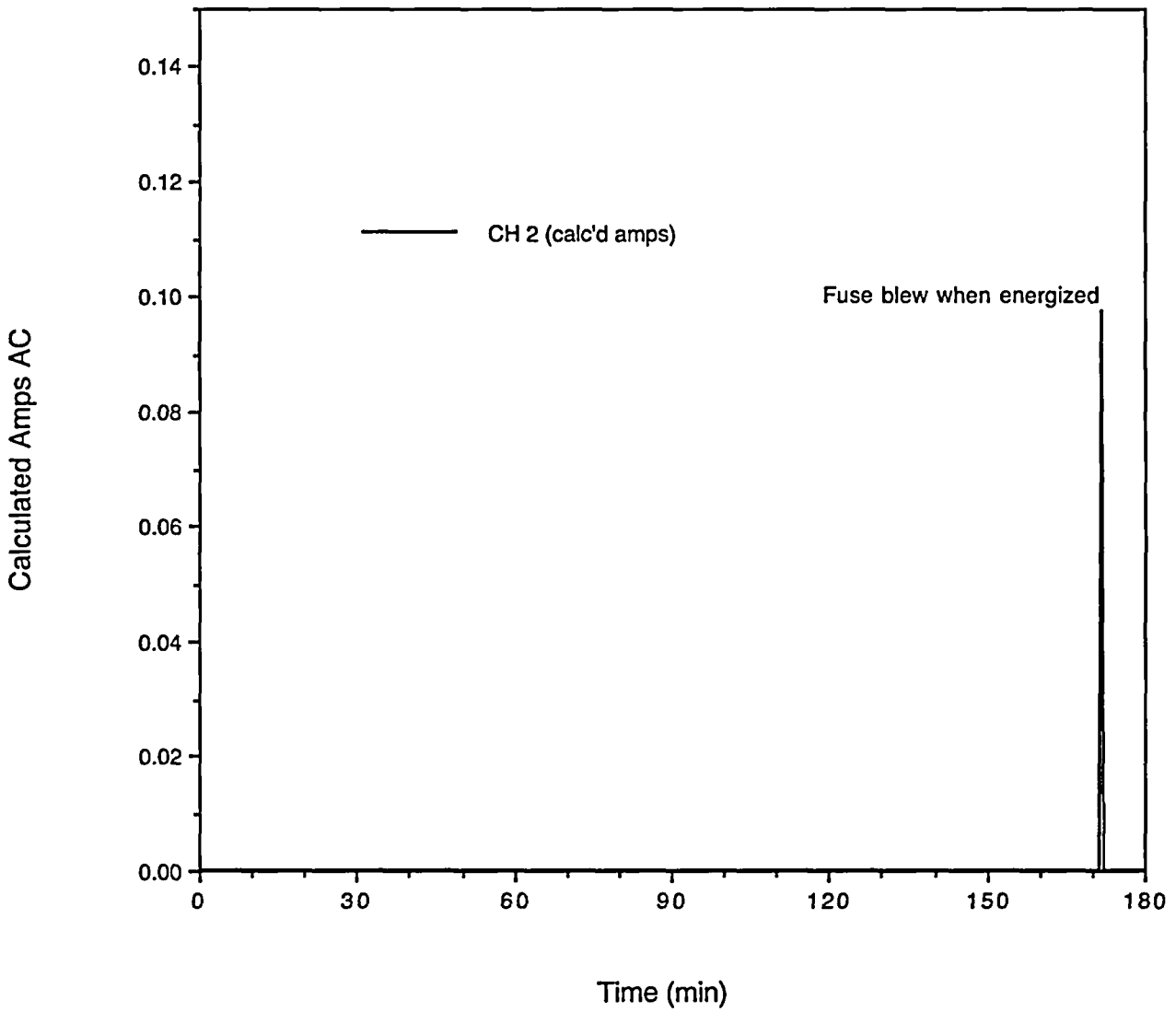
Project No. 14980-11747
Framatome-ANP
Channel #1 Current to 4/C #8 Cable



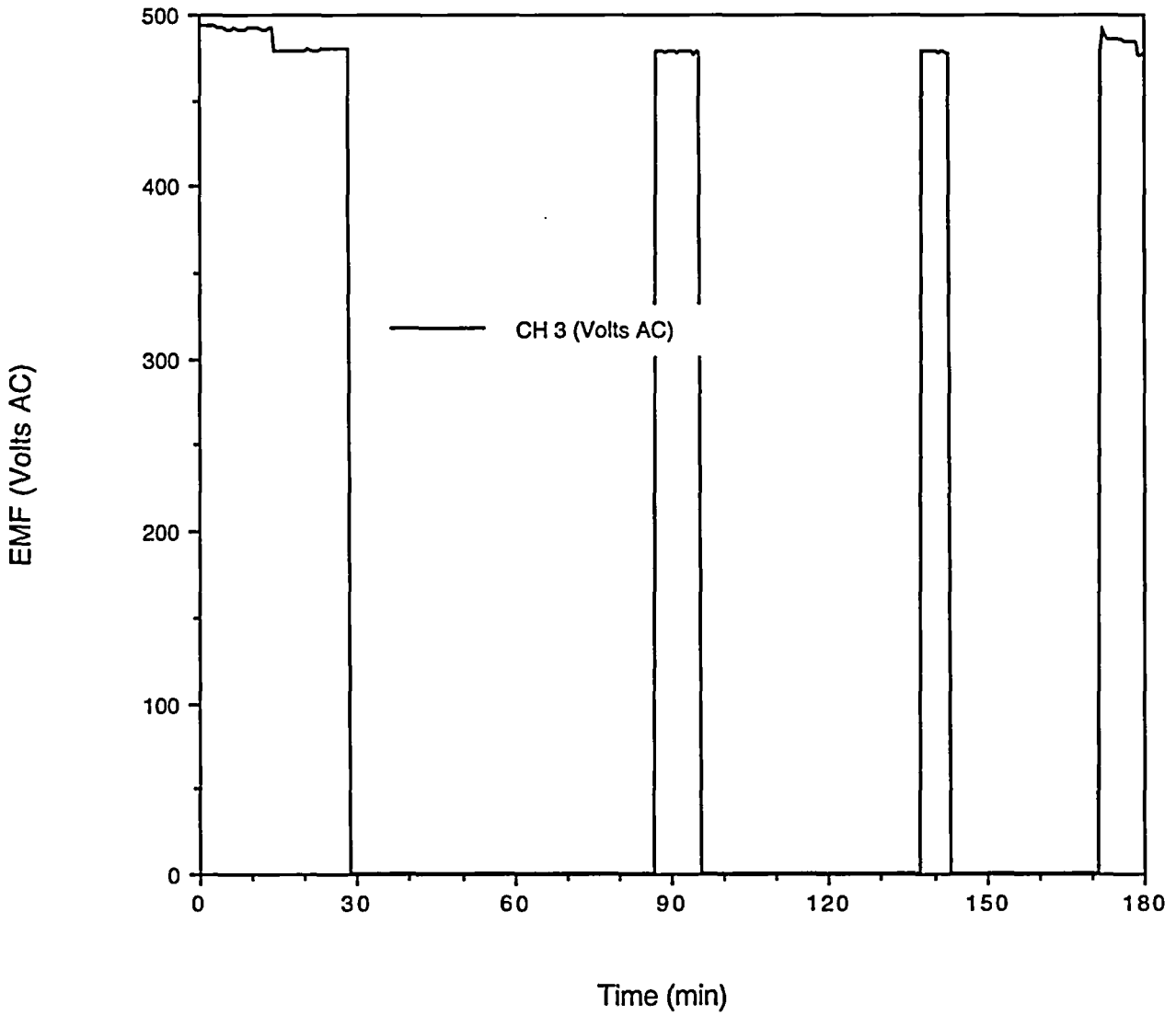
Project No. 14980-11747
Framatome-ANP
Channel #2 Voltage to Conductor #1 in 4/C #8 Cable



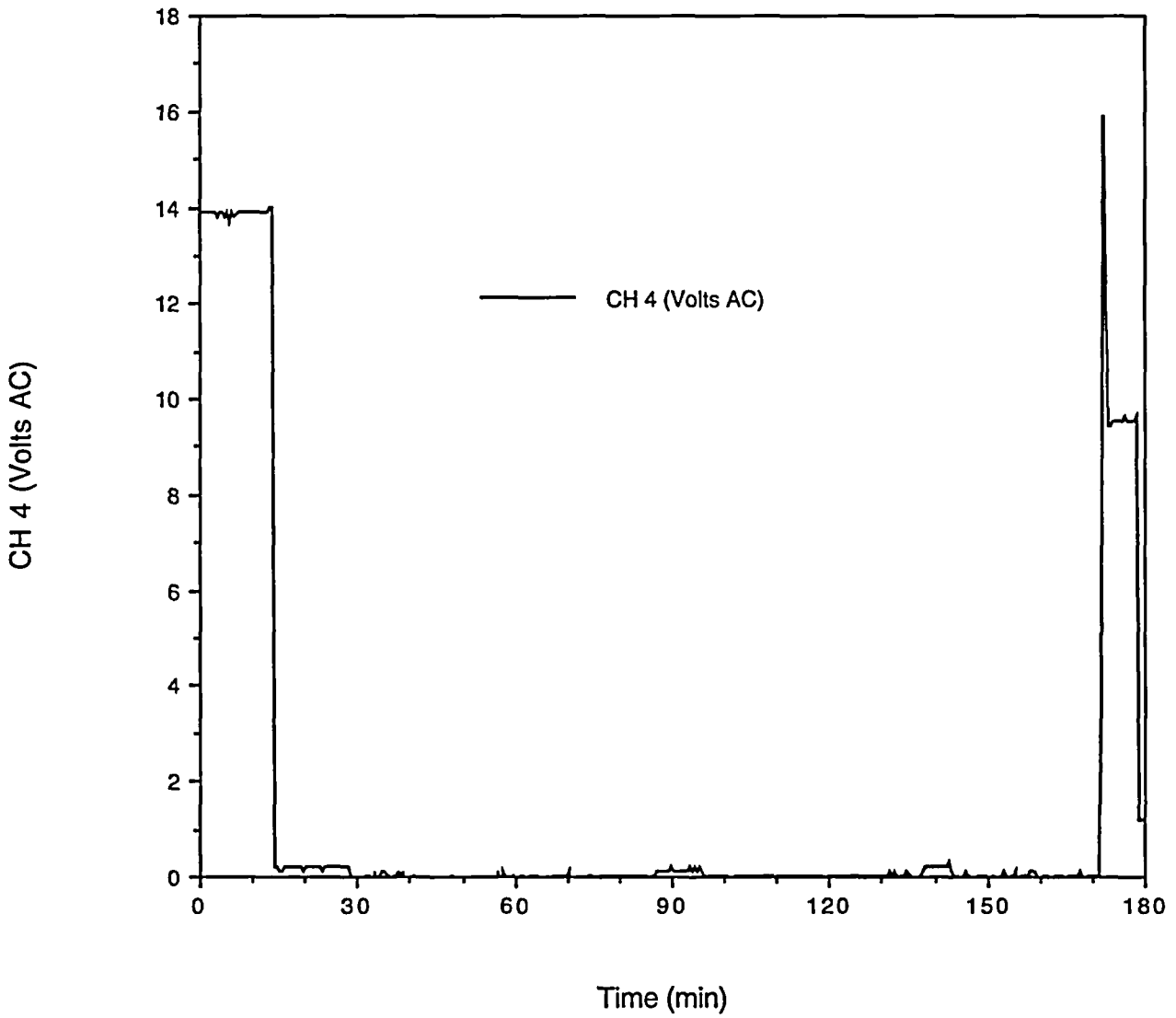
Project No. 14980-11747
Framatome-ANP
Channel #2 Calculated Current to Conductor #1 in 4/C #8 Cable



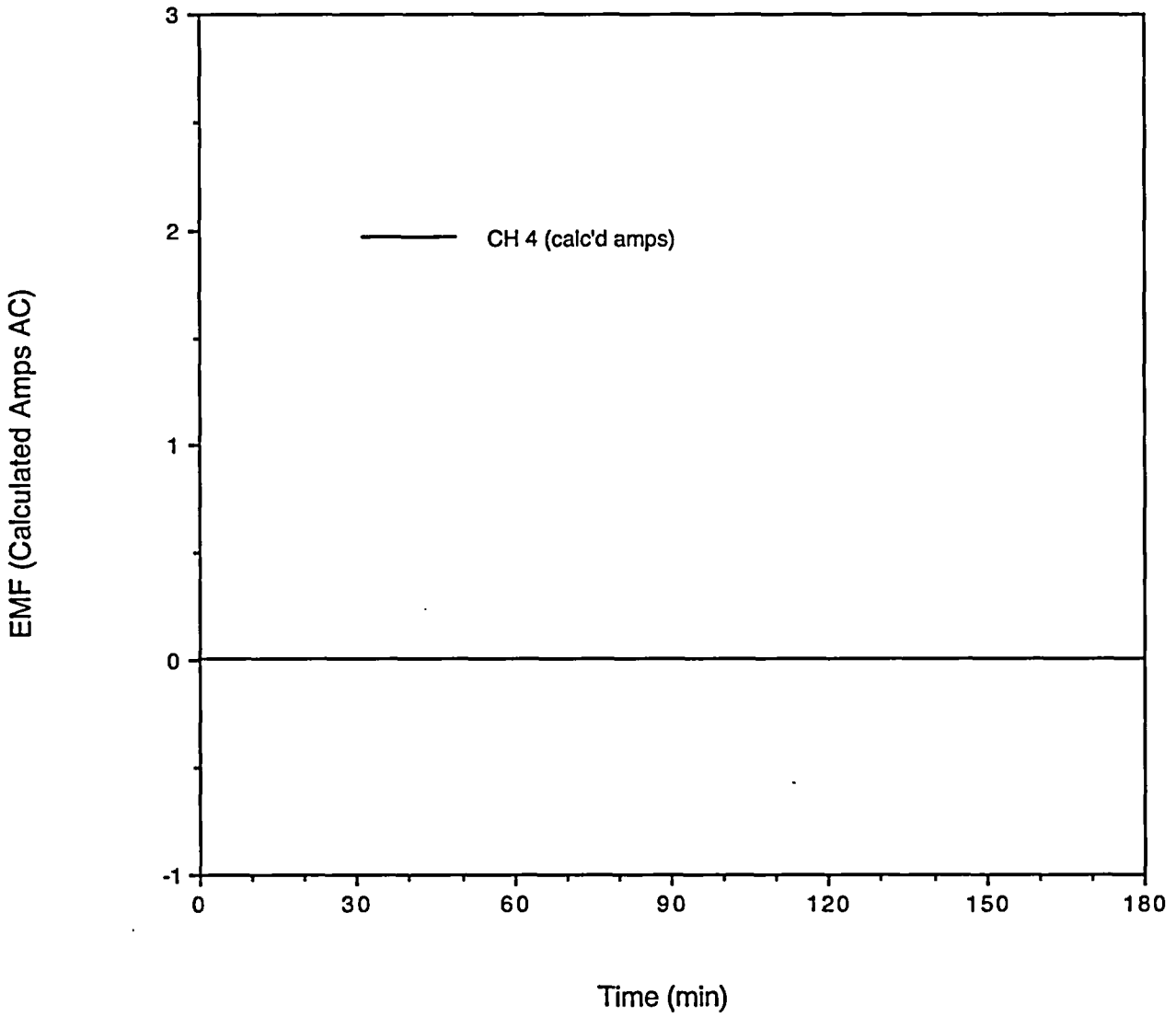
Project No. 14980-11747
Framatome-ANP
Channel #3 Voltage to 4/C #8 Cable



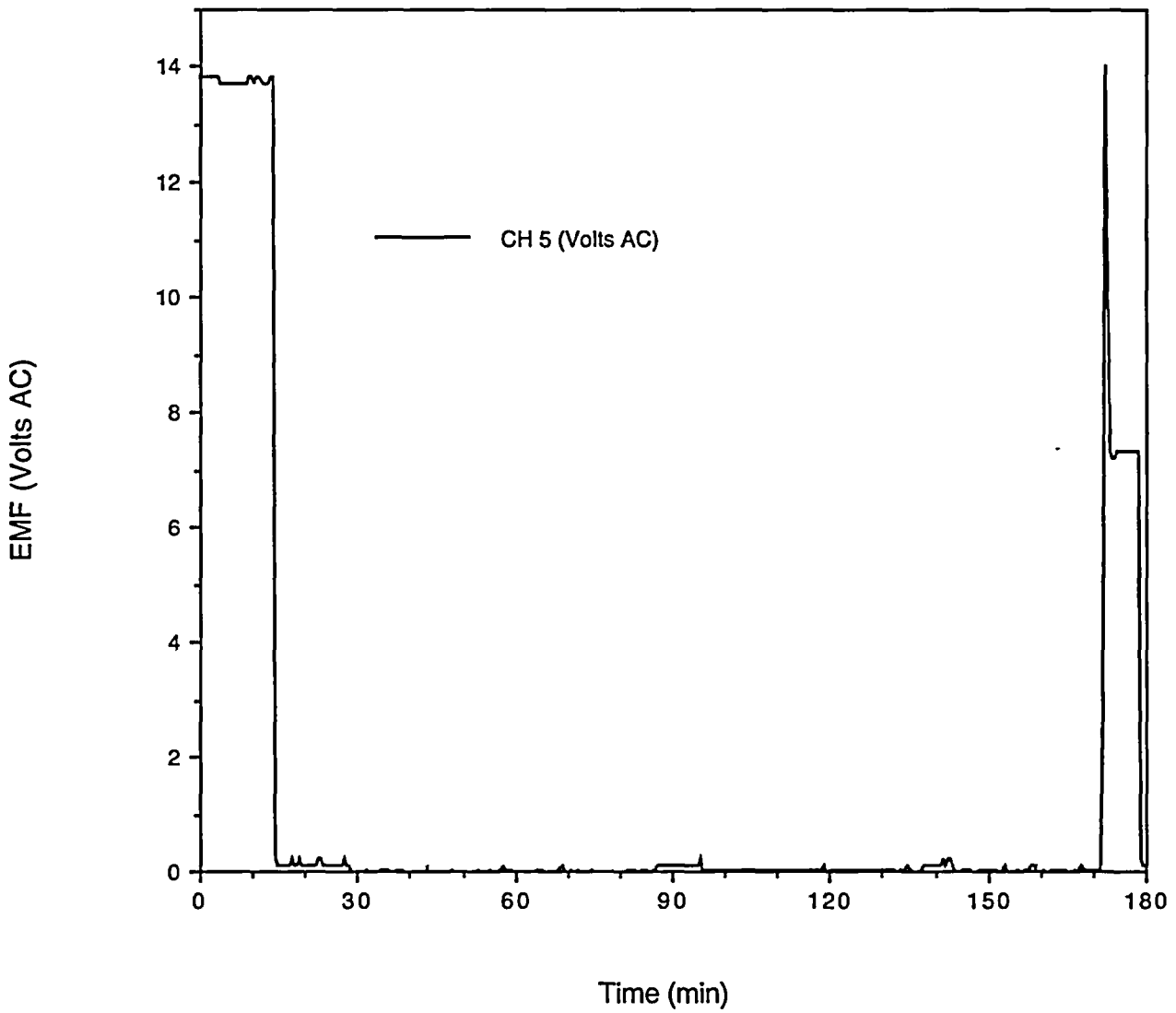
Project No. 14980-11747
Framatome-ANP
Channel #4 Voltage to Conductor #2 in 4/C #8 Cable



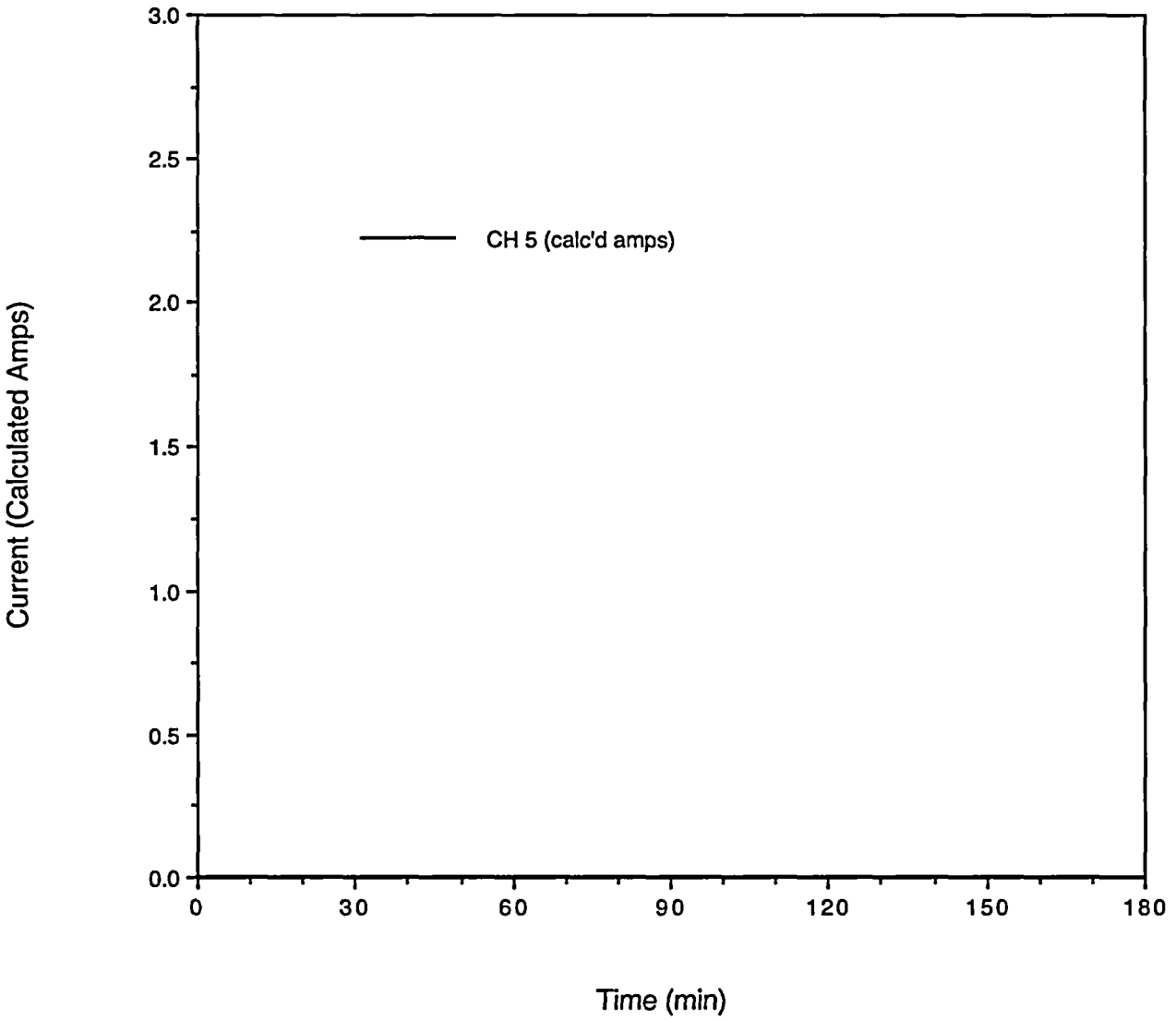
Project No. 14980-11747
Framatome-ANP
Channel #4 Calculated Amps to Conductor #2 in 4/C #8 Cable



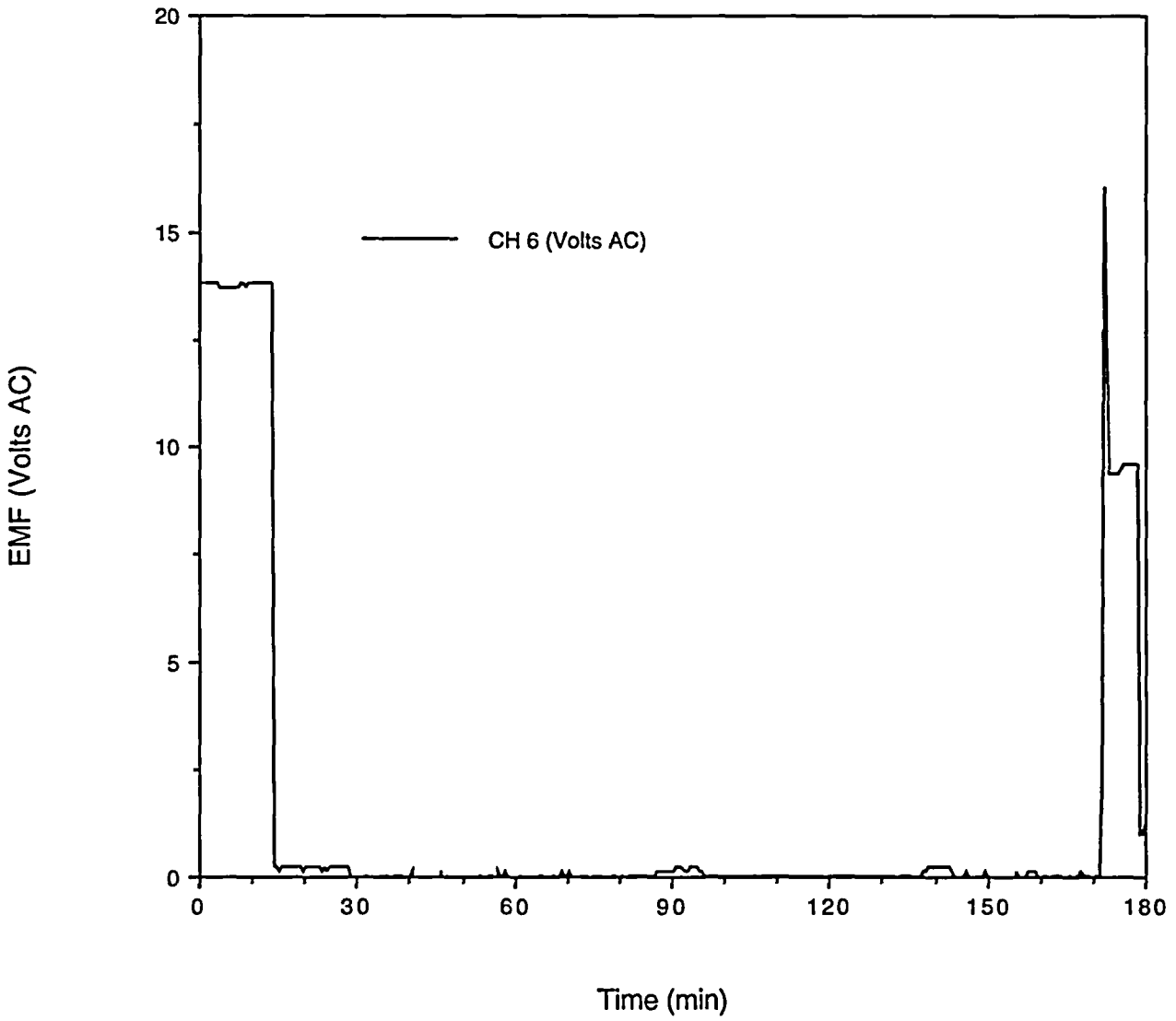
Project No. 14980-11747
Framatome-ANP
Channel #5 Voltage to Conductor #3 in 4/C #8 Cable



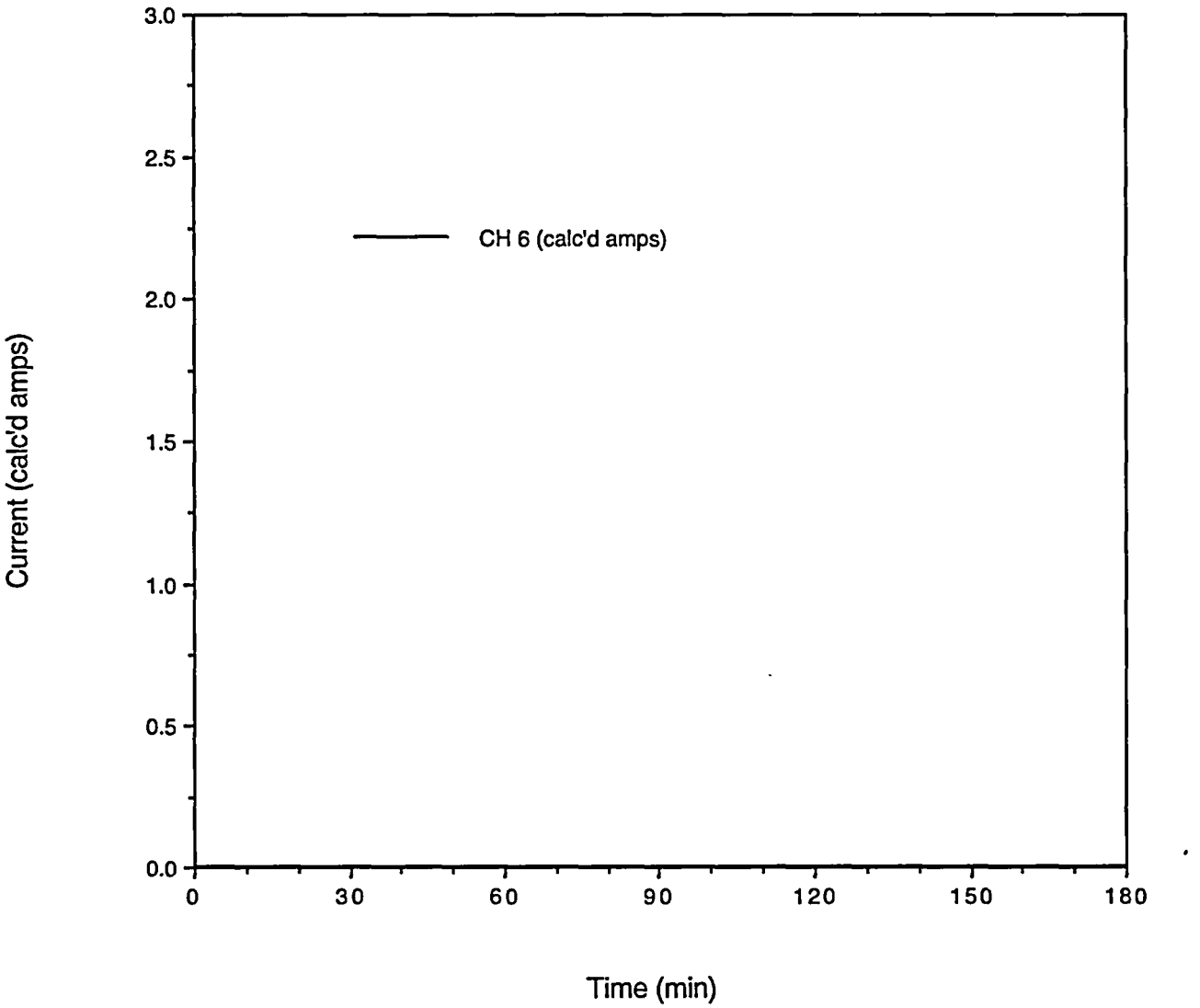
Project No. 14980-11747
Framatome-ANP
Channel #5 Calculated Current to Conductor #3 in 4/C #8 Cable



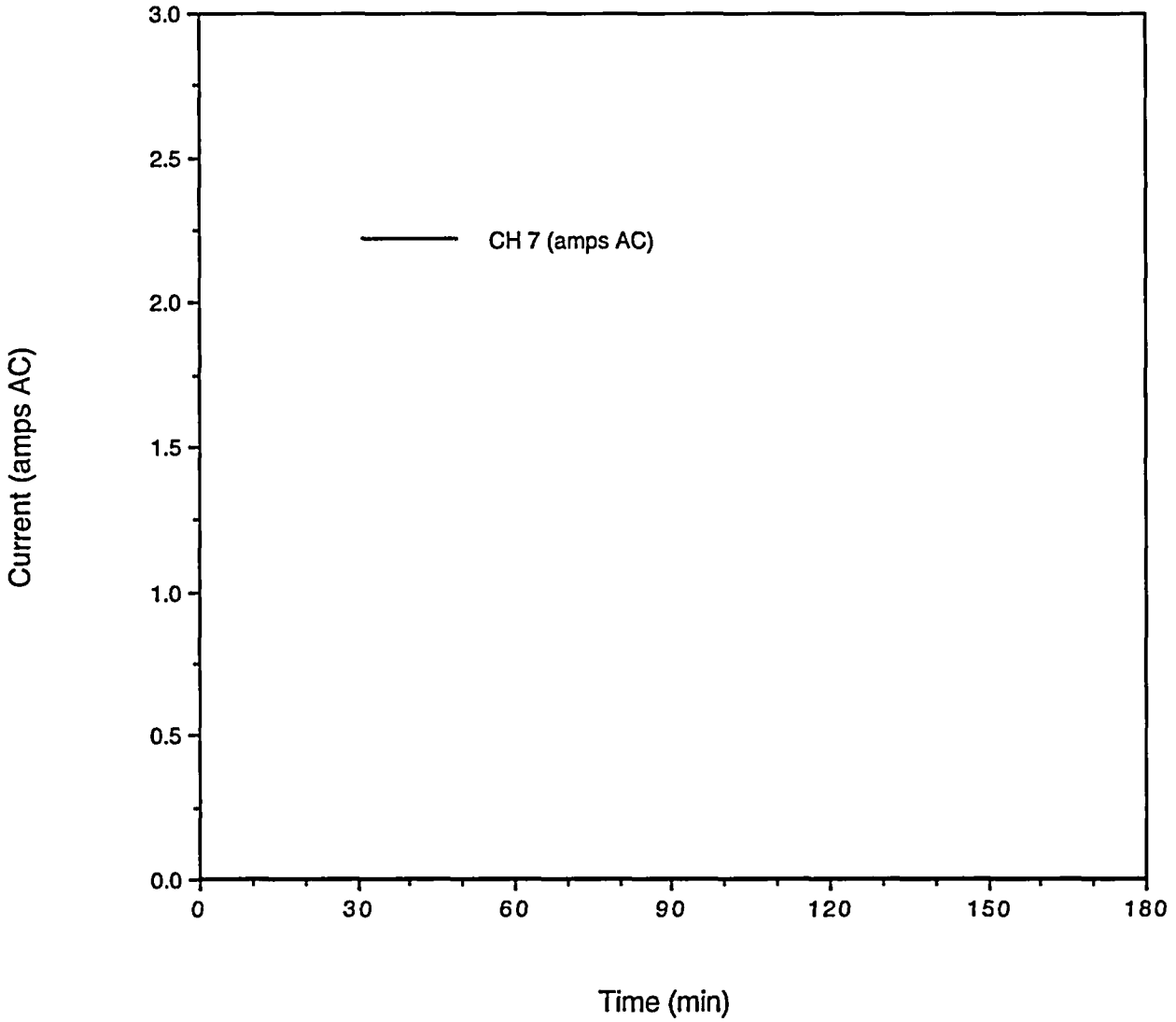
Project No. 14980-11747
Framatome-ANP
Channel #6 Voltage to Conductor #4 in 4/C #8 Cable



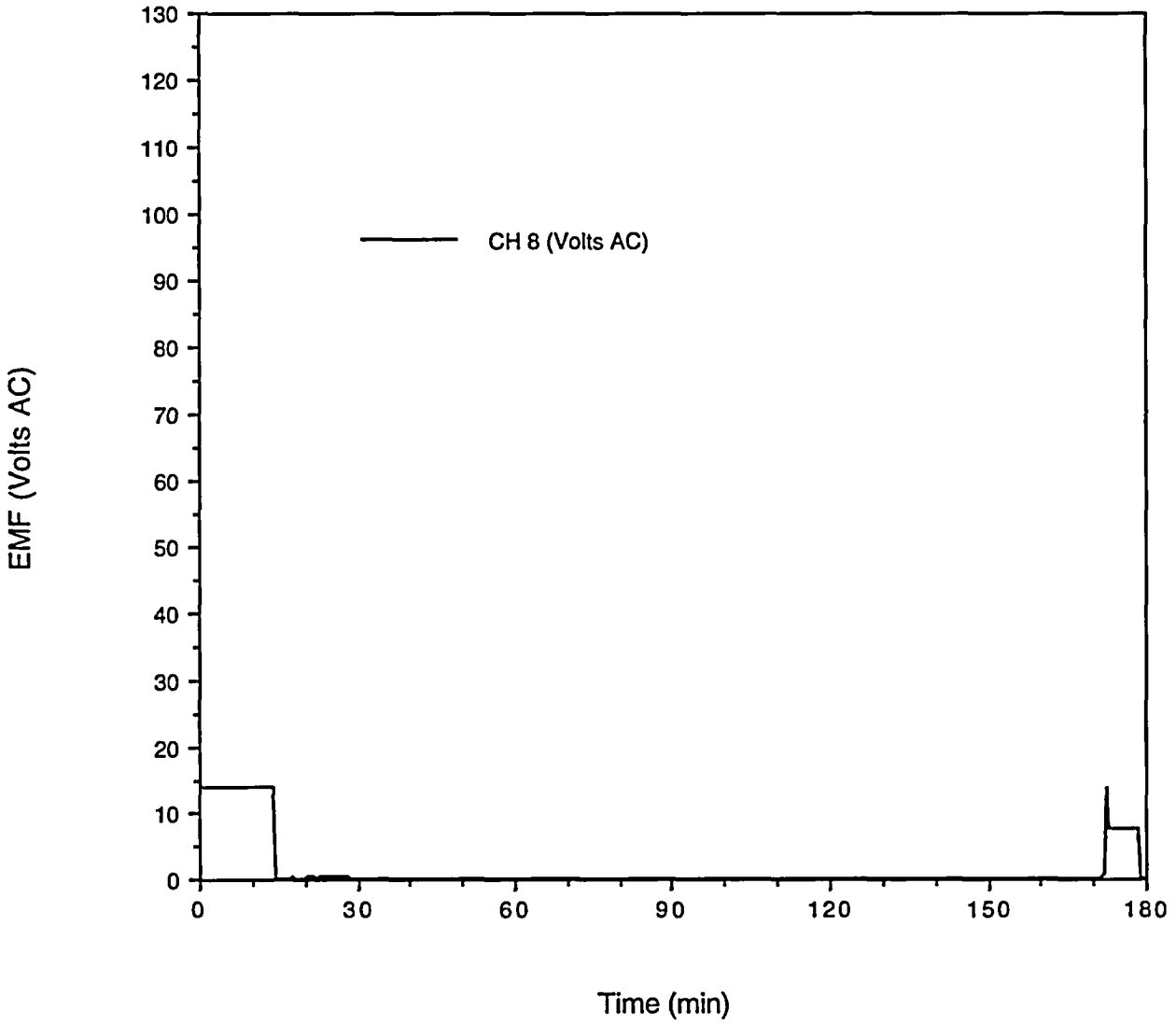
Project No. 14980-11747
Framatome-ANP
Channel #6 Calculated Current to Conductor #4 in 4/C #8 Cable



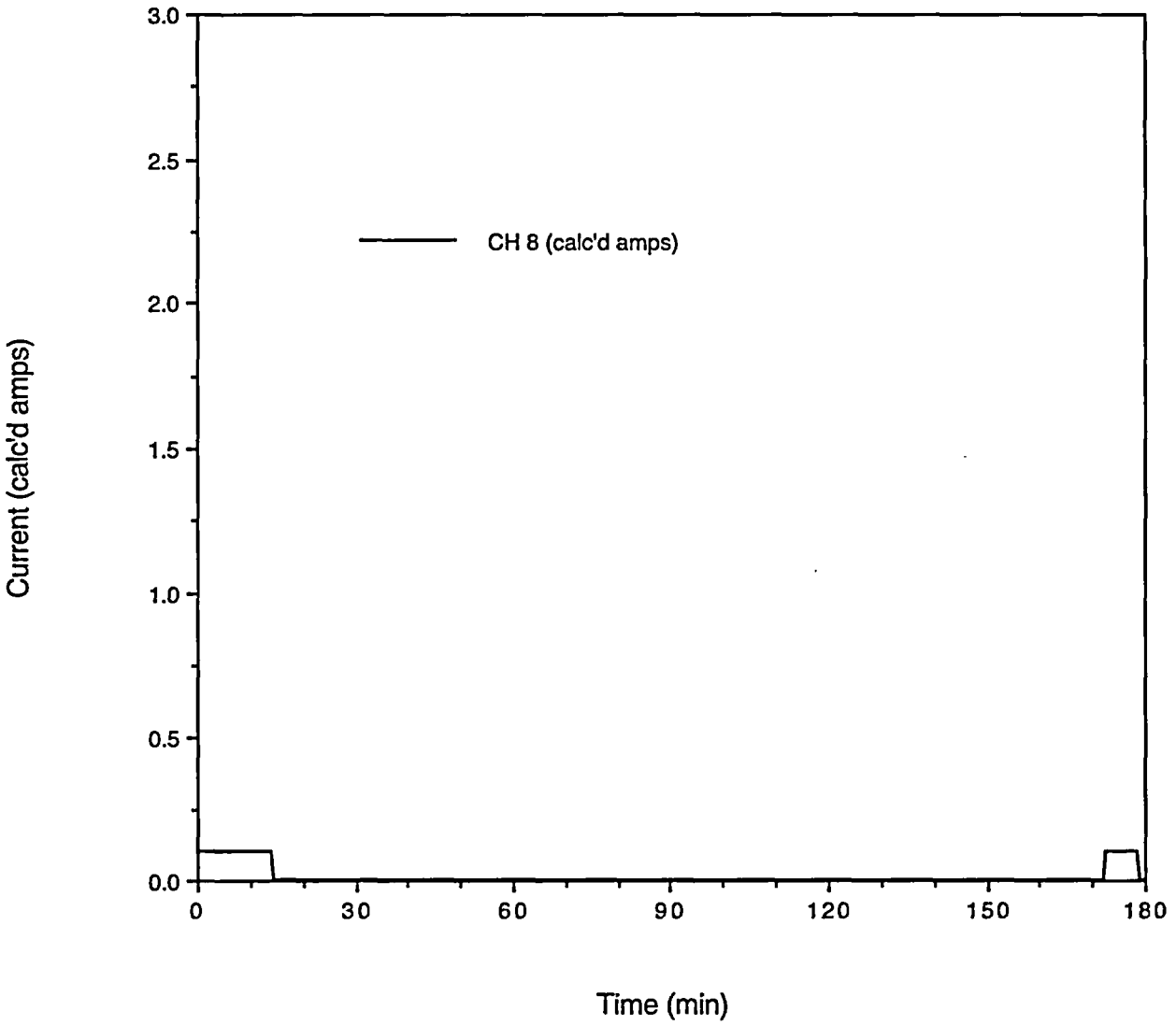
Project No. 14980-11747
Framatome-ANP
Channel #7 Current to 8/C #12 Cable



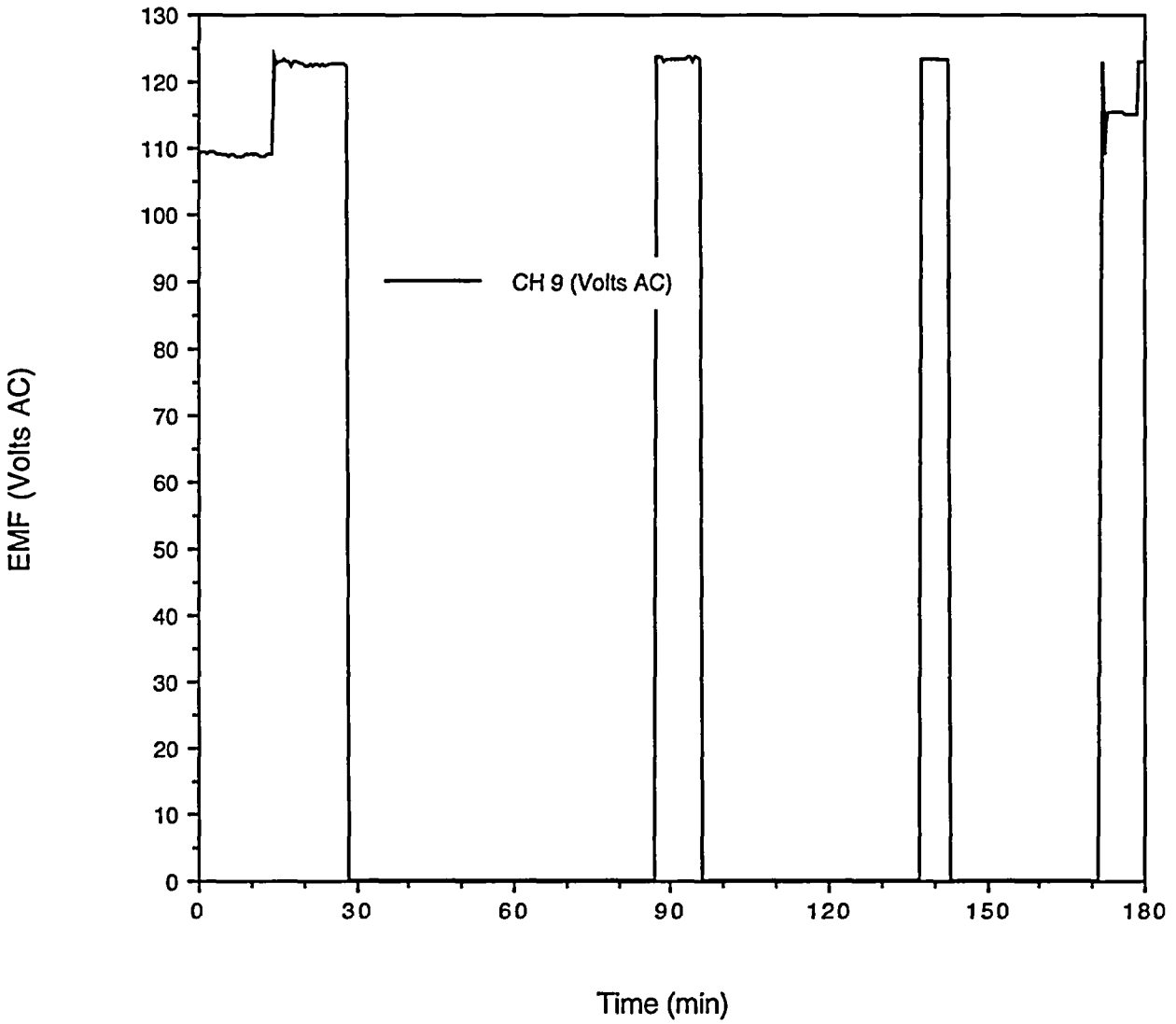
Project No. 14980-11747
Framatome-ANP
Channel #8 Voltage to Conductor 1 in 8/C #12 Cable



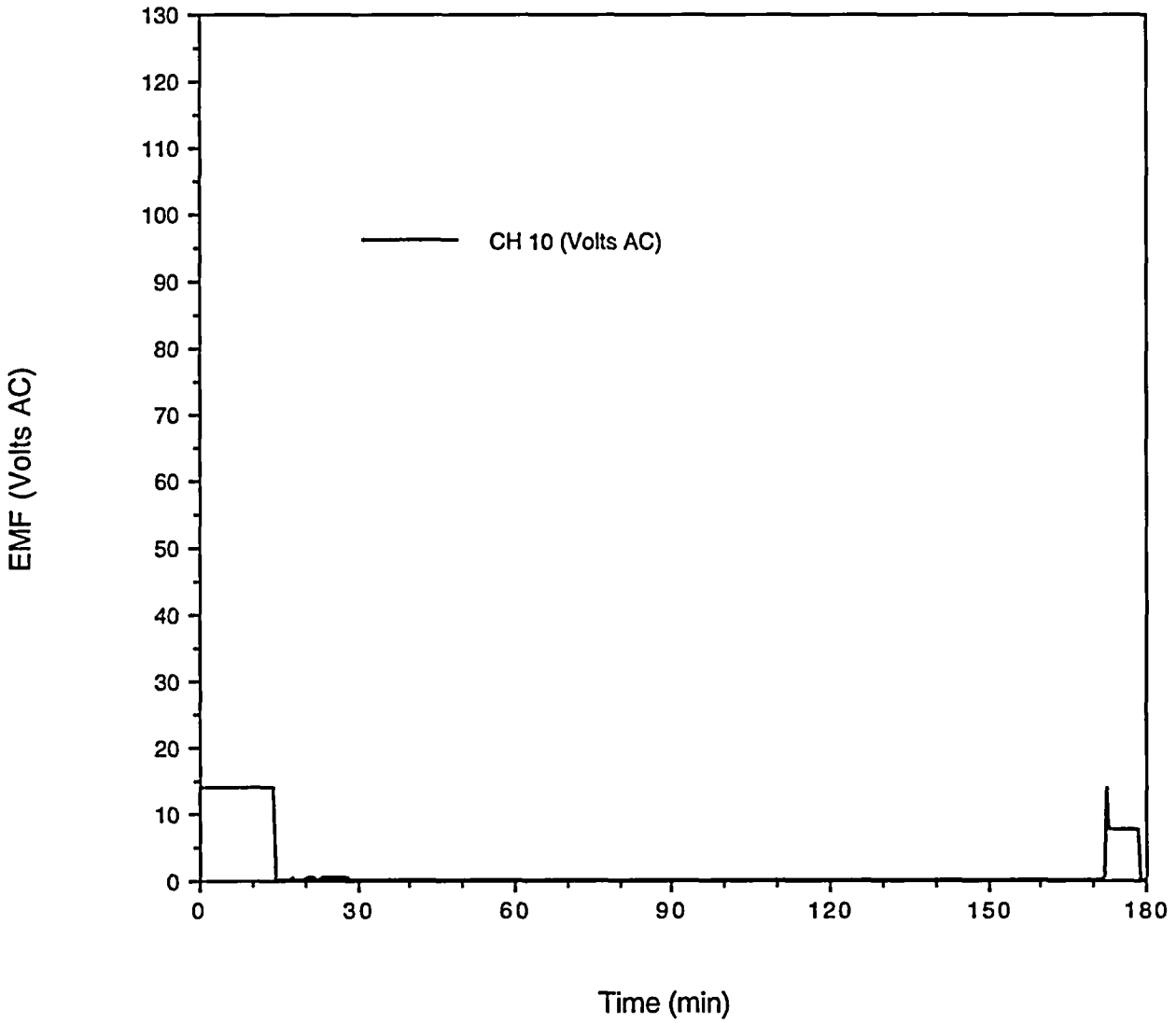
Project No. 14980-11747
Framatome-ANP
Channel #8 Calculated Current to Conductor 1 in 8/C #12 Cable



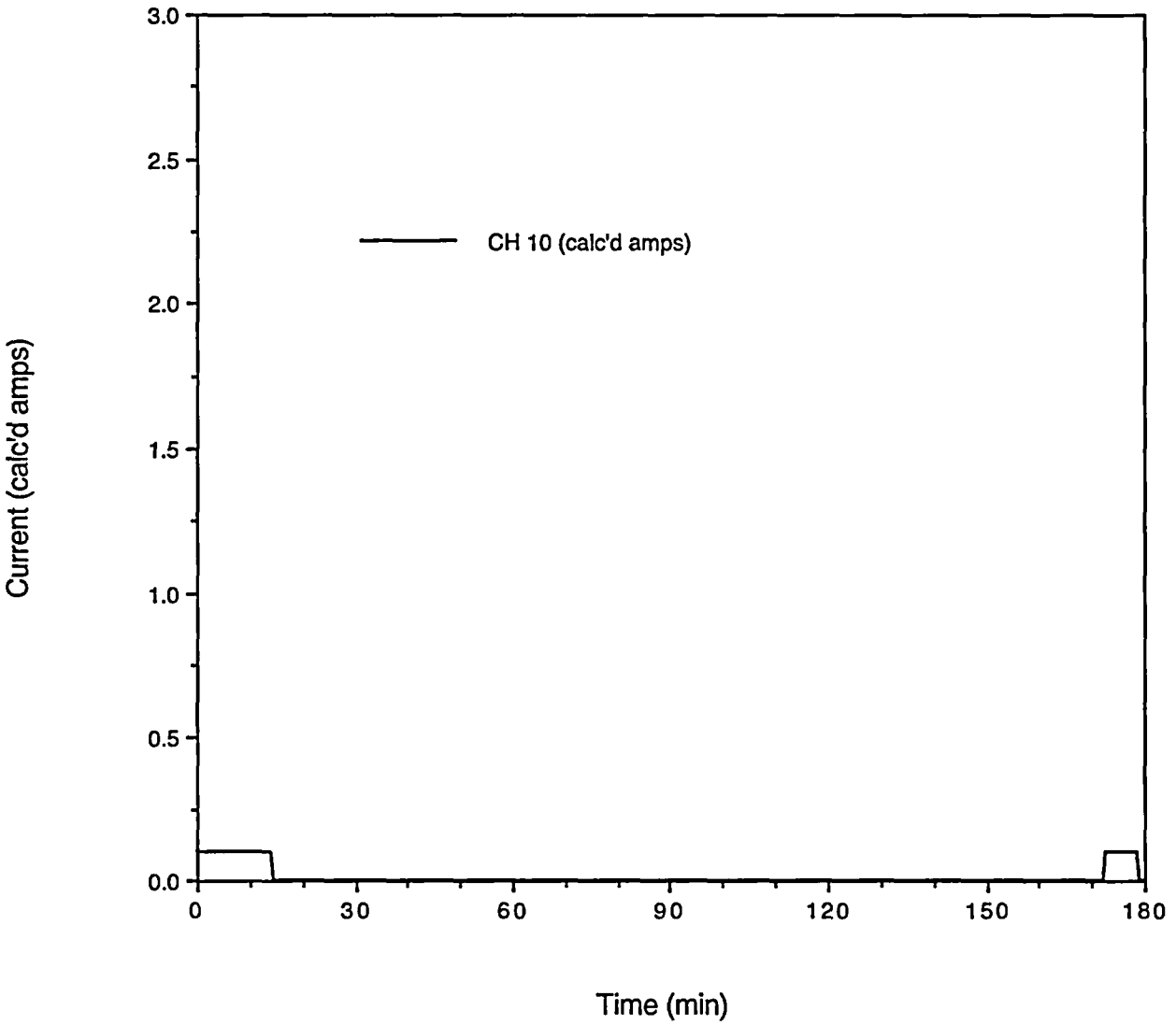
Project No. 14980-11747
Framatome-ANP
Channel #9 Voltage to 8/C #12 Cable



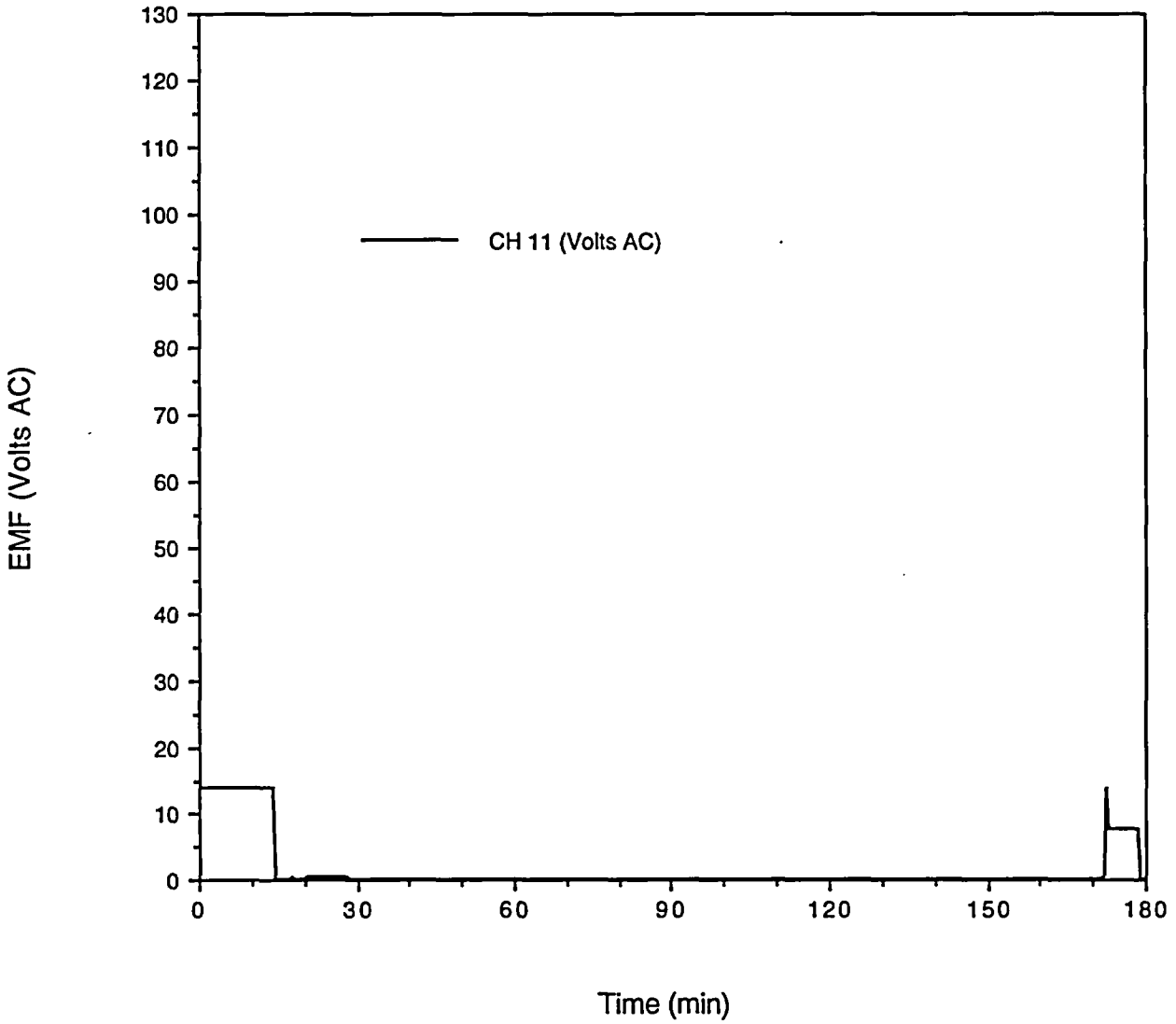
Project No. 14980-11747
Framatome-ANP
Channel #10 Voltage to Conductor 2 in 8/C #12 Cable



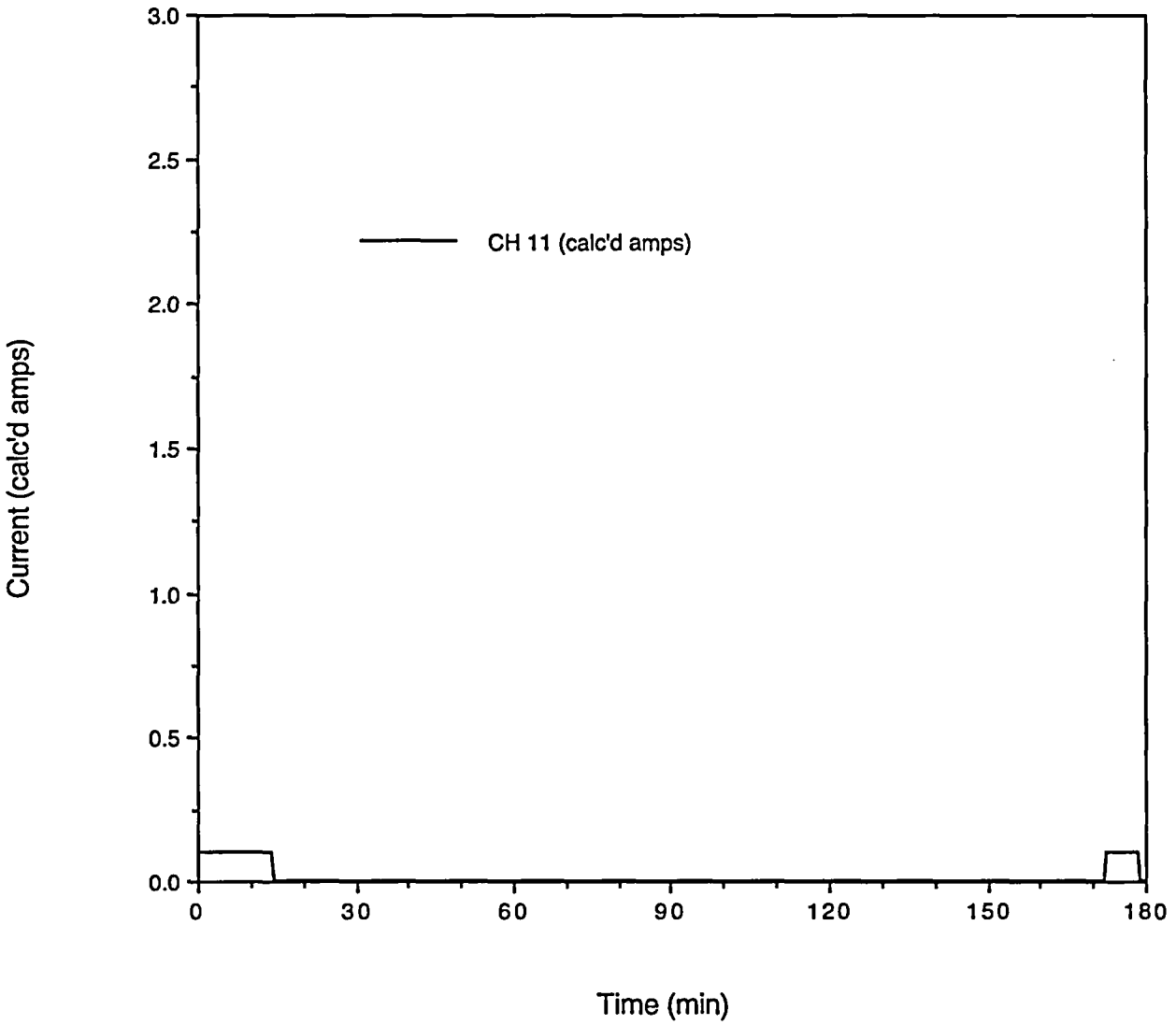
Project No. 14980-11747
Framatome-ANP
Channel #10 Calculated Current to Conductor 2 in 8/C #12 Cable



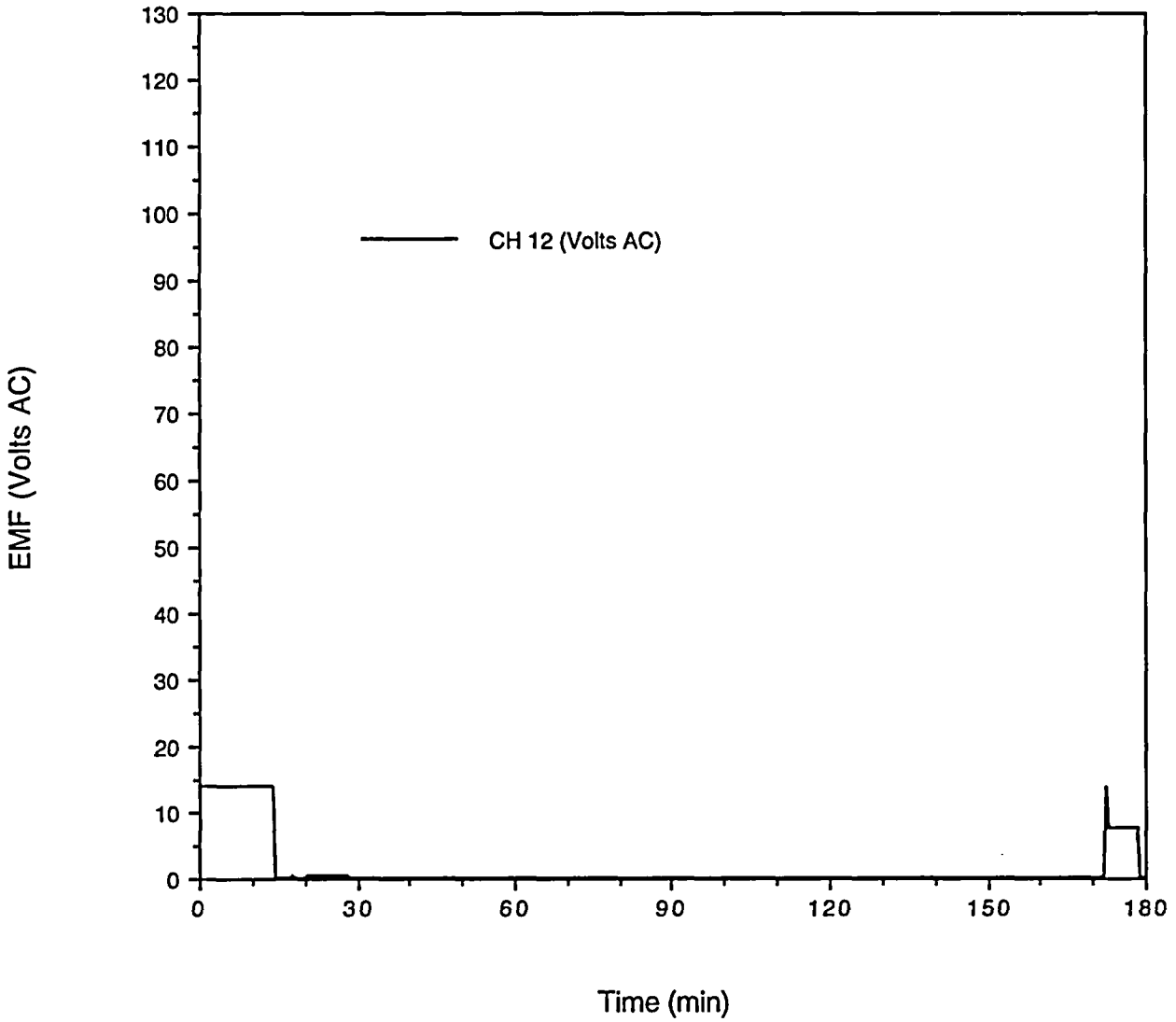
Project No. 14980-11747
Framatome-ANP
Channel #11 Voltage to Conductor 7 in 8/C #12 Cable



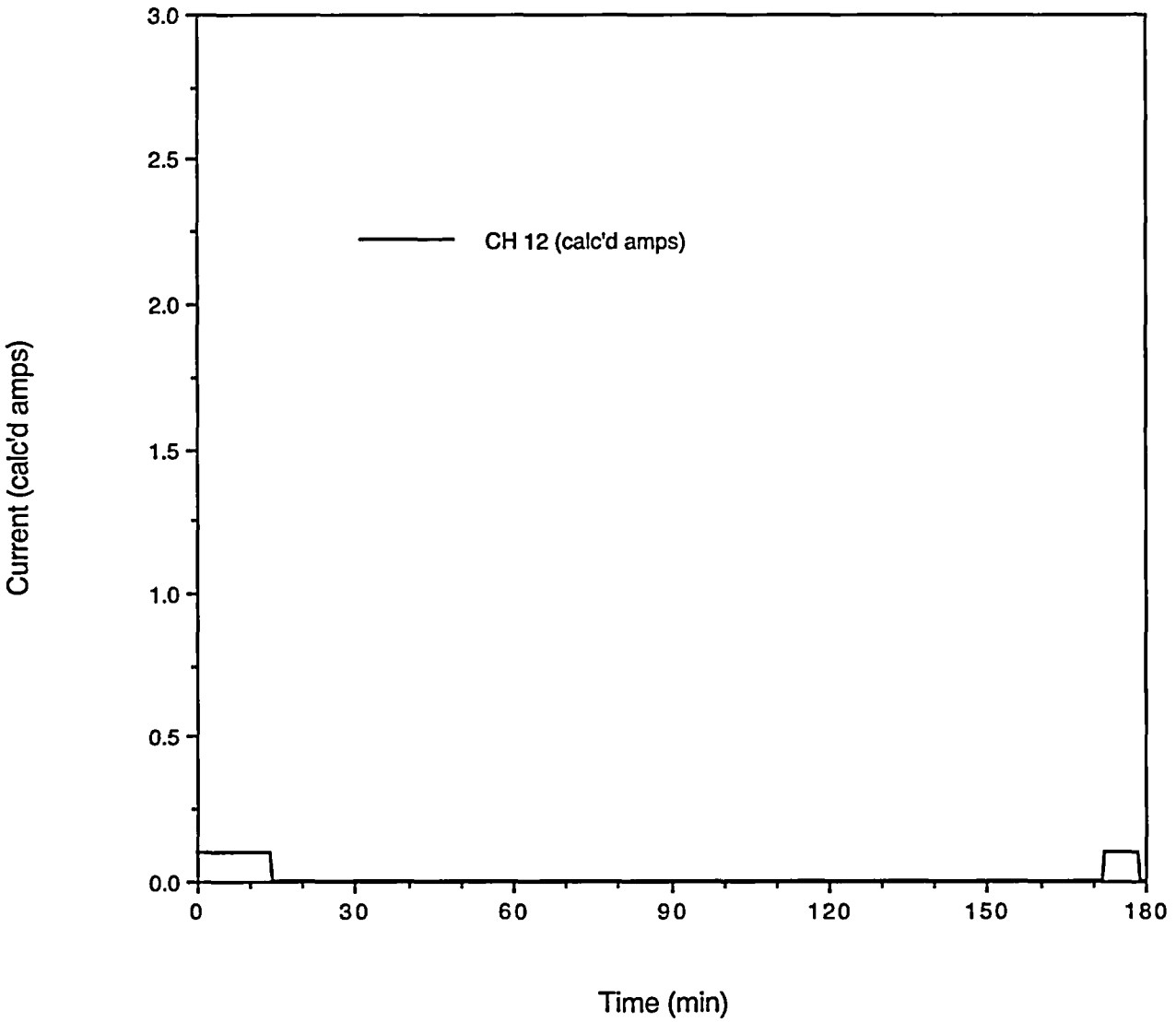
Project No. 14980-11747
Framatome-ANP
Channel #11 Calculated Current to Conductor 7 in 8/C #12 Cable



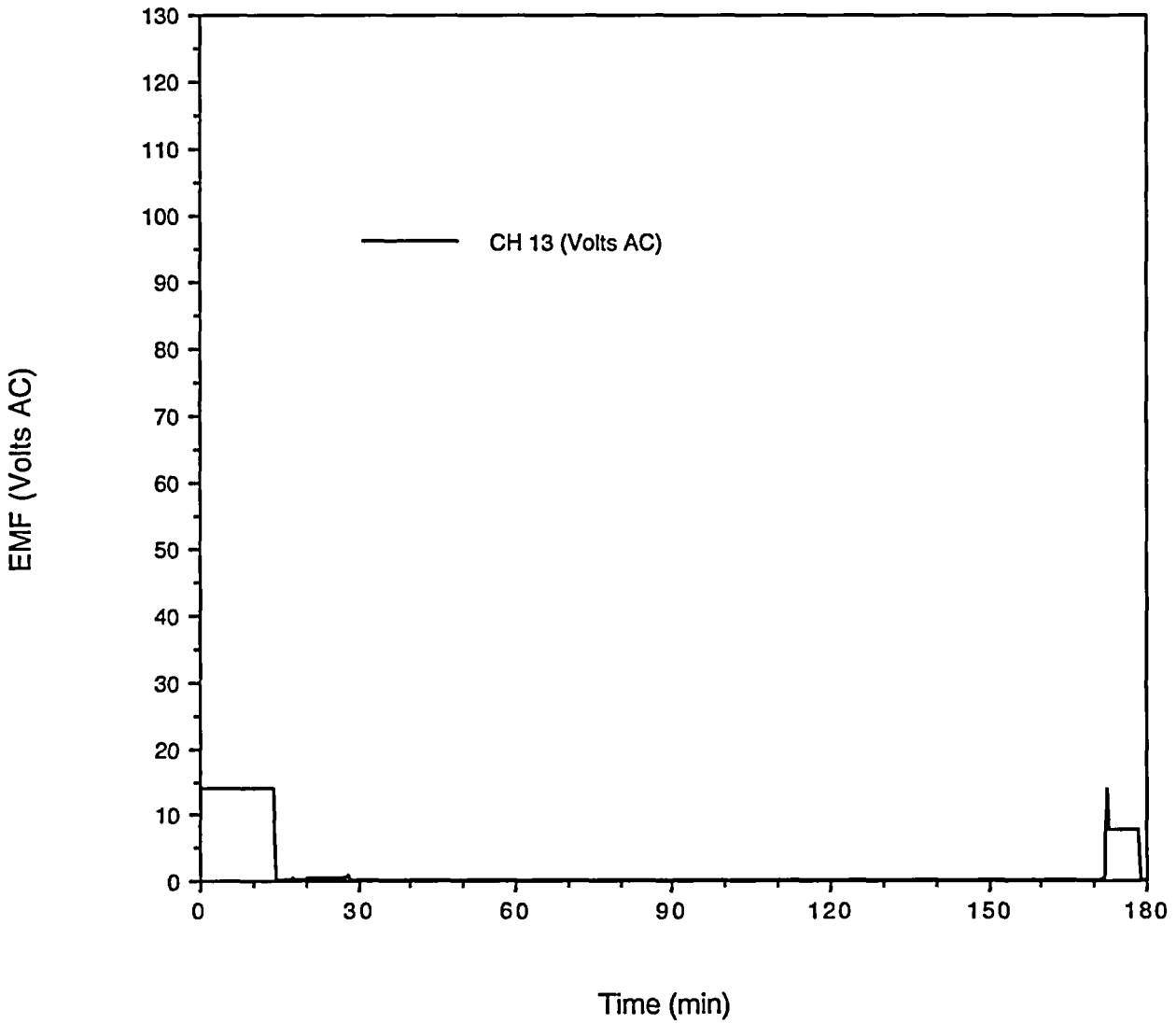
Project No. 14980-11747
Framatome-ANP
Channel #12 Voltage to Conductor 8 in 8/C #12 Cable



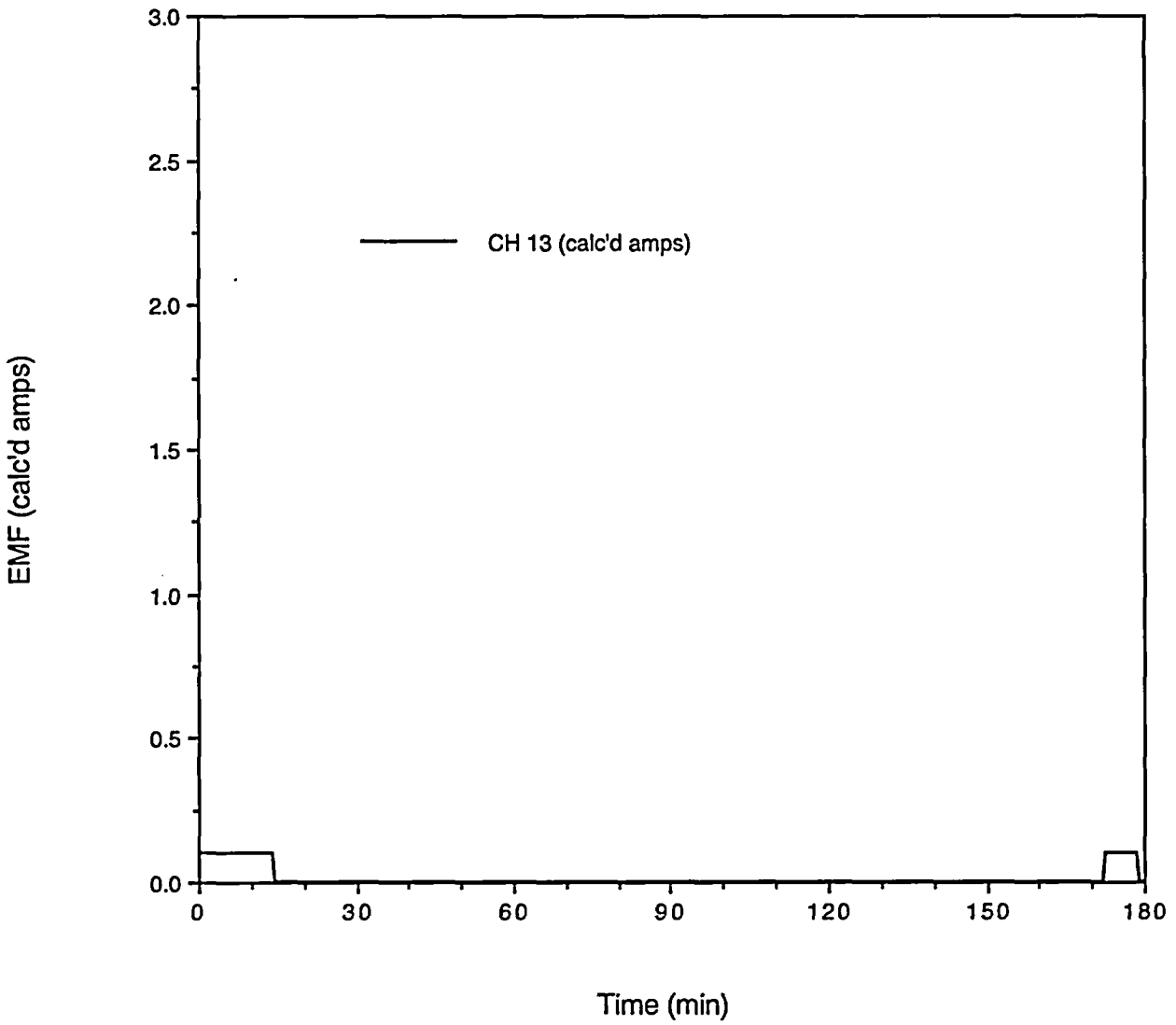
Project No. 14980-11747
Framatome-ANP
Channel #12 Calculated Current to Conductor 8 in 8/C #12 Cable



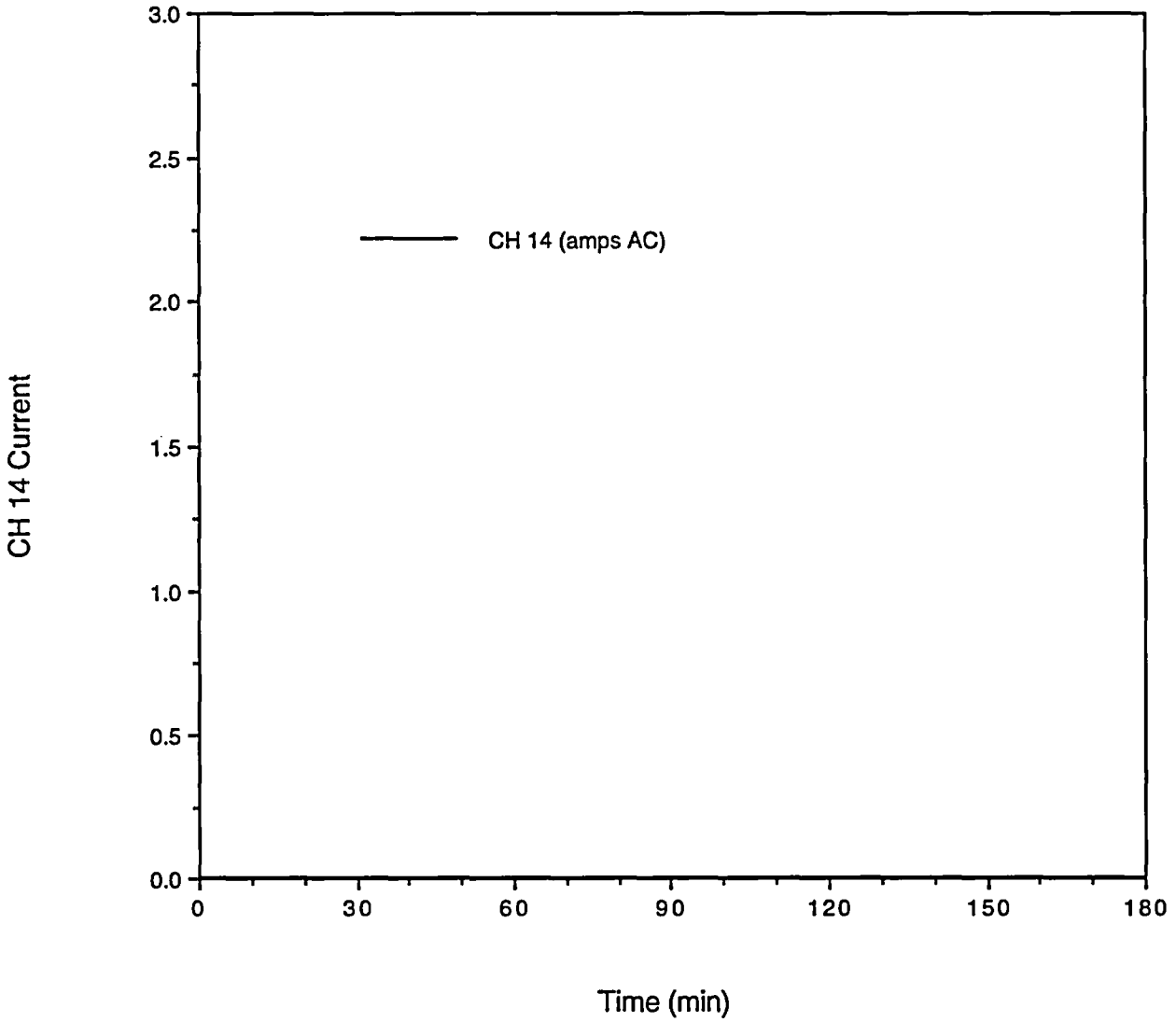
Project No. 14980-11747
Framatome-ANP
Channel #13 Voltage to Conductor 3, 4, 5 & 6 in 8/C #12 Cable



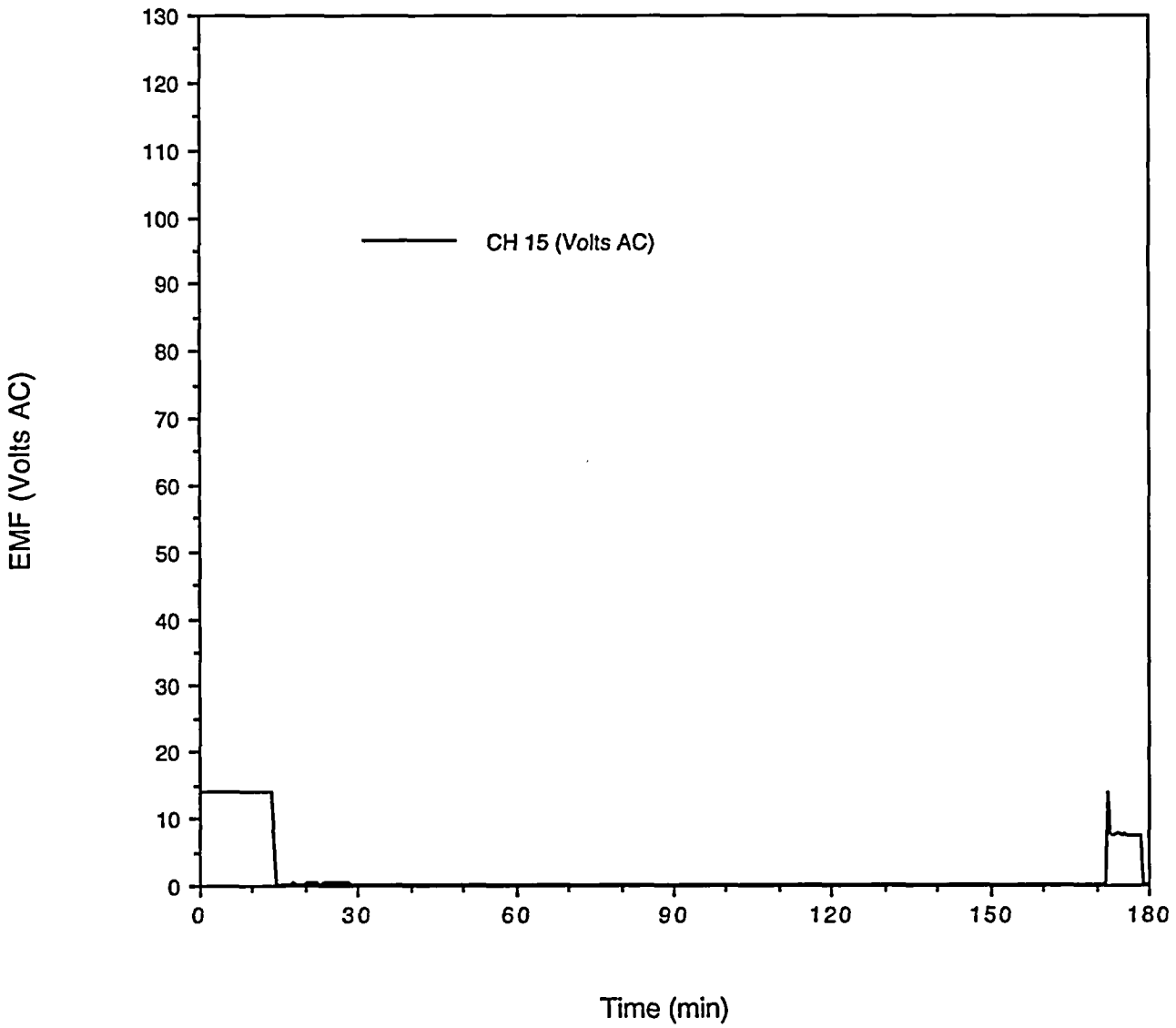
Project No. 14980-11747
Framatome-ANP
Channel #13 Calculated Current to Conductors 3, 4, 5 & 6 in 8/C #12 Ca



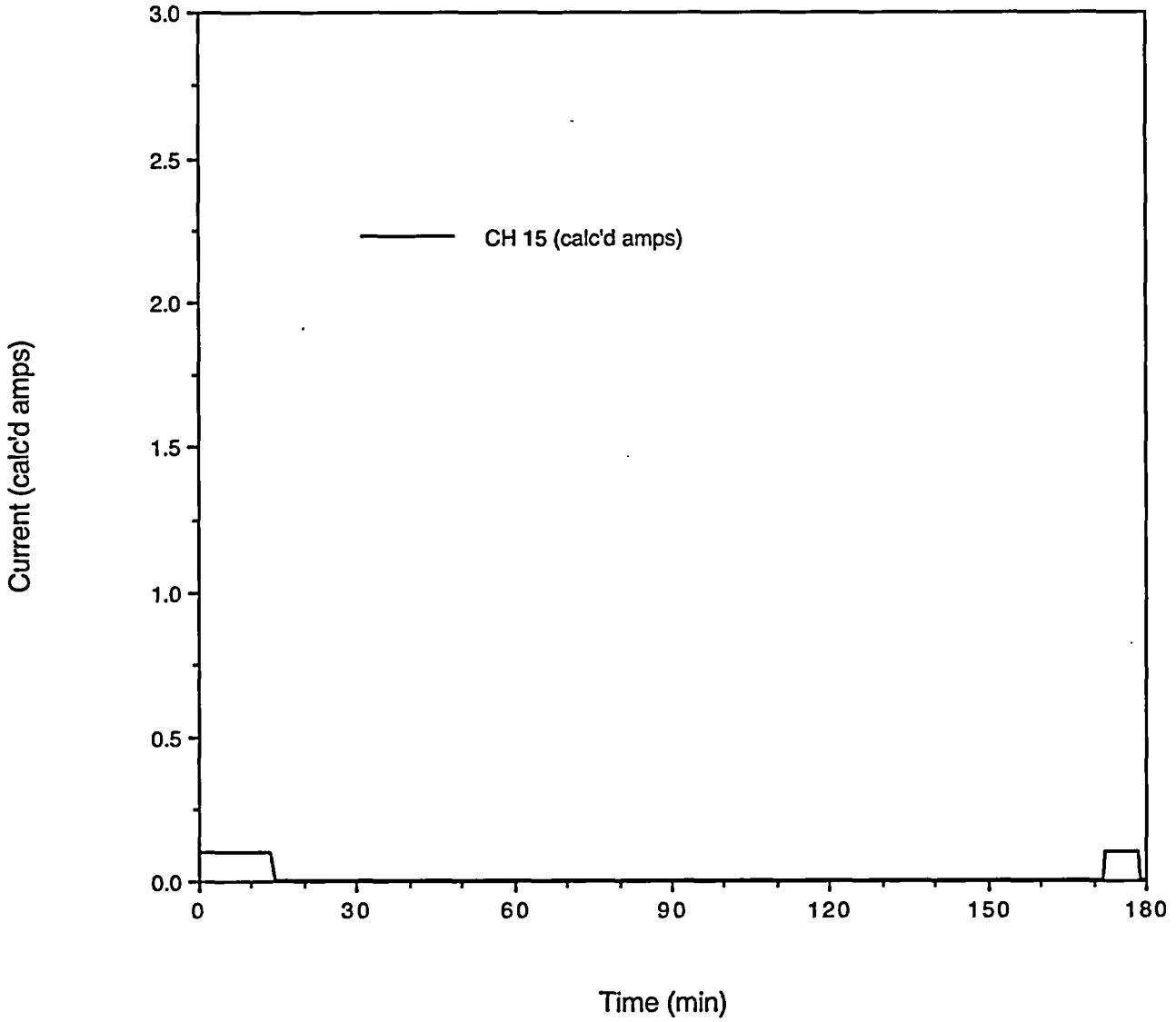
Project No. 14980-11747
Framatome-ANP
Channel #14 Current to 7/C #14 Cable



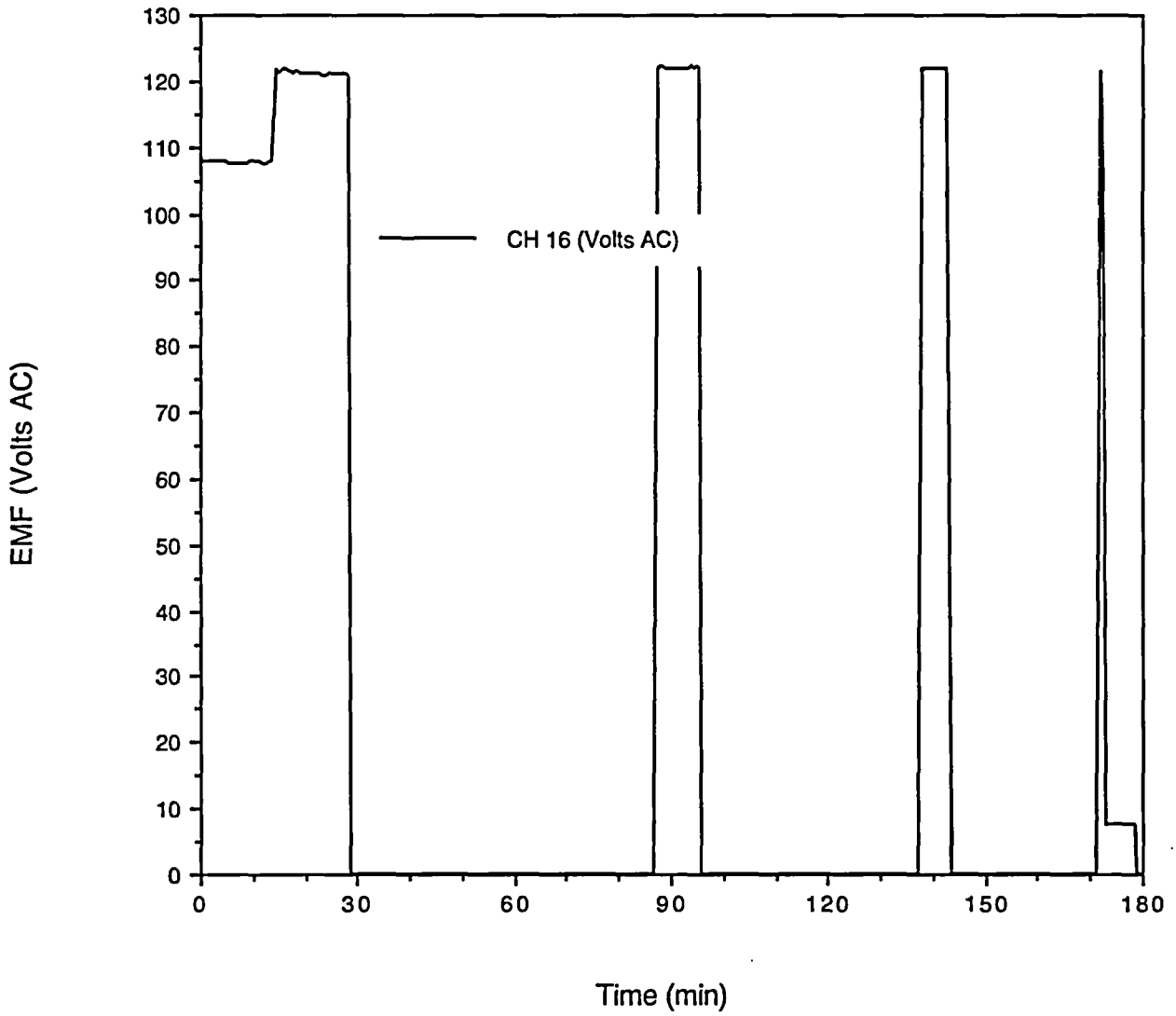
Project No. 14980-11747
Framatome-ANP
Channel #15 Voltage to Conductor 1 in 7/C #14 Cable



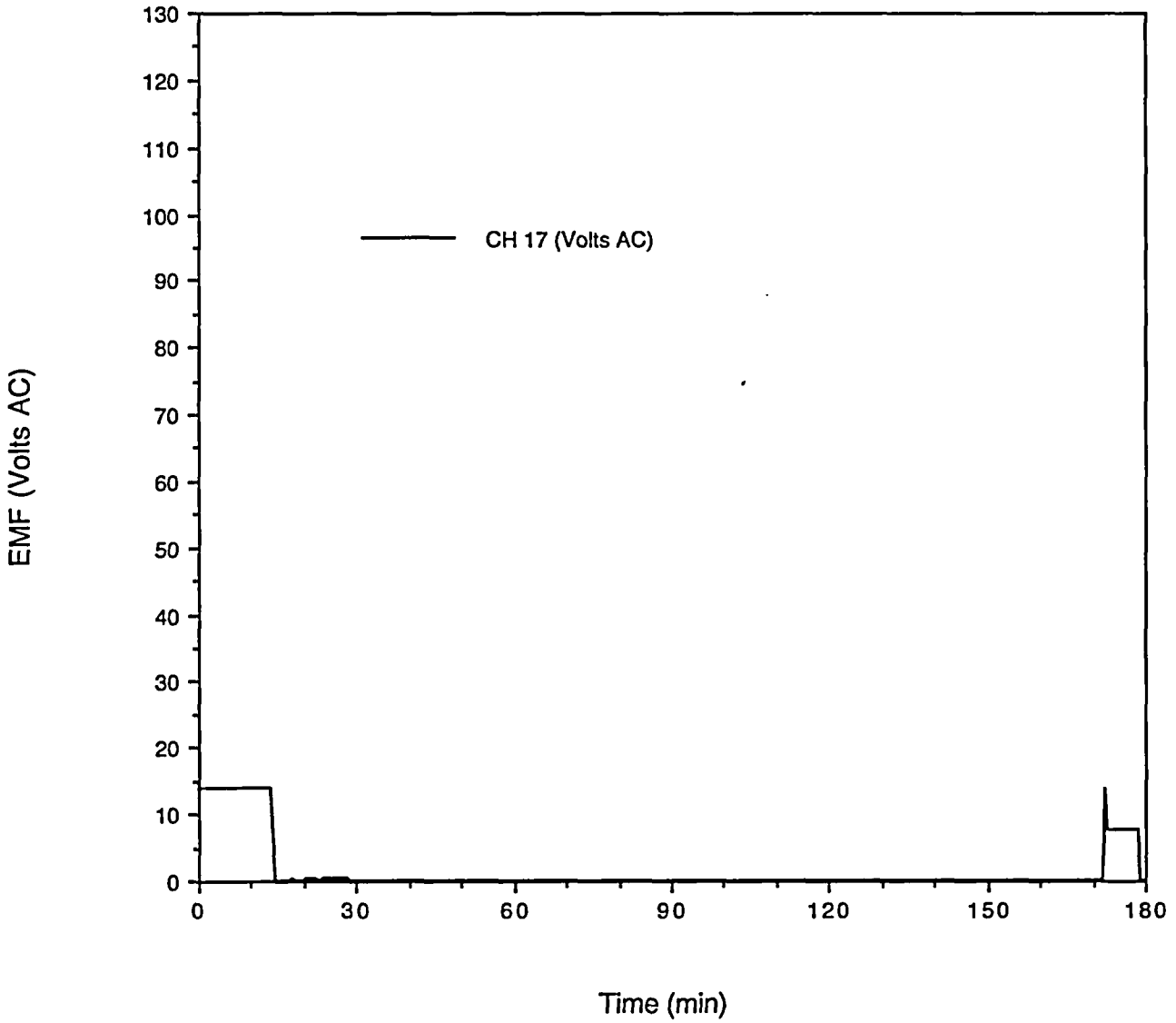
Project No. 14980-11747
Framatome-ANP
Channel #15 Calculated Current to Conductor 1 7/C #14 Cable



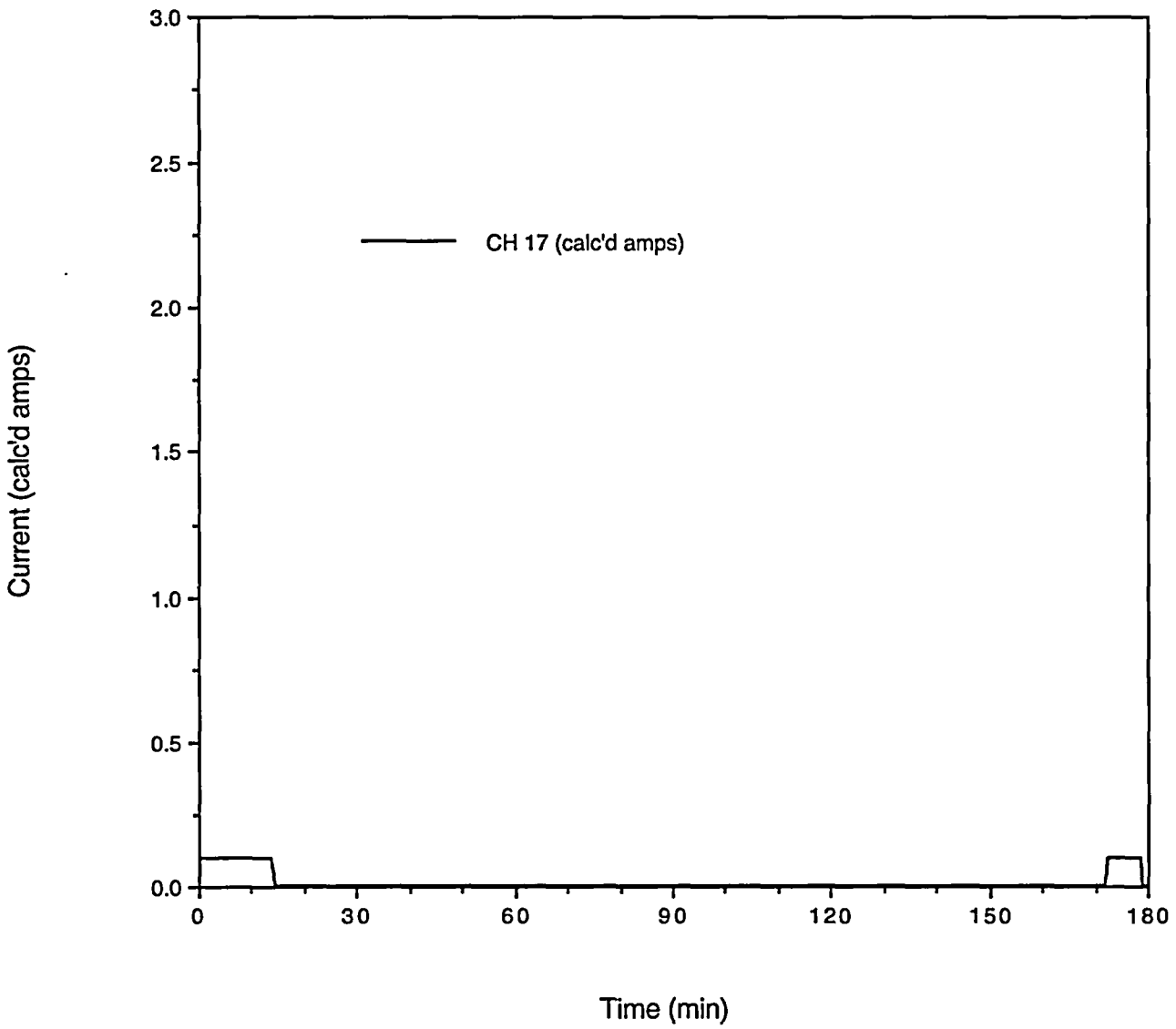
Project No. 14980-11747
Framatome-ANP
Channel #16 Voltage to 7/C #14 Cable



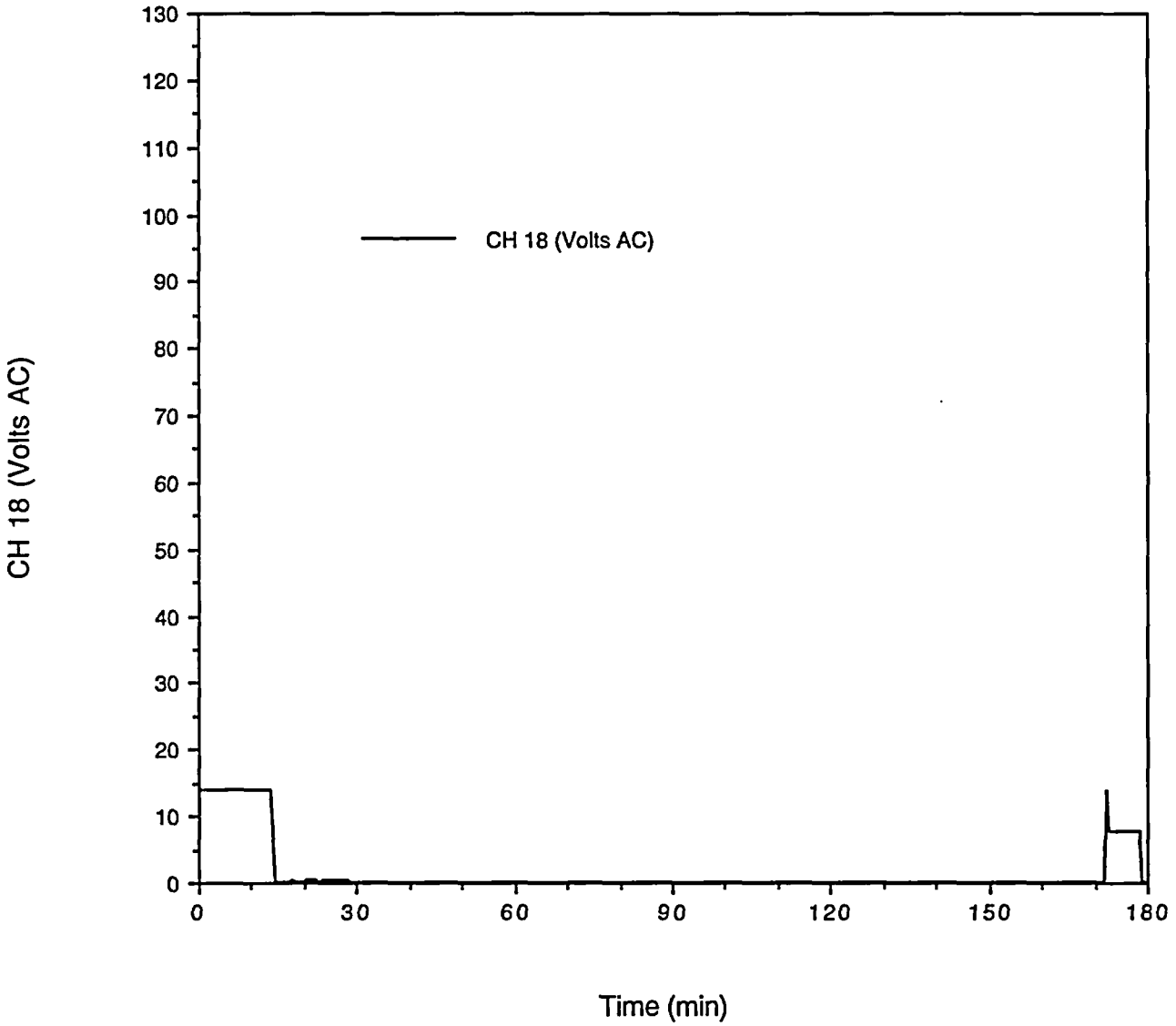
Project No. 14980-11747
Framatome-ANP
Channel #17 Voltage to Conductor 2 in 7/C #14 Cable



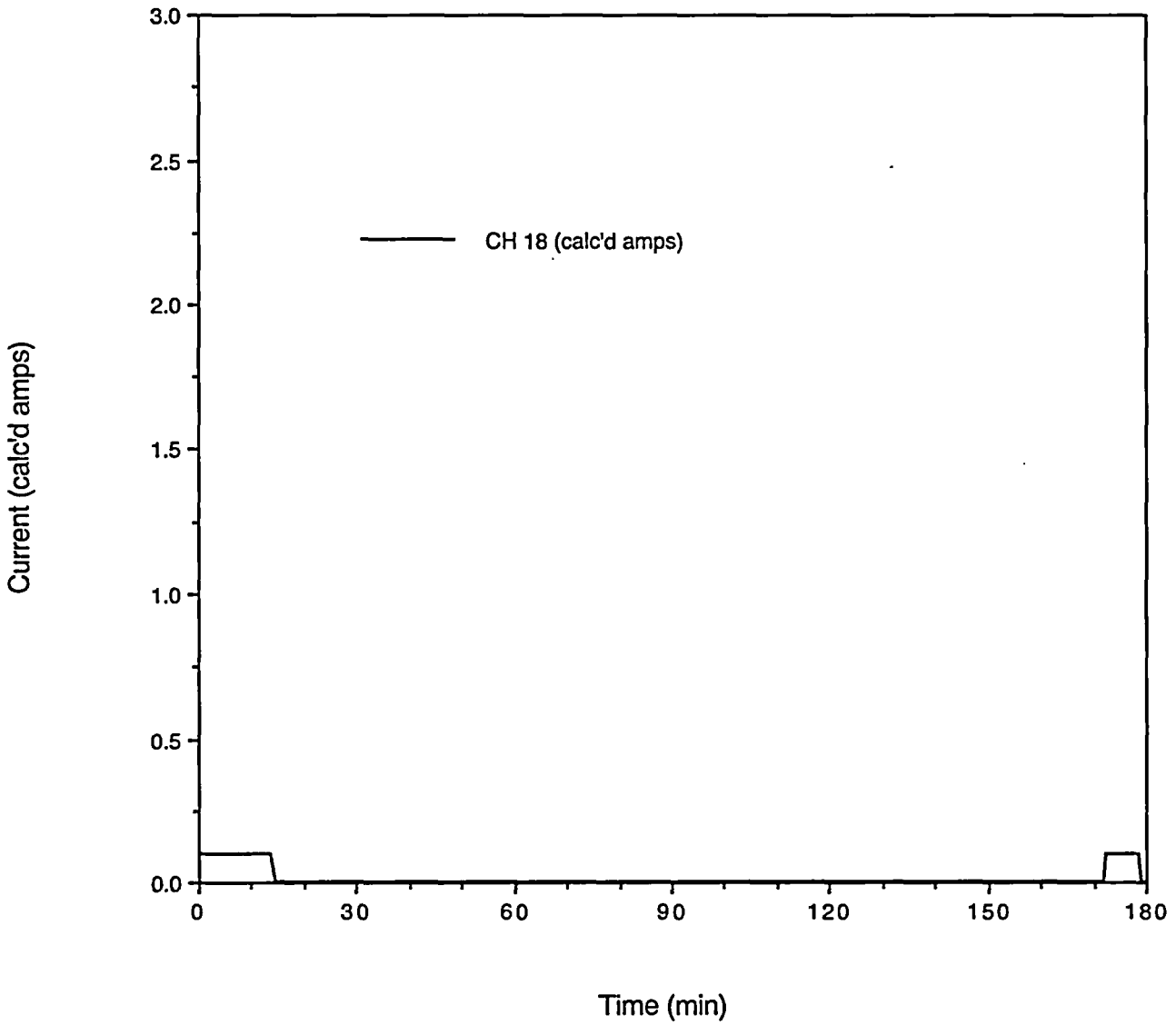
Project No. 14980-11747
Framatome-ANP
Channel #17 Calculated Current to Conductor 2 in 7/C #14 Cable



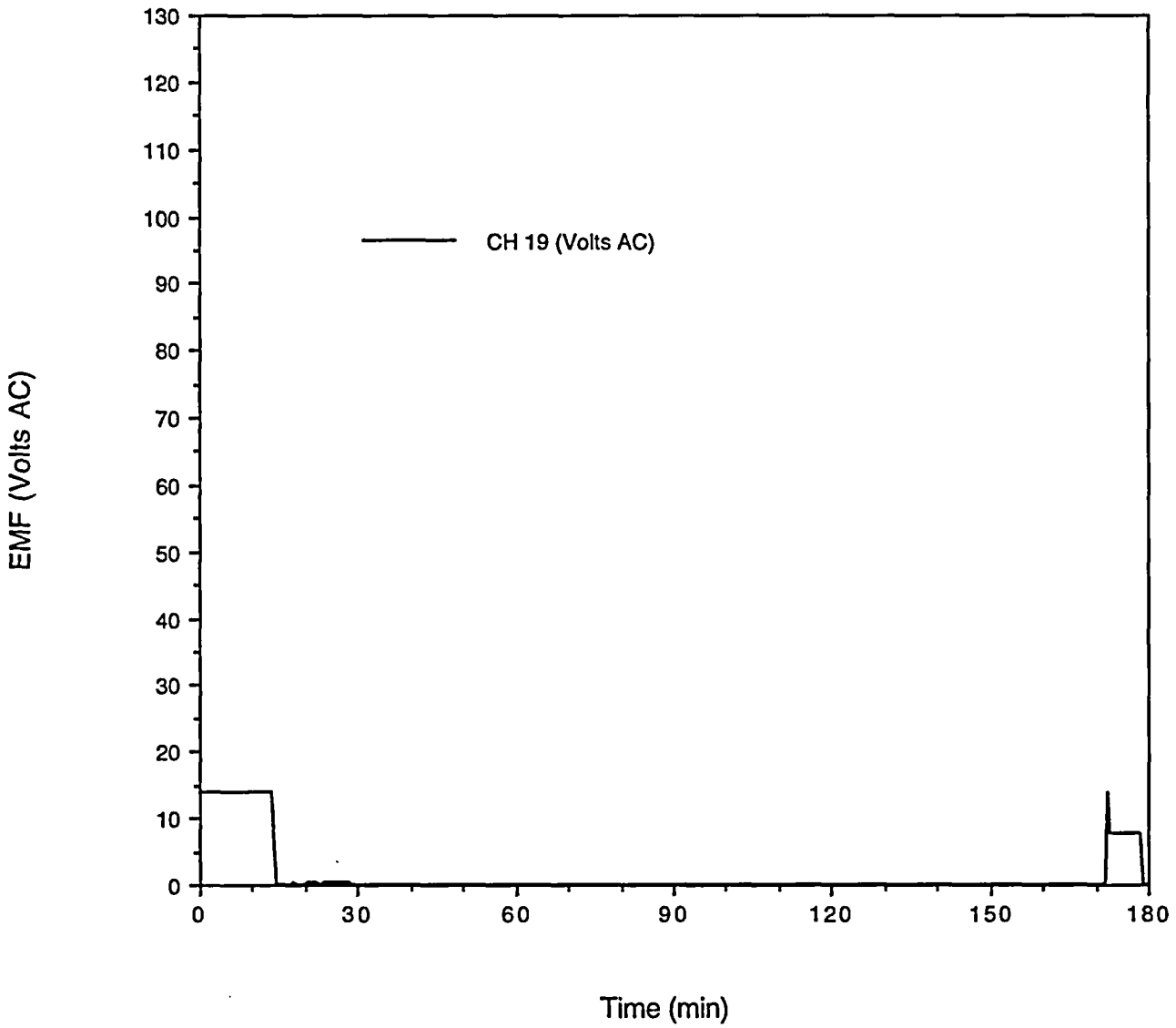
Project No. 14980-11747
Framatome-ANP
Channel #18 Voltage to Conductor 6 in 7/C #14 Cable



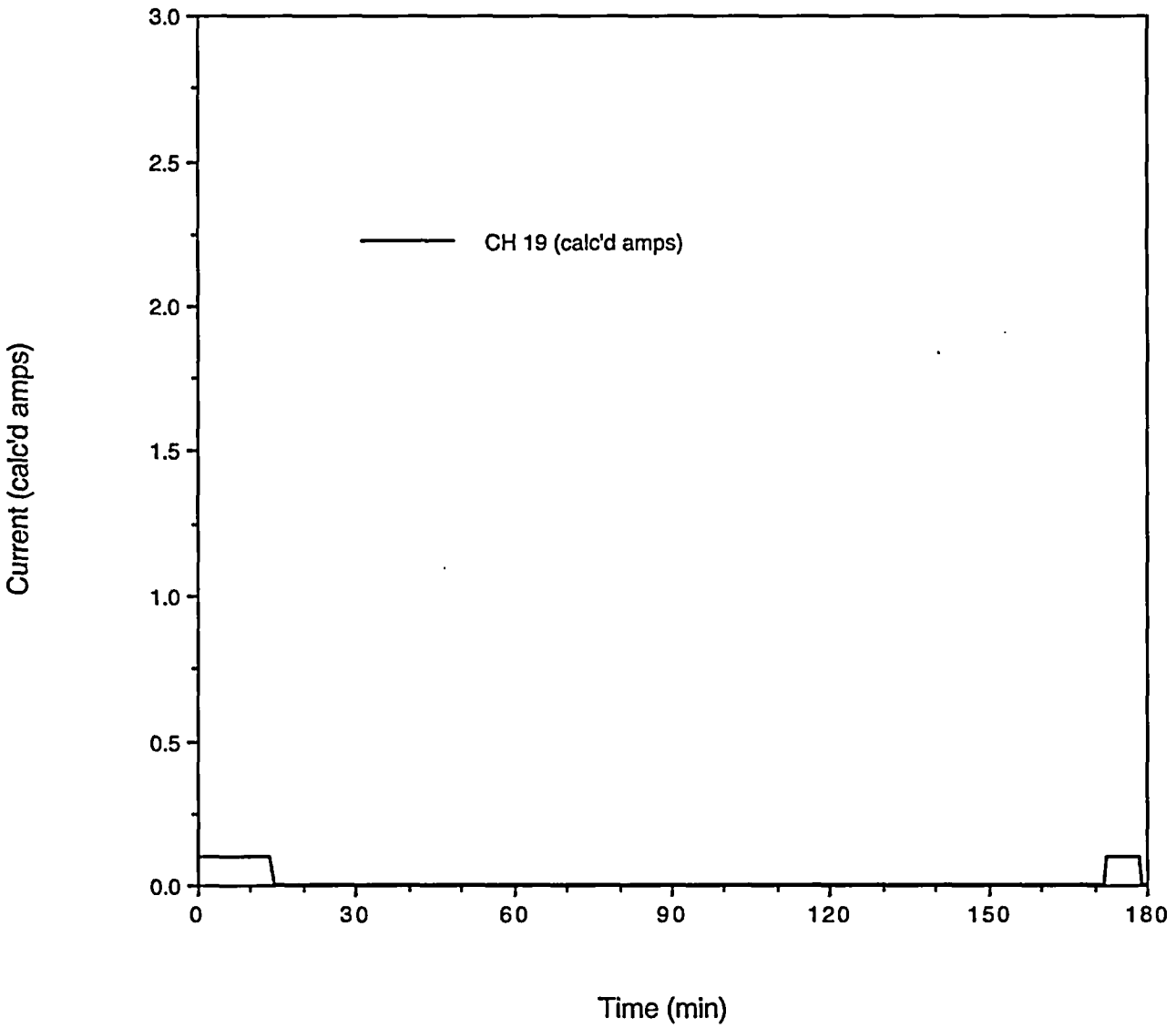
Project No. 14980-11747
Framatome-ANP
Channel #18 Calculated Current to Conductor 6 in 7/C #14 Cable



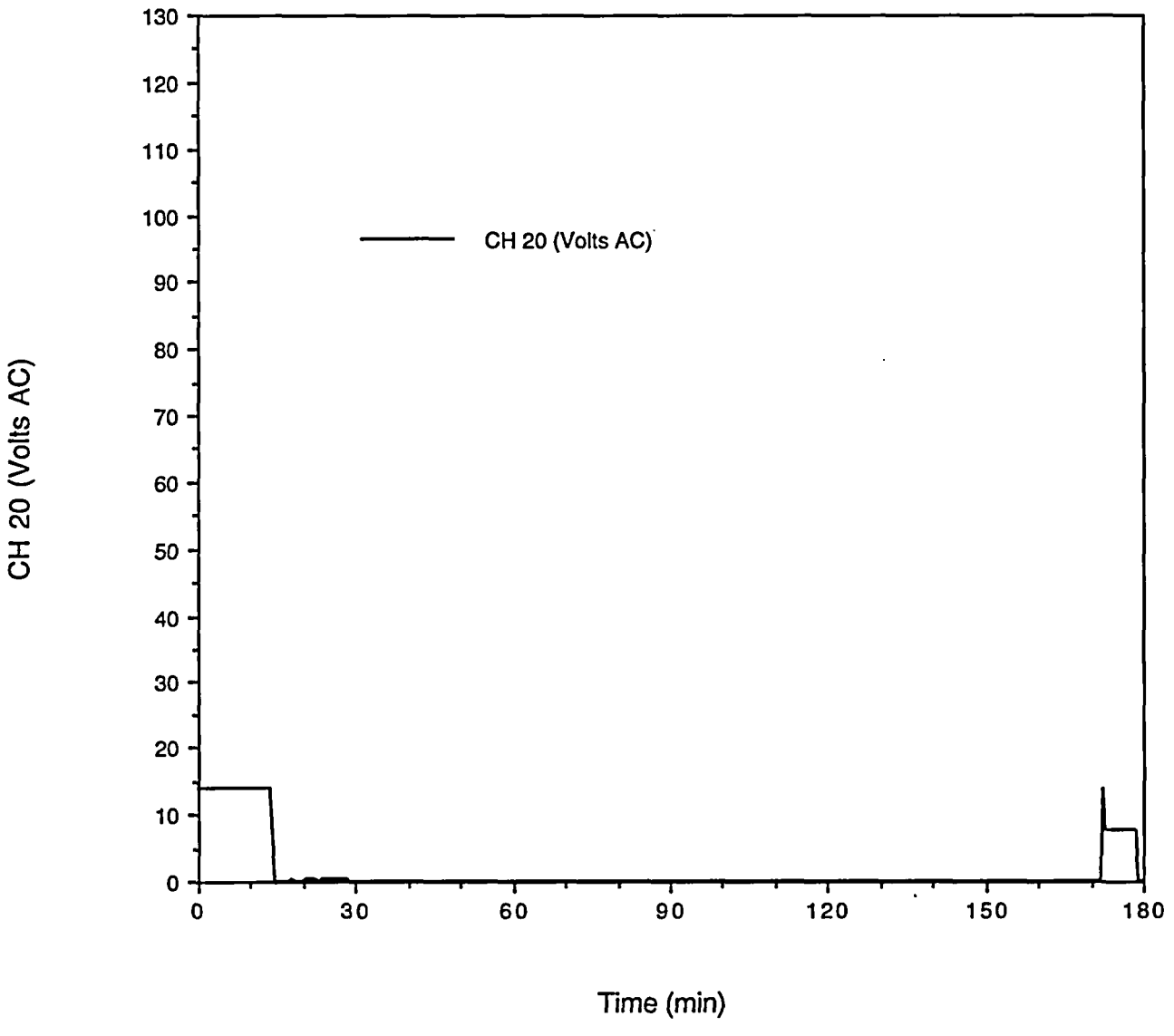
Project No. 14980-11747
Framatome-ANP
Channel #19 Voltage to Conductor 7 in 7/C #14 Cable



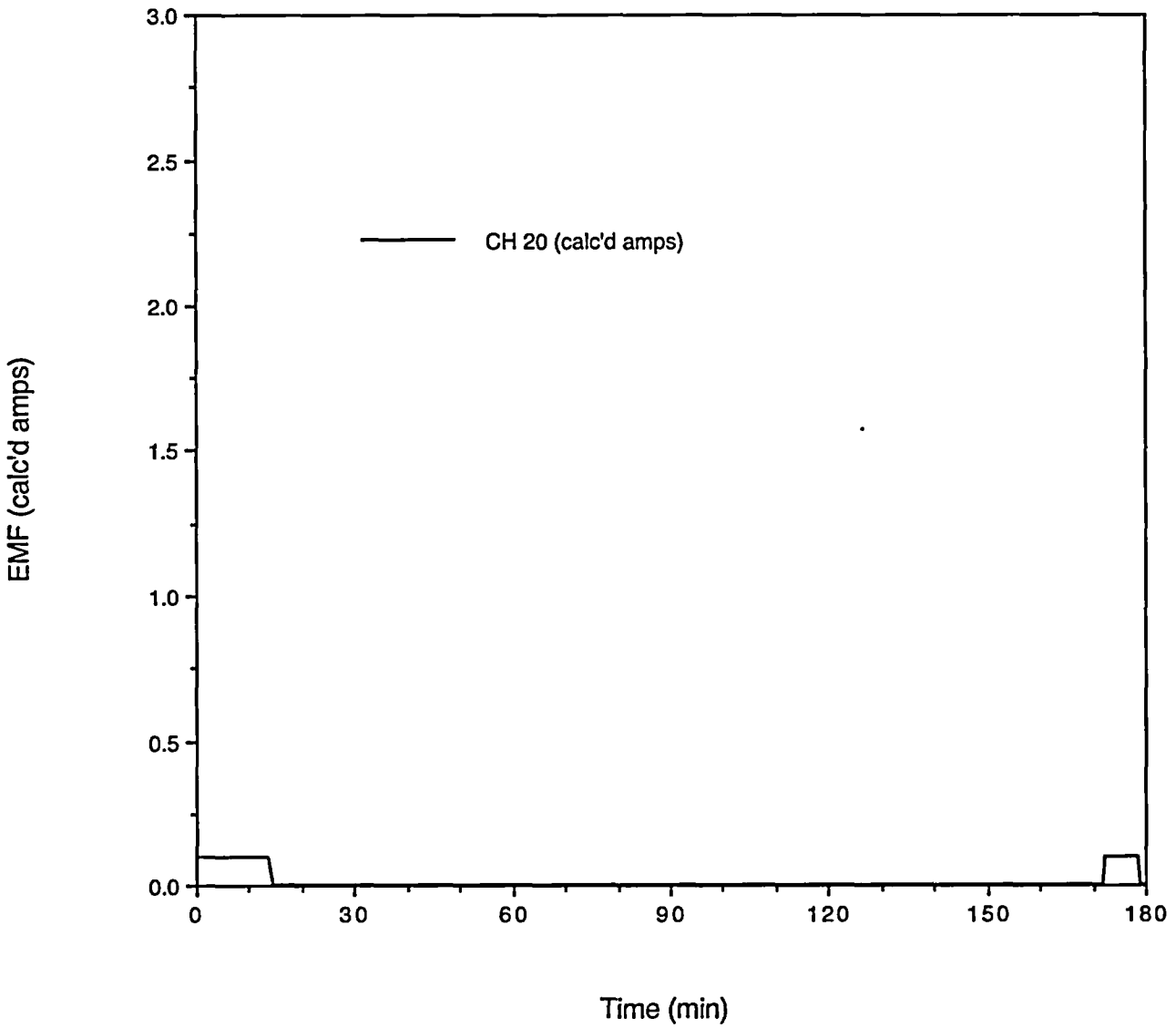
Project No. 14980-11747
Framatome-ANP
Channel #19 Calculated Current to Conductor 7 in 7/C #14 Cable



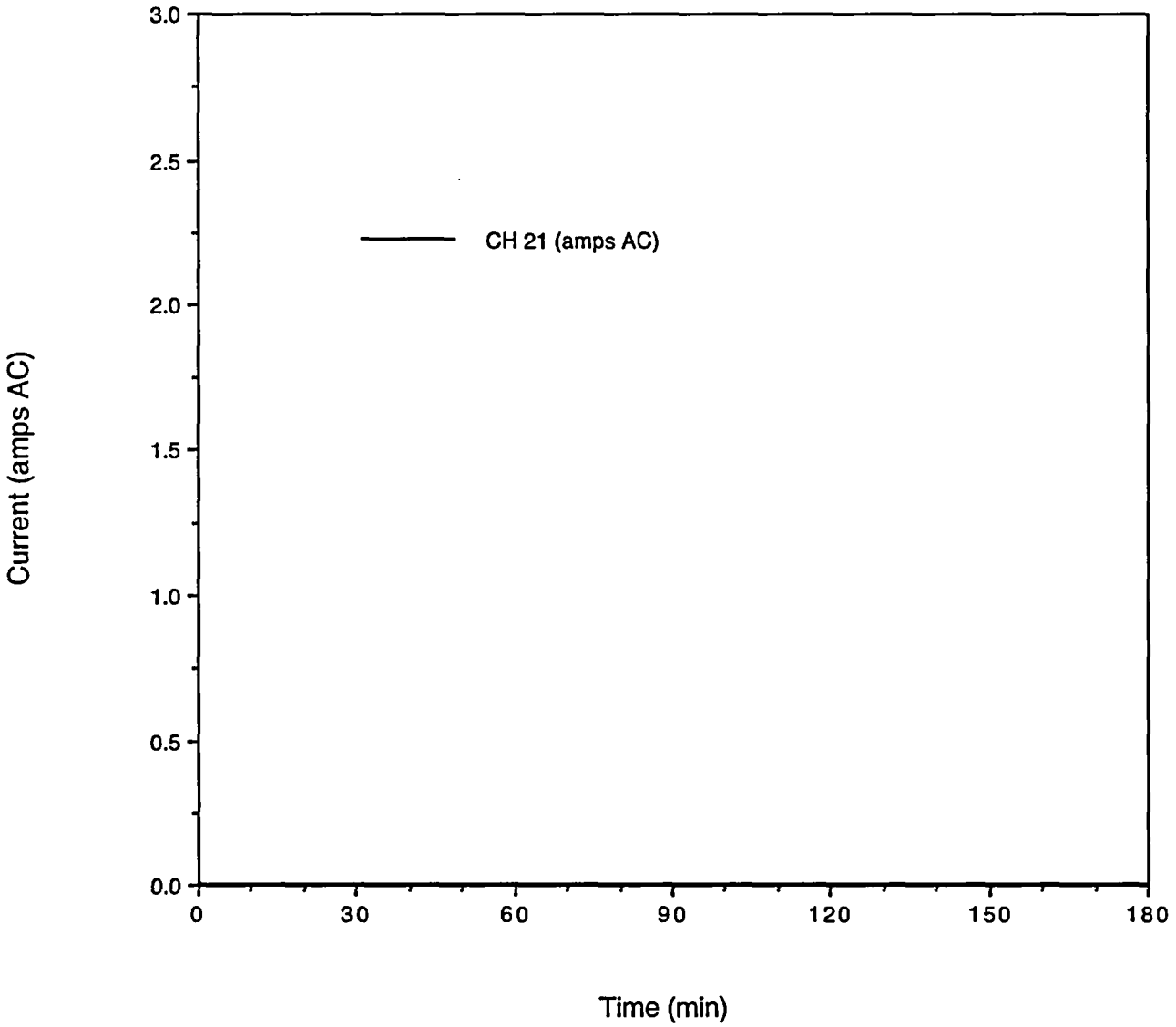
Project No. 14980-11747
Framatome-ANP
Channel #20 Voltage to Conductors 3, 4 & 5 in 7/C #14 Cable



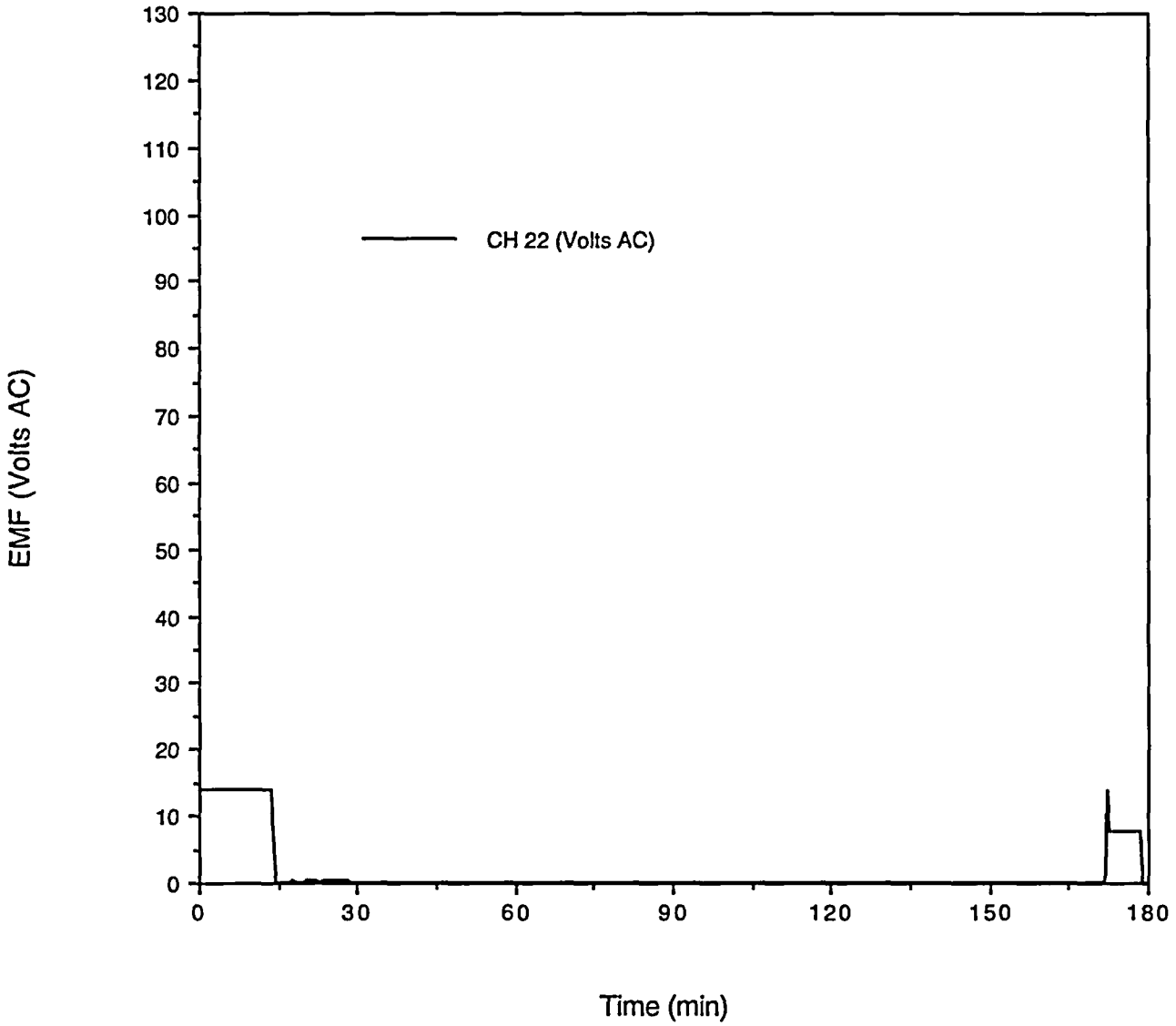
Project No. 14980-11747
Framatome-ANP
Channel #20 Calculated Current to Conductors 3, 4 & 5 in 7/C #14 C



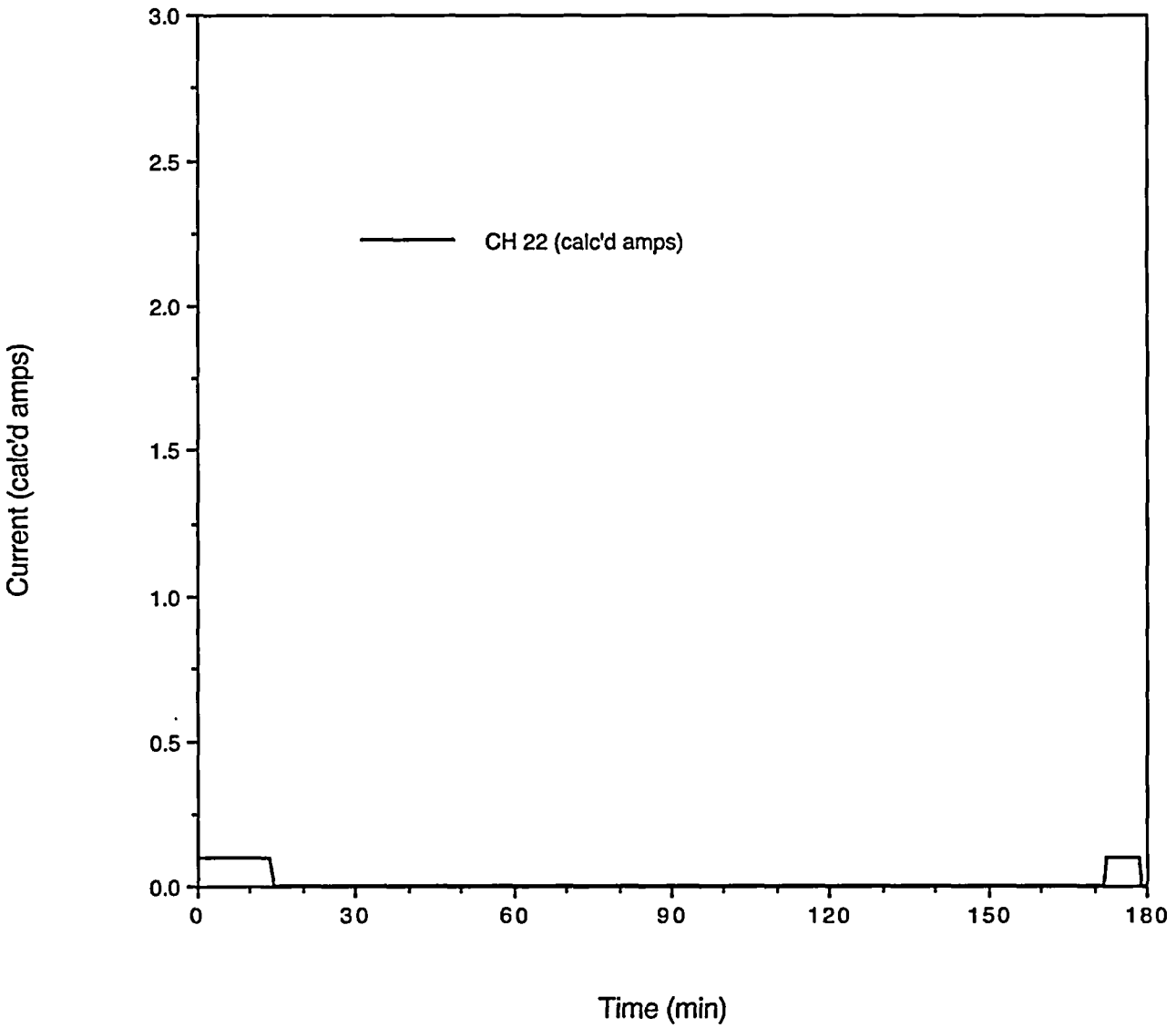
Project No. 14980-11747
Framatome-ANP
Channel #21 Current to 7/C #10 Cable



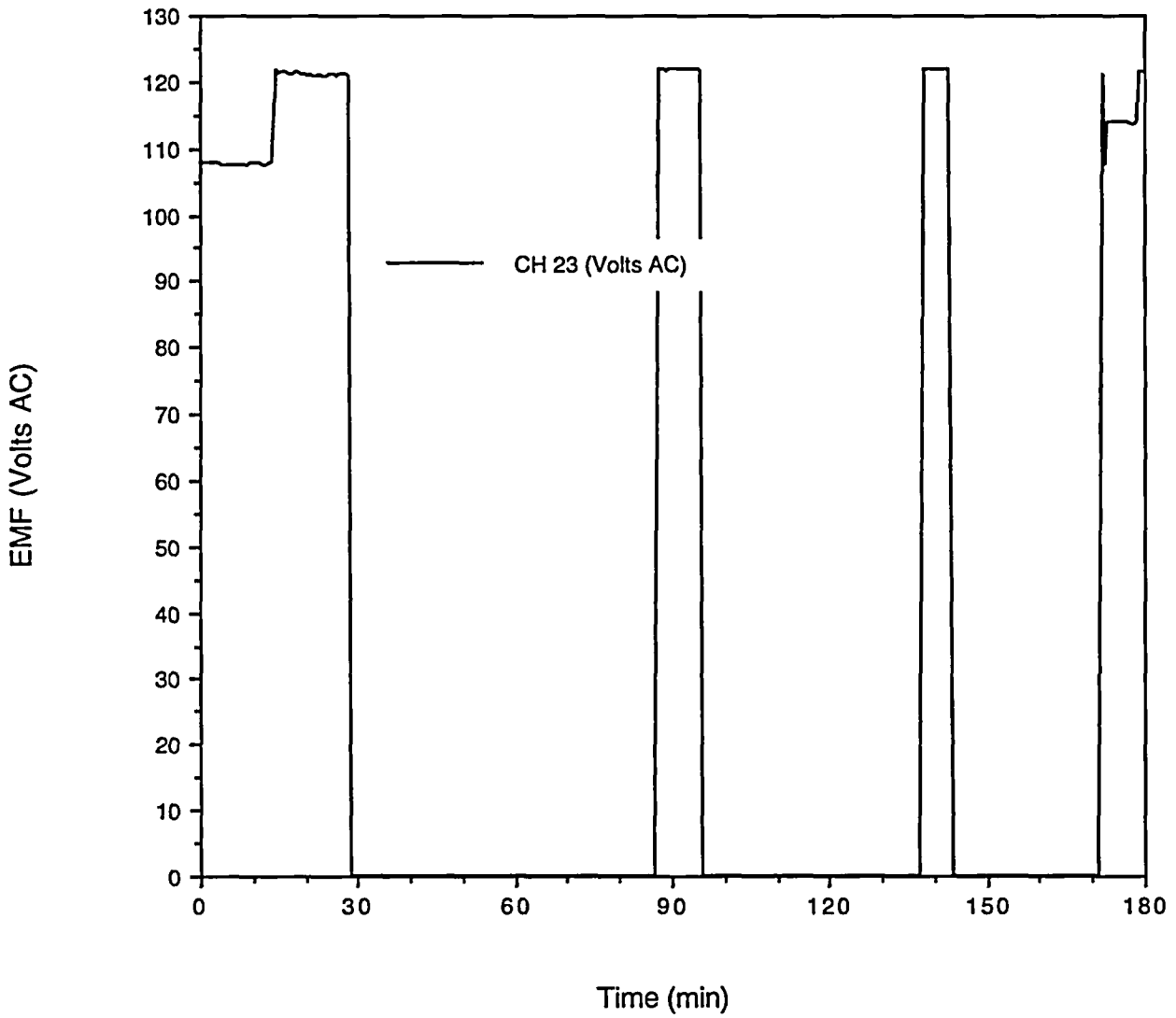
Project No. 14980-11747
Framatome-ANP
Channel #22 Voltage to Conductor 1 in 7/C #10 Cable



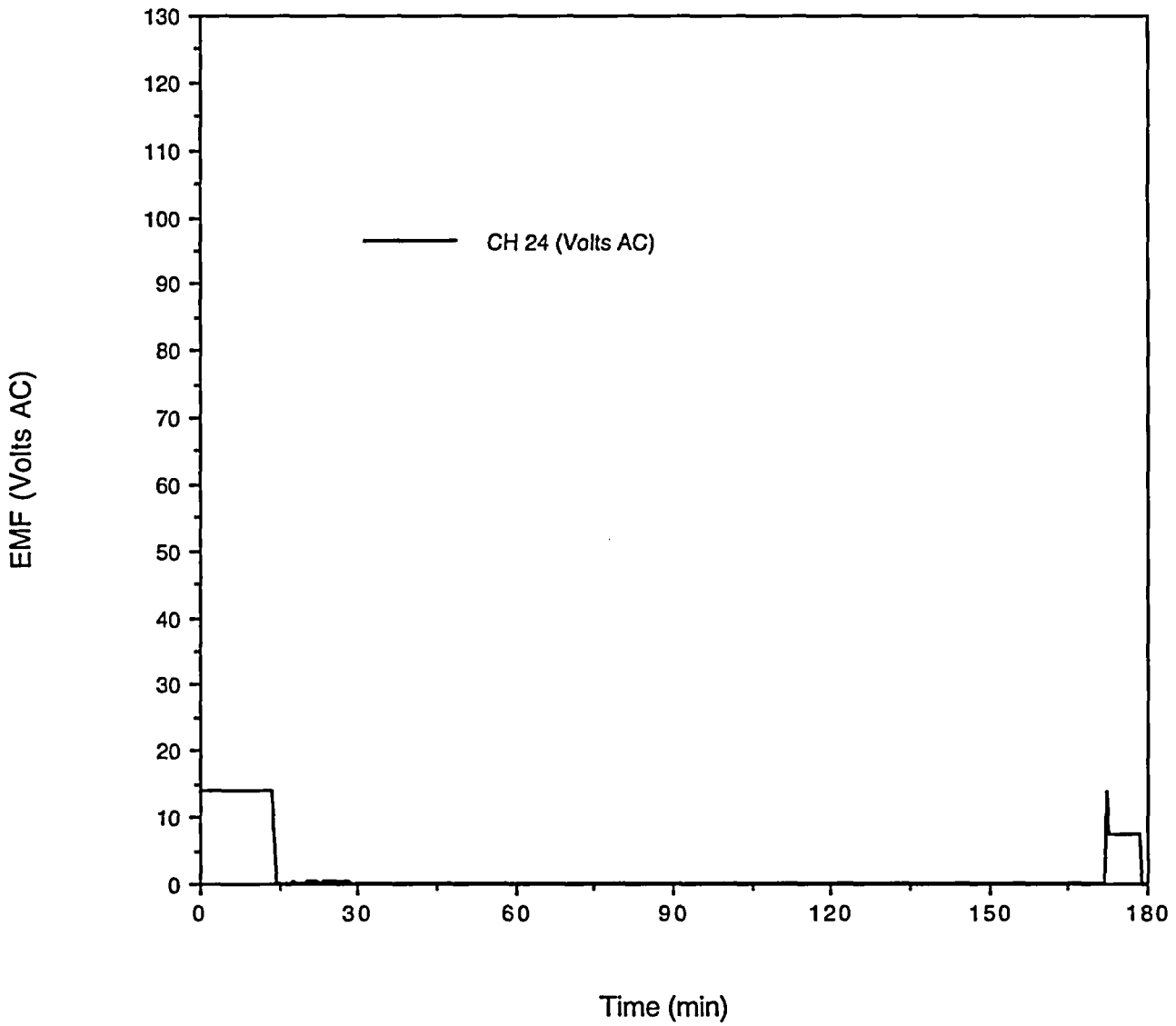
Project No. 14980-11747
Framatome-ANP
Channel #22 Calculated Current to Conductor 1 in 7/C #10 Cable



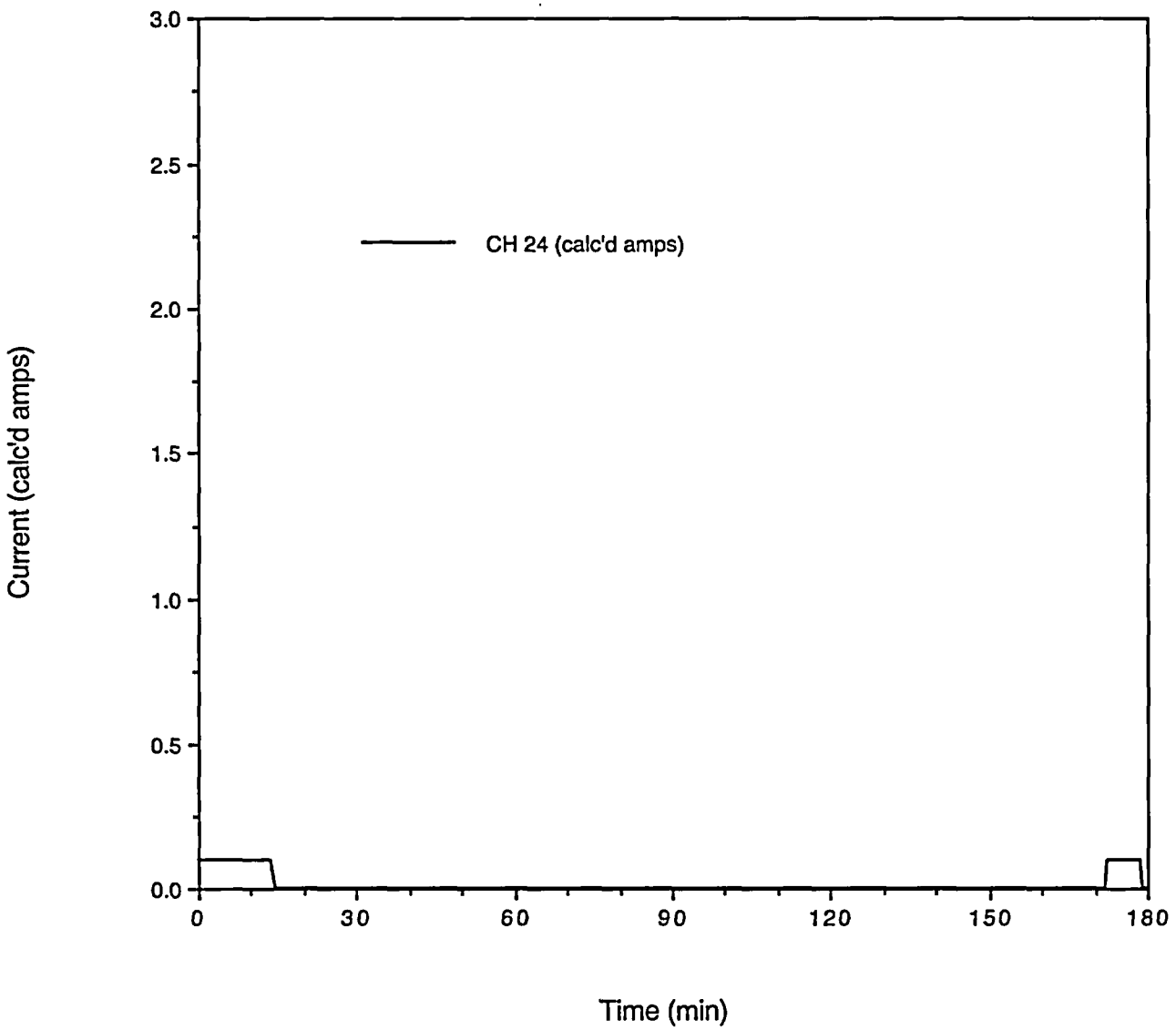
Project No. 14980-11747
Framatome-ANP
Channel #23 Voltage to 7/C #10 Cable



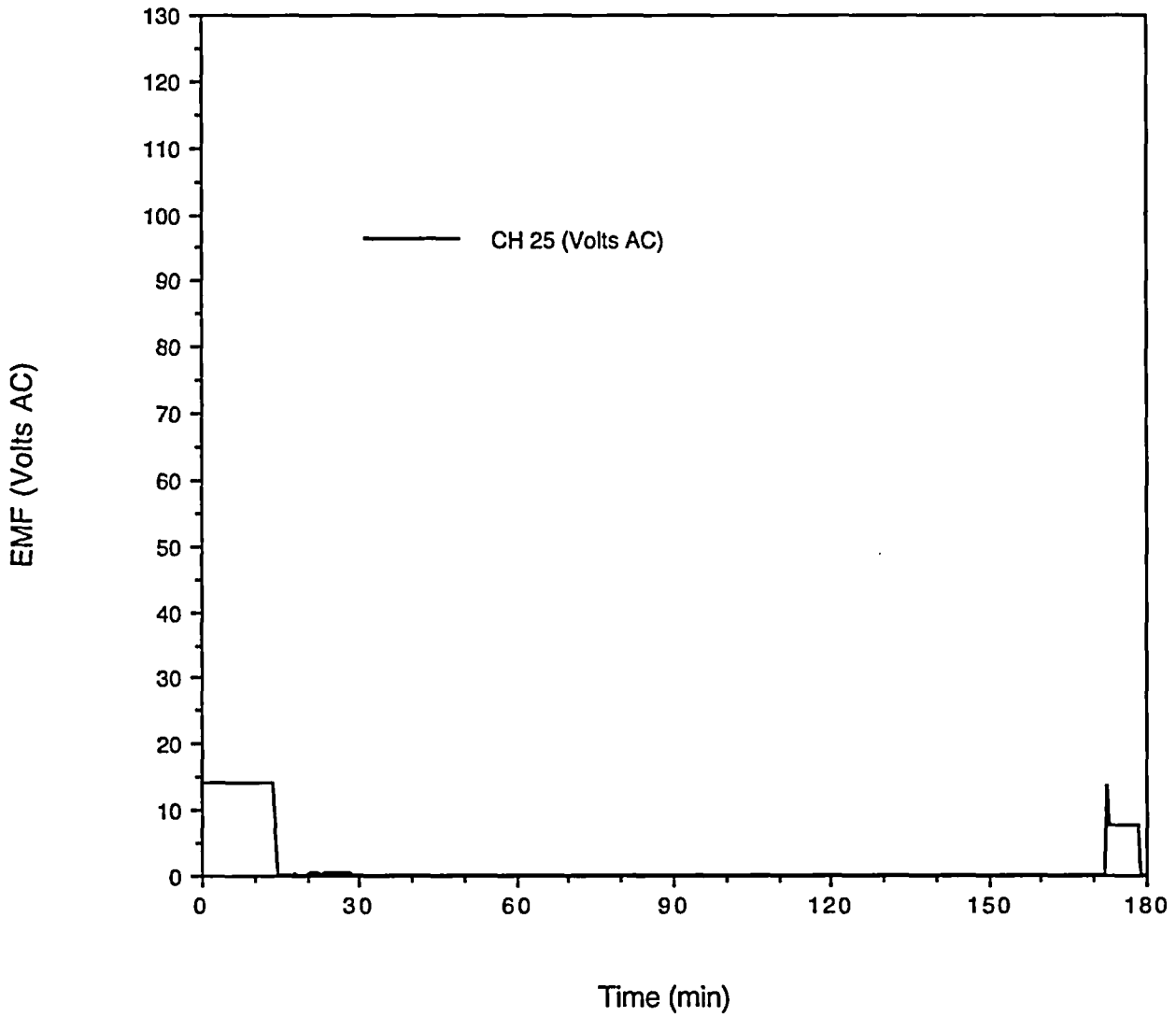
Project No. 14980-11747
Framatome-ANP
Channel #24 Voltage to Conductor 2 in 7/C #10 Cable



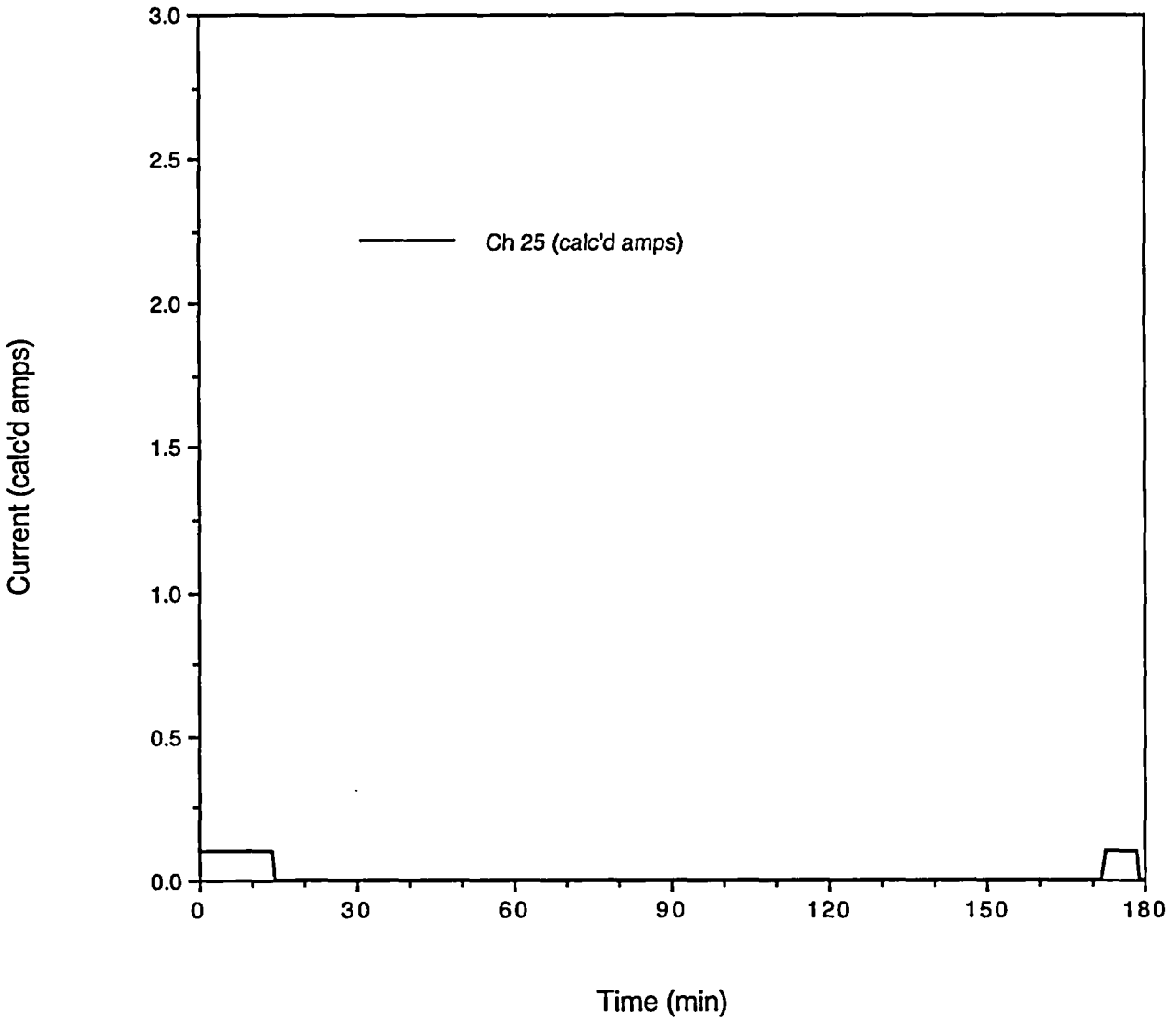
Project No. 14980-11747
Framatome-ANP
Channel #24 Calculated Current to Conductor 2 in 7/C #10 Cable



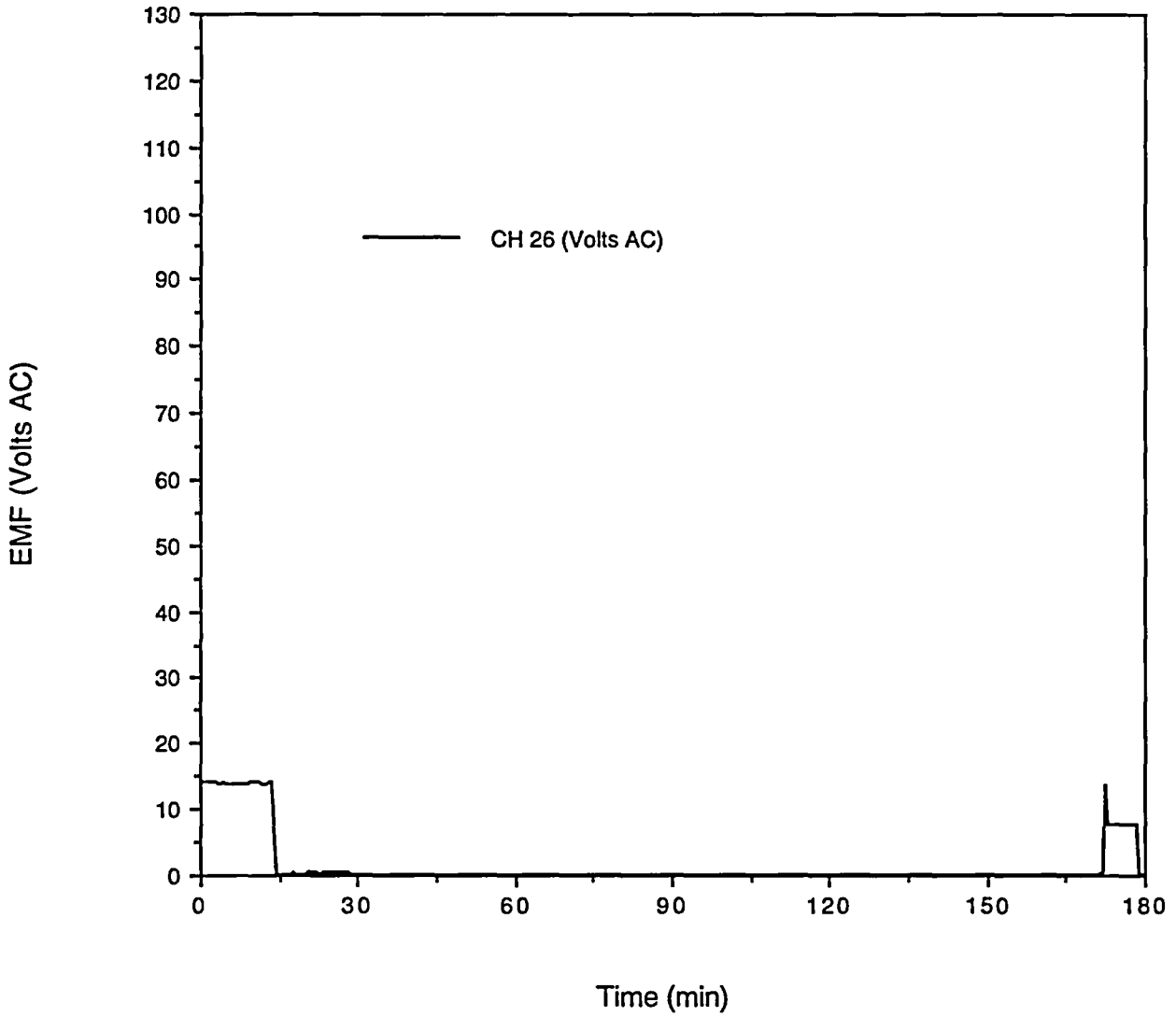
Project No. 14980-11747
Framatome-ANP
Channel #25 Voltage to Conductor 6 in 7/C #10 Cable



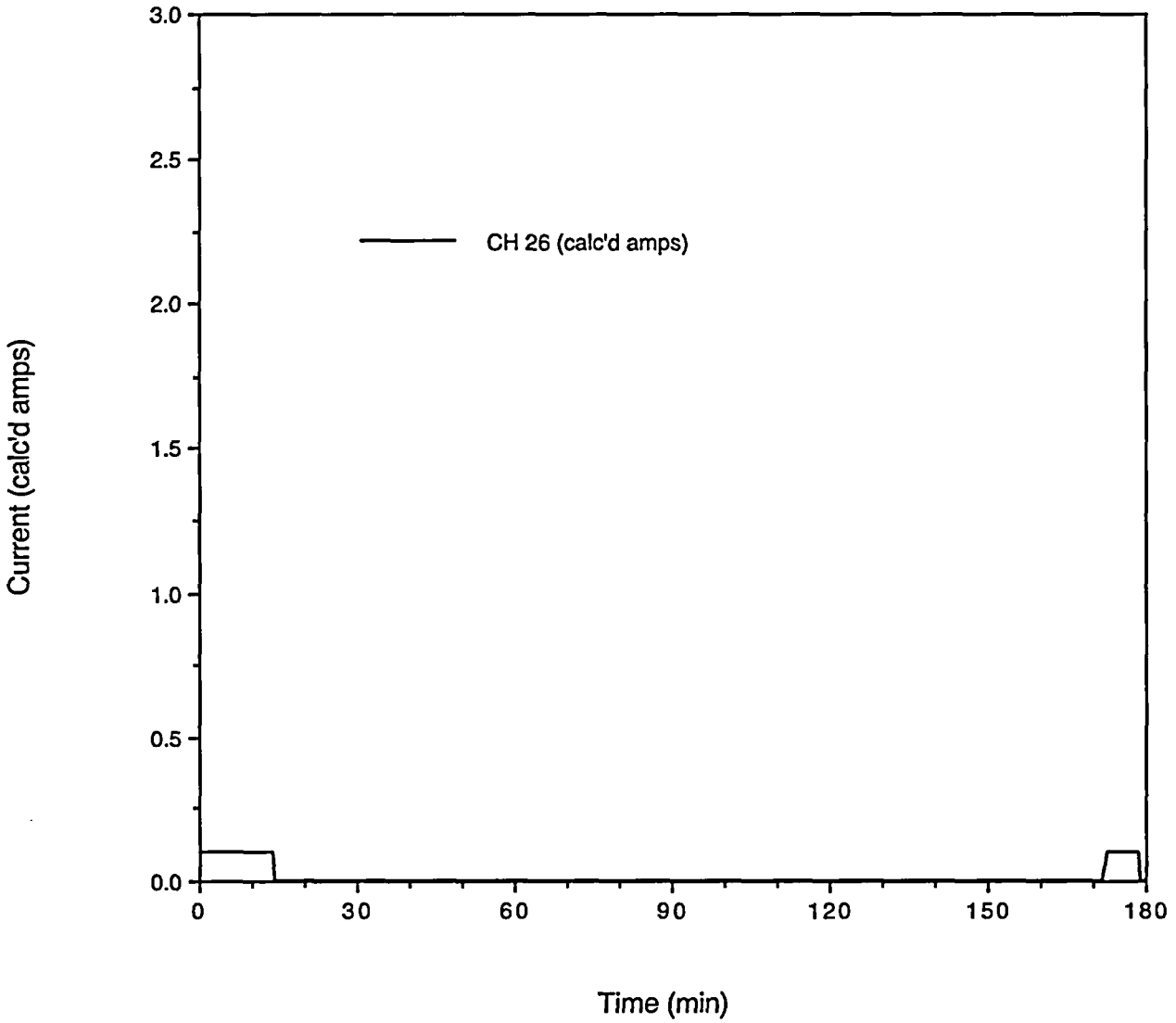
Project No. 14980-11747
Framatome-ANP
Channel #25 Calculated Current to Conductor 6 in 7/C #10 Cable



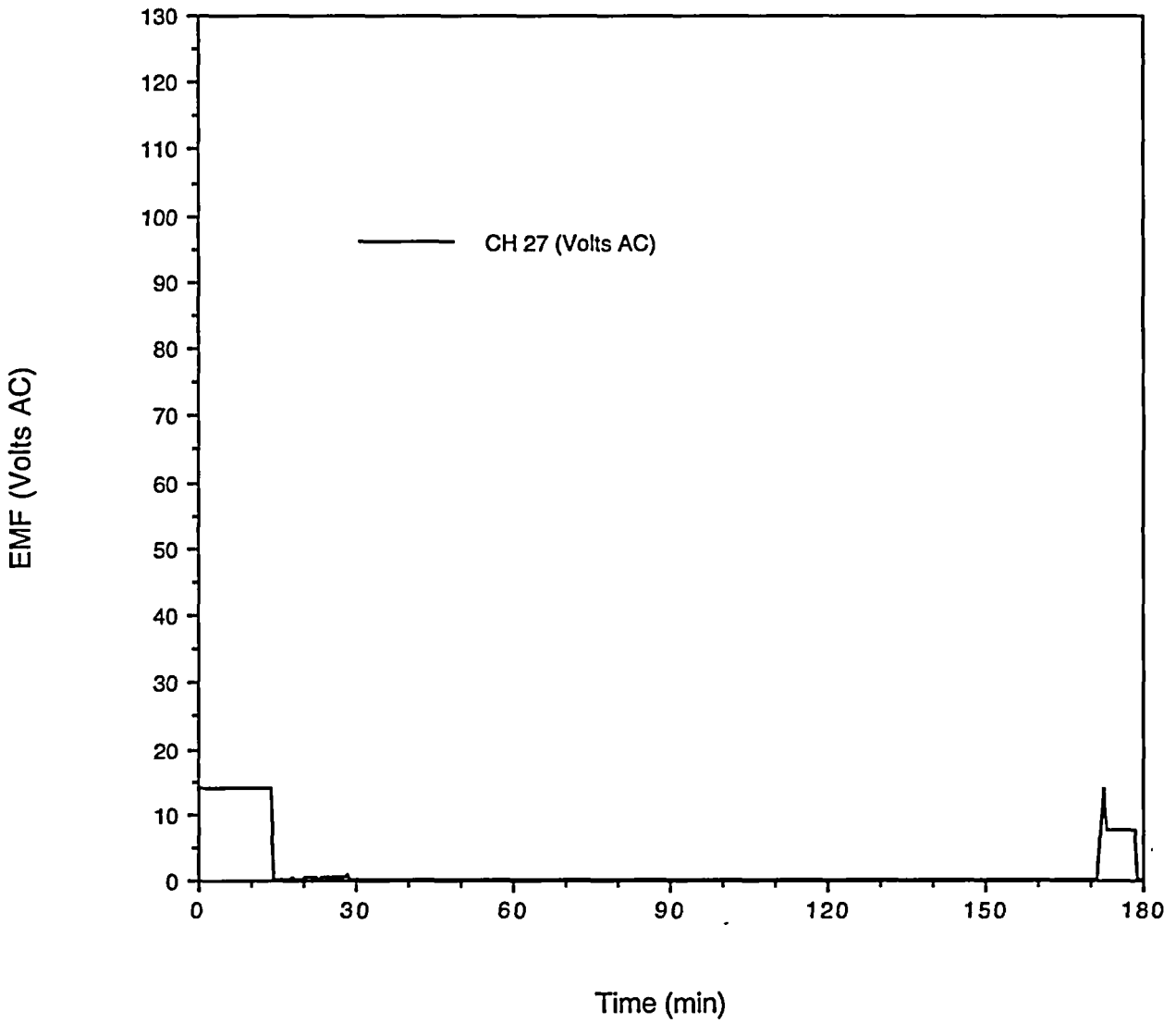
Project No. 14980-11747
Framatome-ANP
Channel #26 Voltage to Conductor 7 in 7/C #10 Cable



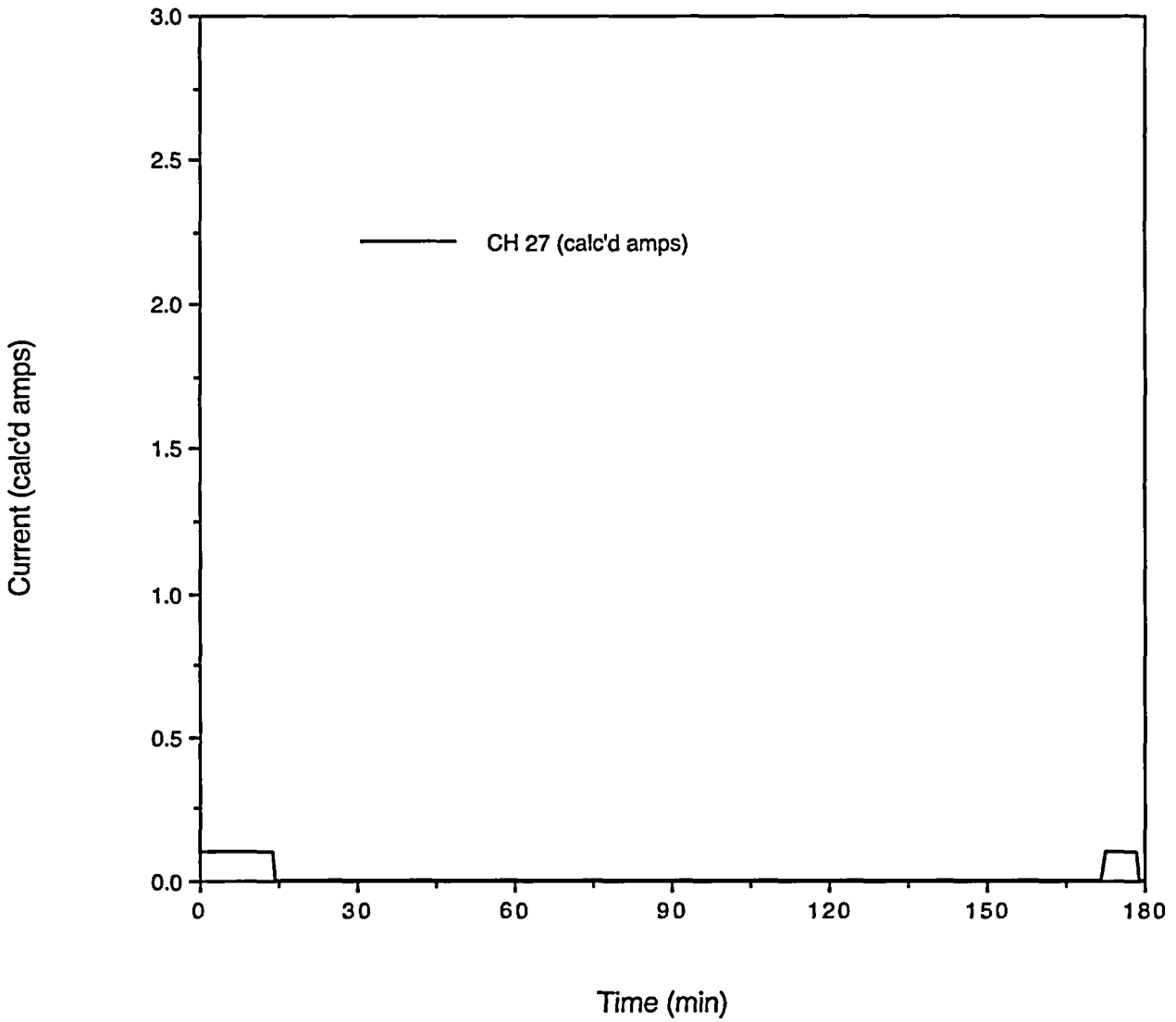
Project No. 14980-11747
Framatome-ANP
Channel #26 Calculated Current to Conductor 7 in 7/C #10 Cable



Project No. 14980-11747
Framatome-ANP
Channel #27 Voltage to Conductors 3, 4 & 5 in 7/C #10 Cable



Project No. 14980-11747
Framatome-ANP
Channel #27 Calculated Current to Conductors 3, 4 & 5 in 7/C #10 Ca



Project No. 14980-117047
FURNACE CONTROL DATA

FRAMATOME-ANP
March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
0.0	68	67	0	0	0.00	67	66	67
0.5	161	92	1	15	-92.0	82	80	88
1.0	254	178	24	75	-67.9	147	156	165
1.5	348	314	99	183	-45.7	258	323	303
2.0	441	476	245	336	-27.1	402	519	435
2.5	534	664	479	537	-10.8	581	721	597
3.0	627	769	795	784	1.45	694	824	688
3.5	720	807	1,153	1,077	7.00	741	858	728
4.0	814	813	1,524	1,418	7.47	754	859	742
4.5	907	842	1,899	1,804	5.22	778	870	776
5.0	1000	898	2,294	2,238	2.49	826	902	838
5.5	1030	961	2,718	2,708	0.38	887	946	914
6.0	1060	1024	3,174	3,193	-0.60	955	996	998
6.5	1090	1081	3,660	3,694	-0.90	1017	1047	1076
7.0	1120	1130	4,174	4,209	-0.83	1070	1094	1135
7.5	1150	1170	4,711	4,740	-0.60	1115	1136	1182
8.0	1180	1202	5,267	5,285	-0.34	1149	1170	1217
8.5	1210	1221	5,838	5,846	-0.14	1167	1190	1233
9.0	1240	1230	6,416	6,421	-0.09	1172	1198	1236
9.5	1270	1238	6,998	7,012	-0.20	1177	1202	1241
10.0	1300	1256	7,584	7,617	-0.43	1203	1223	1267
10.5	1317	1278	8,182	8,237	-0.66	1229	1248	1292
11.0	1328	1293	8,789	8,863	-0.83	1245	1264	1308
11.5	1337	1307	9,404	9,494	-0.95	1258	1279	1320
12.0	1347	1322	10,026	10,130	-1.04	1271	1295	1335
12.5	1356	1340	10,655	10,771	-1.08	1291	1313	1355
13.0	1364	1360	11,294	11,416	-1.07	1311	1334	1375
13.5	1373	1379	11,943	12,066	-1.02	1331	1353	1394
14.0	1381	1396	12,601	12,719	-0.93	1348	1369	1413
14.5	1388	1413	13,268	13,377	-0.81	1363	1386	1434
15.0	1396	1426	13,943	14,038	-0.68	1376	1401	1449
15.5	1403	1437	14,623	14,703	-0.54	1386	1414	1461
16.0	1410	1442	15,309	15,372	-0.41	1392	1422	1464
16.5	1417	1448	15,997	16,044	-0.30	1397	1430	1467
17.0	1424	1453	16,687	16,720	-0.19	1401	1435	1469
17.5	1430	1457	17,380	17,398	-0.10	1403	1439	1469
18.0	1436	1461	18,075	18,080	-0.03	1407	1443	1470
18.5	1442	1466	18,772	18,765	0.04	1410	1448	1474
19.0	1448	1472	19,472	19,453	0.10	1414	1453	1478
19.5	1454	1477	20,175	20,144	0.15	1419	1459	1483
20.0	1459	1483	20,881	20,838	0.21	1425	1464	1487
20.5	1465	1489	21,589	21,534	0.25	1431	1471	1492
21.0	1470	1493	22,300	22,233	0.30	1436	1476	1496
21.5	1475	1497	23,013	22,935	0.34	1440	1479	1499

Project No. 14980-117047
FURNACE CONTROL DATA

FRAMATOME-ANP
March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
22.0	1480	1501	23,728	23,640	0.38	1445	1487	1502
22.5	1485	1524	24,447	24,347	0.41	1450	1647	1505
23.0	1490	1545	25,182	25,056	0.50	1454	1788	1510
23.5	1495	1516	25,924	25,768	0.61	1457	1921	1514
24.0	1499	1518	26,651	26,482	0.64	1460	1877	1516
24.5	1504	1522	27,377	27,198	0.66	1465	1829	1518
25.0	1508	1525	28,104	27,917	0.67	1469	1911	1521
25.5	1513	1530	28,833	28,638	0.68	1473	1513	1525
26.0	1517	1535	29,565	29,361	0.69	1477	1508	1529
26.5	1521	1540	30,299	30,086	0.71	1482	1524	1534
27.0	1525	1544	31,036	30,813	0.72	1486	1542	1536
27.5	1529	1545	31,774	31,543	0.73	1488	1563	1538
28.0	1533	1548	32,513	32,274	0.74	1490	1529	1539
28.5	1537	1550	33,253	33,007	0.74	1492	1533	1541
29.0	1541	1552	33,994	33,743	0.75	1494	1534	1542
29.5	1545	1555	34,737	34,480	0.74	1497	1536	1546
30.0	1549	1558	35,481	35,219	0.74	1500	1538	1548
30.5	1552	1561	36,226	35,960	0.74	1503	1540	1551
31.0	1556	1564	36,973	36,702	0.74	1506	1542	1552
31.5	1559	1568	37,722	37,447	0.73	1510	1545	1556
32.0	1563	1571	38,472	38,193	0.73	1513	712	1559
32.5	1566	1573	39,224	38,941	0.73	1517	1077	1562
33.0	1570	1577	39,977	39,691	0.72	1521	1283	1566
33.5	1573	1580	40,732	40,442	0.72	1525	798	1569
34.0	1576	1585	41,488	41,195	0.71	1530	1305	1573
34.5	1579	1588	42,247	41,950	0.71	1533	1387	1576
35.0	1583	1590	43,008	42,706	0.71	1534	1307	1577
35.5	1586	1592	43,769	43,464	0.70	1536	1108	1579
36.0	1589	1594	44,531	44,223	0.70	1539	1440	1583
36.5	1592	1599	45,295	44,984	0.69	1544	-32767	1588
37.0	1595	1606	46,061	45,746	0.69	1552	1332	1595
37.5	1598	1610	46,831	46,510	0.69	1563	1416	1602
38.0	1601	1613	47,602	47,275	0.69	1573	1486	1608
38.5	1604	1617	48,375	48,042	0.69	1581	1539	1615
39.0	1606	1620	49,150	48,810	0.70	1588	1577	1620
39.5	1609	1623	49,927	49,580	0.70	1595	1603	1624
40.0	1612	1626	50,705	50,351	0.70	1601	1622	1627
40.5	1615	1627	51,484	51,124	0.70	1605	1636	1630
41.0	1617	1630	52,263	51,897	0.71	1608	1646	1633
41.5	1620	1632	53,045	52,673	0.71	1612	1651	1635
42.0	1623	1635	53,827	53,449	0.71	1616	1656	1637
42.5	1625	1638	54,611	54,227	0.71	1620	1661	1640
43.0	1628	1639	55,396	55,006	0.71	1624	1666	1642
43.5	1631	1642	56,182	55,786	0.71	1628	1669	1643

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
44.0	1633	1643	56,969	56,568	0.71	1629	1671	1645
44.5	1636	1640	57,756	57,351	0.71	1628	1669	1642
45.0	1638	1639	58,542	58,135	0.70	1629	1669	1641
45.5	1640	1639	59,327	58,920	0.69	1629	1667	1640
46.0	1643	1638	60,112	59,707	0.68	1631	1667	1640
46.5	1645	1640	60,898	60,495	0.67	1631	1667	1641
47.0	1648	1641	61,684	61,284	0.65	1632	1666	1640
47.5	1650	1643	62,471	62,074	0.64	1634	1668	1641
48.0	1652	1645	63,258	62,865	0.63	1635	1669	1641
48.5	1655	1646	64,047	63,658	0.61	1636	1670	1643
49.0	1657	1645	64,836	64,451	0.60	1639	1673	1644
49.5	1659	1646	65,625	65,246	0.58	1641	1677	1646
50.0	1661	1647	66,414	66,042	0.56	1642	1676	1647
50.5	1663	1656	67,205	66,839	0.55	1647	1681	1652
51.0	1666	1663	68,000	67,637	0.54	1653	1690	1661
51.5	1668	1664	68,797	68,436	0.53	1658	1694	1664
52.0	1670	1666	69,596	69,236	0.52	1661	1696	1667
52.5	1672	1669	70,395	70,037	0.51	1664	1698	1669
53.0	1674	1670	71,196	70,840	0.50	1666	1699	1669
53.5	1676	1672	71,997	71,643	0.49	1667	1700	1671
54.0	1678	1675	72,799	72,447	0.49	1669	1703	1674
54.5	1680	1678	73,603	73,253	0.48	1674	1709	1679
55.0	1682	1682	74,409	74,059	0.47	1676	1710	1681
55.5	1684	1684	75,216	74,866	0.47	1678	1712	1683
56.0	1686	1686	76,024	75,675	0.46	1680	1714	1685
56.5	1688	1688	76,834	76,484	0.46	1683	1715	1687
57.0	1690	1690	77,644	77,295	0.45	1685	1717	1689
57.5	1692	1693	78,455	78,106	0.45	1688	1719	1692
58.0	1694	1695	79,268	78,918	0.44	1688	1719	1692
58.5	1696	1696	80,082	79,731	0.44	1689	1719	1692
59.0	1698	1695	80,896	80,546	0.43	1690	1721	1693
59.5	1700	1695	81,709	81,361	0.43	1689	1720	1693
60.0	1701	1695	82,523	82,177	0.42	1690	1720	1693
60.5	1703	1697	83,337	82,994	0.41	1693	1723	1695
61.0	1705	1698	84,152	83,812	0.41	1693	1723	1696
61.5	1707	1699	84,967	84,630	0.40	1694	1727	1697
62.0	1709	1702	85,782	85,450	0.39	1697	1735	1699
62.5	1710	1705	86,600	86,271	0.38	1699	1735	1702
63.0	1712	1708	87,419	87,092	0.37	1701	1734	1704
63.5	1714	1710	88,239	87,914	0.37	1703	1737	1707
64.0	1716	1711	89,060	88,738	0.36	1704	1737	1708
64.5	1717	1712	89,881	89,562	0.36	1706	1739	1709
65.0	1719	1714	90,704	90,387	0.35	1707	1745	1710
65.5	1721	1717	91,527	91,212	0.34	1709	1746	1712

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
66.0	1722	1719	92,352	92,039	0.34	1712	1750	1714
66.5	1724	1721	93,178	92,866	0.34	1715	1753	1716
67.0	1726	1722	94,004	93,695	0.33	1715	1753	1717
67.5	1727	1724	94,832	94,524	0.33	1717	1753	1718
68.0	1729	1723	95,660	95,354	0.32	1716	1749	1718
68.5	1731	1723	96,487	96,185	0.31	1716	1745	1718
69.0	1732	1724	97,315	97,016	0.31	1718	1746	1721
69.5	1734	1726	98,143	97,848	0.30	1719	1746	1722
70.0	1735	1727	98,973	98,681	0.29	1721	1745	1722
70.5	1737	1729	99,802	99,515	0.29	1723	1746	1725
71.0	1738	1731	100,633	100,350	0.28	1724	1748	1726
71.5	1740	1732	101,465	101,186	0.28	1726	1750	1728
72.0	1742	1734	102,297	102,022	0.27	1728	1751	1730
72.5	1743	1737	103,130	102,859	0.26	1730	1754	1732
73.0	1745	1739	103,965	103,697	0.26	1732	1756	1733
73.5	1746	1740	104,801	104,535	0.25	1733	1757	1735
74.0	1748	1741	105,637	105,374	0.25	1734	1758	1736
74.5	1749	1743	106,474	106,214	0.24	1737	1760	1739
75.0	1751	1746	107,312	107,055	0.24	1739	1761	1740
75.5	1752	1750	108,151	107,897	0.24	1742	1766	1743
76.0	1753	1752	108,992	108,739	0.23	1743	1767	1745
76.5	1755	1750	109,834	109,582	0.23	1745	1768	1746
77.0	1756	1752	110,675	110,426	0.23	1746	1768	1747
77.5	1758	1752	111,517	111,270	0.22	1747	1769	1747
78.0	1759	1754	112,359	112,115	0.22	1748	1769	1749
78.5	1761	1756	113,202	112,961	0.21	1750	1769	1751
79.0	1762	1757	114,046	113,807	0.21	1750	1770	1752
79.5	1763	1760	114,891	114,655	0.21	1753	1775	1755
80.0	1765	1763	115,737	115,502	0.20	1754	1778	1757
80.5	1766	1765	116,585	116,351	0.20	1756	1782	1758
81.0	1768	1767	117,434	117,200	0.20	1757	1782	1760
81.5	1769	1768	118,284	118,050	0.20	1759	1783	1762
82.0	1770	1767	119,133	118,901	0.20	1760	1783	1763
82.5	1772	1768	119,983	119,752	0.19	1762	1783	1764
83.0	1773	1769	120,833	120,604	0.19	1764	1785	1765
83.5	1774	1770	121,683	121,457	0.19	1764	1786	1766
84.0	1776	1771	122,534	122,310	0.18	1765	1787	1767
84.5	1777	1773	123,386	123,164	0.18	1767	1789	1769
85.0	1778	1774	124,239	124,019	0.18	1768	1790	1770
85.5	1779	1775	125,092	124,874	0.17	1769	1791	1771
86.0	1781	1776	125,945	125,730	0.17	1770	1792	1772
86.5	1782	1778	126,800	126,586	0.17	1771	1792	1773
87.0	1783	1780	127,655	127,444	0.17	1773	1793	1776
87.5	1785	1782	128,511	128,301	0.16	1775	1794	1777

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
88.0	1786	1783	129,368	129,160	0.16	1776	1796	1779
88.5	1787	1783	130,225	130,019	0.16	1777	1797	1780
89.0	1788	1785	131,083	130,879	0.16	1779	1798	1781
89.5	1789	1786	131,942	131,739	0.15	1779	1799	1782
90.0	1791	1788	132,801	132,600	0.15	1781	1800	1783
90.5	1792	1790	133,661	133,461	0.15	1783	1800	1785
91.0	1793	1790	134,522	134,324	0.15	1783	1802	1786
91.5	1794	1791	135,383	135,186	0.15	1785	1804	1787
92.0	1796	1792	136,245	136,050	0.14	1786	1805	1788
92.5	1797	1794	137,107	136,914	0.14	1787	1805	1789
93.0	1798	1795	137,971	137,778	0.14	1788	1807	1791
93.5	1799	1797	138,835	138,643	0.14	1790	1809	1793
94.0	1800	1798	139,699	139,509	0.14	1790	1810	1793
94.5	1801	1798	140,564	140,375	0.13	1792	1812	1794
95.0	1803	1800	141,429	141,242	0.13	1793	1813	1795
95.5	1804	1801	142,295	142,110	0.13	1793	1812	1797
96.0	1805	1802	143,162	142,978	0.13	1794	1812	1798
96.5	1806	1804	144,029	143,847	0.13	1796	1815	1800
97.0	1807	1805	144,897	144,716	0.13	1797	1815	1801
97.5	1808	1805	145,766	145,586	0.12	1798	1816	1801
98.0	1809	1806	146,634	146,456	0.12	1799	1818	1802
98.5	1811	1807	147,503	147,327	0.12	1800	1819	1803
99.0	1812	1808	148,373	148,198	0.12	1801	1820	1805
99.5	1813	1809	149,243	149,070	0.12	1802	1821	1807
100.0	1814	1811	150,114	149,943	0.11	1804	1823	1809
100.5	1815	1812	150,985	150,816	0.11	1805	1823	1811
101.0	1816	1813	151,858	151,690	0.11	1806	1824	1812
101.5	1817	1814	152,730	152,564	0.11	1807	1825	1814
102.0	1818	1815	153,603	153,439	0.11	1808	1825	1814
102.5	1819	1815	154,477	154,314	0.11	1809	1826	1816
103.0	1820	1816	155,351	155,190	0.10	1810	1827	1816
103.5	1822	1817	156,225	156,066	0.10	1811	1829	1817
104.0	1823	1819	157,100	156,943	0.10	1812	1830	1819
104.5	1824	1819	157,975	157,821	0.10	1812	1830	1820
105.0	1825	1820	158,851	158,699	0.10	1813	1831	1821
105.5	1826	1821	159,727	159,577	0.09	1814	1832	1822
106.0	1827	1823	160,604	160,456	0.09	1815	1834	1823
106.5	1828	1824	161,481	161,336	0.09	1816	1834	1825
107.0	1829	1826	162,360	162,216	0.09	1818	1836	1826
107.5	1830	1828	163,239	163,096	0.09	1820	1838	1828
108.0	1831	1829	164,119	163,977	0.09	1821	1839	1830
108.5	1832	1829	165,000	164,859	0.09	1821	1840	1833
109.0	1833	1830	165,880	165,741	0.08	1821	1841	1835
109.5	1834	1832	166,762	166,624	0.08	1822	1842	1838

Project No. 14980-117047
FURNACE CONTROL DATA

FRAMATOME-ANP
March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
110.0	1835	1833	167,644	167,507	0.08	1823	1842	1837
110.5	1836	1833	168,527	168,390	0.08	1825	1843	1837
111.0	1836	1833	169,409	169,274	0.08	1825	1844	1837
111.5	1837	1834	170,292	170,159	0.08	1825	1845	1837
112.0	1838	1835	171,175	171,043	0.08	1827	1846	1837
112.5	1838	1835	172,059	171,928	0.08	1828	1844	1838
113.0	1839	1835	172,942	172,813	0.07	1828	1845	1838
113.5	1839	1835	173,825	173,699	0.07	1828	1846	1838
114.0	1840	1836	174,709	174,585	0.07	1830	1847	1839
114.5	1841	1838	175,593	175,471	0.07	1831	1848	1839
115.0	1841	1838	176,478	176,357	0.07	1831	1848	1841
115.5	1842	1840	177,364	177,244	0.07	1833	1849	1842
116.0	1843	1841	178,250	178,131	0.07	1834	1851	1843
116.5	1843	1841	179,136	179,018	0.07	1835	1852	1844
117.0	1844	1843	180,023	179,906	0.07	1836	1853	1844
117.5	1844	1843	180,911	180,794	0.06	1836	1852	1844
118.0	1845	1844	181,798	181,682	0.06	1837	1852	1845
118.5	1846	1845	182,686	182,571	0.06	1837	1854	1844
119.0	1846	1846	183,575	183,460	0.06	1838	1854	1845
119.5	1847	1847	184,464	184,349	0.06	1839	1856	1846
120.0	1848	1848	185,354	185,239	0.06	1839	1856	1847
120.5	1848	1848	186,243	186,129	0.06	1841	1858	1849
121.0	1849	1849	187,134	187,019	0.06	1841	1859	1850
121.5	1850	1849	188,024	187,910	0.06	1841	1858	1850
122.0	1850	1848	188,914	188,800	0.06	1841	1859	1850
122.5	1851	1849	189,805	189,692	0.06	1842	1861	1853
123.0	1851	1850	190,695	190,583	0.06	1843	1862	1854
123.5	1852	1851	191,586	191,475	0.06	1844	1862	1855
124.0	1853	1853	192,478	192,367	0.06	1845	1862	1856
124.5	1853	1853	193,371	193,259	0.06	1845	1862	1858
125.0	1854	1853	194,263	194,152	0.06	1846	1862	1859
125.5	1855	1854	195,155	195,045	0.06	1846	1861	1858
126.0	1855	1856	196,049	195,939	0.06	1846	1862	1857
126.5	1856	1858	196,943	196,832	0.06	1848	1863	1858
127.0	1856	1860	197,838	197,726	0.06	1850	1864	1858
127.5	1857	1861	198,734	198,620	0.06	1851	1865	1859
128.0	1858	1863	199,631	199,515	0.06	1853	1868	1860
128.5	1858	1864	200,528	200,410	0.06	1854	1871	1860
129.0	1859	1864	201,426	201,305	0.06	1854	1873	1861
129.5	1860	1864	202,324	202,201	0.06	1854	1872	1862
130.0	1860	1864	203,222	203,097	0.06	1855	1872	1864
130.5	1861	1865	204,121	203,993	0.06	1856	1873	1865
131.0	1861	1865	205,019	204,889	0.06	1857	1872	1865
131.5	1862	1866	205,918	205,786	0.06	1858	1871	1864

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
132.0	1863	1867	206,817	206,683	0.06	1858	1871	1861
132.5	1863	1867	207,716	207,581	0.07	1859	1872	1860
133.0	1864	1866	208,616	208,479	0.07	1860	1872	1861
133.5	1865	1866	209,515	209,377	0.07	1860	1873	1861
134.0	1865	1866	210,413	210,275	0.07	1861	1875	1860
134.5	1866	1867	211,313	211,174	0.07	1861	1875	1858
135.0	1866	1867	212,212	212,073	0.07	1861	1874	1858
135.5	1867	1868	213,112	212,972	0.07	1862	1874	1861
136.0	1868	1869	214,012	213,872	0.07	1862	1874	1862
136.5	1868	1871	214,913	214,772	0.07	1863	1876	1863
137.0	1869	1872	215,815	215,672	0.07	1863	1876	1864
137.5	1870	1872	216,717	216,572	0.07	1863	1877	1864
138.0	1870	1870	217,618	217,473	0.07	1863	1874	1864
138.5	1871	1869	218,519	218,375	0.07	1862	1873	1864
139.0	1871	1868	219,420	219,276	0.07	1862	1872	1863
139.5	1872	1867	220,320	220,178	0.06	1861	1871	1862
140.0	1873	1866	221,219	221,080	0.06	1859	1871	1864
140.5	1873	1865	222,118	221,983	0.06	1858	1872	1865
141.0	1874	1866	223,017	222,885	0.06	1857	1870	1865
141.5	1875	1867	223,916	223,788	0.06	1858	1869	1864
142.0	1875	1867	224,815	224,692	0.05	1859	1869	1863
142.5	1876	1869	225,715	225,596	0.05	1860	1870	1862
143.0	1877	1868	226,615	226,500	0.05	1861	1870	1863
143.5	1877	1868	227,515	227,404	0.05	1860	1871	1864
144.0	1878	1868	228,415	228,309	0.05	1861	1872	1863
144.5	1878	1868	229,315	229,214	0.04	1862	1873	1863
145.0	1879	1869	230,215	230,119	0.04	1864	1874	1863
145.5	1880	1869	231,116	231,025	0.04	1865	1875	1865
146.0	1880	1870	232,017	231,930	0.04	1865	1874	1864
146.5	1881	1873	232,918	232,837	0.03	1866	1877	1865
147.0	1882	1879	233,821	233,743	0.03	1870	1882	1870
147.5	1882	1883	234,727	234,650	0.03	1874	1887	1874
148.0	1883	1884	235,635	235,557	0.03	1875	1887	1877
148.5	1883	1885	236,543	236,465	0.03	1875	1887	1878
149.0	1884	1886	237,452	237,373	0.03	1877	1889	1881
149.5	1885	1886	238,361	238,281	0.03	1877	1890	1884
150.0	1885	1887	239,270	239,189	0.03	1877	1890	1884
150.5	1886	1888	240,180	240,098	0.03	1880	1893	1884
151.0	1887	1890	241,090	241,007	0.03	1881	1894	1884
151.5	1887	1891	242,001	241,916	0.03	1882	1894	1884
152.0	1888	1892	242,913	242,826	0.04	1882	1895	1887
152.5	1888	1889	243,824	243,736	0.04	1881	1893	1889
153.0	1889	1890	244,735	244,646	0.04	1881	1894	1892
153.5	1890	1890	245,646	245,557	0.04	1880	1895	1894

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
154.0	1890	1892	246,557	246,468	0.04	1881	1896	1895
154.5	1891	1892	247,469	247,379	0.04	1882	1896	1895
155.0	1892	1892	248,380	248,291	0.04	1882	1895	1895
155.5	1892	1892	249,292	249,203	0.04	1883	1896	1894
156.0	1893	1892	250,204	250,115	0.04	1883	1897	1897
156.5	1893	1891	251,116	251,028	0.04	1883	1897	1898
157.0	1894	1891	252,028	251,940	0.03	1883	1897	1898
157.5	1895	1891	252,939	252,854	0.03	1883	1898	1899
158.0	1895	1892	253,851	253,767	0.03	1884	1899	1900
158.5	1896	1892	254,763	254,681	0.03	1885	1900	1900
159.0	1897	1894	255,675	255,595	0.03	1886	1902	1901
159.5	1897	1894	256,588	256,509	0.03	1886	1903	1901
160.0	1898	1894	257,501	257,424	0.03	1886	1901	1901
160.5	1899	1896	258,414	258,339	0.03	1887	1902	1901
161.0	1899	1898	259,328	259,254	0.03	1888	1904	1901
161.5	1900	1900	260,243	260,170	0.03	1890	1905	1901
162.0	1900	1902	261,160	261,086	0.03	1892	1905	1899
162.5	1901	1905	262,077	262,002	0.03	1894	1906	1900
163.0	1902	1905	262,996	262,919	0.03	1895	1906	1901
163.5	1902	1904	263,915	263,836	0.03	1894	1907	1903
164.0	1903	1902	264,832	264,753	0.03	1892	1905	1904
164.5	1904	1901	265,749	265,671	0.03	1892	1905	1903
165.0	1904	1900	266,665	266,589	0.03	1891	1905	1901
165.5	1905	1899	267,581	267,507	0.03	1891	1904	1901
166.0	1905	1901	268,497	268,425	0.03	1892	1904	1899
166.5	1906	1901	269,413	269,344	0.03	1892	1903	1899
167.0	1907	1901	270,330	270,263	0.02	1892	1903	1900
167.5	1907	1903	271,246	271,183	0.02	1893	1904	1900
168.0	1908	1905	272,164	272,102	0.02	1894	1905	1901
168.5	1909	1906	273,083	273,022	0.02	1894	1907	1900
169.0	1909	1905	274,001	273,943	0.02	1895	1907	1901
169.5	1910	1905	274,920	274,863	0.02	1895	1907	1903
170.0	1910	1905	275,838	275,784	0.02	1895	1908	1904
170.5	1911	1906	276,757	276,706	0.02	1896	1909	1904
171.0	1912	1908	277,676	277,627	0.02	1897	1909	1904
171.5	1912	1909	278,596	278,549	0.02	1899	1910	1904
172.0	1913	1909	279,516	279,472	0.02	1898	1912	1907
172.5	1914	1908	280,436	280,394	0.02	1898	1910	1908
173.0	1914	1908	281,356	281,317	0.01	1898	1911	1908
173.5	1915	1908	282,276	282,240	0.01	1898	1910	1909
174.0	1915	1907	283,196	283,164	0.01	1898	1911	1910
174.5	1916	1910	284,115	284,088	0.01	1900	1913	1910
175.0	1917	1911	285,036	285,012	0.01	1900	1913	1910
175.5	1917	1911	285,958	285,936	0.01	1901	1914	1910

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	E119 Std Average (°F)	Furnace Average (°F)	Integration of Furnace Average (°F•min)	Integration of E119 Std Average (°F•min)	Error (%)	Furnace Probe #1 (°F)	Furnace Probe #2 (°F)	Furnace Probe #3 (°F)
176.0	1918	1910	286,879	286,861	0.01	1901	1914	1912
176.5	1919	1909	287,800	287,786	0.00	1901	1914	1914
177.0	1919	1908	288,721	288,712	0.00	1901	1914	1915
177.5	1920	1909	289,641	289,637	0.00	1901	1916	1918
178.0	1921	1914	290,562	290,563	0.00	1905	1922	1923
178.5	1921	1918	291,485	291,490	0.00	1908	1927	1928
179.0	1922	1921	292,410	292,416	0.00	1912	1931	1931
179.5	1922	1924	293,338	293,343	0.00	1915	1935	1933
180.0	1923	1925	294,266	294,271	0.00	1917	1936	1935

Project No. 14980-117047
FURNACE CONTROL DATA

FRAMATOME-ANP
March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
0.0	67	67	67	67	67	70
0.5	92	94	117	87	94	70
1.0	194	190	253	154	166	71
1.5	348	321	414	270	278	71
2.0	523	474	615	409	431	70
2.5	720	650	834	594	618	70
3.0	824	756	915	709	744	71
3.5	857	796	920	758	797	71
4.0	859	803	901	770	814	71
4.5	907	845	927	792	838	71
5.0	988	918	994	838	879	71
5.5	1067	990	1065	892	926	71
6.0	1135	1055	1129	946	974	71
6.5	1199	1111	1180	996	1018	71
7.0	1249	1161	1228	1040	1059	71
7.5	1291	1202	1260	1079	1096	71
8.0	1323	1234	1284	1112	1127	71
8.5	1340	1253	1295	1138	1152	71
9.0	1344	1263	1299	1154	1170	71
9.5	1340	1278	1314	1167	1184	71
10.0	1362	1292	1330	1179	1195	71
10.5	1383	1313	1348	1198	1212	71
11.0	1400	1328	1357	1213	1227	71
11.5	1417	1342	1369	1228	1243	71
12.0	1438	1354	1380	1244	1260	71
12.5	1460	1370	1396	1260	1277	71
13.0	1488	1386	1413	1277	1295	71
13.5	1518	1402	1432	1293	1311	72
14.0	1537	1418	1450	1309	1327	72
14.5	1559	1434	1463	1323	1341	72
15.0	1571	1448	1475	1335	1354	72
15.5	1577	1460	1489	1345	1365	72
16.0	1573	1467	1493	1353	1374	72
16.5	1571	1474	1498	1361	1384	72
17.0	1575	1478	1503	1368	1392	72
17.5	1575	1485	1510	1375	1400	72
18.0	1572	1489	1514	1381	1408	72
18.5	1581	1495	1518	1387	1416	72
19.0	1589	1500	1524	1394	1424	72
19.5	1591	1505	1529	1401	1432	72
20.0	1595	1511	1535	1408	1440	72
20.5	1604	1515	1538	1415	1447	72
21.0	1599	1517	1542	1421	1454	72
21.5	1603	1521	1548	1427	1461	72

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
22.0	1601	1523	1552	1432	1467	72
22.5	1599	1524	1556	1436	1473	73
23.0	1611	1526	1557	1440	1477	73
23.5	1620	1530	1561	1445	1482	72
24.0	1621	1532	1564	1449	1487	72
24.5	1623	1534	1566	1453	1492	72
25.0	1624	1538	1569	1458	1496	72
25.5	1631	1542	1574	1463	1501	72
26.0	1642	1546	1579	1468	1507	73
26.5	1651	1551	1581	1473	1511	73
27.0	1654	1554	1582	1478	1515	73
27.5	1656	1555	1580	1481	1518	73
28.0	1667	1555	1580	1483	1519	73
28.5	1671	1556	1581	1486	1522	73
29.0	1669	1559	1584	1489	1526	73
29.5	1674	1561	1587	1492	1530	73
30.0	1674	1564	1590	1496	1534	73
30.5	1677	1567	1593	1500	1537	73
31.0	1683	1570	1595	1503	1540	73
31.5	1688	1572	1598	1507	1543	73
32.0	1691	1574	1601	1510	1546	73
32.5	1692	1577	1602	1513	1548	73
33.0	1700	1579	1603	1516	1551	73
33.5	1705	1581	1606	1519	1554	73
34.0	1714	1585	1610	1523	1558	73
34.5	1714	1588	1614	1527	1563	74
35.0	1712	1591	1617	1531	1567	74
35.5	1714	1594	1618	1534	1569	74
36.0	1711	1597	1620	1537	1572	74
36.5	1718	1600	1623	1541	1576	74
37.0	1736	1605	1627	1545	1579	73
37.5	1742	1607	1627	1547	1581	74
38.0	1744	1610	1627	1550	1581	74
38.5	1749	1613	1629	1552	1582	74
39.0	1750	1615	1630	1554	1583	74
39.5	1755	1616	1632	1556	1586	74
40.0	1757	1617	1634	1558	1589	74
40.5	1743	1617	1634	1559	1590	74
41.0	1745	1618	1635	1561	1592	74
41.5	1752	1618	1636	1561	1592	74
42.0	1755	1619	1637	1563	1595	74
42.5	1757	1621	1640	1565	1596	74
43.0	1752	1623	1641	1567	1598	74
43.5	1753	1625	1645	1570	1602	75

Project No. 14980-117047
FURNACE CONTROL DATA

FRAMATOME-ANP
March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
44.0	1755	1626	1644	1571	1603	74
44.5	1740	1624	1642	1572	1605	74
45.0	1726	1622	1642	1572	1608	74
45.5	1723	1622	1643	1572	1614	74
46.0	1714	1621	1643	1573	1617	74
46.5	1720	1621	1644	1573	1619	74
47.0	1730	1622	1645	1574	1622	74
47.5	1734	1624	1647	1576	1623	74
48.0	1734	1625	1650	1578	1627	74
48.5	1738	1626	1650	1579	1627	74
49.0	1721	1626	1651	1580	1627	74
49.5	1715	1627	1650	1581	1628	74
50.0	1719	1629	1652	1583	1630	75
50.5	1743	1636	1662	1588	1637	75
51.0	1752	1642	1667	1593	1644	74
51.5	1748	1644	1667	1596	1643	75
52.0	1748	1646	1669	1599	1642	75
52.5	1752	1649	1673	1602	1644	75
53.0	1754	1651	1673	1604	1646	75
53.5	1749	1653	1678	1607	1652	75
54.0	1749	1656	1681	1609	1655	75
54.5	1755	1659	1683	1612	1655	75
55.0	1760	1662	1687	1615	1663	75
55.5	1764	1665	1688	1618	1665	75
56.0	1764	1667	1689	1620	1667	75
56.5	1765	1670	1692	1623	1670	75
57.0	1765	1672	1695	1626	1670	75
57.5	1772	1675	1696	1630	1674	75
58.0	1777	1678	1698	1632	1673	75
58.5	1780	1679	1699	1634	1673	75
59.0	1772	1680	1699	1636	1670	75
59.5	1773	1680	1698	1637	1670	75
60.0	1769	1681	1699	1639	1672	74
60.5	1768	1683	1702	1641	1674	75
61.0	1768	1683	1701	1642	1674	75
61.5	1763	1685	1705	1645	1675	75
62.0	1757	1689	1711	1649	1679	76
62.5	1757	1693	1716	1652	1683	75
63.0	1769	1695	1719	1654	1686	76
63.5	1768	1697	1721	1656	1689	75
64.0	1769	1699	1721	1658	1690	75
64.5	1770	1700	1724	1660	1691	76
65.0	1767	1700	1725	1662	1694	76
65.5	1770	1703	1731	1665	1698	76

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
66.0	1770	1705	1733	1667	1702	76
66.5	1775	1707	1732	1669	1702	76
67.0	1778	1709	1732	1671	1703	76
67.5	1781	1710	1734	1673	1703	76
68.0	1781	1710	1733	1674	1702	76
68.5	1788	1711	1731	1675	1703	76
69.0	1787	1712	1731	1677	1703	76
69.5	1797	1714	1731	1678	1701	76
70.0	1798	1715	1734	1680	1702	76
70.5	1800	1717	1736	1682	1703	76
71.0	1805	1720	1739	1684	1703	76
71.5	1804	1720	1739	1685	1704	76
72.0	1806	1722	1741	1688	1708	76
72.5	1808	1724	1743	1690	1714	76
73.0	1812	1725	1742	1691	1721	76
73.5	1811	1726	1744	1693	1724	77
74.0	1810	1728	1744	1695	1722	77
74.5	1809	1731	1749	1698	1723	77
75.0	1816	1734	1754	1700	1721	77
75.5	1825	1737	1757	1702	1725	77
76.0	1827	1738	1759	1704	1730	77
76.5	1814	1737	1756	1705	1732	77
77.0	1814	1739	1755	1707	1736	77
77.5	1814	1740	1755	1708	1737	77
78.0	1819	1741	1757	1710	1740	77
78.5	1822	1743	1759	1712	1738	77
79.0	1826	1746	1762	1714	1734	78
79.5	1829	1748	1766	1716	1735	78
80.0	1832	1752	1771	1719	1739	78
80.5	1835	1753	1773	1720	1740	78
81.0	1842	1755	1777	1722	1742	77
81.5	1839	1756	1774	1724	1743	77
82.0	1834	1756	1772	1725	1743	77
82.5	1833	1757	1772	1726	1743	77
83.0	1834	1758	1773	1727	1746	77
83.5	1831	1759	1773	1729	1749	77
84.0	1829	1760	1773	1731	1752	77
84.5	1834	1762	1776	1733	1757	76
85.0	1837	1762	1774	1733	1756	77
85.5	1835	1763	1774	1735	1758	77
86.0	1837	1765	1777	1737	1761	76
86.5	1839	1767	1781	1738	1760	76
87.0	1843	1769	1784	1741	1762	77
87.5	1843	1771	1785	1743	1765	77

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
88.0	1844	1772	1787	1743	1765	77
88.5	1846	1773	1787	1744	1762	77
89.0	1846	1775	1789	1746	1765	77
89.5	1847	1776	1791	1747	1764	78
90.0	1852	1778	1795	1749	1762	78
90.5	1859	1781	1797	1751	1763	77
91.0	1856	1781	1795	1752	1764	78
91.5	1856	1781	1795	1753	1764	78
92.0	1859	1783	1796	1754	1766	77
92.5	1863	1785	1800	1756	1768	77
93.0	1861	1786	1801	1758	1771	78
93.5	1859	1787	1800	1759	1778	78
94.0	1859	1787	1799	1760	1782	78
94.5	1859	1788	1800	1761	1779	78
95.0	1865	1790	1803	1762	1777	78
95.5	1873	1791	1804	1763	1776	77
96.0	1868	1793	1805	1765	1779	77
96.5	1869	1794	1807	1767	1781	77
97.0	1870	1797	1809	1769	1781	77
97.5	1867	1797	1809	1770	1782	77
98.0	1865	1798	1809	1771	1784	76
98.5	1862	1799	1809	1772	1789	77
99.0	1863	1799	1809	1773	1792	76
99.5	1863	1800	1810	1775	1797	77
100.0	1865	1801	1812	1776	1796	76
100.5	1868	1802	1812	1777	1798	76
101.0	1869	1803	1812	1778	1800	76
101.5	1867	1804	1814	1780	1804	77
102.0	1865	1805	1815	1781	1805	76
102.5	1867	1806	1814	1781	1804	77
103.0	1868	1806	1815	1782	1803	77
103.5	1866	1808	1818	1784	1806	77
104.0	1870	1810	1819	1786	1804	77
104.5	1870	1810	1819	1786	1805	77
105.0	1872	1811	1819	1787	1808	77
105.5	1873	1812	1820	1788	1808	77
106.0	1876	1813	1821	1789	1810	78
106.5	1876	1814	1823	1791	1813	78
107.0	1877	1816	1827	1793	1817	78
107.5	1878	1818	1829	1795	1816	78
108.0	1881	1820	1830	1796	1816	78
108.5	1880	1820	1829	1796	1814	78
109.0	1877	1822	1831	1797	1818	78
109.5	1879	1825	1833	1800	1819	78

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
110.0	1881	1826	1833	1801	1823	78
110.5	1879	1825	1831	1801	1822	78
111.0	1878	1825	1832	1802	1821	77
111.5	1880	1826	1833	1803	1825	78
112.0	1881	1827	1835	1803	1825	77
112.5	1881	1826	1833	1803	1825	78
113.0	1881	1826	1833	1803	1823	77
113.5	1879	1826	1833	1805	1822	77
114.0	1884	1827	1834	1806	1823	77
114.5	1886	1829	1838	1808	1827	78
115.0	1884	1829	1837	1808	1826	78
115.5	1884	1831	1839	1809	1829	78
116.0	1888	1833	1839	1811	1831	78
116.5	1885	1833	1839	1811	1831	78
117.0	1887	1835	1843	1813	1833	78
117.5	1888	1837	1846	1814	1830	78
118.0	1889	1838	1846	1814	1828	78
118.5	1893	1839	1847	1815	1827	78
119.0	1896	1840	1849	1817	1830	77
119.5	1894	1841	1849	1818	1834	78
120.0	1895	1842	1849	1819	1834	78
120.5	1893	1843	1849	1820	1834	77
121.0	1892	1843	1849	1821	1836	78
121.5	1892	1843	1848	1820	1836	78
122.0	1891	1843	1847	1821	1835	77
122.5	1890	1843	1847	1821	1836	77
123.0	1890	1844	1848	1822	1836	77
123.5	1892	1846	1851	1823	1837	76
124.0	1895	1847	1852	1825	1838	77
124.5	1891	1847	1852	1825	1840	77
125.0	1888	1848	1853	1826	1839	77
125.5	1893	1849	1855	1827	1843	78
126.0	1898	1852	1861	1829	1844	78
126.5	1899	1854	1863	1831	1846	78
127.0	1902	1856	1864	1832	1850	79
127.5	1904	1858	1865	1834	1850	79
128.0	1908	1860	1867	1835	1849	79
128.5	1912	1861	1868	1836	1849	79
129.0	1911	1861	1868	1837	1850	80
129.5	1908	1861	1866	1837	1850	80
130.0	1907	1861	1867	1837	1852	80
130.5	1908	1861	1868	1838	1851	80
131.0	1908	1862	1868	1838	1848	79
131.5	1913	1863	1869	1839	1847	79

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
132.0	1922	1864	1874	1840	1846	80
132.5	1923	1865	1873	1840	1843	81
133.0	1920	1865	1871	1840	1842	80
133.5	1916	1864	1870	1839	1841	80
134.0	1918	1864	1870	1840	1842	80
134.5	1921	1865	1873	1840	1842	80
135.0	1921	1865	1874	1841	1842	80
135.5	1922	1866	1874	1842	1845	80
136.0	1924	1867	1876	1843	1846	80
136.5	1926	1869	1879	1845	1848	80
137.0	1923	1871	1880	1847	1849	80
137.5	1924	1871	1880	1848	1850	80
138.0	1916	1870	1878	1847	1850	80
138.5	1913	1870	1876	1846	1849	80
139.0	1911	1869	1877	1846	1847	79
139.5	1910	1868	1876	1845	1846	80
140.0	1903	1867	1872	1844	1848	79
140.5	1900	1865	1868	1843	1852	80
141.0	1902	1865	1872	1844	1854	80
141.5	1903	1866	1876	1845	1852	80
142.0	1903	1867	1878	1845	1850	80
142.5	1909	1869	1882	1847	1850	79
143.0	1907	1870	1879	1847	1850	79
143.5	1904	1869	1877	1846	1849	79
144.0	1908	1868	1876	1846	1847	79
144.5	1913	1868	1876	1845	1847	79
145.0	1913	1868	1877	1846	1847	79
145.5	1909	1869	1877	1847	1847	78
146.0	1916	1870	1878	1848	1847	78
146.5	1921	1872	1881	1850	1849	78
147.0	1934	1877	1887	1854	1854	78
147.5	1942	1881	1892	1858	1856	78
148.0	1938	1884	1896	1859	1859	78
148.5	1931	1886	1901	1861	1864	79
149.0	1930	1887	1900	1863	1864	79
149.5	1924	1887	1898	1863	1865	79
150.0	1925	1888	1900	1864	1865	79
150.5	1929	1890	1900	1866	1865	80
151.0	1936	1891	1899	1867	1865	79
151.5	1942	1892	1900	1868	1866	78
152.0	1939	1893	1900	1868	1869	78
152.5	1929	1891	1895	1868	1868	79
153.0	1922	1891	1896	1868	1873	79
153.5	1921	1890	1894	1868	1876	79

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
154.0	1924	1891	1895	1870	1880	79
154.5	1925	1892	1896	1870	1878	79
155.0	1925	1891	1897	1870	1879	79
155.5	1924	1892	1899	1870	1880	79
156.0	1922	1892	1895	1871	1881	79
156.5	1919	1891	1892	1870	1880	79
157.0	1919	1890	1891	1870	1877	78
157.5	1922	1890	1891	1870	1873	78
158.0	1926	1891	1891	1870	1873	78
158.5	1922	1892	1893	1871	1875	78
159.0	1924	1893	1894	1872	1876	78
159.5	1923	1894	1894	1873	1876	78
160.0	1921	1895	1896	1873	1876	78
160.5	1927	1897	1899	1875	1878	78
161.0	1934	1899	1900	1876	1880	79
161.5	1937	1901	1908	1878	1883	79
162.0	1942	1903	1912	1880	1885	79
162.5	1949	1906	1915	1883	1888	79
163.0	1948	1907	1914	1883	1888	79
163.5	1944	1906	1909	1883	1888	79
164.0	1940	1904	1905	1882	1885	78
164.5	1937	1903	1902	1880	1883	78
165.0	1937	1901	1902	1880	1882	78
165.5	1936	1900	1900	1879	1880	78
166.0	1939	1901	1905	1880	1884	77
166.5	1936	1903	1910	1881	1884	77
167.0	1936	1903	1907	1881	1885	77
167.5	1939	1904	1911	1882	1888	78
168.0	1941	1906	1914	1884	1891	78
168.5	1942	1908	1919	1885	1889	77
169.0	1941	1908	1917	1885	1889	77
169.5	1941	1907	1912	1885	1889	78
170.0	1939	1907	1909	1885	1889	77
170.5	1944	1907	1912	1885	1893	77
171.0	1944	1909	1919	1887	1892	78
171.5	1945	1911	1918	1888	1893	78
172.0	1943	1911	1915	1888	1895	78
172.5	1938	1910	1913	1888	1895	78
173.0	1938	1911	1914	1888	1894	78
173.5	1938	1911	1913	1889	1893	78
174.0	1938	1910	1911	1888	1891	78
174.5	1944	1912	1914	1890	1894	79
175.0	1945	1913	1916	1891	1897	78
175.5	1948	1913	1916	1891	1897	78

Project No. 14980-117047 FRAMATOME-ANP
FURNACE CONTROL DATA March 16, 2004

Time (min)	Furnace Probe #4 (°F)	Furnace Probe #5 (°F)	Furnace Probe #6 (°F)	Furnace Probe #7 (°F)	Furnace Probe #8 (°F)	Lab Air Temp. (°F)
176.0	1943	1913	1913	1891	1895	79
176.5	1937	1912	1910	1890	1891	79
177.0	1936	1911	1909	1889	1889	79
177.5	1935	1911	1910	1891	1893	80
178.0	1939	1914	1914	1894	1898	79
178.5	1944	1917	1918	1897	1901	80
179.0	1948	1921	1921	1900	1905	78
179.5	1952	1924	1925	1902	1905	78
180.0	1955	1927	1926	1904	1903	79

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
0.0	0.00	13.3	0.0	492.6	13.9	0.0
0.5	0.00	13.3	0.0	492.6	13.9	0.0
1.0	0.00	13.3	0.0	492.8	13.9	0.0
1.5	0.00	13.3	0.0	492.8	13.9	0.0
2.0	0.00	13.3	0.0	492.7	13.9	0.0
2.5	0.00	13.3	0.0	492.9	13.9	0.0
3.0	0.00	13.3	0.0	492.9	13.9	0.0
3.5	0.00	13.2	0.0	491.8	13.8	0.0
4.0	0.00	13.2	0.0	491.9	13.9	0.0
4.5	0.00	13.3	0.0	491.7	13.9	0.0
5.0	0.00	13.2	0.0	491.5	13.8	0.0
5.5	0.00	13.2	0.0	491.1	13.9	0.0
6.0	0.00	13.2	0.0	490.9	13.7	0.0
6.5	0.00	13.2	0.0	491.1	13.9	0.0
7.0	0.00	13.2	0.0	491.2	13.8	0.0
7.5	0.00	13.3	0.0	490.9	13.9	0.0
8.0	0.00	13.2	0.0	490.9	13.9	0.0
8.5	0.00	13.2	0.0	491.0	13.9	0.0
9.0	0.00	13.2	0.0	491.0	13.9	0.0
9.5	0.00	13.3	0.0	492.3	13.9	0.0
10.0	0.00	13.3	0.0	492.3	13.9	0.0
10.5	0.00	13.2	0.0	492.1	13.9	0.0
11.0	0.00	13.3	0.0	492.4	13.9	0.0
11.5	0.00	13.3	0.0	492.3	13.9	0.0
12.0	0.00	13.2	0.0	490.7	13.9	0.0
12.5	0.00	13.3	0.0	490.3	13.9	0.0
13.0	0.00	13.2	0.0	490.4	13.9	0.0
13.5	0.00	13.4	0.0	492.1	14.0	0.0
14.0	0.00	13.3	0.0	492.0	14.0	0.0
14.5	0.00	0.2	0.0	478.2	0.2	0.0
15.0	0.00	0.2	0.0	478.8	0.2	0.0
15.5	0.00	0.1	0.0	478.3	0.1	0.0
16.0	0.00	0.2	0.0	478.7	0.1	0.0
16.5	0.00	0.2	0.0	478.6	0.2	0.0
17.0	0.00	0.2	0.0	478.5	0.2	0.0
17.5	0.00	0.2	0.0	478.6	0.2	0.0
18.0	0.00	0.2	0.0	478.4	0.2	0.0
18.5	0.00	0.2	0.0	477.7	0.2	0.0
19.0	0.00	0.2	0.0	478.3	0.2	0.0
19.5	0.00	0.2	0.0	478.1	0.2	0.0
20.0	0.00	0.1	0.0	478.8	0.1	0.0
20.5	0.00	0.2	0.0	478.3	0.2	0.0
21.0	0.00	0.2	0.0	479.1	0.2	0.0
21.5	0.00	0.2	0.0	478.4	0.2	0.0
22.0	0.00	0.2	0.0	478.8	0.2	0.0
22.5	0.00	0.2	0.0	478.6	0.2	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
23.0	0.00	0.2	0.0	478.8	0.2	0.0
23.5	0.00	0.1	0.0	479.4	0.1	0.0
24.0	0.00	0.1	0.0	479.2	0.2	0.0
24.5	0.00	0.1	0.0	479.4	0.2	0.0
25.0	0.00	0.2	0.0	479.4	0.2	0.0
25.5	0.00	0.2	0.0	479.0	0.2	0.0
26.0	0.00	0.2	0.0	479.1	0.2	0.0
26.5	0.00	0.2	0.0	479.1	0.2	0.0
27.0	0.00	0.2	0.0	479.1	0.2	0.0
27.5	0.00	0.2	0.0	479.1	0.2	0.0
28.0	0.00	0.2	0.0	479.5	0.2	0.0
28.5	0.00	0.2	0.0	479.4	0.2	0.0
29.0	0.00	0.0	0.0	0.1	0.0	0.0
29.5	0.00	-0.1	0.0	0.0	-0.1	0.0
30.0	0.00	0.0	0.0	0.1	0.0	0.0
30.5	0.00	0.0	0.0	0.0	-0.1	0.0
31.0	0.00	0.0	0.0	0.0	-0.1	0.0
31.5	0.00	0.0	0.0	0.1	0.0	0.0
32.0	0.00	0.0	0.0	0.1	0.0	0.0
32.5	0.00	-0.1	0.0	-0.1	0.0	0.0
33.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
33.5	0.00	0.0	0.0	0.0	0.1	0.0
34.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
34.5	0.00	0.0	0.0	0.0	0.0	0.0
35.0	0.00	0.0	0.0	0.0	0.1	0.0
35.5	0.00	0.0	0.0	0.0	0.1	0.0
36.0	0.00	0.0	0.0	0.0	0.0	0.0
36.5	0.00	-0.1	0.0	0.0	-0.1	0.0
37.0	0.00	0.0	0.0	0.0	0.0	0.0
37.5	0.00	0.0	0.0	0.0	0.0	0.0
38.0	0.00	0.0	0.0	0.0	0.1	0.0
38.5	0.00	0.0	0.0	0.0	0.0	0.0
39.0	0.00	0.0	0.0	0.0	0.1	0.0
39.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
40.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
40.5	0.00	0.0	0.0	0.0	0.0	0.0
41.0	0.00	-0.1	0.0	-0.1	0.0	0.0
41.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
42.0	0.00	-0.1	0.0	0.0	-0.1	0.0
42.5	0.00	0.0	0.0	0.1	0.0	0.0
43.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
43.5	0.00	0.0	0.0	0.0	0.0	0.0
44.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
44.5	0.00	-0.1	0.0	-0.1	0.0	0.0
45.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
45.5	0.00	-0.1	0.0	-0.1	-0.1	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
46.0	0.00	0.0	0.0	0.0	0.0	0.0
46.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
47.0	0.00	0.0	0.0	0.0	0.0	0.0
47.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
48.0	0.00	-0.1	0.0	0.0	0.0	0.0
48.5	0.00	-0.1	0.0	0.0	0.0	0.0
49.0	0.00	0.0	0.0	0.0	-0.1	0.0
49.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
50.0	0.00	0.0	0.0	0.0	0.0	0.0
50.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
51.0	0.00	0.0	0.0	-0.1	-0.1	0.0
51.5	0.00	-0.1	0.0	-0.1	0.0	0.0
52.0	0.00	-0.1	0.0	0.0	-0.1	0.0
52.5	0.00	0.0	0.0	-0.1	-0.1	0.0
53.0	0.00	-0.1	0.0	0.0	-0.1	0.0
53.5	0.00	0.1	0.0	0.0	0.0	0.0
54.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
54.5	0.00	-0.1	0.0	0.0	-0.1	0.0
55.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
55.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
56.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
56.5	0.00	0.0	0.0	0.0	-0.1	0.0
57.0	0.00	0.0	0.0	0.0	0.1	0.0
57.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
58.0	0.00	0.0	0.0	0.0	0.1	0.0
58.5	0.00	0.0	0.0	0.0	0.0	0.0
59.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
59.5	0.00	-0.1	0.0	-0.1	0.0	0.0
60.0	0.00	0.0	0.0	0.0	0.0	0.0
60.5	0.00	0.0	0.0	-0.1	-0.1	0.0
61.0	0.00	-0.1	0.0	0.0	0.0	0.0
61.5	0.00	0.0	0.0	0.0	0.0	0.0
62.0	0.00	0.0	0.0	-0.1	0.0	0.0
62.5	0.00	0.0	0.0	-0.1	-0.1	0.0
63.0	0.00	0.0	0.0	0.0	0.0	0.0
63.5	0.00	0.0	0.0	-0.1	0.0	0.0
64.0	0.00	0.0	0.0	-0.1	0.0	0.0
64.5	0.00	0.0	0.0	-0.1	0.0	0.0
65.0	0.00	0.0	0.0	-0.1	-0.1	0.0
65.5	0.00	0.0	0.0	-0.1	0.0	0.0
66.0	0.00	-0.1	0.0	0.0	-0.1	0.0
66.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
67.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
67.5	0.00	-0.1	0.0	-0.1	0.0	0.0
68.0	0.00	-0.1	0.0	-0.1	0.0	0.0
68.5	0.00	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
69.0	0.00	0.0	0.0	0.1	0.0	0.0
69.5	0.00	-0.1	0.0	-0.1	0.0	0.0
70.0	0.00	-0.1	0.0	0.0	0.0	0.0
70.5	0.00	0.1	0.0	0.0	0.1	0.0
71.0	0.00	0.0	0.0	-0.1	-0.1	0.0
71.5	0.00	0.0	0.0	-0.1	-0.1	0.0
72.0	0.00	0.0	0.0	0.0	-0.1	0.0
72.5	0.00	-0.1	0.0	0.0	0.0	0.0
73.0	0.00	-0.1	0.0	0.0	-0.1	0.0
73.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
74.0	0.00	-0.1	0.0	0.0	0.0	0.0
74.5	0.00	-0.1	0.0	0.0	0.0	0.0
75.0	0.00	0.0	0.0	-0.1	0.0	0.0
75.5	0.00	-0.1	0.0	0.0	-0.1	0.0
76.0	0.00	0.0	0.0	-0.1	-0.1	0.0
76.5	0.00	-0.1	0.0	0.0	0.0	0.0
77.0	0.00	0.0	0.0	0.0	0.0	0.0
77.5	0.00	-0.1	0.0	0.0	0.0	0.0
78.0	0.00	-0.1	0.0	0.0	0.0	0.0
78.5	0.00	0.0	0.0	-0.1	0.0	0.0
79.0	0.00	-0.1	0.0	0.0	0.0	0.0
79.5	0.00	-0.1	0.0	0.0	0.0	0.0
80.0	0.00	0.0	0.0	0.0	0.0	0.0
80.5	0.00	0.0	0.0	0.0	0.0	0.0
81.0	0.00	0.0	0.0	0.0	0.0	0.0
81.5	0.00	-0.1	0.0	0.0	0.0	0.0
82.0	0.00	0.0	0.0	0.0	0.0	0.0
82.5	0.00	0.0	0.0	0.0	0.0	0.0
83.0	0.00	-0.1	0.0	0.0	0.0	0.0
83.5	0.00	-0.1	0.0	0.0	0.0	0.0
84.0	0.00	0.0	0.0	0.0	0.0	0.0
84.5	0.00	0.0	0.0	0.0	0.0	0.0
85.0	0.00	-0.1	0.0	0.0	0.0	0.0
85.5	0.00	0.0	0.0	0.0	0.0	0.0
86.0	0.00	0.0	0.0	0.0	-0.1	0.0
86.5	0.00	-0.1	0.0	0.0	0.0	0.0
87.0	0.00	-0.1	0.0	0.0	0.0	0.0
87.5	0.04	0.1	0.0	478.7	0.1	0.0
88.0	0.04	0.1	0.0	478.8	0.1	0.0
88.5	0.04	0.1	0.0	478.6	0.1	0.0
89.0	0.04	0.1	0.0	477.0	0.1	0.0
89.5	0.04	0.2	0.0	478.3	0.1	0.0
90.0	0.04	0.2	0.0	478.2	0.2	0.0
90.5	0.04	0.2	0.0	478.1	0.1	0.0
91.0	0.04	0.2	0.0	477.6	0.1	0.0
91.5	0.04	0.2	0.0	477.5	0.1	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
92.0	0.04	0.2	0.0	478.0	0.1	0.0
92.5	0.04	0.2	0.0	477.9	0.1	0.0
93.0	0.04	0.2	0.0	477.8	0.1	0.0
93.5	0.04	0.2	0.0	478.2	0.2	0.0
94.0	0.05	0.2	0.0	478.3	0.1	0.0
94.5	0.04	0.2	0.0	475.8	0.2	0.0
95.0	0.05	0.2	0.0	478.1	0.1	0.0
95.5	0.05	0.2	0.0	478.0	0.2	0.0
96.0	0.00	0.1	0.0	0.3	0.1	0.0
96.5	0.00	0.0	0.0	0.0	0.0	0.0
97.0	0.00	0.0	0.0	0.0	0.0	0.0
97.5	0.00	0.0	0.0	0.0	0.0	0.0
98.0	0.00	0.0	0.0	0.0	0.0	0.0
98.5	0.00	0.0	0.0	0.0	0.0	0.0
99.0	0.00	0.0	0.0	0.0	0.0	0.0
99.5	0.00	0.0	0.0	0.0	0.0	0.0
100.0	0.00	0.0	0.0	0.0	0.0	0.0
100.5	0.00	0.0	0.0	0.0	0.0	0.0
101.0	0.00	0.0	0.0	0.0	0.0	0.0
101.5	0.00	0.0	0.0	0.0	-0.1	0.0
102.0	0.00	0.0	0.0	0.0	0.0	0.0
102.5	0.00	0.0	0.0	0.0	0.0	0.0
103.0	0.00	0.0	0.0	0.0	0.0	0.0
103.5	0.00	0.0	0.0	0.0	0.0	0.0
104.0	0.00	0.0	0.0	0.0	0.0	0.0
104.5	0.00	0.0	0.0	0.0	0.0	0.0
105.0	0.00	0.0	0.0	0.0	0.0	0.0
105.5	0.00	0.0	0.0	0.0	0.0	0.0
106.0	0.00	0.0	0.0	0.0	0.0	0.0
106.5	0.00	0.0	0.0	0.0	0.0	0.0
107.0	0.00	0.0	0.0	0.0	0.0	0.0
107.5	0.00	0.0	0.0	0.0	0.0	0.0
108.0	0.00	0.0	0.0	0.0	0.0	0.0
108.5	0.00	0.0	0.0	0.0	0.0	0.0
109.0	0.00	0.0	0.0	0.0	0.0	0.0
109.5	0.00	0.0	0.0	0.0	0.0	0.0
110.0	0.00	0.0	0.0	0.0	0.0	0.0
110.5	0.00	0.0	0.0	0.0	0.0	0.0
111.0	0.00	0.0	0.0	0.0	0.0	0.0
111.5	0.00	0.0	0.0	0.0	0.0	0.0
112.0	0.00	0.0	0.0	0.0	0.0	0.0
112.5	0.00	0.0	0.0	0.0	0.0	0.0
113.0	0.00	0.0	0.0	0.0	0.0	0.0
113.5	0.00	0.0	0.0	0.0	0.0	0.0
114.0	0.00	0.0	0.0	0.0	0.0	0.0
114.5	0.00	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
115.0	0.00	0.0	0.0	0.0	0.0	0.0
115.5	0.00	0.0	0.0	0.0	0.0	0.0
116.0	0.00	0.0	0.0	0.0	0.0	0.0
116.5	0.00	0.0	0.0	0.0	0.0	0.0
117.0	0.00	0.0	0.0	0.0	0.0	0.0
117.5	0.00	0.0	0.0	0.0	0.0	0.0
118.0	0.00	0.0	0.0	0.0	0.0	0.0
118.5	0.00	0.0	0.0	0.0	0.0	0.0
119.0	0.00	0.0	0.0	0.0	0.0	0.0
119.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
120.0	0.00	0.0	0.0	0.0	0.0	0.0
120.5	0.00	0.0	0.0	0.0	0.0	0.0
121.0	0.00	0.0	0.0	0.0	0.0	0.0
121.5	0.00	0.0	0.0	0.0	0.0	0.0
122.0	0.00	0.0	0.0	0.0	0.0	0.0
122.5	0.00	0.0	0.0	0.0	0.0	0.0
123.0	0.00	0.0	0.0	0.0	0.0	0.0
123.5	0.00	0.0	0.0	0.1	0.0	0.0
124.0	0.00	0.0	0.0	0.0	0.0	0.0
124.5	0.00	0.0	0.0	0.0	0.0	0.0
125.0	0.00	0.0	0.0	0.0	0.0	0.0
125.5	0.00	0.0	0.0	0.0	0.0	0.0
126.0	0.00	0.0	0.0	0.0	0.0	0.0
126.5	0.00	0.0	0.0	0.0	0.0	0.0
127.0	0.00	0.0	0.0	0.0	0.0	0.0
127.5	0.00	0.0	0.0	0.0	0.0	0.0
128.0	0.00	0.0	0.0	0.0	0.0	0.0
128.5	0.00	0.0	0.0	0.0	0.0	0.0
129.0	0.00	0.0	0.0	0.0	0.0	0.0
129.5	0.00	0.0	0.0	0.0	0.0	0.0
130.0	0.00	0.0	0.0	0.0	0.0	0.0
130.5	0.00	0.0	0.0	0.0	0.0	0.0
131.0	0.00	0.0	0.0	0.0	0.0	0.0
131.5	0.00	0.1	0.0	0.0	0.1	0.0
132.0	0.00	0.0	0.0	0.0	0.0	0.0
132.5	0.00	0.0	0.0	0.0	0.1	0.0
133.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
133.5	0.00	0.0	0.0	0.0	0.0	0.0
134.0	0.00	0.1	0.0	0.0	0.0	0.0
134.5	0.00	0.0	0.0	0.0	0.0	0.0
135.0	0.00	0.0	0.0	0.0	0.1	0.0
135.5	0.00	0.0	0.0	0.0	0.0	0.0
136.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
136.5	0.00	0.0	0.0	0.0	0.0	0.0
137.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
137.5	0.00	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
138.0	0.09	0.2	0.0	478.4	0.1	0.0
138.5	0.09	0.1	0.0	478.2	0.2	0.0
139.0	0.09	0.2	0.0	477.8	0.2	0.0
139.5	0.09	0.2	0.0	478.0	0.2	0.0
140.0	0.09	0.2	0.0	478.1	0.2	0.0
140.5	0.09	0.1	0.0	477.9	0.2	0.0
141.0	0.09	0.1	0.0	477.5	0.2	0.0
141.5	0.09	0.2	0.0	477.7	0.2	0.0
142.0	0.09	0.1	0.0	477.6	0.2	0.0
142.5	0.09	0.2	0.0	477.5	0.2	0.0
143.0	0.09	0.2	0.0	477.4	0.3	0.0
143.5	0.00	0.1	0.0	0.2	0.1	0.0
144.0	0.00	-0.1	0.0	0.0	0.0	0.0
144.5	0.00	0.0	0.0	0.0	0.0	0.0
145.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
145.5	0.00	0.0	0.0	0.0	0.0	0.0
146.0	0.00	0.1	0.0	0.1	0.1	0.0
146.5	0.00	0.0	0.0	0.1	0.0	0.0
147.0	0.00	-0.1	0.0	-0.1	0.0	0.0
147.5	0.00	-0.1	0.0	0.0	-0.1	0.0
148.0	0.00	-0.1	0.0	0.0	-0.1	0.0
148.5	0.00	0.0	0.0	0.0	0.0	0.0
149.0	0.00	-0.1	0.0	-0.1	0.0	0.0
149.5	0.00	0.0	0.0	0.0	0.0	0.0
150.0	0.00	0.0	0.0	-0.1	0.0	0.0
150.5	0.00	-0.1	0.0	-0.1	-0.1	0.0
151.0	0.00	-0.1	0.0	-0.1	0.0	0.0
151.5	0.00	-0.1	0.0	0.0	0.0	0.0
152.0	0.00	0.0	0.0	-0.1	-0.1	0.0
152.5	0.00	-0.1	0.0	0.0	-0.1	0.0
153.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
153.5	0.00	0.1	0.0	0.1	0.1	0.0
154.0	0.00	0.0	0.0	0.0	-0.1	0.0
154.5	0.00	-0.1	0.0	0.0	0.0	0.0
155.0	0.00	-0.1	0.0	-0.1	0.0	0.0
155.5	0.00	0.0	0.0	0.0	0.1	0.0
156.0	0.00	-0.1	0.0	-0.1	-0.1	0.0
156.5	0.00	0.0	0.0	-0.1	0.0	0.0
157.0	0.00	0.0	0.0	-0.1	0.0	0.0
157.5	0.00	-0.1	0.0	-0.1	0.0	0.0
158.0	0.00	0.0	0.0	0.0	0.0	0.0
158.5	0.00	0.1	0.0	0.0	0.1	0.0
159.0	0.00	0.2	0.0	0.1	0.1	0.0
159.5	0.00	0.0	0.0	0.0	0.0	0.0
160.0	0.00	0.0	0.0	0.0	-0.1	0.0
160.5	0.00	-0.1	0.0	-0.1	0.0	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
161.0	0.00	0.0	0.0	-0.1	0.0	0.0
161.5	0.00	0.0	0.0	-0.1	0.0	0.0
162.0	0.00	0.0	0.0	0.0	0.0	0.0
162.5	0.00	-0.1	0.0	0.0	-0.1	0.0
163.0	0.00	-0.1	0.0	0.0	0.0	0.0
163.5	0.00	0.0	0.0	0.1	0.0	0.0
164.0	0.00	-0.1	0.0	-0.1	0.0	0.0
164.5	0.00	0.0	0.0	-0.1	0.0	0.0
165.0	0.00	0.0	0.0	-0.1	-0.1	0.0
165.5	0.00	0.0	0.0	0.0	0.0	0.0
166.0	0.00	-0.1	0.0	0.0	0.0	0.0
166.5	0.00	0.0	0.0	0.0	0.0	0.0
167.0	0.00	0.0	0.0	0.0	0.0	0.0
167.5	0.00	-0.1	0.0	0.0	0.0	0.0
168.0	0.00	0.1	0.0	0.1	0.1	0.0
168.5	0.00	-0.1	0.0	0.0	-0.1	0.0
169.0	0.00	-0.1	0.0	0.0	0.0	0.0
169.5	0.00	-0.1	0.0	0.0	0.0	0.0
170.0	0.00	-0.1	0.0	-0.1	0.0	0.0
170.5	0.00	0.0	0.0	-0.1	0.0	0.0
171.0	0.00	-0.1	0.0	-0.1	0.0	0.0
171.5	0.00	0.0	0.0	0.0	0.0	0.0
172.0	0.36	57.2	0.1	478.1	3.4	0.0
172.5	0.14	13.2	0.0	491.1	15.9	0.0
173.0	0.14	6.6	0.0	485.0	9.4	0.0
173.5	0.14	6.6	0.0	484.8	9.4	0.0
174.0	0.14	6.6	0.0	484.8	9.5	0.0
174.5	0.14	6.6	0.0	484.6	9.5	0.0
175.0	0.14	6.6	0.0	484.5	9.5	0.0
175.5	0.14	6.6	0.0	484.7	9.5	0.0
176.0	0.14	6.6	0.0	484.4	9.5	0.0
176.5	0.14	6.6	0.0	484.2	9.6	0.0
177.0	0.14	6.6	0.0	484.2	9.5	0.0
177.5	0.14	6.6	0.0	483.9	9.5	0.0
178.0	0.14	6.6	0.0	484.0	9.5	0.0
178.5	0.14	6.6	0.0	484.0	9.6	0.0
179.0	0.15	0.2	0.0	475.8	1.2	0.0
179.5	0.15	0.2	0.0	476.1	1.2	0.0
180.0	0.15	0.2	0.0	476.4	1.2	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
0.0	13.8	0.0	13.8	0.0	0.00	13.9
0.5	13.8	0.0	13.8	0.0	0.00	13.9
1.0	13.8	0.0	13.8	0.0	0.00	13.9
1.5	13.8	0.0	13.8	0.0	0.00	13.9
2.0	13.8	0.0	13.8	0.0	0.00	13.9
2.5	13.8	0.0	13.8	0.0	0.00	13.9
3.0	13.8	0.0	13.8	0.0	0.00	13.9
3.5	13.8	0.0	13.8	0.0	0.00	13.9
4.0	13.7	0.0	13.7	0.0	0.00	13.9
4.5	13.7	0.0	13.7	0.0	0.00	13.9
5.0	13.7	0.0	13.7	0.0	0.00	13.9
5.5	13.7	0.0	13.7	0.0	0.00	13.9
6.0	13.7	0.0	13.7	0.0	0.00	13.8
6.5	13.7	0.0	13.7	0.0	0.00	13.9
7.0	13.7	0.0	13.7	0.0	0.00	13.9
7.5	13.7	0.0	13.7	0.0	0.00	13.9
8.0	13.7	0.0	13.8	0.0	0.00	13.9
8.5	13.7	0.0	13.8	0.0	0.00	13.9
9.0	13.7	0.0	13.7	0.0	0.00	13.9
9.5	13.8	0.0	13.8	0.0	0.00	13.9
10.0	13.8	0.0	13.8	0.0	0.00	13.9
10.5	13.7	0.0	13.8	0.0	0.00	13.9
11.0	13.8	0.0	13.8	0.0	0.00	13.9
11.5	13.8	0.0	13.8	0.0	0.00	13.9
12.0	13.7	0.0	13.8	0.0	0.00	13.9
12.5	13.7	0.0	13.8	0.0	0.00	13.9
13.0	13.7	0.0	13.8	0.0	0.00	13.8
13.5	13.8	0.0	13.8	0.0	0.00	13.9
14.0	13.8	0.0	13.8	0.0	0.00	13.9
14.5	0.2	0.0	0.2	0.0	0.00	0.0
15.0	0.1	0.0	0.2	0.0	0.00	0.1
15.5	0.1	0.0	0.1	0.0	0.00	0.0
16.0	0.1	0.0	0.2	0.0	0.00	0.0
16.5	0.1	0.0	0.2	0.0	0.00	0.0
17.0	0.1	0.0	0.2	0.0	0.00	0.0
17.5	0.2	0.0	0.2	0.0	0.00	0.1
18.0	0.1	0.0	0.2	0.0	0.00	0.3
18.5	0.1	0.0	0.2	0.0	0.00	0.0
19.0	0.2	0.0	0.2	0.0	0.00	0.1
19.5	0.1	0.0	0.2	0.0	0.00	0.1
20.0	0.1	0.0	0.1	0.0	0.00	0.1
20.5	0.1	0.0	0.2	0.0	0.00	0.3
21.0	0.1	0.0	0.2	0.0	0.00	0.4
21.5	0.1	0.0	0.2	0.0	0.00	0.2
22.0	0.1	0.0	0.2	0.0	0.00	0.2
22.5	0.2	0.0	0.2	0.0	0.00	0.1

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
23.0	0.2	0.0	0.2	0.0	0.00	0.2
23.5	0.1	0.0	0.1	0.0	0.00	0.4
24.0	0.1	0.0	0.2	0.0	0.00	0.2
24.5	0.1	0.0	0.1	0.0	0.00	0.4
25.0	0.1	0.0	0.2	0.0	0.00	0.2
25.5	0.1	0.0	0.2	0.0	0.00	0.2
26.0	0.1	0.0	0.2	0.0	0.00	0.2
26.5	0.1	0.0	0.2	0.0	0.00	0.2
27.0	0.1	0.0	0.2	0.0	0.00	0.2
27.5	0.2	0.0	0.2	0.0	0.00	0.2
28.0	0.1	0.0	0.2	0.0	0.00	0.2
28.5	0.1	0.0	0.2	0.0	0.00	0.5
29.0	0.0	0.0	0.0	0.0	0.00	0.0
29.5	-0.1	0.0	-0.1	0.0	0.00	0.0
30.0	0.0	0.0	0.0	0.0	0.00	0.0
30.5	-0.1	0.0	-0.1	0.0	0.00	0.0
31.0	-0.1	0.0	-0.1	0.0	0.00	0.0
31.5	0.0	0.0	0.0	0.0	0.00	0.0
32.0	0.0	0.0	0.0	0.0	0.00	0.0
32.5	-0.1	0.0	-0.1	0.0	0.00	0.0
33.0	-0.1	0.0	-0.1	0.0	0.00	0.0
33.5	0.0	0.0	0.0	0.0	0.00	0.0
34.0	-0.1	0.0	-0.1	0.0	0.00	0.0
34.5	0.0	0.0	0.0	0.0	0.00	0.0
35.0	0.0	0.0	0.0	0.0	0.00	0.0
35.5	0.0	0.0	0.0	0.0	0.00	0.0
36.0	0.0	0.0	0.0	0.0	0.00	0.0
36.5	-0.1	0.0	-0.1	0.0	0.00	0.0
37.0	-0.1	0.0	0.0	0.0	0.00	0.0
37.5	0.0	0.0	0.0	0.0	0.00	0.0
38.0	0.0	0.0	0.0	0.0	0.00	0.0
38.5	0.0	0.0	0.0	0.0	0.00	0.0
39.0	0.0	0.0	0.0	0.0	0.00	0.0
39.5	-0.1	0.0	-0.1	0.0	0.00	0.0
40.0	-0.1	0.0	-0.1	0.0	0.00	0.0
40.5	0.0	0.0	0.1	0.0	0.00	0.0
41.0	-0.1	0.0	-0.1	0.0	0.00	0.0
41.5	-0.1	0.0	-0.1	0.0	0.00	0.0
42.0	-0.1	0.0	-0.1	0.0	0.00	0.0
42.5	0.0	0.0	0.0	0.0	0.00	0.0
43.0	-0.1	0.0	-0.1	0.0	0.00	0.0
43.5	0.1	0.0	0.0	0.0	0.00	0.0
44.0	-0.1	0.0	-0.1	0.0	0.00	0.0
44.5	-0.1	0.0	-0.1	0.0	0.00	0.0
45.0	-0.1	0.0	-0.1	0.0	0.00	0.0
45.5	-0.1	0.0	-0.1	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
46.0	0.0	0.0	0.1	0.0	0.00	0.0
46.5	-0.1	0.0	-0.1	0.0	0.00	0.0
47.0	0.0	0.0	0.0	0.0	0.00	0.0
47.5	-0.1	0.0	0.0	0.0	0.00	0.0
48.0	0.0	0.0	-0.1	0.0	0.00	0.0
48.5	0.0	0.0	-0.1	0.0	0.00	0.0
49.0	-0.1	0.0	-0.1	0.0	0.00	0.0
49.5	-0.1	0.0	-0.1	0.0	0.00	0.0
50.0	0.0	0.0	0.0	0.0	0.00	0.0
50.5	-0.1	0.0	-0.1	0.0	0.00	0.0
51.0	0.0	0.0	-0.1	0.0	0.00	0.0
51.5	-0.1	0.0	-0.1	0.0	0.00	0.0
52.0	-0.1	0.0	-0.1	0.0	0.00	0.0
52.5	-0.1	0.0	-0.1	0.0	0.00	0.0
53.0	0.0	0.0	-0.1	0.0	0.00	0.0
53.5	0.0	0.0	0.0	0.0	0.00	0.0
54.0	-0.1	0.0	0.0	0.0	0.00	0.0
54.5	-0.1	0.0	-0.1	0.0	0.00	0.0
55.0	0.0	0.0	0.0	0.0	0.00	0.0
55.5	0.0	0.0	0.0	0.0	0.00	0.0
56.0	-0.1	0.0	0.0	0.0	0.00	0.0
56.5	-0.1	0.0	-0.1	0.0	0.00	0.0
57.0	0.0	0.0	0.1	0.0	0.00	0.0
57.5	0.0	0.0	0.0	0.0	0.00	0.0
58.0	0.1	0.0	0.0	0.0	0.00	0.0
58.5	0.0	0.0	0.1	0.0	0.00	0.0
59.0	0.0	0.0	-0.1	0.0	0.00	0.0
59.5	0.0	0.0	-0.1	0.0	0.00	0.0
60.0	-0.1	0.0	0.0	0.0	0.00	0.0
60.5	-0.1	0.0	-0.1	0.0	0.00	0.0
61.0	-0.1	0.0	0.0	0.0	0.00	0.0
61.5	0.0	0.0	0.0	0.0	0.00	0.0
62.0	-0.1	0.0	-0.1	0.0	0.00	0.0
62.5	-0.1	0.0	0.0	0.0	0.00	0.0
63.0	-0.1	0.0	-0.1	0.0	0.00	0.0
63.5	-0.1	0.0	-0.1	0.0	0.00	0.0
64.0	0.0	0.0	-0.1	0.0	0.00	0.0
64.5	0.0	0.0	0.0	0.0	0.00	0.0
65.0	0.0	0.0	0.0	0.0	0.00	0.0
65.5	0.0	0.0	0.0	0.0	0.00	0.0
66.0	-0.1	0.0	-0.1	0.0	0.00	0.0
66.5	-0.1	0.0	-0.1	0.0	0.00	0.0
67.0	-0.1	0.0	-0.1	0.0	0.00	0.0
67.5	0.0	0.0	0.0	0.0	0.00	0.0
68.0	-0.1	0.0	0.0	0.0	0.00	0.0
68.5	0.0	0.0	-0.1	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
69.0	0.1	0.0	0.1	0.0	0.00	0.0
69.5	-0.1	0.0	-0.1	0.0	0.00	0.0
70.0	-0.1	0.0	0.0	0.0	0.00	0.0
70.5	0.0	0.0	0.1	0.0	0.00	0.0
71.0	0.0	0.0	0.0	0.0	0.00	0.0
71.5	-0.1	0.0	-0.1	0.0	0.00	0.0
72.0	0.0	0.0	0.0	0.0	0.00	0.0
72.5	0.0	0.0	-0.1	0.0	0.00	0.0
73.0	-0.1	0.0	0.0	0.0	0.00	0.0
73.5	0.0	0.0	0.0	0.0	0.00	0.0
74.0	-0.1	0.0	0.0	0.0	0.00	0.0
74.5	0.0	0.0	-0.1	0.0	0.00	0.0
75.0	0.0	0.0	0.0	0.0	0.00	0.0
75.5	-0.1	0.0	0.0	0.0	0.00	0.0
76.0	-0.1	0.0	0.0	0.0	0.00	0.0
76.5	-0.1	0.0	0.0	0.0	0.00	0.0
77.0	0.0	0.0	0.0	0.0	0.00	0.0
77.5	-0.1	0.0	-0.1	0.0	0.00	0.0
78.0	0.0	0.0	-0.1	0.0	0.00	0.0
78.5	-0.1	0.0	0.0	0.0	0.00	0.0
79.0	-0.1	0.0	0.0	0.0	0.00	0.0
79.5	0.0	0.0	0.0	0.0	0.00	0.0
80.0	-0.1	0.0	-0.1	0.0	0.00	0.0
80.5	-0.1	0.0	0.0	0.0	0.00	0.0
81.0	-0.1	0.0	0.0	0.0	0.00	0.0
81.5	0.0	0.0	-0.1	0.0	0.00	0.0
82.0	0.0	0.0	0.0	0.0	0.00	0.0
82.5	0.0	0.0	0.0	0.0	0.00	0.0
83.0	0.0	0.0	0.0	0.0	0.00	0.0
83.5	-0.1	0.0	0.0	0.0	0.00	0.0
84.0	0.0	0.0	0.0	0.0	0.00	0.0
84.5	0.0	0.0	0.0	0.0	0.00	0.0
85.0	0.0	0.0	0.0	0.0	0.00	0.0
85.5	0.0	0.0	0.0	0.0	0.00	0.0
86.0	-0.1	0.0	0.0	0.0	0.00	0.0
86.5	0.0	0.0	0.0	0.0	0.00	0.0
87.0	0.0	0.0	0.0	0.0	0.00	0.0
87.5	0.1	0.0	0.1	0.0	0.00	0.0
88.0	0.1	0.0	0.1	0.0	0.00	0.0
88.5	0.1	0.0	0.1	0.0	0.00	0.0
89.0	0.1	0.0	0.1	0.0	0.00	0.0
89.5	0.1	0.0	0.1	0.0	0.00	0.0
90.0	0.1	0.0	0.1	0.0	0.00	0.0
90.5	0.1	0.0	0.1	0.0	0.00	0.0
91.0	0.1	0.0	0.2	0.0	0.00	0.0
91.5	0.1	0.0	0.2	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
92.0	0.1	0.0	0.2	0.0	0.00	0.0
92.5	0.1	0.0	0.1	0.0	0.00	0.0
93.0	0.1	0.0	0.1	0.0	0.00	0.0
93.5	0.1	0.0	0.2	0.0	0.00	0.0
94.0	0.1	0.0	0.2	0.0	0.00	0.0
94.5	0.1	0.0	0.2	0.0	0.00	0.0
95.0	0.1	0.0	0.2	0.0	0.00	0.0
95.5	0.2	0.0	0.1	0.0	0.00	0.0
96.0	0.0	0.0	0.1	0.0	0.00	0.0
96.5	0.0	0.0	0.0	0.0	0.00	0.0
97.0	0.0	0.0	0.0	0.0	0.00	0.0
97.5	0.0	0.0	0.0	0.0	0.00	0.0
98.0	0.0	0.0	0.0	0.0	0.00	0.0
98.5	0.0	0.0	0.0	0.0	0.00	0.0
99.0	0.0	0.0	0.0	0.0	0.00	0.0
99.5	0.0	0.0	0.0	0.0	0.00	0.0
100.0	0.0	0.0	0.0	0.0	0.00	0.0
100.5	0.0	0.0	0.0	0.0	0.00	0.0
101.0	0.0	0.0	0.0	0.0	0.00	0.0
101.5	0.0	0.0	0.0	0.0	0.00	0.0
102.0	0.0	0.0	0.0	0.0	0.00	0.0
102.5	0.0	0.0	0.0	0.0	0.00	0.0
103.0	0.0	0.0	0.0	0.0	0.00	0.0
103.5	0.0	0.0	0.0	0.0	0.00	0.0
104.0	0.0	0.0	0.0	0.0	0.00	0.0
104.5	0.0	0.0	0.0	0.0	0.00	0.0
105.0	0.0	0.0	0.0	0.0	0.00	0.0
105.5	0.0	0.0	0.0	0.0	0.00	0.0
106.0	0.0	0.0	0.0	0.0	0.00	0.0
106.5	0.0	0.0	0.0	0.0	0.00	0.0
107.0	0.0	0.0	0.0	0.0	0.00	0.0
107.5	0.0	0.0	0.0	0.0	0.00	0.0
108.0	0.0	0.0	0.0	0.0	0.00	0.0
108.5	0.0	0.0	0.0	0.0	0.00	0.0
109.0	0.0	0.0	0.0	0.0	0.00	0.0
109.5	0.0	0.0	0.0	0.0	0.00	0.0
110.0	0.0	0.0	0.0	0.0	0.00	0.0
110.5	0.0	0.0	0.0	0.0	0.00	0.0
111.0	0.0	0.0	0.0	0.0	0.00	0.0
111.5	0.0	0.0	0.0	0.0	0.00	0.0
112.0	0.0	0.0	0.0	0.0	0.00	0.0
112.5	0.0	0.0	0.0	0.0	0.00	0.0
113.0	0.0	0.0	0.0	0.0	0.00	0.0
113.5	0.0	0.0	0.0	0.0	0.00	0.0
114.0	0.0	0.0	0.0	0.0	0.00	0.0
114.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
115.0	0.0	0.0	0.0	0.0	0.00	0.0
115.5	0.0	0.0	0.0	0.0	0.00	0.0
116.0	0.0	0.0	0.0	0.0	0.00	0.0
116.5	0.0	0.0	0.0	0.0	0.00	0.0
117.0	0.0	0.0	0.0	0.0	0.00	0.0
117.5	0.0	0.0	0.0	0.0	0.00	0.0
118.0	0.0	0.0	0.0	0.0	0.00	0.0
118.5	0.0	0.0	0.0	0.0	0.00	0.0
119.0	0.1	0.0	0.0	0.0	0.00	0.0
119.5	-0.1	0.0	-0.1	0.0	0.00	0.0
120.0	0.0	0.0	0.0	0.0	0.00	0.0
120.5	0.0	0.0	0.0	0.0	0.00	0.0
121.0	0.0	0.0	0.0	0.0	0.00	0.0
121.5	0.0	0.0	0.0	0.0	0.00	0.0
122.0	0.0	0.0	0.0	0.0	0.00	0.0
122.5	0.0	0.0	0.0	0.0	0.00	0.0
123.0	0.0	0.0	0.0	0.0	0.00	0.0
123.5	0.0	0.0	0.0	0.0	0.00	0.0
124.0	0.0	0.0	0.0	0.0	0.00	0.0
124.5	0.0	0.0	0.0	0.0	0.00	0.0
125.0	0.0	0.0	0.0	0.0	0.00	0.0
125.5	0.0	0.0	0.0	0.0	0.00	0.0
126.0	0.0	0.0	0.0	0.0	0.00	0.0
126.5	0.0	0.0	0.0	0.0	0.00	0.0
127.0	0.0	0.0	0.0	0.0	0.00	0.0
127.5	0.0	0.0	0.0	0.0	0.00	0.0
128.0	0.0	0.0	0.0	0.0	0.00	0.0
128.5	0.0	0.0	0.0	0.0	0.00	0.0
129.0	0.0	0.0	0.0	0.0	0.00	0.0
129.5	0.0	0.0	0.0	0.0	0.00	0.0
130.0	0.0	0.0	0.0	0.0	0.00	0.0
130.5	0.0	0.0	0.0	0.0	0.00	0.0
131.0	0.0	0.0	0.0	0.0	0.00	0.0
131.5	0.0	0.0	0.0	0.0	0.00	0.0
132.0	0.0	0.0	0.0	0.0	0.00	0.0
132.5	0.0	0.0	0.0	0.0	0.00	0.0
133.0	-0.1	0.0	-0.1	0.0	0.00	0.0
133.5	0.0	0.0	0.0	0.0	0.00	0.0
134.0	0.0	0.0	0.0	0.0	0.00	0.0
134.5	0.0	0.0	0.0	0.0	0.00	0.0
135.0	0.1	0.0	0.0	0.0	0.00	0.0
135.5	0.0	0.0	0.0	0.0	0.00	0.0
136.0	-0.1	0.0	-0.1	0.0	0.00	0.0
136.5	0.0	0.0	0.0	0.0	0.00	0.0
137.0	-0.1	0.0	-0.1	0.0	0.00	0.0
137.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
138.0	0.1	0.0	0.1	0.0	0.00	0.0
138.5	0.1	0.0	0.1	0.0	0.00	0.0
139.0	0.1	0.0	0.2	0.0	0.00	0.0
139.5	0.1	0.0	0.2	0.0	0.00	0.0
140.0	0.1	0.0	0.2	0.0	0.00	0.0
140.5	0.1	0.0	0.2	0.0	0.00	0.0
141.0	0.1	0.0	0.2	0.0	0.00	0.0
141.5	0.2	0.0	0.2	0.0	0.00	0.0
142.0	0.1	0.0	0.2	0.0	0.00	0.0
142.5	0.2	0.0	0.2	0.0	0.00	0.0
143.0	0.2	0.0	0.2	0.0	0.00	0.0
143.5	0.1	0.0	0.1	0.0	0.00	0.0
144.0	-0.1	0.0	-0.1	0.0	0.00	0.0
144.5	-0.1	0.0	-0.1	0.0	0.00	0.0
145.0	0.0	0.0	-0.1	0.0	0.00	0.0
145.5	0.0	0.0	0.0	0.0	0.00	0.0
146.0	0.0	0.0	0.1	0.0	0.00	0.0
146.5	0.0	0.0	0.0	0.0	0.00	0.0
147.0	0.0	0.0	-0.1	0.0	0.00	0.0
147.5	-0.1	0.0	-0.1	0.0	0.00	0.0
148.0	-0.1	0.0	-0.1	0.0	0.00	0.0
148.5	0.0	0.0	0.0	0.0	0.00	0.0
149.0	0.0	0.0	-0.1	0.0	0.00	0.0
149.5	0.0	0.0	0.1	0.0	0.00	0.0
150.0	0.0	0.0	-0.1	0.0	0.00	0.0
150.5	0.0	0.0	0.0	0.0	0.00	0.0
151.0	0.0	0.0	-0.1	0.0	0.00	0.0
151.5	0.0	0.0	-0.1	0.0	0.00	0.0
152.0	0.0	0.0	0.0	0.0	0.00	0.0
152.5	-0.1	0.0	-0.1	0.0	0.00	0.0
153.0	-0.1	0.0	-0.1	0.0	0.00	0.0
153.5	0.1	0.0	0.0	0.0	0.00	0.0
154.0	-0.1	0.0	-0.1	0.0	0.00	0.0
154.5	-0.1	0.0	0.0	0.0	0.00	0.0
155.0	-0.1	0.0	-0.1	0.0	0.00	0.0
155.5	0.0	0.0	0.1	0.0	0.00	0.0
156.0	0.0	0.0	0.0	0.0	0.00	0.0
156.5	-0.1	0.0	-0.1	0.0	0.00	0.0
157.0	0.0	0.0	-0.1	0.0	0.00	0.0
157.5	0.0	0.0	0.0	0.0	0.00	0.0
158.0	0.0	0.0	0.1	0.0	0.00	0.0
158.5	0.1	0.0	0.1	0.0	0.00	0.0
159.0	0.1	0.0	0.1	0.0	0.00	0.0
159.5	-0.1	0.0	0.0	0.0	0.00	0.0
160.0	-0.1	0.0	-0.1	0.0	0.00	0.0
160.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
161.0	0.0	0.0	0.0	0.0	0.00	0.0
161.5	-0.1	0.0	0.0	0.0	0.00	0.0
162.0	0.0	0.0	-0.1	0.0	0.00	0.0
162.5	0.0	0.0	0.0	0.0	0.00	0.0
163.0	0.0	0.0	0.0	0.0	0.00	0.0
163.5	0.0	0.0	0.0	0.0	0.00	0.0
164.0	0.0	0.0	0.0	0.0	0.00	0.0
164.5	0.0	0.0	-0.1	0.0	0.00	0.0
165.0	0.0	0.0	-0.1	0.0	0.00	0.0
165.5	-0.1	0.0	0.0	0.0	0.00	0.0
166.0	-0.1	0.0	0.0	0.0	0.00	0.0
166.5	0.0	0.0	-0.1	0.0	0.00	0.0
167.0	0.0	0.0	0.0	0.0	0.00	0.0
167.5	-0.1	0.0	0.0	0.0	0.00	0.0
168.0	0.1	0.0	0.1	0.0	0.00	0.0
168.5	0.0	0.0	0.0	0.0	0.00	0.0
169.0	0.0	0.0	0.0	0.0	0.00	0.0
169.5	0.0	0.0	0.0	0.0	0.00	0.0
170.0	0.0	0.0	-0.1	0.0	0.00	0.0
170.5	0.0	0.0	0.0	0.0	0.00	0.0
171.0	0.0	0.0	0.0	0.0	0.00	0.0
171.5	0.0	0.0	0.0	0.0	0.00	0.0
172.0	2.4	0.0	2.4	0.0	0.00	0.6
172.5	14.0	0.0	16.0	0.0	0.00	13.8
173.0	7.3	0.0	9.4	0.0	0.00	7.5
173.5	7.2	0.0	9.4	0.0	0.00	7.5
174.0	7.2	0.0	9.4	0.0	0.00	7.5
174.5	7.3	0.0	9.4	0.0	0.00	7.5
175.0	7.3	0.0	9.4	0.0	0.00	7.5
175.5	7.3	0.0	9.5	0.0	0.00	7.5
176.0	7.3	0.0	9.6	0.0	0.00	7.5
176.5	7.3	0.0	9.6	0.0	0.00	7.5
177.0	7.3	0.0	9.6	0.0	0.00	7.5
177.5	7.3	0.0	9.6	0.0	0.00	7.5
178.0	7.3	0.0	9.6	0.0	0.00	7.5
178.5	7.3	0.0	9.6	0.0	0.00	7.5
179.0	0.2	0.0	1.0	0.0	0.00	0.0
179.5	0.1	0.0	1.0	0.0	0.00	0.0
180.0	0.1	0.0	1.2	0.0	0.00	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
0.0	0.1	109.1	13.9	0.1	14.0	0.1
0.5	0.1	109.1	13.9	0.1	14.0	0.1
1.0	0.1	109.2	13.9	0.1	14.0	0.1
1.5	0.1	109.2	13.9	0.1	14.0	0.1
2.0	0.1	109.1	13.9	0.1	14.0	0.1
2.5	0.1	109.2	13.9	0.1	14.0	0.1
3.0	0.1	109.2	13.9	0.1	14.0	0.1
3.5	0.1	108.9	13.9	0.1	14.0	0.1
4.0	0.1	108.9	13.9	0.1	14.0	0.1
4.5	0.1	108.9	13.9	0.1	14.0	0.1
5.0	0.1	108.8	13.9	0.1	13.9	0.1
5.5	0.1	108.8	13.9	0.1	13.9	0.1
6.0	0.1	108.7	13.9	0.1	13.9	0.1
6.5	0.1	108.8	13.9	0.1	13.9	0.1
7.0	0.1	108.8	13.9	0.1	13.9	0.1
7.5	0.1	108.7	13.9	0.1	13.9	0.1
8.0	0.1	108.7	13.9	0.1	13.9	0.1
8.5	0.1	108.7	13.9	0.1	13.9	0.1
9.0	0.1	108.8	13.9	0.1	13.9	0.1
9.5	0.1	109.0	13.9	0.1	14.0	0.1
10.0	0.1	109.0	13.9	0.1	14.0	0.1
10.5	0.1	109.0	13.9	0.1	14.0	0.1
11.0	0.1	109.1	13.9	0.1	14.0	0.1
11.5	0.1	109.1	13.9	0.1	14.0	0.1
12.0	0.1	108.7	13.9	0.1	13.9	0.1
12.5	0.1	108.6	13.9	0.1	13.9	0.1
13.0	0.1	108.6	13.9	0.1	13.9	0.1
13.5	0.1	109.0	13.9	0.1	14.0	0.1
14.0	0.1	109.0	13.9	0.1	14.0	0.1
14.5	0.0	123.4	0.0	0.0	0.0	0.0
15.0	0.0	122.5	0.1	0.0	0.1	0.0
15.5	0.0	122.9	0.0	0.0	0.0	0.0
16.0	0.0	123.0	0.0	0.0	0.0	0.0
16.5	0.0	123.1	0.0	0.0	0.0	0.0
17.0	0.0	122.8	0.0	0.0	0.0	0.0
17.5	0.0	122.8	0.1	0.0	0.1	0.0
18.0	0.0	122.3	0.3	0.0	0.3	0.0
18.5	0.0	122.9	0.0	0.0	0.0	0.0
19.0	0.0	122.8	0.1	0.0	0.1	0.0
19.5	0.0	122.4	0.1	0.0	0.1	0.0
20.0	0.0	122.5	0.1	0.0	0.1	0.0
20.5	0.0	122.1	0.3	0.0	0.4	0.0
21.0	0.0	122.3	0.3	0.0	0.3	0.0
21.5	0.0	122.4	0.2	0.0	0.2	0.0
22.0	0.0	122.3	0.2	0.0	0.3	0.0
22.5	0.0	122.5	0.1	0.0	0.2	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
23.0	0.0	122.5	0.1	0.0	0.2	0.0
23.5	0.0	122.2	0.4	0.0	0.4	0.0
24.0	0.0	122.4	0.2	0.0	0.2	0.0
24.5	0.0	122.3	0.4	0.0	0.4	0.0
25.0	0.0	122.4	0.2	0.0	0.3	0.0
25.5	0.0	122.6	0.2	0.0	0.2	0.0
26.0	0.0	122.4	0.2	0.0	0.3	0.0
26.5	0.0	122.5	0.2	0.0	0.2	0.0
27.0	0.0	122.4	0.2	0.0	0.2	0.0
27.5	0.0	122.4	0.2	0.0	0.2	0.0
28.0	0.0	122.5	0.2	0.0	0.2	0.0
28.5	0.0	122.2	0.5	0.0	0.5	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0
29.5	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0
30.5	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0
31.5	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0
32.5	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0
33.5	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0
34.5	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0
35.5	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0
36.5	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0
37.5	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0
38.5	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0
39.5	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0
40.5	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0
41.5	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0
42.5	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0
43.5	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0
44.5	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0
45.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
46.0	0.0	0.0	0.0	0.0	0.0	0.0
46.5	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0
47.5	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0
48.5	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0
49.5	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0
50.5	0.0	0.0	0.0	0.0	0.0	0.0
51.0	0.0	0.0	0.0	0.0	0.0	0.0
51.5	0.0	0.0	0.0	0.0	0.0	0.0
52.0	0.0	0.0	0.0	0.0	0.0	0.0
52.5	0.0	0.0	0.0	0.0	0.0	0.0
53.0	0.0	0.0	0.0	0.0	0.0	0.0
53.5	0.0	0.0	0.0	0.0	0.0	0.0
54.0	0.0	0.0	0.0	0.0	0.0	0.0
54.5	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0
55.5	0.0	0.0	0.0	0.0	0.0	0.0
56.0	0.0	0.0	0.0	0.0	0.0	0.0
56.5	0.0	0.0	0.0	0.0	0.0	0.0
57.0	0.0	0.0	0.0	0.0	0.0	0.0
57.5	0.0	0.0	0.0	0.0	0.0	0.0
58.0	0.0	0.0	0.0	0.0	0.0	0.0
58.5	0.0	0.0	0.0	0.0	0.0	0.0
59.0	0.0	0.0	0.0	0.0	0.0	0.0
59.5	0.0	0.0	0.0	0.0	0.0	0.0
60.0	0.0	0.0	0.0	0.0	0.0	0.0
60.5	0.0	0.0	0.0	0.0	0.0	0.0
61.0	0.0	0.0	0.0	0.0	0.0	0.0
61.5	0.0	0.0	0.0	0.0	0.0	0.0
62.0	0.0	0.0	0.0	0.0	0.0	0.0
62.5	0.0	0.0	0.0	0.0	0.0	0.0
63.0	0.0	0.0	0.0	0.0	0.0	0.0
63.5	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0
64.5	0.0	0.0	0.0	0.0	0.0	0.0
65.0	0.0	0.0	0.0	0.0	0.0	0.0
65.5	0.0	0.0	0.0	0.0	0.0	0.0
66.0	0.0	0.0	0.0	0.0	0.0	0.0
66.5	0.0	0.0	0.0	0.0	0.0	0.0
67.0	0.0	0.0	0.0	0.0	0.0	0.0
67.5	0.0	0.0	0.0	0.0	0.0	0.0
68.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
69.0	0.0	0.0	0.0	0.0	0.0	0.0
69.5	0.0	0.0	0.0	0.0	0.0	0.0
70.0	0.0	0.0	0.0	0.0	0.0	0.0
70.5	0.0	0.0	0.0	0.0	0.0	0.0
71.0	0.0	0.0	0.0	0.0	0.0	0.0
71.5	0.0	0.0	0.0	0.0	0.0	0.0
72.0	0.0	0.0	0.0	0.0	0.0	0.0
72.5	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0
73.5	0.0	0.0	0.0	0.0	0.0	0.0
74.0	0.0	0.0	0.0	0.0	0.0	0.0
74.5	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0
75.5	0.0	0.0	0.0	0.0	0.0	0.0
76.0	0.0	0.0	0.0	0.0	0.0	0.0
76.5	0.0	0.0	0.0	0.0	0.0	0.0
77.0	0.0	0.0	0.0	0.0	0.0	0.0
77.5	0.0	0.0	0.0	0.0	0.0	0.0
78.0	0.0	0.0	0.0	0.0	0.0	0.0
78.5	0.0	0.0	0.0	0.0	0.0	0.0
79.0	0.0	0.0	0.0	0.0	0.0	0.0
79.5	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0
80.5	0.0	0.0	0.0	0.0	0.0	0.0
81.0	0.0	0.0	0.0	0.0	0.0	0.0
81.5	0.0	0.0	0.0	0.0	0.0	0.0
82.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5	0.0	0.0	0.0	0.0	0.0	0.0
83.0	0.0	0.0	0.0	0.0	0.0	0.0
83.5	0.0	0.0	0.0	0.0	0.0	0.0
84.0	0.0	0.0	0.0	0.0	0.0	0.0
84.5	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0
85.5	0.0	0.0	0.0	0.0	0.0	0.0
86.0	0.0	0.0	0.0	0.0	0.0	0.0
86.5	0.0	0.0	0.0	0.0	0.0	0.0
87.0	0.0	0.0	0.0	0.0	0.0	0.0
87.5	0.0	123.4	0.0	0.0	0.0	0.0
88.0	0.0	123.4	0.0	0.0	0.0	0.0
88.5	0.0	123.4	0.0	0.0	0.0	0.0
89.0	0.0	123.0	0.0	0.0	0.0	0.0
89.5	0.0	123.3	0.0	0.0	0.0	0.0
90.0	0.0	123.3	0.0	0.0	0.0	0.0
90.5	0.0	123.3	0.0	0.0	0.0	0.0
91.0	0.0	123.2	0.0	0.0	0.0	0.0
91.5	0.0	123.2	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
92.0	0.0	123.3	0.0	0.0	0.0	0.0
92.5	0.0	123.3	0.0	0.0	0.0	0.0
93.0	0.0	123.3	0.0	0.0	0.0	0.0
93.5	0.0	123.4	0.0	0.0	0.0	0.0
94.0	0.0	123.4	0.0	0.0	0.0	0.0
94.5	0.0	123.0	0.0	0.0	0.0	0.0
95.0	0.0	123.4	0.0	0.0	0.0	0.0
95.5	0.0	123.3	0.0	0.0	0.0	0.0
96.0	0.0	0.1	0.0	0.0	0.0	0.0
96.5	0.0	0.0	0.0	0.0	0.0	0.0
97.0	0.0	0.0	0.0	0.0	0.0	0.0
97.5	0.0	0.0	0.0	0.0	0.0	0.0
98.0	0.0	0.0	0.0	0.0	0.0	0.0
98.5	0.0	0.0	0.0	0.0	0.0	0.0
99.0	0.0	0.0	0.0	0.0	0.0	0.0
99.5	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0
100.5	0.0	0.0	0.0	0.0	0.0	0.0
101.0	0.0	0.0	0.0	0.0	0.0	0.0
101.5	0.0	0.0	0.0	0.0	0.0	0.0
102.0	0.0	0.0	0.0	0.0	0.0	0.0
102.5	0.0	0.0	0.0	0.0	0.0	0.0
103.0	0.0	0.0	0.0	0.0	0.0	0.0
103.5	0.0	0.0	0.0	0.0	0.0	0.0
104.0	0.0	0.0	0.0	0.0	0.0	0.0
104.5	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0
105.5	0.0	0.0	0.0	0.0	0.0	0.0
106.0	0.0	0.0	0.0	0.0	0.0	0.0
106.5	0.0	0.0	0.0	0.0	0.0	0.0
107.0	0.0	0.0	0.0	0.0	0.0	0.0
107.5	0.0	0.0	0.0	0.0	0.0	0.0
108.0	0.0	0.0	0.0	0.0	0.0	0.0
108.5	0.0	0.0	0.0	0.0	0.0	0.0
109.0	0.0	0.0	0.0	0.0	0.0	0.0
109.5	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0
110.5	0.0	0.0	0.0	0.0	0.0	0.0
111.0	0.0	0.0	0.0	0.0	0.0	0.0
111.5	0.0	0.0	0.0	0.0	0.0	0.0
112.0	0.0	0.0	0.0	0.0	0.0	0.0
112.5	0.0	0.0	0.0	0.0	0.0	0.0
113.0	0.0	0.0	0.0	0.0	0.0	0.0
113.5	0.0	0.0	0.0	0.0	0.0	0.0
114.0	0.0	0.0	0.0	0.0	0.0	0.0
114.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
115.0	0.0	0.0	0.0	0.0	0.0	0.0
115.5	0.0	0.0	0.0	0.0	0.0	0.0
116.0	0.0	0.0	0.0	0.0	0.0	0.0
116.5	0.0	0.0	0.0	0.0	0.0	0.0
117.0	0.0	0.0	0.0	0.0	0.0	0.0
117.5	0.0	0.0	0.0	0.0	0.0	0.0
118.0	0.0	0.0	0.0	0.0	0.0	0.0
118.5	0.0	0.0	0.0	0.0	0.0	0.0
119.0	0.0	0.0	0.0	0.0	0.0	0.0
119.5	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0
120.5	0.0	0.0	0.0	0.0	0.0	0.0
121.0	0.0	0.0	0.0	0.0	0.0	0.0
121.5	0.0	0.0	0.0	0.0	0.0	0.0
122.0	0.0	0.0	0.0	0.0	0.0	0.0
122.5	0.0	0.0	0.0	0.0	0.0	0.0
123.0	0.0	0.0	0.0	0.0	0.0	0.0
123.5	0.0	0.0	0.0	0.0	0.0	0.0
124.0	0.0	0.0	0.0	0.0	0.0	0.0
124.5	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0
125.5	0.0	0.0	0.0	0.0	0.0	0.0
126.0	0.0	0.0	0.0	0.0	0.0	0.0
126.5	0.0	0.0	0.0	0.0	0.0	0.0
127.0	0.0	0.0	0.0	0.0	0.0	0.0
127.5	0.0	0.0	0.0	0.0	0.0	0.0
128.0	0.0	0.0	0.0	0.0	0.0	0.0
128.5	0.0	0.0	0.0	0.0	0.0	0.0
129.0	0.0	0.0	0.0	0.0	0.0	0.0
129.5	0.0	0.0	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0
130.5	0.0	0.0	0.0	0.0	0.0	0.0
131.0	0.0	0.0	0.0	0.0	0.0	0.0
131.5	0.0	0.0	0.0	0.0	0.0	0.0
132.0	0.0	0.0	0.0	0.0	0.0	0.0
132.5	0.0	0.0	0.0	0.0	0.0	0.0
133.0	0.0	0.0	0.0	0.0	0.0	0.0
133.5	0.0	0.0	0.0	0.0	0.0	0.0
134.0	0.0	0.0	0.0	0.0	0.0	0.0
134.5	0.0	0.0	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0
135.5	0.0	0.0	0.0	0.0	0.0	0.0
136.0	0.0	0.0	0.0	0.0	0.0	0.0
136.5	0.0	0.0	0.0	0.0	0.0	0.0
137.0	0.0	0.0	0.0	0.0	0.0	0.0
137.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
138.0	0.0	123.3	0.0	0.0	0.0	0.0
138.5	0.0	123.3	0.0	0.0	0.0	0.0
139.0	0.0	123.2	0.0	0.0	0.0	0.0
139.5	0.0	123.3	0.0	0.0	0.0	0.0
140.0	0.0	123.3	0.0	0.0	0.0	0.0
140.5	0.0	123.3	0.0	0.0	0.0	0.0
141.0	0.0	123.2	0.0	0.0	0.0	0.0
141.5	0.0	123.3	0.0	0.0	0.0	0.0
142.0	0.0	123.3	0.0	0.0	0.0	0.0
142.5	0.0	123.2	0.0	0.0	0.0	0.0
143.0	0.0	123.2	0.0	0.0	0.0	0.0
143.5	0.0	0.1	0.0	0.0	0.0	0.0
144.0	0.0	0.0	0.0	0.0	0.0	0.0
144.5	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0
145.5	0.0	0.0	0.0	0.0	0.0	0.0
146.0	0.0	0.0	0.0	0.0	0.0	0.0
146.5	0.0	0.0	0.0	0.0	0.0	0.0
147.0	0.0	0.0	0.0	0.0	0.0	0.0
147.5	0.0	0.0	0.0	0.0	0.0	0.0
148.0	0.0	0.0	0.0	0.0	0.0	0.0
148.5	0.0	0.0	0.0	0.0	0.0	0.0
149.0	0.0	0.0	0.0	0.0	0.0	0.0
149.5	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0
150.5	0.0	0.0	0.0	0.0	0.0	0.0
151.0	0.0	0.0	0.0	0.0	0.0	0.0
151.5	0.0	0.0	0.0	0.0	0.0	0.0
152.0	0.0	0.0	0.0	0.0	0.0	0.0
152.5	0.0	0.0	0.0	0.0	0.0	0.0
153.0	0.0	0.0	0.0	0.0	0.0	0.0
153.5	0.0	0.0	0.0	0.0	0.0	0.0
154.0	0.0	0.0	0.0	0.0	0.0	0.0
154.5	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0
155.5	0.0	0.0	0.0	0.0	0.0	0.0
156.0	0.0	0.0	0.0	0.0	0.0	0.0
156.5	0.0	0.0	0.0	0.0	0.0	0.0
157.0	0.0	0.0	0.0	0.0	0.0	0.0
157.5	0.0	0.0	0.0	0.0	0.0	0.0
158.0	0.0	0.0	0.0	0.0	0.0	0.0
158.5	0.0	0.0	0.0	0.0	0.0	0.0
159.0	0.0	0.0	0.0	0.0	0.0	0.0
159.5	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0
160.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
161.0	0.0	0.0	0.0	0.0	0.0	0.0
161.5	0.0	0.0	0.0	0.0	0.0	0.0
162.0	0.0	0.0	0.0	0.0	0.0	0.0
162.5	0.0	0.0	0.0	0.0	0.0	0.0
163.0	0.0	0.0	0.0	0.0	0.0	0.0
163.5	0.0	0.0	0.0	0.0	0.0	0.0
164.0	0.0	0.0	0.0	0.0	0.0	0.0
164.5	0.0	0.0	0.0	0.0	0.0	0.0
165.0	0.0	0.0	0.0	0.0	0.0	0.0
165.5	0.0	0.0	0.0	0.0	0.0	0.0
166.0	0.0	0.0	0.0	0.0	0.0	0.0
166.5	0.0	0.0	0.0	0.0	0.0	0.0
167.0	0.0	0.0	0.0	0.0	0.0	0.0
167.5	0.0	0.0	0.0	0.0	0.0	0.0
168.0	0.0	0.0	0.0	0.0	0.0	0.0
168.5	0.0	0.0	0.0	0.0	0.0	0.0
169.0	0.0	0.0	0.0	0.0	0.0	0.0
169.5	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0
170.5	0.0	0.0	0.0	0.0	0.0	0.0
171.0	0.0	0.0	0.0	0.0	0.0	0.0
171.5	0.0	0.0	0.0	0.0	0.0	0.0
172.0	0.0	122.7	0.4	0.0	0.4	0.0
172.5	0.1	108.8	13.8	0.1	13.9	0.1
173.0	0.1	115.2	7.4	0.1	7.5	0.1
173.5	0.1	115.2	7.5	0.1	7.5	0.1
174.0	0.1	115.2	7.4	0.1	7.5	0.1
174.5	0.1	115.2	7.4	0.1	7.5	0.1
175.0	0.1	115.2	7.4	0.1	7.5	0.1
175.5	0.1	115.2	7.4	0.1	7.5	0.1
176.0	0.1	115.2	7.4	0.1	7.5	0.1
176.5	0.1	115.1	7.4	0.1	7.5	0.1
177.0	0.1	115.1	7.4	0.1	7.5	0.1
177.5	0.1	115.1	7.4	0.1	7.5	0.1
178.0	0.1	115.1	7.4	0.1	7.5	0.1
178.5	0.1	115.1	7.4	0.1	7.5	0.1
179.0	0.0	122.8	0.0	0.0	0.0	0.0
179.5	0.0	122.9	0.0	0.0	0.0	0.0
180.0	0.0	122.9	0.0	0.0	0.0	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
0.0	13.9	0.1	14.0	0.1	0.00	13.9
0.5	13.9	0.1	14.0	0.1	0.00	13.9
1.0	13.9	0.1	14.0	0.1	0.00	13.9
1.5	13.9	0.1	14.0	0.1	0.00	13.9
2.0	13.9	0.1	14.0	0.1	0.00	13.9
2.5	13.9	0.1	14.0	0.1	0.00	13.9
3.0	13.9	0.1	14.0	0.1	0.00	13.9
3.5	13.9	0.1	13.9	0.1	0.00	13.9
4.0	13.9	0.1	13.9	0.1	0.00	13.9
4.5	13.9	0.1	13.9	0.1	0.00	13.9
5.0	13.9	0.1	13.9	0.1	0.00	13.9
5.5	13.9	0.1	13.9	0.1	0.00	13.9
6.0	13.8	0.1	13.9	0.1	0.00	13.8
6.5	13.9	0.1	13.9	0.1	0.00	13.9
7.0	13.8	0.1	13.9	0.1	0.00	13.9
7.5	13.8	0.1	13.9	0.1	0.00	13.9
8.0	13.9	0.1	13.9	0.1	0.00	13.9
8.5	13.9	0.1	13.9	0.1	0.00	13.9
9.0	13.8	0.1	13.9	0.1	0.00	13.9
9.5	13.9	0.1	14.0	0.1	0.00	13.9
10.0	13.9	0.1	14.0	0.1	0.00	13.9
10.5	13.9	0.1	13.9	0.1	0.00	13.9
11.0	13.9	0.1	14.0	0.1	0.00	13.9
11.5	13.9	0.1	14.0	0.1	0.00	13.9
12.0	13.8	0.1	13.9	0.1	0.00	13.8
12.5	13.8	0.1	13.9	0.1	0.00	13.9
13.0	13.8	0.1	13.9	0.1	0.00	13.9
13.5	13.9	0.1	14.0	0.1	0.00	13.9
14.0	13.9	0.1	14.0	0.1	0.00	13.9
14.5	0.0	0.0	0.0	0.0	0.00	0.0
15.0	0.1	0.0	0.1	0.0	0.00	0.1
15.5	0.0	0.0	0.0	0.0	0.00	0.0
16.0	0.0	0.0	0.0	0.0	0.00	0.0
16.5	0.0	0.0	0.0	0.0	0.00	0.0
17.0	0.0	0.0	0.0	0.0	0.00	0.0
17.5	0.1	0.0	0.1	0.0	0.00	0.1
18.0	0.3	0.0	0.3	0.0	0.00	0.2
18.5	0.0	0.0	0.0	0.0	0.00	0.0
19.0	0.1	0.0	0.1	0.0	0.00	0.1
19.5	0.1	0.0	0.1	0.0	0.00	0.1
20.0	0.1	0.0	0.1	0.0	0.00	0.1
20.5	0.4	0.0	0.4	0.0	0.00	0.3
21.0	0.3	0.0	0.3	0.0	0.00	0.3
21.5	0.2	0.0	0.2	0.0	0.00	0.2
22.0	0.3	0.0	0.3	0.0	0.00	0.2
22.5	0.2	0.0	0.2	0.0	0.00	0.2

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
23.0	0.2	0.0	0.2	0.0	0.00	0.1
23.5	0.4	0.0	0.4	0.0	0.00	0.4
24.0	0.3	0.0	0.3	0.0	0.00	0.3
24.5	0.4	0.0	0.4	0.0	0.00	0.4
25.0	0.3	0.0	0.3	0.0	0.00	0.3
25.5	0.2	0.0	0.2	0.0	0.00	0.2
26.0	0.3	0.0	0.3	0.0	0.00	0.2
26.5	0.2	0.0	0.2	0.0	0.00	0.2
27.0	0.2	0.0	0.2	0.0	0.00	0.2
27.5	0.2	0.0	0.2	0.0	0.00	0.2
28.0	0.2	0.0	0.2	0.0	0.00	0.2
28.5	0.5	0.0	0.6	0.0	0.00	0.5
29.0	0.0	0.0	0.0	0.0	0.00	0.0
29.5	0.0	0.0	0.0	0.0	0.00	0.0
30.0	0.0	0.0	0.0	0.0	0.00	0.0
30.5	0.0	0.0	0.0	0.0	0.00	0.0
31.0	0.0	0.0	0.0	0.0	0.00	0.0
31.5	0.0	0.0	0.0	0.0	0.00	0.0
32.0	0.0	0.0	0.0	0.0	0.00	0.0
32.5	0.0	0.0	0.0	0.0	0.00	0.0
33.0	0.0	0.0	0.0	0.0	0.00	0.0
33.5	0.0	0.0	0.0	0.0	0.00	0.0
34.0	0.0	0.0	0.0	0.0	0.00	0.0
34.5	0.0	0.0	0.0	0.0	0.00	0.0
35.0	0.0	0.0	0.0	0.0	0.00	0.0
35.5	0.0	0.0	0.0	0.0	0.00	0.0
36.0	0.0	0.0	0.0	0.0	0.00	0.0
36.5	0.0	0.0	0.0	0.0	0.00	0.0
37.0	0.0	0.0	0.0	0.0	0.00	0.0
37.5	0.0	0.0	0.0	0.0	0.00	0.0
38.0	0.0	0.0	0.0	0.0	0.00	0.0
38.5	0.0	0.0	0.0	0.0	0.00	0.0
39.0	0.0	0.0	0.0	0.0	0.00	0.0
39.5	0.0	0.0	0.0	0.0	0.00	0.0
40.0	0.0	0.0	0.0	0.0	0.00	0.0
40.5	0.0	0.0	0.0	0.0	0.00	0.0
41.0	0.0	0.0	0.0	0.0	0.00	0.0
41.5	0.0	0.0	0.0	0.0	0.00	0.0
42.0	0.0	0.0	0.0	0.0	0.00	0.0
42.5	0.0	0.0	0.0	0.0	0.00	0.0
43.0	0.0	0.0	0.0	0.0	0.00	0.0
43.5	0.0	0.0	0.0	0.0	0.00	0.0
44.0	0.0	0.0	0.0	0.0	0.00	0.0
44.5	0.0	0.0	0.0	0.0	0.00	0.0
45.0	0.0	0.0	0.0	0.0	0.00	0.0
45.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
46.0	0.0	0.0	0.0	0.0	0.00	0.0
46.5	0.0	0.0	0.0	0.0	0.00	0.0
47.0	0.0	0.0	0.0	0.0	0.00	0.0
47.5	0.0	0.0	0.0	0.0	0.00	0.0
48.0	0.0	0.0	0.0	0.0	0.00	0.0
48.5	0.0	0.0	0.0	0.0	0.00	0.0
49.0	0.0	0.0	0.0	0.0	0.00	0.0
49.5	0.0	0.0	0.0	0.0	0.00	0.0
50.0	0.0	0.0	0.0	0.0	0.00	0.0
50.5	0.0	0.0	0.0	0.0	0.00	0.0
51.0	0.0	0.0	0.0	0.0	0.00	0.0
51.5	0.0	0.0	0.0	0.0	0.00	0.0
52.0	0.0	0.0	0.0	0.0	0.00	0.0
52.5	0.0	0.0	0.0	0.0	0.00	0.0
53.0	0.0	0.0	0.0	0.0	0.00	0.0
53.5	0.0	0.0	0.0	0.0	0.00	0.0
54.0	0.0	0.0	0.0	0.0	0.00	0.0
54.5	0.0	0.0	0.0	0.0	0.00	0.0
55.0	0.0	0.0	0.0	0.0	0.00	0.0
55.5	0.0	0.0	0.0	0.0	0.00	0.0
56.0	0.0	0.0	0.0	0.0	0.00	0.0
56.5	0.0	0.0	0.0	0.0	0.00	0.0
57.0	0.0	0.0	0.0	0.0	0.00	0.0
57.5	0.0	0.0	0.0	0.0	0.00	0.0
58.0	0.0	0.0	0.0	0.0	0.00	0.0
58.5	0.0	0.0	0.0	0.0	0.00	0.0
59.0	0.0	0.0	0.0	0.0	0.00	0.0
59.5	0.0	0.0	0.0	0.0	0.00	0.0
60.0	0.0	0.0	0.0	0.0	0.00	0.0
60.5	0.0	0.0	0.0	0.0	0.00	0.0
61.0	0.0	0.0	0.0	0.0	0.00	0.0
61.5	0.0	0.0	0.0	0.0	0.00	0.0
62.0	0.0	0.0	0.0	0.0	0.00	0.0
62.5	0.0	0.0	0.0	0.0	0.00	0.0
63.0	0.0	0.0	0.0	0.0	0.00	0.0
63.5	0.0	0.0	0.0	0.0	0.00	0.0
64.0	0.0	0.0	0.0	0.0	0.00	0.0
64.5	0.0	0.0	0.0	0.0	0.00	0.0
65.0	0.0	0.0	0.0	0.0	0.00	0.0
65.5	0.0	0.0	0.0	0.0	0.00	0.0
66.0	0.0	0.0	0.0	0.0	0.00	0.0
66.5	0.0	0.0	0.0	0.0	0.00	0.0
67.0	0.0	0.0	0.0	0.0	0.00	0.0
67.5	0.0	0.0	0.0	0.0	0.00	0.0
68.0	0.0	0.0	0.0	0.0	0.00	0.0
68.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
69.0	0.0	0.0	0.0	0.0	0.00	0.0
69.5	0.0	0.0	0.0	0.0	0.00	0.0
70.0	0.0	0.0	0.0	0.0	0.00	0.0
70.5	0.0	0.0	0.0	0.0	0.00	0.0
71.0	0.0	0.0	0.0	0.0	0.00	0.0
71.5	0.0	0.0	0.0	0.0	0.00	0.0
72.0	0.0	0.0	0.0	0.0	0.00	0.0
72.5	0.0	0.0	0.0	0.0	0.00	0.0
73.0	0.0	0.0	0.0	0.0	0.00	0.0
73.5	0.0	0.0	0.0	0.0	0.00	0.0
74.0	0.0	0.0	0.0	0.0	0.00	0.0
74.5	0.0	0.0	0.0	0.0	0.00	0.0
75.0	0.0	0.0	0.0	0.0	0.00	0.0
75.5	0.0	0.0	0.0	0.0	0.00	0.0
76.0	0.0	0.0	0.0	0.0	0.00	0.0
76.5	0.0	0.0	0.0	0.0	0.00	0.0
77.0	0.0	0.0	0.0	0.0	0.00	0.0
77.5	0.0	0.0	0.0	0.0	0.00	0.0
78.0	0.0	0.0	0.0	0.0	0.00	0.0
78.5	0.0	0.0	0.0	0.0	0.00	0.0
79.0	0.0	0.0	0.0	0.0	0.00	0.0
79.5	0.0	0.0	0.0	0.0	0.00	0.0
80.0	0.0	0.0	0.0	0.0	0.00	0.0
80.5	0.0	0.0	0.0	0.0	0.00	0.0
81.0	0.0	0.0	0.0	0.0	0.00	0.0
81.5	0.0	0.0	0.0	0.0	0.00	0.0
82.0	0.0	0.0	0.0	0.0	0.00	0.0
82.5	0.0	0.0	0.0	0.0	0.00	0.0
83.0	0.0	0.0	0.0	0.0	0.00	0.0
83.5	0.0	0.0	0.0	0.0	0.00	0.0
84.0	0.0	0.0	0.0	0.0	0.00	0.0
84.5	0.0	0.0	0.0	0.0	0.00	0.0
85.0	0.0	0.0	0.0	0.0	0.00	0.0
85.5	0.0	0.0	0.0	0.0	0.00	0.0
86.0	0.0	0.0	0.0	0.0	0.00	0.0
86.5	0.0	0.0	0.0	0.0	0.00	0.0
87.0	0.0	0.0	0.0	0.0	0.00	0.0
87.5	0.0	0.0	0.0	0.0	0.00	0.0
88.0	0.0	0.0	0.0	0.0	0.00	0.0
88.5	0.0	0.0	0.0	0.0	0.00	0.0
89.0	0.0	0.0	0.0	0.0	0.00	0.0
89.5	0.0	0.0	0.0	0.0	0.00	0.0
90.0	0.0	0.0	0.0	0.0	0.00	0.0
90.5	0.0	0.0	0.0	0.0	0.00	0.0
91.0	0.0	0.0	0.0	0.0	0.00	0.0
91.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
92.0	0.0	0.0	0.0	0.0	0.00	0.0
92.5	0.0	0.0	0.0	0.0	0.00	0.0
93.0	0.0	0.0	0.0	0.0	0.00	0.0
93.5	0.0	0.0	0.0	0.0	0.00	0.0
94.0	0.0	0.0	0.0	0.0	0.00	0.0
94.5	0.0	0.0	0.0	0.0	0.00	0.0
95.0	0.0	0.0	0.0	0.0	0.00	0.0
95.5	0.0	0.0	0.0	0.0	0.00	0.0
96.0	0.0	0.0	0.0	0.0	0.00	0.0
96.5	0.0	0.0	0.0	0.0	0.00	0.0
97.0	0.0	0.0	0.0	0.0	0.00	0.0
97.5	0.0	0.0	0.0	0.0	0.00	0.0
98.0	0.0	0.0	0.0	0.0	0.00	0.0
98.5	0.0	0.0	0.0	0.0	0.00	0.0
99.0	0.0	0.0	0.0	0.0	0.00	0.0
99.5	0.0	0.0	0.0	0.0	0.00	0.0
100.0	0.0	0.0	0.0	0.0	0.00	0.0
100.5	0.0	0.0	0.0	0.0	0.00	0.0
101.0	0.0	0.0	0.0	0.0	0.00	0.0
101.5	0.0	0.0	0.0	0.0	0.00	0.0
102.0	0.0	0.0	0.0	0.0	0.00	0.0
102.5	0.0	0.0	0.0	0.0	0.00	0.0
103.0	0.0	0.0	0.0	0.0	0.00	0.0
103.5	0.0	0.0	0.0	0.0	0.00	0.0
104.0	0.0	0.0	0.0	0.0	0.00	0.0
104.5	0.0	0.0	0.0	0.0	0.00	0.0
105.0	0.0	0.0	0.0	0.0	0.00	0.0
105.5	0.0	0.0	0.0	0.0	0.00	0.0
106.0	0.0	0.0	0.0	0.0	0.00	0.0
106.5	0.0	0.0	0.0	0.0	0.00	0.0
107.0	0.0	0.0	0.0	0.0	0.00	0.0
107.5	0.0	0.0	0.0	0.0	0.00	0.0
108.0	0.0	0.0	0.0	0.0	0.00	0.0
108.5	0.0	0.0	0.0	0.0	0.00	0.0
109.0	0.0	0.0	0.0	0.0	0.00	0.0
109.5	0.0	0.0	0.0	0.0	0.00	0.0
110.0	0.0	0.0	0.0	0.0	0.00	0.0
110.5	0.0	0.0	0.0	0.0	0.00	0.0
111.0	0.0	0.0	0.0	0.0	0.00	0.0
111.5	0.0	0.0	0.0	0.0	0.00	0.0
112.0	0.0	0.0	0.0	0.0	0.00	0.0
112.5	0.0	0.0	0.0	0.0	0.00	0.0
113.0	0.0	0.0	0.0	0.0	0.00	0.0
113.5	0.0	0.0	0.0	0.0	0.00	0.0
114.0	0.0	0.0	0.0	0.0	0.00	0.0
114.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
115.0	0.0	0.0	0.0	0.0	0.00	0.0
115.5	0.0	0.0	0.0	0.0	0.00	0.0
116.0	0.0	0.0	0.0	0.0	0.00	0.0
116.5	0.0	0.0	0.0	0.0	0.00	0.0
117.0	0.0	0.0	0.0	0.0	0.00	0.0
117.5	0.0	0.0	0.0	0.0	0.00	0.0
118.0	0.0	0.0	0.0	0.0	0.00	0.0
118.5	0.0	0.0	0.0	0.0	0.00	0.0
119.0	0.0	0.0	0.0	0.0	0.00	0.0
119.5	0.0	0.0	0.0	0.0	0.00	0.0
120.0	0.0	0.0	0.0	0.0	0.00	0.0
120.5	0.0	0.0	0.0	0.0	0.00	0.0
121.0	0.0	0.0	0.0	0.0	0.00	0.0
121.5	0.0	0.0	0.0	0.0	0.00	0.0
122.0	0.0	0.0	0.0	0.0	0.00	0.0
122.5	0.0	0.0	0.0	0.0	0.00	0.0
123.0	0.0	0.0	0.0	0.0	0.00	0.0
123.5	0.0	0.0	0.0	0.0	0.00	0.0
124.0	0.0	0.0	0.0	0.0	0.00	0.0
124.5	0.0	0.0	0.0	0.0	0.00	0.0
125.0	0.0	0.0	0.0	0.0	0.00	0.0
125.5	0.0	0.0	0.0	0.0	0.00	0.0
126.0	0.0	0.0	0.0	0.0	0.00	0.0
126.5	0.0	0.0	0.0	0.0	0.00	0.0
127.0	0.0	0.0	0.0	0.0	0.00	0.0
127.5	0.0	0.0	0.0	0.0	0.00	0.0
128.0	0.0	0.0	0.0	0.0	0.00	0.0
128.5	0.0	0.0	0.0	0.0	0.00	0.0
129.0	0.0	0.0	0.0	0.0	0.00	0.0
129.5	0.0	0.0	0.0	0.0	0.00	0.0
130.0	0.0	0.0	0.0	0.0	0.00	0.0
130.5	0.0	0.0	0.0	0.0	0.00	0.0
131.0	0.0	0.0	0.0	0.0	0.00	0.0
131.5	0.0	0.0	0.0	0.0	0.00	0.0
132.0	0.0	0.0	0.0	0.0	0.00	0.0
132.5	0.0	0.0	0.0	0.0	0.00	0.0
133.0	0.0	0.0	0.0	0.0	0.00	0.0
133.5	0.0	0.0	0.0	0.0	0.00	0.0
134.0	0.0	0.0	0.0	0.0	0.00	0.0
134.5	0.0	0.0	0.0	0.0	0.00	0.0
135.0	0.0	0.0	0.0	0.0	0.00	0.0
135.5	0.0	0.0	0.0	0.0	0.00	0.0
136.0	0.0	0.0	0.0	0.0	0.00	0.0
136.5	0.0	0.0	0.0	0.0	0.00	0.0
137.0	0.0	0.0	0.0	0.0	0.00	0.0
137.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
138.0	0.0	0.0	0.0	0.0	0.00	0.0
138.5	0.0	0.0	0.0	0.0	0.00	0.0
139.0	0.0	0.0	0.0	0.0	0.00	0.0
139.5	0.0	0.0	0.0	0.0	0.00	0.0
140.0	0.0	0.0	0.0	0.0	0.00	0.0
140.5	0.0	0.0	0.0	0.0	0.00	0.0
141.0	0.0	0.0	0.0	0.0	0.00	0.0
141.5	0.0	0.0	0.0	0.0	0.00	0.0
142.0	0.0	0.0	0.0	0.0	0.00	0.0
142.5	0.0	0.0	0.0	0.0	0.00	0.0
143.0	0.0	0.0	0.0	0.0	0.00	0.0
143.5	0.0	0.0	0.0	0.0	0.00	0.0
144.0	0.0	0.0	0.0	0.0	0.00	0.0
144.5	0.0	0.0	0.0	0.0	0.00	0.0
145.0	0.0	0.0	0.0	0.0	0.00	0.0
145.5	0.0	0.0	0.0	0.0	0.00	0.0
146.0	0.0	0.0	0.0	0.0	0.00	0.0
146.5	0.0	0.0	0.0	0.0	0.00	0.0
147.0	0.0	0.0	0.0	0.0	0.00	0.0
147.5	0.0	0.0	0.0	0.0	0.00	0.0
148.0	0.0	0.0	0.0	0.0	0.00	0.0
148.5	0.0	0.0	0.0	0.0	0.00	0.0
149.0	0.0	0.0	0.0	0.0	0.00	0.0
149.5	0.0	0.0	0.0	0.0	0.00	0.0
150.0	0.0	0.0	0.0	0.0	0.00	0.0
150.5	0.0	0.0	0.0	0.0	0.00	0.0
151.0	0.0	0.0	0.0	0.0	0.00	0.0
151.5	0.0	0.0	0.0	0.0	0.00	0.0
152.0	0.0	0.0	0.0	0.0	0.00	0.0
152.5	0.0	0.0	0.0	0.0	0.00	0.0
153.0	0.0	0.0	0.0	0.0	0.00	0.0
153.5	0.0	0.0	0.0	0.0	0.00	0.0
154.0	0.0	0.0	0.0	0.0	0.00	0.0
154.5	0.0	0.0	0.0	0.0	0.00	0.0
155.0	0.0	0.0	0.0	0.0	0.00	0.0
155.5	0.0	0.0	0.0	0.0	0.00	0.0
156.0	0.0	0.0	0.0	0.0	0.00	0.0
156.5	0.0	0.0	0.0	0.0	0.00	0.0
157.0	0.0	0.0	0.0	0.0	0.00	0.0
157.5	0.0	0.0	0.0	0.0	0.00	0.0
158.0	0.0	0.0	0.0	0.0	0.00	0.0
158.5	0.0	0.0	0.0	0.0	0.00	0.0
159.0	0.0	0.0	0.0	0.0	0.00	0.0
159.5	0.0	0.0	0.0	0.0	0.00	0.0
160.0	0.0	0.0	0.0	0.0	0.00	0.0
160.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
161.0	0.0	0.0	0.0	0.0	0.00	0.0
161.5	0.0	0.0	0.0	0.0	0.00	0.0
162.0	0.0	0.0	0.0	0.0	0.00	0.0
162.5	0.0	0.0	0.0	0.0	0.00	0.0
163.0	0.0	0.0	0.0	0.0	0.00	0.0
163.5	0.0	0.0	0.0	0.0	0.00	0.0
164.0	0.0	0.0	0.0	0.0	0.00	0.0
164.5	0.0	0.0	0.0	0.0	0.00	0.0
165.0	0.0	0.0	0.0	0.0	0.00	0.0
165.5	0.0	0.0	0.0	0.0	0.00	0.0
166.0	0.0	0.0	0.0	0.0	0.00	0.0
166.5	0.0	0.0	0.0	0.0	0.00	0.0
167.0	0.0	0.0	0.0	0.0	0.00	0.0
167.5	0.0	0.0	0.0	0.0	0.00	0.0
168.0	0.0	0.0	0.0	0.0	0.00	0.0
168.5	0.0	0.0	0.0	0.0	0.00	0.0
169.0	0.0	0.0	0.0	0.0	0.00	0.0
169.5	0.0	0.0	0.0	0.0	0.00	0.0
170.0	0.0	0.0	0.0	0.0	0.00	0.0
170.5	0.0	0.0	0.0	0.0	0.00	0.0
171.0	0.0	0.0	0.0	0.0	0.00	0.0
171.5	0.0	0.0	0.0	0.0	0.00	0.0
172.0	0.4	0.0	0.3	0.0	0.00	0.3
172.5	13.8	0.1	13.9	0.1	0.00	13.8
173.0	7.4	0.1	7.5	0.1	0.00	7.5
173.5	7.4	0.1	7.5	0.1	0.00	7.4
174.0	7.4	0.1	7.5	0.1	0.00	7.5
174.5	7.4	0.1	7.5	0.1	0.00	7.5
175.0	7.4	0.1	7.5	0.1	0.00	7.4
175.5	7.4	0.1	7.5	0.1	0.00	7.5
176.0	7.4	0.1	7.5	0.1	0.00	7.4
176.5	7.4	0.1	7.5	0.1	0.00	7.4
177.0	7.4	0.1	7.5	0.1	0.00	7.4
177.5	7.4	0.1	7.5	0.1	0.00	7.4
178.0	7.4	0.1	7.5	0.1	0.00	7.4
178.5	7.4	0.1	7.5	0.1	0.00	7.4
179.0	0.0	0.0	0.0	0.0	0.00	0.0
179.5	0.0	0.0	0.0	0.0	0.00	0.0
180.0	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
0.0	0.1	107.8	14.0	0.1	14.0	0.1
0.5	0.1	107.8	14.0	0.1	14.0	0.1
1.0	0.1	107.9	14.0	0.1	14.0	0.1
1.5	0.1	107.9	14.0	0.1	14.0	0.1
2.0	0.1	107.8	14.0	0.1	14.0	0.1
2.5	0.1	107.9	14.0	0.1	14.0	0.1
3.0	0.1	107.9	14.0	0.1	14.0	0.1
3.5	0.1	107.6	13.9	0.1	13.9	0.1
4.0	0.1	107.6	13.9	0.1	13.9	0.1
4.5	0.1	107.6	13.9	0.1	13.9	0.1
5.0	0.1	107.6	13.9	0.1	13.9	0.1
5.5	0.1	107.5	13.9	0.1	13.9	0.1
6.0	0.1	107.4	13.9	0.1	13.9	0.1
6.5	0.1	107.5	13.9	0.1	13.9	0.1
7.0	0.1	107.5	13.9	0.1	13.9	0.1
7.5	0.1	107.5	13.9	0.1	13.9	0.1
8.0	0.1	107.5	13.9	0.1	13.9	0.1
8.5	0.1	107.5	13.9	0.1	13.9	0.1
9.0	0.1	107.5	13.9	0.1	13.9	0.1
9.5	0.1	107.7	14.0	0.1	14.0	0.1
10.0	0.1	107.8	14.0	0.1	14.0	0.1
10.5	0.1	107.7	13.9	0.1	13.9	0.1
11.0	0.1	107.8	14.0	0.1	14.0	0.1
11.5	0.1	107.8	14.0	0.1	14.0	0.1
12.0	0.1	107.4	13.9	0.1	13.9	0.1
12.5	0.1	107.3	13.9	0.1	13.9	0.1
13.0	0.1	107.5	13.9	0.1	13.9	0.1
13.5	0.1	107.7	13.9	0.1	13.9	0.1
14.0	0.1	107.7	13.9	0.1	13.9	0.1
14.5	0.0	121.9	0.0	0.0	0.0	0.0
15.0	0.0	121.1	0.1	0.0	0.1	0.0
15.5	0.0	121.5	0.0	0.0	0.0	0.0
16.0	0.0	121.6	0.0	0.0	0.0	0.0
16.5	0.0	121.6	0.0	0.0	0.0	0.0
17.0	0.0	121.4	0.0	0.0	0.0	0.0
17.5	0.0	121.4	0.1	0.0	0.1	0.0
18.0	0.0	120.9	0.3	0.0	0.3	0.0
18.5	0.0	121.4	0.0	0.0	0.0	0.0
19.0	0.0	121.4	0.1	0.0	0.1	0.0
19.5	0.0	121.1	0.1	0.0	0.1	0.0
20.0	0.0	121.2	0.1	0.0	0.1	0.0
20.5	0.0	121.0	0.3	0.0	0.3	0.0
21.0	0.0	120.9	0.3	0.0	0.3	0.0
21.5	0.0	121.0	0.2	0.0	0.2	0.0
22.0	0.0	121.1	0.2	0.0	0.2	0.0
22.5	0.0	120.9	0.2	0.0	0.2	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
23.0	0.0	121.2	0.1	0.0	0.1	0.0
23.5	0.0	120.8	0.4	0.0	0.4	0.0
24.0	0.0	120.8	0.4	0.0	0.4	0.0
24.5	0.0	120.8	0.4	0.0	0.4	0.0
25.0	0.0	121.0	0.3	0.0	0.3	0.0
25.5	0.0	121.1	0.2	0.0	0.2	0.0
26.0	0.0	120.9	0.3	0.0	0.3	0.0
26.5	0.0	121.0	0.2	0.0	0.2	0.0
27.0	0.0	121.0	0.2	0.0	0.2	0.0
27.5	0.0	121.0	0.2	0.0	0.2	0.0
28.0	0.0	121.1	0.2	0.0	0.2	0.0
28.5	0.0	120.7	0.5	0.0	0.5	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0
29.5	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0
30.5	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0
31.5	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0
32.5	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0
33.5	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0
34.5	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0
35.5	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0
36.5	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0
37.5	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0
38.5	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0
39.5	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0
40.5	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0
41.5	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0
42.5	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0
43.5	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0
44.5	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0
45.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
46.0	0.0	0.0	0.0	0.0	0.0	0.0
46.5	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0
47.5	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0
48.5	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0
49.5	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0
50.5	0.0	0.0	0.0	0.0	0.0	0.0
51.0	0.0	0.0	0.0	0.0	0.0	0.0
51.5	0.0	0.0	0.0	0.0	0.0	0.0
52.0	0.0	0.0	0.0	0.0	0.0	0.0
52.5	0.0	0.0	0.0	0.0	0.0	0.0
53.0	0.0	0.0	0.0	0.0	0.0	0.0
53.5	0.0	0.0	0.0	0.0	0.0	0.0
54.0	0.0	0.0	0.0	0.0	0.0	0.0
54.5	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0
55.5	0.0	0.0	0.0	0.0	0.0	0.0
56.0	0.0	0.0	0.0	0.0	0.0	0.0
56.5	0.0	0.0	0.0	0.0	0.0	0.0
57.0	0.0	0.0	0.0	0.0	0.0	0.0
57.5	0.0	0.0	0.0	0.0	0.0	0.0
58.0	0.0	0.0	0.0	0.0	0.0	0.0
58.5	0.0	0.0	0.0	0.0	0.0	0.0
59.0	0.0	0.0	0.0	0.0	0.0	0.0
59.5	0.0	0.0	0.0	0.0	0.0	0.0
60.0	0.0	0.0	0.0	0.0	0.0	0.0
60.5	0.0	0.0	0.0	0.0	0.0	0.0
61.0	0.0	0.0	0.0	0.0	0.0	0.0
61.5	0.0	0.0	0.0	0.0	0.0	0.0
62.0	0.0	0.0	0.0	0.0	0.0	0.0
62.5	0.0	0.0	0.0	0.0	0.0	0.0
63.0	0.0	0.0	0.0	0.0	0.0	0.0
63.5	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0
64.5	0.0	0.0	0.0	0.0	0.0	0.0
65.0	0.0	0.0	0.0	0.0	0.0	0.0
65.5	0.0	0.0	0.0	0.0	0.0	0.0
66.0	0.0	0.0	0.0	0.0	0.0	0.0
66.5	0.0	0.0	0.0	0.0	0.0	0.0
67.0	0.0	0.0	0.0	0.0	0.0	0.0
67.5	0.0	0.0	0.0	0.0	0.0	0.0
68.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
69.0	0.0	0.0	0.0	0.0	0.0	0.0
69.5	0.0	0.0	0.0	0.0	0.0	0.0
70.0	0.0	0.0	0.0	0.0	0.0	0.0
70.5	0.0	0.0	0.0	0.0	0.0	0.0
71.0	0.0	0.0	0.0	0.0	0.0	0.0
71.5	0.0	0.0	0.0	0.0	0.0	0.0
72.0	0.0	0.0	0.0	0.0	0.0	0.0
72.5	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0
73.5	0.0	0.0	0.0	0.0	0.0	0.0
74.0	0.0	0.0	0.0	0.0	0.0	0.0
74.5	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0
75.5	0.0	0.0	0.0	0.0	0.0	0.0
76.0	0.0	0.0	0.0	0.0	0.0	0.0
76.5	0.0	0.0	0.0	0.0	0.0	0.0
77.0	0.0	0.0	0.0	0.0	0.0	0.0
77.5	0.0	0.0	0.0	0.0	0.0	0.0
78.0	0.0	0.0	0.0	0.0	0.0	0.0
78.5	0.0	0.0	0.0	0.0	0.0	0.0
79.0	0.0	0.0	0.0	0.0	0.0	0.0
79.5	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0
80.5	0.0	0.0	0.0	0.0	0.0	0.0
81.0	0.0	0.0	0.0	0.0	0.0	0.0
81.5	0.0	0.0	0.0	0.0	0.0	0.0
82.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5	0.0	0.0	0.0	0.0	0.0	0.0
83.0	0.0	0.0	0.0	0.0	0.0	0.0
83.5	0.0	0.0	0.0	0.0	0.0	0.0
84.0	0.0	0.0	0.0	0.0	0.0	0.0
84.5	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0
85.5	0.0	0.0	0.0	0.0	0.0	0.0
86.0	0.0	0.0	0.0	0.0	0.0	0.0
86.5	0.0	0.0	0.0	0.0	0.0	0.0
87.0	0.0	0.0	0.0	0.0	0.0	0.0
87.5	0.0	121.9	0.0	0.0	0.0	0.0
88.0	0.0	122.0	0.0	0.0	0.0	0.0
88.5	0.0	122.0	0.0	0.0	0.0	0.0
89.0	0.0	121.6	0.0	0.0	0.0	0.0
89.5	0.0	121.9	0.0	0.0	0.0	0.0
90.0	0.0	121.9	0.0	0.0	0.0	0.0
90.5	0.0	121.9	0.0	0.0	0.0	0.0
91.0	0.0	121.8	0.0	0.0	0.0	0.0
91.5	0.0	121.7	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
92.0	0.0	121.9	0.0	0.0	0.0	0.0
92.5	0.0	121.9	0.0	0.0	0.0	0.0
93.0	0.0	121.8	0.0	0.0	0.0	0.0
93.5	0.0	121.9	0.0	0.0	0.0	0.0
94.0	0.0	122.0	0.0	0.0	0.0	0.0
94.5	0.0	121.6	0.0	0.0	0.0	0.0
95.0	0.0	122.0	0.0	0.0	0.0	0.0
95.5	0.0	122.0	0.0	0.0	0.0	0.0
96.0	0.0	0.1	0.0	0.0	0.0	0.0
96.5	0.0	0.0	0.0	0.0	0.0	0.0
97.0	0.0	0.0	0.0	0.0	0.0	0.0
97.5	0.0	0.0	0.0	0.0	0.0	0.0
98.0	0.0	0.0	0.0	0.0	0.0	0.0
98.5	0.0	0.0	0.0	0.0	0.0	0.0
99.0	0.0	0.0	0.0	0.0	0.0	0.0
99.5	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0
100.5	0.0	0.0	0.0	0.0	0.0	0.0
101.0	0.0	0.0	0.0	0.0	0.0	0.0
101.5	0.0	0.0	0.0	0.0	0.0	0.0
102.0	0.0	0.0	0.0	0.0	0.0	0.0
102.5	0.0	0.0	0.0	0.0	0.0	0.0
103.0	0.0	0.0	0.0	0.0	0.0	0.0
103.5	0.0	0.0	0.0	0.0	0.0	0.0
104.0	0.0	0.0	0.0	0.0	0.0	0.0
104.5	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0
105.5	0.0	0.0	0.0	0.0	0.0	0.0
106.0	0.0	0.0	0.0	0.0	0.0	0.0
106.5	0.0	0.0	0.0	0.0	0.0	0.0
107.0	0.0	0.0	0.0	0.0	0.0	0.0
107.5	0.0	0.0	0.0	0.0	0.0	0.0
108.0	0.0	0.0	0.0	0.0	0.0	0.0
108.5	0.0	0.0	0.0	0.0	0.0	0.0
109.0	0.0	0.0	0.0	0.0	0.0	0.0
109.5	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0
110.5	0.0	0.0	0.0	0.0	0.0	0.0
111.0	0.0	0.0	0.0	0.0	0.0	0.0
111.5	0.0	0.0	0.0	0.0	0.0	0.0
112.0	0.0	0.0	0.0	0.0	0.0	0.0
112.5	0.0	0.0	0.0	0.0	0.0	0.0
113.0	0.0	0.0	0.0	0.0	0.0	0.0
113.5	0.0	0.0	0.0	0.0	0.0	0.0
114.0	0.0	0.0	0.0	0.0	0.0	0.0
114.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
115.0	0.0	0.0	0.0	0.0	0.0	0.0
115.5	0.0	0.0	0.0	0.0	0.0	0.0
116.0	0.0	0.0	0.0	0.0	0.0	0.0
116.5	0.0	0.0	0.0	0.0	0.0	0.0
117.0	0.0	0.0	0.0	0.0	0.0	0.0
117.5	0.0	0.0	0.0	0.0	0.0	0.0
118.0	0.0	0.0	0.0	0.0	0.0	0.0
118.5	0.0	0.0	0.0	0.0	0.0	0.0
119.0	0.0	0.0	0.0	0.0	0.0	0.0
119.5	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0
120.5	0.0	0.0	0.0	0.0	0.0	0.0
121.0	0.0	0.0	0.0	0.0	0.0	0.0
121.5	0.0	0.0	0.0	0.0	0.0	0.0
122.0	0.0	0.0	0.0	0.0	0.0	0.0
122.5	0.0	0.0	0.0	0.0	0.0	0.0
123.0	0.0	0.0	0.0	0.0	0.0	0.0
123.5	0.0	0.0	0.0	0.0	0.0	0.0
124.0	0.0	0.0	0.0	0.0	0.0	0.0
124.5	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0
125.5	0.0	0.0	0.0	0.0	0.0	0.0
126.0	0.0	0.0	0.0	0.0	0.0	0.0
126.5	0.0	0.0	0.0	0.0	0.0	0.0
127.0	0.0	0.0	0.0	0.0	0.0	0.0
127.5	0.0	0.0	0.0	0.0	0.0	0.0
128.0	0.0	0.0	0.0	0.0	0.0	0.0
128.5	0.0	0.0	0.0	0.0	0.0	0.0
129.0	0.0	0.0	0.0	0.0	0.0	0.0
129.5	0.0	0.0	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0
130.5	0.0	0.0	0.0	0.0	0.0	0.0
131.0	0.0	0.0	0.0	0.0	0.0	0.0
131.5	0.0	0.0	0.0	0.0	0.0	0.0
132.0	0.0	0.0	0.0	0.0	0.0	0.0
132.5	0.0	0.0	0.0	0.0	0.0	0.0
133.0	0.0	0.0	0.0	0.0	0.0	0.0
133.5	0.0	0.0	0.0	0.0	0.0	0.0
134.0	0.0	0.0	0.0	0.0	0.0	0.0
134.5	0.0	0.0	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0
135.5	0.0	0.0	0.0	0.0	0.0	0.0
136.0	0.0	0.0	0.0	0.0	0.0	0.0
136.5	0.0	0.0	0.0	0.0	0.0	0.0
137.0	0.0	0.0	0.0	0.0	0.0	0.0
137.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
138.0	0.0	121.9	0.0	0.0	0.0	0.0
138.5	0.0	121.9	0.0	0.0	0.0	0.0
139.0	0.0	121.8	0.0	0.0	0.0	0.0
139.5	0.0	121.9	0.0	0.0	0.0	0.0
140.0	0.0	121.9	0.0	0.0	0.0	0.0
140.5	0.0	121.9	0.0	0.0	0.0	0.0
141.0	0.0	121.8	0.0	0.0	0.0	0.0
141.5	0.0	121.8	0.0	0.0	0.0	0.0
142.0	0.0	121.8	0.0	0.0	0.0	0.0
142.5	0.0	121.8	0.0	0.0	0.0	0.0
143.0	0.0	121.8	0.0	0.0	0.0	0.0
143.5	0.0	0.0	0.0	0.0	0.0	0.0
144.0	0.0	0.0	0.0	0.0	0.0	0.0
144.5	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0
145.5	0.0	0.0	0.0	0.0	0.0	0.0
146.0	0.0	0.0	0.0	0.0	0.0	0.0
146.5	0.0	0.0	0.0	0.0	0.0	0.0
147.0	0.0	0.0	0.0	0.0	0.0	0.0
147.5	0.0	0.0	0.0	0.0	0.0	0.0
148.0	0.0	0.0	0.0	0.0	0.0	0.0
148.5	0.0	0.0	0.0	0.0	0.0	0.0
149.0	0.0	0.0	0.0	0.0	0.0	0.0
149.5	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0
150.5	0.0	0.0	0.0	0.0	0.0	0.0
151.0	0.0	0.0	0.0	0.0	0.0	0.0
151.5	0.0	0.0	0.0	0.0	0.0	0.0
152.0	0.0	0.0	0.0	0.0	0.0	0.0
152.5	0.0	0.0	0.0	0.0	0.0	0.0
153.0	0.0	0.0	0.0	0.0	0.0	0.0
153.5	0.0	0.0	0.0	0.0	0.0	0.0
154.0	0.0	0.0	0.0	0.0	0.0	0.0
154.5	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0
155.5	0.0	0.0	0.0	0.0	0.0	0.0
156.0	0.0	0.0	0.0	0.0	0.0	0.0
156.5	0.0	0.0	0.0	0.0	0.0	0.0
157.0	0.0	0.0	0.0	0.0	0.0	0.0
157.5	0.0	0.0	0.0	0.0	0.0	0.0
158.0	0.0	0.0	0.0	0.0	0.0	0.0
158.5	0.0	0.0	0.0	0.0	0.0	0.0
159.0	0.0	0.0	0.0	0.0	0.0	0.0
159.5	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0
160.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
161.0	0.0	0.0	0.0	0.0	0.0	0.0
161.5	0.0	0.0	0.0	0.0	0.0	0.0
162.0	0.0	0.0	0.0	0.0	0.0	0.0
162.5	0.0	0.0	0.0	0.0	0.0	0.0
163.0	0.0	0.0	0.0	0.0	0.0	0.0
163.5	0.0	0.0	0.0	0.0	0.0	0.0
164.0	0.0	0.0	0.0	0.0	0.0	0.0
164.5	0.0	0.0	0.0	0.0	0.0	0.0
165.0	0.0	0.0	0.0	0.0	0.0	0.0
165.5	0.0	0.0	0.0	0.0	0.0	0.0
166.0	0.0	0.0	0.0	0.0	0.0	0.0
166.5	0.0	0.0	0.0	0.0	0.0	0.0
167.0	0.0	0.0	0.0	0.0	0.0	0.0
167.5	0.0	0.0	0.0	0.0	0.0	0.0
168.0	0.0	0.0	0.0	0.0	0.0	0.0
168.5	0.0	0.0	0.0	0.0	0.0	0.0
169.0	0.0	0.0	0.0	0.0	0.0	0.0
169.5	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0
170.5	0.0	0.0	0.0	0.0	0.0	0.0
171.0	0.0	0.0	0.0	0.0	0.0	0.0
171.5	0.0	0.0	0.0	0.0	0.0	0.0
172.0	0.0	121.4	0.2	0.0	0.2	0.0
172.5	0.1	107.5	13.9	0.1	13.9	0.1
173.0	0.1	7.5	7.5	0.1	7.5	0.1
173.5	0.1	7.5	7.5	0.1	7.5	0.1
174.0	0.1	7.5	7.5	0.1	7.5	0.1
174.5	0.1	7.5	7.5	0.1	7.5	0.1
175.0	0.1	7.5	7.5	0.1	7.5	0.1
175.5	0.1	7.5	7.5	0.1	7.5	0.1
176.0	0.1	7.5	7.5	0.1	7.5	0.1
176.5	0.1	7.5	7.5	0.1	7.5	0.1
177.0	0.1	7.5	7.5	0.1	7.5	0.1
177.5	0.1	7.5	7.5	0.1	7.5	0.1
178.0	0.1	7.5	7.5	0.1	7.5	0.1
178.5	0.1	7.5	7.5	0.1	7.5	0.1
179.0	0.0	0.0	0.0	0.0	0.0	0.0
179.5	0.0	0.0	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
0.0	13.9	0.1	14.0	0.1	0.00	14.0
0.5	13.9	0.1	14.0	0.1	0.00	14.0
1.0	13.9	0.1	14.0	0.1	0.00	14.0
1.5	14.0	0.1	14.0	0.1	0.00	14.0
2.0	13.9	0.1	14.0	0.1	0.00	14.0
2.5	14.0	0.1	14.0	0.1	0.00	14.0
3.0	13.9	0.1	14.0	0.1	0.00	14.0
3.5	13.9	0.1	14.0	0.1	0.00	14.0
4.0	13.9	0.1	14.0	0.1	0.00	14.0
4.5	13.9	0.1	14.0	0.1	0.00	14.0
5.0	13.9	0.1	13.9	0.1	0.00	14.0
5.5	13.9	0.1	13.9	0.1	0.00	13.9
6.0	13.9	0.1	13.9	0.1	0.00	13.9
6.5	13.9	0.1	13.9	0.1	0.00	13.9
7.0	13.9	0.1	13.9	0.1	0.00	13.9
7.5	13.9	0.1	13.9	0.1	0.00	13.9
8.0	13.9	0.1	13.9	0.1	0.00	13.9
8.5	13.9	0.1	13.9	0.1	0.00	13.9
9.0	13.9	0.1	13.9	0.1	0.00	13.9
9.5	13.9	0.1	14.0	0.1	0.00	14.0
10.0	13.9	0.1	14.0	0.1	0.00	14.0
10.5	13.9	0.1	14.0	0.1	0.00	14.0
11.0	13.9	0.1	14.0	0.1	0.00	14.0
11.5	13.9	0.1	14.0	0.1	0.00	14.0
12.0	13.9	0.1	13.9	0.1	0.00	13.9
12.5	13.9	0.1	13.9	0.1	0.00	13.9
13.0	13.9	0.1	14.0	0.1	0.00	14.0
13.5	13.9	0.1	14.0	0.1	0.00	14.0
14.0	13.9	0.1	14.0	0.1	0.00	14.0
14.5	0.0	0.0	0.0	0.0	0.00	0.0
15.0	0.1	0.0	0.1	0.0	0.00	0.1
15.5	0.0	0.0	0.0	0.0	0.00	0.0
16.0	0.0	0.0	0.0	0.0	0.00	0.0
16.5	0.0	0.0	0.0	0.0	0.00	0.0
17.0	0.0	0.0	0.0	0.0	0.00	0.0
17.5	0.1	0.0	0.1	0.0	0.00	0.1
18.0	0.2	0.0	0.2	0.0	0.00	0.2
18.5	0.0	0.0	0.0	0.0	0.00	0.0
19.0	0.1	0.0	0.1	0.0	0.00	0.1
19.5	0.1	0.0	0.1	0.0	0.00	0.1
20.0	0.1	0.0	0.1	0.0	0.00	0.1
20.5	0.3	0.0	0.3	0.0	0.00	0.3
21.0	0.3	0.0	0.3	0.0	0.00	0.3
21.5	0.2	0.0	0.2	0.0	0.00	0.2
22.0	0.2	0.0	0.2	0.0	0.00	0.2
22.5	0.3	0.0	0.3	0.0	0.00	0.3

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
23.0	0.1	0.0	0.1	0.0	0.00	0.1
23.5	0.4	0.0	0.4	0.0	0.00	0.4
24.0	0.4	0.0	0.4	0.0	0.00	0.4
24.5	0.4	0.0	0.4	0.0	0.00	0.4
25.0	0.3	0.0	0.3	0.0	0.00	0.3
25.5	0.2	0.0	0.2	0.0	0.00	0.2
26.0	0.3	0.0	0.3	0.0	0.00	0.2
26.5	0.2	0.0	0.2	0.0	0.00	0.2
27.0	0.2	0.0	0.2	0.0	0.00	0.2
27.5	0.2	0.0	0.2	0.0	0.00	0.2
28.0	0.2	0.0	0.2	0.0	0.00	0.2
28.5	0.5	0.0	0.5	0.0	0.00	0.5
29.0	0.0	0.0	0.0	0.0	0.00	0.0
29.5	0.0	0.0	0.0	0.0	0.00	0.0
30.0	0.0	0.0	0.0	0.0	0.00	0.0
30.5	0.0	0.0	0.0	0.0	0.00	0.0
31.0	0.0	0.0	0.0	0.0	0.00	0.0
31.5	0.0	0.0	0.0	0.0	0.00	0.0
32.0	0.0	0.0	0.0	0.0	0.00	0.0
32.5	0.0	0.0	0.0	0.0	0.00	0.0
33.0	0.0	0.0	0.0	0.0	0.00	0.0
33.5	0.0	0.0	0.0	0.0	0.00	0.0
34.0	0.0	0.0	0.0	0.0	0.00	0.0
34.5	0.0	0.0	0.0	0.0	0.00	0.0
35.0	0.0	0.0	0.0	0.0	0.00	0.0
35.5	0.0	0.0	0.0	0.0	0.00	0.0
36.0	0.0	0.0	0.0	0.0	0.00	0.0
36.5	0.0	0.0	0.0	0.0	0.00	0.0
37.0	0.0	0.0	0.0	0.0	0.00	0.0
37.5	0.0	0.0	0.0	0.0	0.00	0.0
38.0	0.0	0.0	0.0	0.0	0.00	0.0
38.5	0.0	0.0	0.0	0.0	0.00	0.0
39.0	0.0	0.0	0.0	0.0	0.00	0.0
39.5	0.0	0.0	0.0	0.0	0.00	0.0
40.0	0.0	0.0	0.0	0.0	0.00	0.0
40.5	0.0	0.0	0.0	0.0	0.00	0.0
41.0	0.0	0.0	0.0	0.0	0.00	0.0
41.5	0.0	0.0	0.0	0.0	0.00	0.0
42.0	0.0	0.0	0.0	0.0	0.00	0.0
42.5	0.0	0.0	0.0	0.0	0.00	0.0
43.0	0.0	0.0	0.0	0.0	0.00	0.0
43.5	0.0	0.0	0.0	0.0	0.00	0.0
44.0	0.0	0.0	0.0	0.0	0.00	0.0
44.5	0.0	0.0	0.0	0.0	0.00	0.0
45.0	0.0	0.0	0.0	0.0	0.00	0.0
45.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
46.0	0.0	0.0	0.0	0.0	0.00	0.0
46.5	0.0	0.0	0.0	0.0	0.00	0.0
47.0	0.0	0.0	0.0	0.0	0.00	0.0
47.5	0.0	0.0	0.0	0.0	0.00	0.0
48.0	0.0	0.0	0.0	0.0	0.00	0.0
48.5	0.0	0.0	0.0	0.0	0.00	0.0
49.0	0.0	0.0	0.0	0.0	0.00	0.0
49.5	0.0	0.0	0.0	0.0	0.00	0.0
50.0	0.0	0.0	0.0	0.0	0.00	0.0
50.5	0.0	0.0	0.0	0.0	0.00	0.0
51.0	0.0	0.0	0.0	0.0	0.00	0.0
51.5	0.0	0.0	0.0	0.0	0.00	0.0
52.0	0.0	0.0	0.0	0.0	0.00	0.0
52.5	0.0	0.0	0.0	0.0	0.00	0.0
53.0	0.0	0.0	0.0	0.0	0.00	0.0
53.5	0.0	0.0	0.0	0.0	0.00	0.0
54.0	0.0	0.0	0.0	0.0	0.00	0.0
54.5	0.0	0.0	0.0	0.0	0.00	0.0
55.0	0.0	0.0	0.0	0.0	0.00	0.0
55.5	0.0	0.0	0.0	0.0	0.00	0.0
56.0	0.0	0.0	0.0	0.0	0.00	0.0
56.5	0.0	0.0	0.0	0.0	0.00	0.0
57.0	0.0	0.0	0.0	0.0	0.00	0.0
57.5	0.0	0.0	0.0	0.0	0.00	0.0
58.0	0.0	0.0	0.0	0.0	0.00	0.0
58.5	0.0	0.0	0.0	0.0	0.00	0.0
59.0	0.0	0.0	0.0	0.0	0.00	0.0
59.5	0.0	0.0	0.0	0.0	0.00	0.0
60.0	0.0	0.0	0.0	0.0	0.00	0.0
60.5	0.0	0.0	0.0	0.0	0.00	0.0
61.0	0.0	0.0	0.0	0.0	0.00	0.0
61.5	0.0	0.0	0.0	0.0	0.00	0.0
62.0	0.0	0.0	0.0	0.0	0.00	0.0
62.5	0.0	0.0	0.0	0.0	0.00	0.0
63.0	0.0	0.0	0.0	0.0	0.00	0.0
63.5	0.0	0.0	0.0	0.0	0.00	0.0
64.0	0.0	0.0	0.0	0.0	0.00	0.0
64.5	0.0	0.0	0.0	0.0	0.00	0.0
65.0	0.0	0.0	0.0	0.0	0.00	0.0
65.5	0.0	0.0	0.0	0.0	0.00	0.0
66.0	0.0	0.0	0.0	0.0	0.00	0.0
66.5	0.0	0.0	0.0	0.0	0.00	0.0
67.0	0.0	0.0	0.0	0.0	0.00	0.0
67.5	0.0	0.0	0.0	0.0	0.00	0.0
68.0	0.0	0.0	0.0	0.0	0.00	0.0
68.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
69.0	0.0	0.0	0.0	0.0	0.00	0.0
69.5	0.0	0.0	0.0	0.0	0.00	0.0
70.0	0.0	0.0	0.0	0.0	0.00	0.0
70.5	0.0	0.0	0.0	0.0	0.00	0.0
71.0	0.0	0.0	0.0	0.0	0.00	0.0
71.5	0.0	0.0	0.0	0.0	0.00	0.0
72.0	0.0	0.0	0.0	0.0	0.00	0.0
72.5	0.0	0.0	0.0	0.0	0.00	0.0
73.0	0.0	0.0	0.0	0.0	0.00	0.0
73.5	0.0	0.0	0.0	0.0	0.00	0.0
74.0	0.0	0.0	0.0	0.0	0.00	0.0
74.5	0.0	0.0	0.0	0.0	0.00	0.0
75.0	0.0	0.0	0.0	0.0	0.00	0.0
75.5	0.0	0.0	0.0	0.0	0.00	0.0
76.0	0.0	0.0	0.0	0.0	0.00	0.0
76.5	0.0	0.0	0.0	0.0	0.00	0.0
77.0	0.0	0.0	0.0	0.0	0.00	0.0
77.5	0.0	0.0	0.0	0.0	0.00	0.0
78.0	0.0	0.0	0.0	0.0	0.00	0.0
78.5	0.0	0.0	0.0	0.0	0.00	0.0
79.0	0.0	0.0	0.0	0.0	0.00	0.0
79.5	0.0	0.0	0.0	0.0	0.00	0.0
80.0	0.0	0.0	0.0	0.0	0.00	0.0
80.5	0.0	0.0	0.0	0.0	0.00	0.0
81.0	0.0	0.0	0.0	0.0	0.00	0.0
81.5	0.0	0.0	0.0	0.0	0.00	0.0
82.0	0.0	0.0	0.0	0.0	0.00	0.0
82.5	0.0	0.0	0.0	0.0	0.00	0.0
83.0	0.0	0.0	0.0	0.0	0.00	0.0
83.5	0.0	0.0	0.0	0.0	0.00	0.0
84.0	0.0	0.0	0.0	0.0	0.00	0.0
84.5	0.0	0.0	0.0	0.0	0.00	0.0
85.0	0.0	0.0	0.0	0.0	0.00	0.0
85.5	0.0	0.0	0.0	0.0	0.00	0.0
86.0	0.0	0.0	0.0	0.0	0.00	0.0
86.5	0.0	0.0	0.0	0.0	0.00	0.0
87.0	0.0	0.0	0.0	0.0	0.00	0.0
87.5	0.0	0.0	0.0	0.0	0.00	0.0
88.0	0.0	0.0	0.0	0.0	0.00	0.0
88.5	0.0	0.0	0.0	0.0	0.00	0.0
89.0	0.0	0.0	0.0	0.0	0.00	0.0
89.5	0.0	0.0	0.0	0.0	0.00	0.0
90.0	0.0	0.0	0.0	0.0	0.00	0.0
90.5	0.0	0.0	0.0	0.0	0.00	0.0
91.0	0.0	0.0	0.0	0.0	0.00	0.0
91.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
92.0	0.0	0.0	0.0	0.0	0.00	0.0
92.5	0.0	0.0	0.0	0.0	0.00	0.0
93.0	0.0	0.0	0.0	0.0	0.00	0.0
93.5	0.0	0.0	0.0	0.0	0.00	0.0
94.0	0.0	0.0	0.0	0.0	0.00	0.0
94.5	0.0	0.0	0.0	0.0	0.00	0.0
95.0	0.0	0.0	0.0	0.0	0.00	0.0
95.5	0.0	0.0	0.0	0.0	0.00	0.0
96.0	0.0	0.0	0.0	0.0	0.00	0.0
96.5	0.0	0.0	0.0	0.0	0.00	0.0
97.0	0.0	0.0	0.0	0.0	0.00	0.0
97.5	0.0	0.0	0.0	0.0	0.00	0.0
98.0	0.0	0.0	0.0	0.0	0.00	0.0
98.5	0.0	0.0	0.0	0.0	0.00	0.0
99.0	0.0	0.0	0.0	0.0	0.00	0.0
99.5	0.0	0.0	0.0	0.0	0.00	0.0
100.0	0.0	0.0	0.0	0.0	0.00	0.0
100.5	0.0	0.0	0.0	0.0	0.00	0.0
101.0	0.0	0.0	0.0	0.0	0.00	0.0
101.5	0.0	0.0	0.0	0.0	0.00	0.0
102.0	0.0	0.0	0.0	0.0	0.00	0.0
102.5	0.0	0.0	0.0	0.0	0.00	0.0
103.0	0.0	0.0	0.0	0.0	0.00	0.0
103.5	0.0	0.0	0.0	0.0	0.00	0.0
104.0	0.0	0.0	0.0	0.0	0.00	0.0
104.5	0.0	0.0	0.0	0.0	0.00	0.0
105.0	0.0	0.0	0.0	0.0	0.00	0.0
105.5	0.0	0.0	0.0	0.0	0.00	0.0
106.0	0.0	0.0	0.0	0.0	0.00	0.0
106.5	0.0	0.0	0.0	0.0	0.00	0.0
107.0	0.0	0.0	0.0	0.0	0.00	0.0
107.5	0.0	0.0	0.0	0.0	0.00	0.0
108.0	0.0	0.0	0.0	0.0	0.00	0.0
108.5	0.0	0.0	0.0	0.0	0.00	0.0
109.0	0.0	0.0	0.0	0.0	0.00	0.0
109.5	0.0	0.0	0.0	0.0	0.00	0.0
110.0	0.0	0.0	0.0	0.0	0.00	0.0
110.5	0.0	0.0	0.0	0.0	0.00	0.0
111.0	0.0	0.0	0.0	0.0	0.00	0.0
111.5	0.0	0.0	0.0	0.0	0.00	0.0
112.0	0.0	0.0	0.0	0.0	0.00	0.0
112.5	0.0	0.0	0.0	0.0	0.00	0.0
113.0	0.0	0.0	0.0	0.0	0.00	0.0
113.5	0.0	0.0	0.0	0.0	0.00	0.0
114.0	0.0	0.0	0.0	0.0	0.00	0.0
114.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
115.0	0.0	0.0	0.0	0.0	0.00	0.0
115.5	0.0	0.0	0.0	0.0	0.00	0.0
116.0	0.0	0.0	0.0	0.0	0.00	0.0
116.5	0.0	0.0	0.0	0.0	0.00	0.0
117.0	0.0	0.0	0.0	0.0	0.00	0.0
117.5	0.0	0.0	0.0	0.0	0.00	0.0
118.0	0.0	0.0	0.0	0.0	0.00	0.0
118.5	0.0	0.0	0.0	0.0	0.00	0.0
119.0	0.0	0.0	0.0	0.0	0.00	0.0
119.5	0.0	0.0	0.0	0.0	0.00	0.0
120.0	0.0	0.0	0.0	0.0	0.00	0.0
120.5	0.0	0.0	0.0	0.0	0.00	0.0
121.0	0.0	0.0	0.0	0.0	0.00	0.0
121.5	0.0	0.0	0.0	0.0	0.00	0.0
122.0	0.0	0.0	0.0	0.0	0.00	0.0
122.5	0.0	0.0	0.0	0.0	0.00	0.0
123.0	0.0	0.0	0.0	0.0	0.00	0.0
123.5	0.0	0.0	0.0	0.0	0.00	0.0
124.0	0.0	0.0	0.0	0.0	0.00	0.0
124.5	0.0	0.0	0.0	0.0	0.00	0.0
125.0	0.0	0.0	0.0	0.0	0.00	0.0
125.5	0.0	0.0	0.0	0.0	0.00	0.0
126.0	0.0	0.0	0.0	0.0	0.00	0.0
126.5	0.0	0.0	0.0	0.0	0.00	0.0
127.0	0.0	0.0	0.0	0.0	0.00	0.0
127.5	0.0	0.0	0.0	0.0	0.00	0.0
128.0	0.0	0.0	0.0	0.0	0.00	0.0
128.5	0.0	0.0	0.0	0.0	0.00	0.0
129.0	0.0	0.0	0.0	0.0	0.00	0.0
129.5	0.0	0.0	0.0	0.0	0.00	0.0
130.0	0.0	0.0	0.0	0.0	0.00	0.0
130.5	0.0	0.0	0.0	0.0	0.00	0.0
131.0	0.0	0.0	0.0	0.0	0.00	0.0
131.5	0.0	0.0	0.0	0.0	0.00	0.0
132.0	0.0	0.0	0.0	0.0	0.00	0.0
132.5	0.0	0.0	0.0	0.0	0.00	0.0
133.0	0.0	0.0	0.0	0.0	0.00	0.0
133.5	0.0	0.0	0.0	0.0	0.00	0.0
134.0	0.0	0.0	0.0	0.0	0.00	0.0
134.5	0.0	0.0	0.0	0.0	0.00	0.0
135.0	0.0	0.0	0.0	0.0	0.00	0.0
135.5	0.0	0.0	0.0	0.0	0.00	0.0
136.0	0.0	0.0	0.0	0.0	0.00	0.0
136.5	0.0	0.0	0.0	0.0	0.00	0.0
137.0	0.0	0.0	0.0	0.0	0.00	0.0
137.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
138.0	0.0	0.0	0.0	0.0	0.00	0.0
138.5	0.0	0.0	0.0	0.0	0.00	0.0
139.0	0.0	0.0	0.0	0.0	0.00	0.0
139.5	0.0	0.0	0.0	0.0	0.00	0.0
140.0	0.0	0.0	0.0	0.0	0.00	0.0
140.5	0.0	0.0	0.0	0.0	0.00	0.0
141.0	0.0	0.0	0.0	0.0	0.00	0.0
141.5	0.0	0.0	0.0	0.0	0.00	0.0
142.0	0.0	0.0	0.0	0.0	0.00	0.0
142.5	0.0	0.0	0.0	0.0	0.00	0.0
143.0	0.0	0.0	0.0	0.0	0.00	0.0
143.5	0.0	0.0	0.0	0.0	0.00	0.0
144.0	0.0	0.0	0.0	0.0	0.00	0.0
144.5	0.0	0.0	0.0	0.0	0.00	0.0
145.0	0.0	0.0	0.0	0.0	0.00	0.0
145.5	0.0	0.0	0.0	0.0	0.00	0.0
146.0	0.0	0.0	0.0	0.0	0.00	0.0
146.5	0.0	0.0	0.0	0.0	0.00	0.0
147.0	0.0	0.0	0.0	0.0	0.00	0.0
147.5	0.0	0.0	0.0	0.0	0.00	0.0
148.0	0.0	0.0	0.0	0.0	0.00	0.0
148.5	0.0	0.0	0.0	0.0	0.00	0.0
149.0	0.0	0.0	0.0	0.0	0.00	0.0
149.5	0.0	0.0	0.0	0.0	0.00	0.0
150.0	0.0	0.0	0.0	0.0	0.00	0.0
150.5	0.0	0.0	0.0	0.0	0.00	0.0
151.0	0.0	0.0	0.0	0.0	0.00	0.0
151.5	0.0	0.0	0.0	0.0	0.00	0.0
152.0	0.0	0.0	0.0	0.0	0.00	0.0
152.5	0.0	0.0	0.0	0.0	0.00	0.0
153.0	0.0	0.0	0.0	0.0	0.00	0.0
153.5	0.0	0.0	0.0	0.0	0.00	0.0
154.0	0.0	0.0	0.0	0.0	0.00	0.0
154.5	0.0	0.0	0.0	0.0	0.00	0.0
155.0	0.0	0.0	0.0	0.0	0.00	0.0
155.5	0.0	0.0	0.0	0.0	0.00	0.0
156.0	0.0	0.0	0.0	0.0	0.00	0.0
156.5	0.0	0.0	0.0	0.0	0.00	0.0
157.0	0.0	0.0	0.0	0.0	0.00	0.0
157.5	0.0	0.0	0.0	0.0	0.00	0.0
158.0	0.0	0.0	0.0	0.0	0.00	0.0
158.5	0.0	0.0	0.0	0.0	0.00	0.0
159.0	0.0	0.0	0.0	0.0	0.00	0.0
159.5	0.0	0.0	0.0	0.0	0.00	0.0
160.0	0.0	0.0	0.0	0.0	0.00	0.0
160.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
161.0	0.0	0.0	0.0	0.0	0.00	0.0
161.5	0.0	0.0	0.0	0.0	0.00	0.0
162.0	0.0	0.0	0.0	0.0	0.00	0.0
162.5	0.0	0.0	0.0	0.0	0.00	0.0
163.0	0.0	0.0	0.0	0.0	0.00	0.0
163.5	0.0	0.0	0.0	0.0	0.00	0.0
164.0	0.0	0.0	0.0	0.0	0.00	0.0
164.5	0.0	0.0	0.0	0.0	0.00	0.0
165.0	0.0	0.0	0.0	0.0	0.00	0.0
165.5	0.0	0.0	0.0	0.0	0.00	0.0
166.0	0.0	0.0	0.0	0.0	0.00	0.0
166.5	0.0	0.0	0.0	0.0	0.00	0.0
167.0	0.0	0.0	0.0	0.0	0.00	0.0
167.5	0.0	0.0	0.0	0.0	0.00	0.0
168.0	0.0	0.0	0.0	0.0	0.00	0.0
168.5	0.0	0.0	0.0	0.0	0.00	0.0
169.0	0.0	0.0	0.0	0.0	0.00	0.0
169.5	0.0	0.0	0.0	0.0	0.00	0.0
170.0	0.0	0.0	0.0	0.0	0.00	0.0
170.5	0.0	0.0	0.0	0.0	0.00	0.0
171.0	0.0	0.0	0.0	0.0	0.00	0.0
171.5	0.0	0.0	0.0	0.0	0.00	0.0
172.0	0.2	0.0	0.2	0.0	0.00	0.2
172.5	13.8	0.1	13.9	0.1	0.00	13.9
173.0	7.5	0.1	7.5	0.1	0.00	7.5
173.5	7.5	0.1	7.5	0.1	0.00	7.5
174.0	7.5	0.1	7.5	0.1	0.00	7.5
174.5	7.5	0.1	7.5	0.1	0.00	7.5
175.0	7.5	0.1	7.5	0.1	0.00	7.5
175.5	7.5	0.1	7.5	0.1	0.00	7.5
176.0	7.5	0.1	7.5	0.1	0.00	7.5
176.5	7.5	0.1	7.5	0.1	0.00	7.5
177.0	7.5	0.1	7.5	0.1	0.00	7.5
177.5	7.5	0.1	7.5	0.1	0.00	7.5
178.0	7.5	0.1	7.5	0.1	0.00	7.5
178.5	7.5	0.1	7.5	0.1	0.00	7.5
179.0	0.0	0.0	0.0	0.0	0.00	0.0
179.5	0.0	0.0	0.0	0.0	0.00	0.0
180.0	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
0.0	0.1	107.7	13.9	0.1	13.9	0.1
0.5	0.1	107.7	13.9	0.1	13.9	0.1
1.0	0.1	107.8	13.9	0.1	13.9	0.1
1.5	0.1	107.8	13.9	0.1	13.9	0.1
2.0	0.1	107.8	13.9	0.1	13.9	0.1
2.5	0.1	107.8	13.9	0.1	13.9	0.1
3.0	0.1	107.7	13.9	0.1	13.9	0.1
3.5	0.1	107.6	13.9	0.1	13.9	0.1
4.0	0.1	107.5	13.9	0.1	13.9	0.1
4.5	0.1	107.5	13.9	0.1	13.9	0.1
5.0	0.1	107.5	13.9	0.1	13.9	0.1
5.5	0.1	107.4	13.9	0.1	13.9	0.1
6.0	0.1	107.3	13.8	0.1	13.9	0.1
6.5	0.1	107.4	13.8	0.1	13.9	0.1
7.0	0.1	107.4	13.9	0.1	13.9	0.1
7.5	0.1	107.4	13.9	0.1	13.9	0.1
8.0	0.1	107.4	13.9	0.1	13.9	0.1
8.5	0.1	107.4	13.9	0.1	13.9	0.1
9.0	0.1	107.4	13.9	0.1	13.9	0.1
9.5	0.1	107.7	13.9	0.1	13.9	0.1
10.0	0.1	107.7	13.9	0.1	13.9	0.1
10.5	0.1	107.6	13.9	0.1	13.9	0.1
11.0	0.1	107.7	13.9	0.1	13.9	0.1
11.5	0.1	107.7	13.9	0.1	13.9	0.1
12.0	0.1	107.3	13.8	0.1	13.9	0.1
12.5	0.1	107.2	13.8	0.1	13.9	0.1
13.0	0.1	107.5	13.9	0.1	13.9	0.1
13.5	0.1	107.6	13.9	0.1	13.9	0.1
14.0	0.1	107.6	13.9	0.1	13.9	0.1
14.5	0.0	121.8	0.0	0.0	0.0	0.0
15.0	0.0	121.0	0.1	0.0	0.1	0.0
15.5	0.0	121.4	0.0	0.0	0.0	0.0
16.0	0.0	121.5	0.0	0.0	0.0	0.0
16.5	0.0	121.5	0.0	0.0	0.0	0.0
17.0	0.0	121.2	0.0	0.0	0.0	0.0
17.5	0.0	120.9	0.1	0.0	0.1	0.0
18.0	0.0	120.9	0.2	0.0	0.2	0.0
18.5	0.0	121.3	0.0	0.0	0.0	0.0
19.0	0.0	121.3	0.1	0.0	0.1	0.0
19.5	0.0	121.1	0.1	0.0	0.1	0.0
20.0	0.0	121.1	0.1	0.0	0.1	0.0
20.5	0.0	120.6	0.3	0.0	0.3	0.0
21.0	0.0	121.0	0.2	0.0	0.2	0.0
21.5	0.0	120.8	0.2	0.0	0.2	0.0
22.0	0.0	120.8	0.2	0.0	0.2	0.0
22.5	0.0	120.7	0.3	0.0	0.3	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
23.0	0.0	120.9	0.1	0.0	0.1	0.0
23.5	0.0	120.8	0.4	0.0	0.4	0.0
24.0	0.0	120.7	0.4	0.0	0.4	0.0
24.5	0.0	120.7	0.4	0.0	0.4	0.0
25.0	0.0	121.0	0.2	0.0	0.3	0.0
25.5	0.0	120.9	0.2	0.0	0.2	0.0
26.0	0.0	120.8	0.2	0.0	0.3	0.0
26.5	0.0	120.9	0.2	0.0	0.2	0.0
27.0	0.0	120.9	0.2	0.0	0.2	0.0
27.5	0.0	120.9	0.2	0.0	0.2	0.0
28.0	0.0	121.0	0.2	0.0	0.2	0.0
28.5	0.0	120.7	0.4	0.0	0.5	0.0
29.0	0.0	0.0	0.0	0.0	0.0	0.0
29.5	0.0	0.0	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0	0.0	0.0
30.5	0.0	0.0	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0	0.0	0.0
31.5	0.0	0.0	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0	0.0	0.0
32.5	0.0	0.0	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0	0.0	0.0
33.5	0.0	0.0	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0	0.0	0.0
34.5	0.0	0.0	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0	0.0	0.0
35.5	0.0	0.0	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0	0.0	0.0
36.5	0.0	0.0	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0	0.0	0.0
37.5	0.0	0.0	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0	0.0	0.0
38.5	0.0	0.0	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0	0.0	0.0
39.5	0.0	0.0	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0	0.0	0.0
40.5	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0
41.5	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0
42.5	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0
43.5	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0
44.5	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0
45.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
46.0	0.0	0.0	0.0	0.0	0.0	0.0
46.5	0.0	0.0	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0	0.0	0.0
47.5	0.0	0.0	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0	0.0	0.0
48.5	0.0	0.0	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0	0.0	0.0
49.5	0.0	0.0	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0	0.0	0.0
50.5	0.0	0.0	0.0	0.0	0.0	0.0
51.0	0.0	0.0	0.0	0.0	0.0	0.0
51.5	0.0	0.0	0.0	0.0	0.0	0.0
52.0	0.0	0.0	0.0	0.0	0.0	0.0
52.5	0.0	0.0	0.0	0.0	0.0	0.0
53.0	0.0	0.0	0.0	0.0	0.0	0.0
53.5	0.0	0.0	0.0	0.0	0.0	0.0
54.0	0.0	0.0	0.0	0.0	0.0	0.0
54.5	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0
55.5	0.0	0.0	0.0	0.0	0.0	0.0
56.0	0.0	0.0	0.0	0.0	0.0	0.0
56.5	0.0	0.0	0.0	0.0	0.0	0.0
57.0	0.0	0.0	0.0	0.0	0.0	0.0
57.5	0.0	0.0	0.0	0.0	0.0	0.0
58.0	0.0	0.0	0.0	0.0	0.0	0.0
58.5	0.0	0.0	0.0	0.0	0.0	0.0
59.0	0.0	0.0	0.0	0.0	0.0	0.0
59.5	0.0	0.0	0.0	0.0	0.0	0.0
60.0	0.0	0.0	0.0	0.0	0.0	0.0
60.5	0.0	0.0	0.0	0.0	0.0	0.0
61.0	0.0	0.0	0.0	0.0	0.0	0.0
61.5	0.0	0.0	0.0	0.0	0.0	0.0
62.0	0.0	0.0	0.0	0.0	0.0	0.0
62.5	0.0	0.0	0.0	0.0	0.0	0.0
63.0	0.0	0.0	0.0	0.0	0.0	0.0
63.5	0.0	0.0	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0	0.0	0.0
64.5	0.0	0.0	0.0	0.0	0.0	0.0
65.0	0.0	0.0	0.0	0.0	0.0	0.0
65.5	0.0	0.0	0.0	0.0	0.0	0.0
66.0	0.0	0.0	0.0	0.0	0.0	0.0
66.5	0.0	0.0	0.0	0.0	0.0	0.0
67.0	0.0	0.0	0.0	0.0	0.0	0.0
67.5	0.0	0.0	0.0	0.0	0.0	0.0
68.0	0.0	0.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
69.0	0.0	0.0	0.0	0.0	0.0	0.0
69.5	0.0	0.0	0.0	0.0	0.0	0.0
70.0	0.0	0.0	0.0	0.0	0.0	0.0
70.5	0.0	0.0	0.0	0.0	0.0	0.0
71.0	0.0	0.0	0.0	0.0	0.0	0.0
71.5	0.0	0.0	0.0	0.0	0.0	0.0
72.0	0.0	0.0	0.0	0.0	0.0	0.0
72.5	0.0	0.0	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0	0.0	0.0
73.5	0.0	0.0	0.0	0.0	0.0	0.0
74.0	0.0	0.0	0.0	0.0	0.0	0.0
74.5	0.0	0.0	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0	0.0	0.0
75.5	0.0	0.0	0.0	0.0	0.0	0.0
76.0	0.0	0.0	0.0	0.0	0.0	0.0
76.5	0.0	0.0	0.0	0.0	0.0	0.0
77.0	0.0	0.0	0.0	0.0	0.0	0.0
77.5	0.0	0.0	0.0	0.0	0.0	0.0
78.0	0.0	0.0	0.0	0.0	0.0	0.0
78.5	0.0	0.0	0.0	0.0	0.0	0.0
79.0	0.0	0.0	0.0	0.0	0.0	0.0
79.5	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0
80.5	0.0	0.0	0.0	0.0	0.0	0.0
81.0	0.0	0.0	0.0	0.0	0.0	0.0
81.5	0.0	0.0	0.0	0.0	0.0	0.0
82.0	0.0	0.0	0.0	0.0	0.0	0.0
82.5	0.0	0.0	0.0	0.0	0.0	0.0
83.0	0.0	0.0	0.0	0.0	0.0	0.0
83.5	0.0	0.0	0.0	0.0	0.0	0.0
84.0	0.0	0.0	0.0	0.0	0.0	0.0
84.5	0.0	0.0	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0	0.0	0.0
85.5	0.0	0.0	0.0	0.0	0.0	0.0
86.0	0.0	0.0	0.0	0.0	0.0	0.0
86.5	0.0	0.0	0.0	0.0	0.0	0.0
87.0	0.0	0.0	0.0	0.0	0.0	0.0
87.5	0.0	121.8	0.0	0.0	0.0	0.0
88.0	0.0	121.8	0.0	0.0	0.0	0.0
88.5	0.0	121.8	0.0	0.0	0.0	0.0
89.0	0.0	121.5	0.0	0.0	0.0	0.0
89.5	0.0	121.8	0.0	0.0	0.0	0.0
90.0	0.0	121.8	0.0	0.0	0.0	0.0
90.5	0.0	121.8	0.0	0.0	0.0	0.0
91.0	0.0	121.7	0.0	0.0	0.0	0.0
91.5	0.0	121.6	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
92.0	0.0	121.8	0.0	0.0	0.0	0.0
92.5	0.0	121.8	0.0	0.0	0.0	0.0
93.0	0.0	121.8	0.0	0.0	0.0	0.0
93.5	0.0	121.8	0.0	0.0	0.0	0.0
94.0	0.0	121.9	0.0	0.0	0.0	0.0
94.5	0.0	121.6	0.0	0.0	0.0	0.0
95.0	0.0	121.9	0.0	0.0	0.0	0.0
95.5	0.0	121.8	0.0	0.0	0.0	0.0
96.0	0.0	0.1	0.0	0.0	0.0	0.0
96.5	0.0	0.0	0.0	0.0	0.0	0.0
97.0	0.0	0.0	0.0	0.0	0.0	0.0
97.5	0.0	0.0	0.0	0.0	0.0	0.0
98.0	0.0	0.0	0.0	0.0	0.0	0.0
98.5	0.0	0.0	0.0	0.0	0.0	0.0
99.0	0.0	0.0	0.0	0.0	0.0	0.0
99.5	0.0	0.0	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0	0.0	0.0
100.5	0.0	0.0	0.0	0.0	0.0	0.0
101.0	0.0	0.0	0.0	0.0	0.0	0.0
101.5	0.0	0.0	0.0	0.0	0.0	0.0
102.0	0.0	0.0	0.0	0.0	0.0	0.0
102.5	0.0	0.0	0.0	0.0	0.0	0.0
103.0	0.0	0.0	0.0	0.0	0.0	0.0
103.5	0.0	0.0	0.0	0.0	0.0	0.0
104.0	0.0	0.0	0.0	0.0	0.0	0.0
104.5	0.0	0.0	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0	0.0	0.0
105.5	0.0	0.0	0.0	0.0	0.0	0.0
106.0	0.0	0.0	0.0	0.0	0.0	0.0
106.5	0.0	0.0	0.0	0.0	0.0	0.0
107.0	0.0	0.0	0.0	0.0	0.0	0.0
107.5	0.0	0.0	0.0	0.0	0.0	0.0
108.0	0.0	0.0	0.0	0.0	0.0	0.0
108.5	0.0	0.0	0.0	0.0	0.0	0.0
109.0	0.0	0.0	0.0	0.0	0.0	0.0
109.5	0.0	0.0	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0	0.0	0.0
110.5	0.0	0.0	0.0	0.0	0.0	0.0
111.0	0.0	0.0	0.0	0.0	0.0	0.0
111.5	0.0	0.0	0.0	0.0	0.0	0.0
112.0	0.0	0.0	0.0	0.0	0.0	0.0
112.5	0.0	0.0	0.0	0.0	0.0	0.0
113.0	0.0	0.0	0.0	0.0	0.0	0.0
113.5	0.0	0.0	0.0	0.0	0.0	0.0
114.0	0.0	0.0	0.0	0.0	0.0	0.0
114.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
115.0	0.0	0.0	0.0	0.0	0.0	0.0
115.5	0.0	0.0	0.0	0.0	0.0	0.0
116.0	0.0	0.0	0.0	0.0	0.0	0.0
116.5	0.0	0.0	0.0	0.0	0.0	0.0
117.0	0.0	0.0	0.0	0.0	0.0	0.0
117.5	0.0	0.0	0.0	0.0	0.0	0.0
118.0	0.0	0.0	0.0	0.0	0.0	0.0
118.5	0.0	0.0	0.0	0.0	0.0	0.0
119.0	0.0	0.0	0.0	0.0	0.0	0.0
119.5	0.0	0.0	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0	0.0	0.0
120.5	0.0	0.0	0.0	0.0	0.0	0.0
121.0	0.0	0.0	0.0	0.0	0.0	0.0
121.5	0.0	0.0	0.0	0.0	0.0	0.0
122.0	0.0	0.0	0.0	0.0	0.0	0.0
122.5	0.0	0.0	0.0	0.0	0.0	0.0
123.0	0.0	0.0	0.0	0.0	0.0	0.0
123.5	0.0	0.0	0.0	0.0	0.0	0.0
124.0	0.0	0.0	0.0	0.0	0.0	0.0
124.5	0.0	0.0	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0	0.0	0.0
125.5	0.0	0.0	0.0	0.0	0.0	0.0
126.0	0.0	0.0	0.0	0.0	0.0	0.0
126.5	0.0	0.0	0.0	0.0	0.0	0.0
127.0	0.0	0.0	0.0	0.0	0.0	0.0
127.5	0.0	0.0	0.0	0.0	0.0	0.0
128.0	0.0	0.0	0.0	0.0	0.0	0.0
128.5	0.0	0.0	0.0	0.0	0.0	0.0
129.0	0.0	0.0	0.0	0.0	0.0	0.0
129.5	0.0	0.0	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0	0.0	0.0
130.5	0.0	0.0	0.0	0.0	0.0	0.0
131.0	0.0	0.0	0.0	0.0	0.0	0.0
131.5	0.0	0.0	0.0	0.0	0.0	0.0
132.0	0.0	0.0	0.0	0.0	0.0	0.0
132.5	0.0	0.0	0.0	0.0	0.0	0.0
133.0	0.0	0.0	0.0	0.0	0.0	0.0
133.5	0.0	0.0	0.0	0.0	0.0	0.0
134.0	0.0	0.0	0.0	0.0	0.0	0.0
134.5	0.0	0.0	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0	0.0	0.0
135.5	0.0	0.0	0.0	0.0	0.0	0.0
136.0	0.0	0.0	0.0	0.0	0.0	0.0
136.5	0.0	0.0	0.0	0.0	0.0	0.0
137.0	0.0	0.0	0.0	0.0	0.0	0.0
137.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
138.0	0.0	121.8	0.0	0.0	0.0	0.0
138.5	0.0	121.7	0.0	0.0	0.0	0.0
139.0	0.0	121.7	0.0	0.0	0.0	0.0
139.5	0.0	121.8	0.0	0.0	0.0	0.0
140.0	0.0	121.8	0.0	0.0	0.0	0.0
140.5	0.0	121.7	0.0	0.0	0.0	0.0
141.0	0.0	121.7	0.0	0.0	0.0	0.0
141.5	0.0	121.7	0.0	0.0	0.0	0.0
142.0	0.0	121.7	0.0	0.0	0.0	0.0
142.5	0.0	121.7	0.0	0.0	0.0	0.0
143.0	0.0	121.7	0.0	0.0	0.0	0.0
143.5	0.0	0.1	0.0	0.0	0.0	0.0
144.0	0.0	0.0	0.0	0.0	0.0	0.0
144.5	0.0	0.0	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0	0.0	0.0
145.5	0.0	0.0	0.0	0.0	0.0	0.0
146.0	0.0	0.0	0.0	0.0	0.0	0.0
146.5	0.0	0.0	0.0	0.0	0.0	0.0
147.0	0.0	0.0	0.0	0.0	0.0	0.0
147.5	0.0	0.0	0.0	0.0	0.0	0.0
148.0	0.0	0.0	0.0	0.0	0.0	0.0
148.5	0.0	0.0	0.0	0.0	0.0	0.0
149.0	0.0	0.0	0.0	0.0	0.0	0.0
149.5	0.0	0.0	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0	0.0	0.0
150.5	0.0	0.0	0.0	0.0	0.0	0.0
151.0	0.0	0.0	0.0	0.0	0.0	0.0
151.5	0.0	0.0	0.0	0.0	0.0	0.0
152.0	0.0	0.0	0.0	0.0	0.0	0.0
152.5	0.0	0.0	0.0	0.0	0.0	0.0
153.0	0.0	0.0	0.0	0.0	0.0	0.0
153.5	0.0	0.0	0.0	0.0	0.0	0.0
154.0	0.0	0.0	0.0	0.0	0.0	0.0
154.5	0.0	0.0	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0	0.0	0.0
155.5	0.0	0.0	0.0	0.0	0.0	0.0
156.0	0.0	0.0	0.0	0.0	0.0	0.0
156.5	0.0	0.0	0.0	0.0	0.0	0.0
157.0	0.0	0.0	0.0	0.0	0.0	0.0
157.5	0.0	0.0	0.0	0.0	0.0	0.0
158.0	0.0	0.0	0.0	0.0	0.0	0.0
158.5	0.0	0.0	0.0	0.0	0.0	0.0
159.0	0.0	0.0	0.0	0.0	0.0	0.0
159.5	0.0	0.0	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0	0.0	0.0
160.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
161.0	0.0	0.0	0.0	0.0	0.0	0.0
161.5	0.0	0.0	0.0	0.0	0.0	0.0
162.0	0.0	0.0	0.0	0.0	0.0	0.0
162.5	0.0	0.0	0.0	0.0	0.0	0.0
163.0	0.0	0.0	0.0	0.0	0.0	0.0
163.5	0.0	0.0	0.0	0.0	0.0	0.0
164.0	0.0	0.0	0.0	0.0	0.0	0.0
164.5	0.0	0.0	0.0	0.0	0.0	0.0
165.0	0.0	0.0	0.0	0.0	0.0	0.0
165.5	0.0	0.0	0.0	0.0	0.0	0.0
166.0	0.0	0.0	0.0	0.0	0.0	0.0
166.5	0.0	0.0	0.0	0.0	0.0	0.0
167.0	0.0	0.0	0.0	0.0	0.0	0.0
167.5	0.0	0.0	0.0	0.0	0.0	0.0
168.0	0.0	0.0	0.0	0.0	0.0	0.0
168.5	0.0	0.0	0.0	0.0	0.0	0.0
169.0	0.0	0.0	0.0	0.0	0.0	0.0
169.5	0.0	0.0	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0	0.0	0.0
170.5	0.0	0.0	0.0	0.0	0.0	0.0
171.0	0.0	0.0	0.0	0.0	0.0	0.0
171.5	0.0	0.0	0.0	0.0	0.0	0.0
172.0	0.0	121.0	0.1	0.0	0.1	0.0
172.5	0.1	107.4	13.8	0.1	13.8	0.1
173.0	0.1	113.8	7.4	0.1	7.5	0.1
173.5	0.1	113.7	7.4	0.1	7.5	0.1
174.0	0.1	113.8	7.4	0.1	7.5	0.1
174.5	0.1	113.8	7.4	0.1	7.5	0.1
175.0	0.1	113.7	7.4	0.1	7.5	0.1
175.5	0.1	113.8	7.4	0.1	7.5	0.1
176.0	0.1	113.7	7.4	0.1	7.5	0.1
176.5	0.1	113.7	7.4	0.1	7.4	0.1
177.0	0.1	113.7	7.4	0.1	7.4	0.1
177.5	0.1	113.6	7.4	0.1	7.4	0.1
178.0	0.1	113.6	7.4	0.1	7.4	0.1
178.5	0.1	113.7	7.4	0.1	7.4	0.1
179.0	0.0	121.4	0.0	0.0	0.0	0.0
179.5	0.0	121.4	0.0	0.0	0.0	0.0
180.0	0.0	121.4	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
0.0	13.9	0.1	13.9	0.1
0.5	13.9	0.1	13.9	0.1
1.0	13.9	0.1	13.9	0.1
1.5	13.9	0.1	13.9	0.1
2.0	13.9	0.1	13.9	0.1
2.5	13.9	0.1	13.9	0.1
3.0	13.9	0.1	13.9	0.1
3.5	13.8	0.1	13.9	0.1
4.0	13.8	0.1	13.9	0.1
4.5	13.9	0.1	13.9	0.1
5.0	13.8	0.1	13.9	0.1
5.5	13.8	0.1	13.8	0.1
6.0	13.8	0.1	13.8	0.1
6.5	13.8	0.1	13.8	0.1
7.0	13.8	0.1	13.8	0.1
7.5	13.8	0.1	13.8	0.1
8.0	13.8	0.1	13.8	0.1
8.5	13.8	0.1	13.8	0.1
9.0	13.8	0.1	13.8	0.1
9.5	13.9	0.1	13.9	0.1
10.0	13.9	0.1	13.9	0.1
10.5	13.9	0.1	13.9	0.1
11.0	13.9	0.1	13.9	0.1
11.5	13.9	0.1	13.9	0.1
12.0	13.8	0.1	13.8	0.1
12.5	13.8	0.1	13.8	0.1
13.0	13.8	0.1	13.9	0.1
13.5	13.9	0.1	13.9	0.1
14.0	13.9	0.1	13.9	0.1
14.5	0.0	0.0	0.0	0.0
15.0	0.1	0.0	0.1	0.0
15.5	0.0	0.0	0.0	0.0
16.0	0.0	0.0	0.0	0.0
16.5	0.0	0.0	0.0	0.0
17.0	0.0	0.0	0.0	0.0
17.5	0.0	0.0	0.1	0.0
18.0	0.2	0.0	0.2	0.0
18.5	0.0	0.0	0.0	0.0
19.0	0.1	0.0	0.1	0.0
19.5	0.1	0.0	0.1	0.0
20.0	0.1	0.0	0.1	0.0
20.5	0.2	0.0	0.2	0.0
21.0	0.2	0.0	0.2	0.0
21.5	0.2	0.0	0.2	0.0
22.0	0.2	0.0	0.2	0.0
22.5	0.3	0.0	0.3	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
23.0	0.1	0.0	0.1	0.0
23.5	0.3	0.0	0.4	0.0
24.0	0.4	0.0	0.4	0.0
24.5	0.4	0.0	0.4	0.0
25.0	0.2	0.0	0.3	0.0
25.5	0.2	0.0	0.2	0.0
26.0	0.2	0.0	0.3	0.0
26.5	0.2	0.0	0.2	0.0
27.0	0.2	0.0	0.2	0.0
27.5	0.2	0.0	0.2	0.0
28.0	0.2	0.0	0.2	0.0
28.5	0.5	0.0	0.6	0.0
29.0	0.0	0.0	0.0	0.0
29.5	0.0	0.0	0.0	0.0
30.0	0.0	0.0	0.0	0.0
30.5	0.0	0.0	0.0	0.0
31.0	0.0	0.0	0.0	0.0
31.5	0.0	0.0	0.0	0.0
32.0	0.0	0.0	0.0	0.0
32.5	0.0	0.0	0.0	0.0
33.0	0.0	0.0	0.0	0.0
33.5	0.0	0.0	0.0	0.0
34.0	0.0	0.0	0.0	0.0
34.5	0.0	0.0	0.0	0.0
35.0	0.0	0.0	0.0	0.0
35.5	0.0	0.0	0.0	0.0
36.0	0.0	0.0	0.0	0.0
36.5	0.0	0.0	0.0	0.0
37.0	0.0	0.0	0.0	0.0
37.5	0.0	0.0	0.0	0.0
38.0	0.0	0.0	0.0	0.0
38.5	0.0	0.0	0.0	0.0
39.0	0.0	0.0	0.0	0.0
39.5	0.0	0.0	0.0	0.0
40.0	0.0	0.0	0.0	0.0
40.5	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0
41.5	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0
42.5	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0
43.5	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0
44.5	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0
45.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
46.0	0.0	0.0	0.0	0.0
46.5	0.0	0.0	0.0	0.0
47.0	0.0	0.0	0.0	0.0
47.5	0.0	0.0	0.0	0.0
48.0	0.0	0.0	0.0	0.0
48.5	0.0	0.0	0.0	0.0
49.0	0.0	0.0	0.0	0.0
49.5	0.0	0.0	0.0	0.0
50.0	0.0	0.0	0.0	0.0
50.5	0.0	0.0	0.0	0.0
51.0	0.0	0.0	0.0	0.0
51.5	0.0	0.0	0.0	0.0
52.0	0.0	0.0	0.0	0.0
52.5	0.0	0.0	0.0	0.0
53.0	0.0	0.0	0.0	0.0
53.5	0.0	0.0	0.0	0.0
54.0	0.0	0.0	0.0	0.0
54.5	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0
55.5	0.0	0.0	0.0	0.0
56.0	0.0	0.0	0.0	0.0
56.5	0.0	0.0	0.0	0.0
57.0	0.0	0.0	0.0	0.0
57.5	0.0	0.0	0.0	0.0
58.0	0.0	0.0	0.0	0.0
58.5	0.0	0.0	0.0	0.0
59.0	0.0	0.0	0.0	0.0
59.5	0.0	0.0	0.0	0.0
60.0	0.0	0.0	0.0	0.0
60.5	0.0	0.0	0.0	0.0
61.0	0.0	0.0	0.0	0.0
61.5	0.0	0.0	0.0	0.0
62.0	0.0	0.0	0.0	0.0
62.5	0.0	0.0	0.0	0.0
63.0	0.0	0.0	0.0	0.0
63.5	0.0	0.0	0.0	0.0
64.0	0.0	0.0	0.0	0.0
64.5	0.0	0.0	0.0	0.0
65.0	0.0	0.0	0.0	0.0
65.5	0.0	0.0	0.0	0.0
66.0	0.0	0.0	0.0	0.0
66.5	0.0	0.0	0.0	0.0
67.0	0.0	0.0	0.0	0.0
67.5	0.0	0.0	0.0	0.0
68.0	0.0	0.0	0.0	0.0
68.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
69.0	0.0	0.0	0.0	0.0
69.5	0.0	0.0	0.0	0.0
70.0	0.0	0.0	0.0	0.0
70.5	0.0	0.0	0.0	0.0
71.0	0.0	0.0	0.0	0.0
71.5	0.0	0.0	0.0	0.0
72.0	0.0	0.0	0.0	0.0
72.5	0.0	0.0	0.0	0.0
73.0	0.0	0.0	0.0	0.0
73.5	0.0	0.0	0.0	0.0
74.0	0.0	0.0	0.0	0.0
74.5	0.0	0.0	0.0	0.0
75.0	0.0	0.0	0.0	0.0
75.5	0.0	0.0	0.0	0.0
76.0	0.0	0.0	0.0	0.0
76.5	0.0	0.0	0.0	0.0
77.0	0.0	0.0	0.0	0.0
77.5	0.0	0.0	0.0	0.0
78.0	0.0	0.0	0.0	0.0
78.5	0.0	0.0	0.0	0.0
79.0	0.0	0.0	0.0	0.0
79.5	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0
80.5	0.0	0.0	0.0	0.0
81.0	0.0	0.0	0.0	0.0
81.5	0.0	0.0	0.0	0.0
82.0	0.0	0.0	0.0	0.0
82.5	0.0	0.0	0.0	0.0
83.0	0.0	0.0	0.0	0.0
83.5	0.0	0.0	0.0	0.0
84.0	0.0	0.0	0.0	0.0
84.5	0.0	0.0	0.0	0.0
85.0	0.0	0.0	0.0	0.0
85.5	0.0	0.0	0.0	0.0
86.0	0.0	0.0	0.0	0.0
86.5	0.0	0.0	0.0	0.0
87.0	0.0	0.0	0.0	0.0
87.5	0.0	0.0	0.0	0.0
88.0	0.0	0.0	0.0	0.0
88.5	0.0	0.0	0.0	0.0
89.0	0.0	0.0	0.0	0.0
89.5	0.0	0.0	0.0	0.0
90.0	0.0	0.0	0.0	0.0
90.5	0.0	0.0	0.0	0.0
91.0	0.0	0.0	0.0	0.0
91.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
92.0	0.0	0.0	0.0	0.0
92.5	0.0	0.0	0.0	0.0
93.0	0.0	0.0	0.0	0.0
93.5	0.0	0.0	0.0	0.0
94.0	0.0	0.0	0.0	0.0
94.5	0.0	0.0	0.0	0.0
95.0	0.0	0.0	0.0	0.0
95.5	0.0	0.0	0.0	0.0
96.0	0.0	0.0	0.0	0.0
96.5	0.0	0.0	0.0	0.0
97.0	0.0	0.0	0.0	0.0
97.5	0.0	0.0	0.0	0.0
98.0	0.0	0.0	0.0	0.0
98.5	0.0	0.0	0.0	0.0
99.0	0.0	0.0	0.0	0.0
99.5	0.0	0.0	0.0	0.0
100.0	0.0	0.0	0.0	0.0
100.5	0.0	0.0	0.0	0.0
101.0	0.0	0.0	0.0	0.0
101.5	0.0	0.0	0.0	0.0
102.0	0.0	0.0	0.0	0.0
102.5	0.0	0.0	0.0	0.0
103.0	0.0	0.0	0.0	0.0
103.5	0.0	0.0	0.0	0.0
104.0	0.0	0.0	0.0	0.0
104.5	0.0	0.0	0.0	0.0
105.0	0.0	0.0	0.0	0.0
105.5	0.0	0.0	0.0	0.0
106.0	0.0	0.0	0.0	0.0
106.5	0.0	0.0	0.0	0.0
107.0	0.0	0.0	0.0	0.0
107.5	0.0	0.0	0.0	0.0
108.0	0.0	0.0	0.0	0.0
108.5	0.0	0.0	0.0	0.0
109.0	0.0	0.0	0.0	0.0
109.5	0.0	0.0	0.0	0.0
110.0	0.0	0.0	0.0	0.0
110.5	0.0	0.0	0.0	0.0
111.0	0.0	0.0	0.0	0.0
111.5	0.0	0.0	0.0	0.0
112.0	0.0	0.0	0.0	0.0
112.5	0.0	0.0	0.0	0.0
113.0	0.0	0.0	0.0	0.0
113.5	0.0	0.0	0.0	0.0
114.0	0.0	0.0	0.0	0.0
114.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
115.0	0.0	0.0	0.0	0.0
115.5	0.0	0.0	0.0	0.0
116.0	0.0	0.0	0.0	0.0
116.5	0.0	0.0	0.0	0.0
117.0	0.0	0.0	0.0	0.0
117.5	0.0	0.0	0.0	0.0
118.0	0.0	0.0	0.0	0.0
118.5	0.0	0.0	0.0	0.0
119.0	0.0	0.0	0.0	0.0
119.5	0.0	0.0	0.0	0.0
120.0	0.0	0.0	0.0	0.0
120.5	0.0	0.0	0.0	0.0
121.0	0.0	0.0	0.0	0.0
121.5	0.0	0.0	0.0	0.0
122.0	0.0	0.0	0.0	0.0
122.5	0.0	0.0	0.0	0.0
123.0	0.0	0.0	0.0	0.0
123.5	0.0	0.0	0.0	0.0
124.0	0.0	0.0	0.0	0.0
124.5	0.0	0.0	0.0	0.0
125.0	0.0	0.0	0.0	0.0
125.5	0.0	0.0	0.0	0.0
126.0	0.0	0.0	0.0	0.0
126.5	0.0	0.0	0.0	0.0
127.0	0.0	0.0	0.0	0.0
127.5	0.0	0.0	0.0	0.0
128.0	0.0	0.0	0.0	0.0
128.5	0.0	0.0	0.0	0.0
129.0	0.0	0.0	0.0	0.0
129.5	0.0	0.0	0.0	0.0
130.0	0.0	0.0	0.0	0.0
130.5	0.0	0.0	0.0	0.0
131.0	0.0	0.0	0.0	0.0
131.5	0.0	0.0	0.0	0.0
132.0	0.0	0.0	0.0	0.0
132.5	0.0	0.0	0.0	0.0
133.0	0.0	0.0	0.0	0.0
133.5	0.0	0.0	0.0	0.0
134.0	0.0	0.0	0.0	0.0
134.5	0.0	0.0	0.0	0.0
135.0	0.0	0.0	0.0	0.0
135.5	0.0	0.0	0.0	0.0
136.0	0.0	0.0	0.0	0.0
136.5	0.0	0.0	0.0	0.0
137.0	0.0	0.0	0.0	0.0
137.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
138.0	0.0	0.0	0.0	0.0
138.5	0.0	0.0	0.0	0.0
139.0	0.0	0.0	0.0	0.0
139.5	0.0	0.0	0.0	0.0
140.0	0.0	0.0	0.0	0.0
140.5	0.0	0.0	0.0	0.0
141.0	0.0	0.0	0.0	0.0
141.5	0.0	0.0	0.0	0.0
142.0	0.0	0.0	0.0	0.0
142.5	0.0	0.0	0.0	0.0
143.0	0.0	0.0	0.0	0.0
143.5	0.0	0.0	0.0	0.0
144.0	0.0	0.0	0.0	0.0
144.5	0.0	0.0	0.0	0.0
145.0	0.0	0.0	0.0	0.0
145.5	0.0	0.0	0.0	0.0
146.0	0.0	0.0	0.0	0.0
146.5	0.0	0.0	0.0	0.0
147.0	0.0	0.0	0.0	0.0
147.5	0.0	0.0	0.0	0.0
148.0	0.0	0.0	0.0	0.0
148.5	0.0	0.0	0.0	0.0
149.0	0.0	0.0	0.0	0.0
149.5	0.0	0.0	0.0	0.0
150.0	0.0	0.0	0.0	0.0
150.5	0.0	0.0	0.0	0.0
151.0	0.0	0.0	0.0	0.0
151.5	0.0	0.0	0.0	0.0
152.0	0.0	0.0	0.0	0.0
152.5	0.0	0.0	0.0	0.0
153.0	0.0	0.0	0.0	0.0
153.5	0.0	0.0	0.0	0.0
154.0	0.0	0.0	0.0	0.0
154.5	0.0	0.0	0.0	0.0
155.0	0.0	0.0	0.0	0.0
155.5	0.0	0.0	0.0	0.0
156.0	0.0	0.0	0.0	0.0
156.5	0.0	0.0	0.0	0.0
157.0	0.0	0.0	0.0	0.0
157.5	0.0	0.0	0.0	0.0
158.0	0.0	0.0	0.0	0.0
158.5	0.0	0.0	0.0	0.0
159.0	0.0	0.0	0.0	0.0
159.5	0.0	0.0	0.0	0.0
160.0	0.0	0.0	0.0	0.0
160.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
161.0	0.0	0.0	0.0	0.0
161.5	0.0	0.0	0.0	0.0
162.0	0.0	0.0	0.0	0.0
162.5	0.0	0.0	0.0	0.0
163.0	0.0	0.0	0.0	0.0
163.5	0.0	0.0	0.0	0.0
164.0	0.0	0.0	0.0	0.0
164.5	0.0	0.0	0.0	0.0
165.0	0.0	0.0	0.0	0.0
165.5	0.0	0.0	0.0	0.0
166.0	0.0	0.0	0.0	0.0
166.5	0.0	0.0	0.0	0.0
167.0	0.0	0.0	0.0	0.0
167.5	0.0	0.0	0.0	0.0
168.0	0.0	0.0	0.0	0.0
168.5	0.0	0.0	0.0	0.0
169.0	0.0	0.0	0.0	0.0
169.5	0.0	0.0	0.0	0.0
170.0	0.0	0.0	0.0	0.0
170.5	0.0	0.0	0.0	0.0
171.0	0.0	0.0	0.0	0.0
171.5	0.0	0.0	0.0	0.0
172.0	0.4	0.0	4.7	0.0
172.5	13.8	0.1	13.8	0.1
173.0	7.4	0.1	7.4	0.1
173.5	7.4	0.1	7.4	0.1
174.0	7.4	0.1	7.4	0.1
174.5	7.4	0.1	7.4	0.1
175.0	7.4	0.1	7.4	0.1
175.5	7.4	0.1	7.4	0.1
176.0	7.4	0.1	7.4	0.1
176.5	7.4	0.1	7.4	0.1
177.0	7.4	0.1	7.4	0.1
177.5	7.4	0.1	7.4	0.1
178.0	7.4	0.1	7.4	0.1
178.5	7.4	0.1	7.4	0.1
179.0	0.0	0.0	0.0	0.0
179.5	0.0	0.0	0.0	0.0
180.0	0.0	0.0	0.0	0.0

Appendix C3

TEST DATA - POST-HOSE STREAM CURRENT LEAKAGE

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
0.0	0.00	0.0	0.0	-0.1	0.0	0.0
0.1	0.00	0.0	0.0	-0.1	0.0	0.0
0.2	0.00	0.0	0.0	-0.1	0.0	0.0
0.3	0.00	-0.1	0.0	0.0	0.0	0.0
0.4	0.00	0.0	0.0	-0.1	0.0	0.0
0.5	0.00	-0.1	0.0	-0.1	0.0	0.0
0.6	0.00	0.0	0.0	-0.1	-0.1	0.0
0.7	0.00	0.0	0.0	0.0	0.0	0.0
0.8	0.00	0.0	0.0	0.0	-0.1	0.0
0.9	0.00	-0.1	0.0	0.0	0.0	0.0
1.0	0.00	-0.1	0.0	0.0	0.0	0.0
1.1	0.00	-0.1	0.0	0.0	-0.1	0.0
1.2	0.00	-0.1	0.0	-0.1	0.0	0.0
1.3	0.00	0.0	0.0	0.0	0.0	0.0
1.4	0.00	-0.1	0.0	0.0	-0.1	0.0
1.5	0.00	0.0	0.0	-0.1	0.0	0.0
1.6	0.00	0.0	0.0	0.0	-0.1	0.0
1.7	0.00	0.1	0.0	0.1	0.1	0.0
1.8	0.00	0.0	0.0	-0.1	-0.1	0.0
1.9	0.00	0.0	0.0	0.0	-0.1	0.0
2.0	0.00	0.0	0.0	0.0	0.0	0.0
2.1	0.00	0.0	0.0	-0.1	-0.1	0.0
2.2	0.00	-0.1	0.0	-0.1	0.0	0.0
2.3	0.00	0.0	0.0	0.0	0.0	0.0
2.4	0.00	-0.1	0.0	0.0	-0.1	0.0
2.5	0.00	0.0	0.0	-0.1	-0.1	0.0
2.6	0.00	0.0	0.0	0.0	0.0	0.0
2.7	0.00	-0.1	0.0	-0.1	0.0	0.0
2.8	0.00	-0.1	0.0	0.0	0.0	0.0
2.9	0.00	-0.1	0.0	0.0	0.0	0.0
3.0	0.00	0.0	0.0	0.0	-0.1	0.0
3.1	0.00	0.0	0.0	-0.1	0.0	0.0
3.2	0.00	-0.1	0.0	0.0	0.0	0.0
3.3	0.00	0.0	0.0	-0.1	-0.1	0.0
3.4	0.00	0.0	0.0	0.0	-0.1	0.0
3.5	0.00	0.0	0.0	-0.1	0.0	0.0
3.6	0.00	0.0	0.0	-0.1	0.0	0.0
3.7	0.00	0.0	0.0	0.0	0.0	0.0
3.8	0.00	-0.1	0.0	-0.1	0.0	0.0
3.9	0.00	0.0	0.0	0.0	0.0	0.0
4.0	0.00	0.0	0.0	-0.1	0.0	0.0
4.1	0.00	0.0	0.0	0.0	-0.1	0.0
4.2	0.00	0.0	0.0	-0.1	0.0	0.0
4.3	0.00	0.0	0.0	0.0	-0.1	0.0
4.4	0.00	0.0	0.0	0.0	0.0	0.0
4.5	0.00	0.0	0.0	-0.1	0.0	0.0

Time (min)	Channel 1 (amps AC)	Channel 2 (volts AC)	Channel 2 (amps-calc)	Channel 3 (volts AC)	Channel 4 (volts AC)	Channel 4 (amps-calc)
4.6	0.00	-0.1	0.0	-0.1	-0.1	0.0
4.7	0.00	0.0	0.0	0.0	0.0	0.0
4.8	0.00	-0.1	0.0	0.0	-0.1	0.0
4.9	0.00	0.1	0.0	478.9	0.1	0.0
5.0	0.00	0.1	0.0	478.6	0.1	0.0
5.1	0.00	0.4	0.0	478.6	0.1	0.0
5.2	0.00	0.2	0.0	478.6	0.1	0.0
5.3	0.00	0.2	0.0	478.6	0.1	0.0
5.4	0.00	0.2	0.0	478.8	0.1	0.0
5.5	0.00	0.2	0.0	478.8	0.1	0.0
5.6	0.00	0.1	0.0	478.9	0.1	0.0
5.7	0.00	0.2	0.0	478.9	0.1	0.0
5.8	0.00	0.2	0.0	479.1	0.1	0.0
5.9	0.00	0.2	0.0	479.1	0.1	0.0
6.0	0.00	0.2	0.0	478.9	0.1	0.0
6.1	0.00	0.2	0.0	479.0	0.1	0.0
6.2	0.00	0.2	0.0	478.9	0.1	0.0
6.3	0.00	0.2	0.0	478.9	0.1	0.0
6.4	0.00	0.2	0.0	479.1	0.1	0.0
6.5	0.00	0.2	0.0	479.0	0.1	0.0
6.6	0.00	0.2	0.0	479.0	0.1	0.0
6.7	0.00	0.2	0.0	479.0	0.1	0.0
6.8	0.00	0.2	0.0	478.9	0.1	0.0
6.9	0.00	0.2	0.0	479.0	0.1	0.0
7.0	0.00	0.2	0.0	478.9	0.1	0.0
7.1	0.00	0.2	0.0	478.9	0.1	0.0
7.2	0.00	0.2	0.0	478.9	0.1	0.0
7.3	0.00	0.1	0.0	478.6	0.1	0.0
7.4	0.00	0.2	0.0	478.9	0.1	0.0
7.5	0.00	0.2	0.0	478.8	0.1	0.0
7.6	0.00	0.2	0.0	478.6	0.1	0.0
7.7	0.00	0.2	0.0	478.8	0.1	0.0
7.8	0.00	0.2	0.0	478.6	0.1	0.0
7.9	0.00	0.2	0.0	478.8	0.1	0.0
8.0	0.00	0.1	0.0	0.2	0.0	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
0.0	0.0	0.0	0.0	0.0	0.00	0.0
0.1	0.0	0.0	0.0	0.0	0.00	0.0
0.2	0.0	0.0	0.0	0.0	0.00	0.0
0.3	-0.1	0.0	0.0	0.0	0.00	0.0
0.4	-0.1	0.0	0.0	0.0	0.00	0.0
0.5	0.0	0.0	0.0	0.0	0.00	0.0
0.6	0.0	0.0	-0.1	0.0	0.00	0.0
0.7	-0.1	0.0	-0.1	0.0	0.00	0.0
0.8	0.0	0.0	0.0	0.0	0.00	0.0
0.9	0.0	0.0	-0.1	0.0	0.00	0.0
1.0	0.0	0.0	-0.1	0.0	0.00	0.0
1.1	0.0	0.0	-0.1	0.0	0.00	0.0
1.2	-0.1	0.0	-0.1	0.0	0.00	0.0
1.3	0.0	0.0	0.0	0.0	0.00	0.0
1.4	-0.1	0.0	0.0	0.0	0.00	0.0
1.5	0.0	0.0	-0.1	0.0	0.00	0.0
1.6	0.0	0.0	0.0	0.0	0.00	0.0
1.7	0.1	0.0	0.1	0.0	0.00	0.0
1.8	-0.1	0.0	0.0	0.0	0.00	0.0
1.9	0.0	0.0	-0.1	0.0	0.00	0.0
2.0	0.0	0.0	0.0	0.0	0.00	0.0
2.1	0.0	0.0	0.0	0.0	0.00	0.0
2.2	0.0	0.0	0.0	0.0	0.00	0.0
2.3	0.0	0.0	0.0	0.0	0.00	0.0
2.4	-0.1	0.0	0.0	0.0	0.00	0.0
2.5	0.0	0.0	-0.1	0.0	0.00	0.0
2.6	-0.1	0.0	-0.1	0.0	0.00	0.0
2.7	0.0	0.0	0.0	0.0	0.00	0.0
2.8	0.0	0.0	0.0	0.0	0.00	0.0
2.9	0.0	0.0	-0.1	0.0	0.00	0.0
3.0	0.0	0.0	0.0	0.0	0.00	0.0
3.1	-0.1	0.0	-0.1	0.0	0.00	0.0
3.2	0.0	0.0	-0.1	0.0	0.00	0.0
3.3	0.0	0.0	0.0	0.0	0.00	0.0
3.4	0.0	0.0	0.0	0.0	0.00	0.0
3.5	0.0	0.0	0.0	0.0	0.00	0.0
3.6	-0.1	0.0	0.0	0.0	0.00	0.0
3.7	0.0	0.0	0.0	0.0	0.00	0.0
3.8	0.0	0.0	-0.1	0.0	0.00	0.0
3.9	-0.1	0.0	0.0	0.0	0.00	0.0
4.0	0.0	0.0	-0.1	0.0	0.00	0.0
4.1	0.0	0.0	-0.1	0.0	0.00	0.0
4.2	0.0	0.0	0.0	0.0	0.00	0.0
4.3	0.0	0.0	0.0	0.0	0.00	0.0
4.4	-0.1	0.0	0.0	0.0	0.00	0.0
4.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 5 (volts AC)	Channel 5 (amps-calc)	Channel 6 (volts AC)	Channel 6 (amps-calc)	Channel 7 (amps AC)	Channel 8 (volts AC)
4.6	-0.1	0.0	0.0	0.0	0.00	0.0
4.7	0.0	0.0	0.0	0.0	0.00	0.0
4.8	0.0	0.0	0.0	0.0	0.00	0.0
4.9	0.1	0.0	0.1	0.0	0.07	0.0
5.0	0.1	0.0	0.1	0.0	0.08	0.0
5.1	0.1	0.0	0.1	0.0	0.08	0.2
5.2	0.1	0.0	0.1	0.0	0.08	0.0
5.3	0.1	0.0	0.1	0.0	0.08	0.0
5.4	0.1	0.0	0.1	0.0	0.07	0.0
5.5	0.1	0.0	0.1	0.0	0.07	0.0
5.6	0.1	0.0	0.1	0.0	0.07	0.0
5.7	0.1	0.0	0.1	0.0	0.06	0.0
5.8	0.1	0.0	0.1	0.0	0.06	0.0
5.9	0.1	0.0	0.1	0.0	0.06	0.0
6.0	0.1	0.0	0.1	0.0	0.06	0.0
6.1	0.1	0.0	0.1	0.0	0.05	0.0
6.2	0.1	0.0	0.1	0.0	0.05	0.0
6.3	0.1	0.0	0.1	0.0	0.05	0.0
6.4	0.1	0.0	0.1	0.0	0.05	0.0
6.5	0.1	0.0	0.1	0.0	0.05	0.0
6.6	0.1	0.0	0.1	0.0	0.05	0.0
6.7	0.1	0.0	0.2	0.0	0.05	0.0
6.8	0.1	0.0	0.2	0.0	0.04	0.0
6.9	0.1	0.0	0.1	0.0	0.04	0.0
7.0	0.1	0.0	0.2	0.0	0.04	0.0
7.1	0.1	0.0	0.2	0.0	0.04	0.0
7.2	0.1	0.0	0.2	0.0	0.04	0.0
7.3	0.1	0.0	0.2	0.0	0.04	0.0
7.4	0.1	0.0	0.2	0.0	0.04	0.0
7.5	0.1	0.0	0.2	0.0	0.04	0.0
7.6	0.1	0.0	0.1	0.0	0.04	0.0
7.7	0.1	0.0	0.1	0.0	0.04	0.0
7.8	0.1	0.0	0.1	0.0	0.04	0.0
7.9	0.1	0.0	0.2	0.0	0.04	0.0
8.0	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0	0.0	0.0
2.4	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0
2.6	0.0	0.0	0.0	0.0	0.0	0.0
2.7	0.0	0.0	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0
3.1	0.0	0.0	0.0	0.0	0.0	0.0
3.2	0.0	0.0	0.0	0.0	0.0	0.0
3.3	0.0	0.0	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0
3.6	0.0	0.0	0.0	0.0	0.0	0.0
3.7	0.0	0.0	0.0	0.0	0.0	0.0
3.8	0.0	0.0	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0
4.1	0.0	0.0	0.0	0.0	0.0	0.0
4.2	0.0	0.0	0.0	0.0	0.0	0.0
4.3	0.0	0.0	0.0	0.0	0.0	0.0
4.4	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 8 (amps-calc)	Channel 9 (volts AC)	Channel 10 (volts AC)	Channel 10 (amps-calc)	Channel 11 (volts AC)	Channel 11 (amps-calc)
4.6	0.0	0.0	0.0	0.0	0.0	0.0
4.7	0.0	0.0	0.0	0.0	0.0	0.0
4.8	0.0	0.0	0.0	0.0	0.0	0.0
4.9	0.0	123.3	0.0	0.0	0.0	0.0
5.0	0.0	123.3	0.0	0.0	0.0	0.0
5.1	0.0	123.3	0.0	0.0	0.0	0.0
5.2	0.0	123.3	0.0	0.0	0.0	0.0
5.3	0.0	123.3	0.0	0.0	0.0	0.0
5.4	0.0	123.3	0.0	0.0	0.0	0.0
5.5	0.0	123.3	0.0	0.0	0.0	0.0
5.6	0.0	123.4	0.0	0.0	0.0	0.0
5.7	0.0	123.4	0.0	0.0	0.0	0.0
5.8	0.0	123.4	0.0	0.0	0.0	0.0
5.9	0.0	123.4	0.0	0.0	0.0	0.0
6.0	0.0	123.4	0.0	0.0	0.0	0.0
6.1	0.0	123.5	0.0	0.0	0.0	0.0
6.2	0.0	123.4	0.0	0.0	0.0	0.0
6.3	0.0	123.4	0.0	0.0	0.0	0.0
6.4	0.0	123.5	0.0	0.0	0.0	0.0
6.5	0.0	123.4	0.0	0.0	0.0	0.0
6.6	0.0	123.5	0.0	0.0	0.0	0.0
6.7	0.0	123.5	0.0	0.0	0.0	0.0
6.8	0.0	123.5	0.0	0.0	0.0	0.0
6.9	0.0	123.4	0.0	0.0	0.0	0.0
7.0	0.0	123.5	0.0	0.0	0.0	0.0
7.1	0.0	123.4	0.0	0.0	0.0	0.0
7.2	0.0	123.5	0.0	0.0	0.0	0.0
7.3	0.0	123.4	0.0	0.0	0.0	0.0
7.4	0.0	123.5	0.0	0.0	0.0	0.0
7.5	0.0	123.4	0.0	0.0	0.0	0.0
7.6	0.0	123.4	0.0	0.0	0.0	0.0
7.7	0.0	123.4	0.0	0.0	0.0	0.0
7.8	0.0	123.4	0.0	0.0	0.0	0.0
7.9	0.0	123.5	0.0	0.0	0.0	0.0
8.0	0.0	0.1	0.0	0.0	0.0	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
0.0	0.0	0.0	0.0	0.0	0.00	0.0
0.1	0.0	0.0	0.0	0.0	0.00	0.0
0.2	0.0	0.0	0.0	0.0	0.00	0.0
0.3	0.0	0.0	0.0	0.0	0.00	0.0
0.4	0.0	0.0	0.0	0.0	0.00	0.0
0.5	0.0	0.0	0.0	0.0	0.00	0.0
0.6	0.0	0.0	0.0	0.0	0.00	0.0
0.7	0.0	0.0	0.0	0.0	0.00	0.0
0.8	0.0	0.0	0.0	0.0	0.00	0.0
0.9	0.0	0.0	0.0	0.0	0.00	0.0
1.0	0.0	0.0	0.0	0.0	0.00	0.0
1.1	0.0	0.0	0.0	0.0	0.00	0.0
1.2	0.0	0.0	0.0	0.0	0.00	0.0
1.3	0.0	0.0	0.0	0.0	0.00	0.0
1.4	0.0	0.0	0.0	0.0	0.00	0.0
1.5	0.0	0.0	0.0	0.0	0.00	0.0
1.6	0.0	0.0	0.0	0.0	0.00	0.0
1.7	0.0	0.0	0.0	0.0	0.00	0.0
1.8	0.0	0.0	0.0	0.0	0.00	0.0
1.9	0.0	0.0	0.0	0.0	0.00	0.0
2.0	0.0	0.0	0.0	0.0	0.00	0.0
2.1	0.0	0.0	0.0	0.0	0.00	0.0
2.2	0.0	0.0	0.0	0.0	0.00	0.0
2.3	0.0	0.0	0.0	0.0	0.00	0.0
2.4	0.0	0.0	0.0	0.0	0.00	0.0
2.5	0.0	0.0	0.0	0.0	0.00	0.0
2.6	0.0	0.0	0.0	0.0	0.00	0.0
2.7	0.0	0.0	0.0	0.0	0.00	0.0
2.8	0.0	0.0	0.0	0.0	0.00	0.0
2.9	0.0	0.0	0.0	0.0	0.00	0.0
3.0	0.0	0.0	0.0	0.0	0.00	0.0
3.1	0.0	0.0	0.0	0.0	0.00	0.0
3.2	0.0	0.0	0.0	0.0	0.00	0.0
3.3	0.0	0.0	0.0	0.0	0.00	0.0
3.4	0.0	0.0	0.0	0.0	0.00	0.0
3.5	0.0	0.0	0.0	0.0	0.00	0.0
3.6	0.0	0.0	0.0	0.0	0.00	0.0
3.7	0.0	0.0	0.0	0.0	0.00	0.0
3.8	0.0	0.0	0.0	0.0	0.00	0.0
3.9	0.0	0.0	0.0	0.0	0.00	0.0
4.0	0.0	0.0	0.0	0.0	0.00	0.0
4.1	0.0	0.0	0.0	0.0	0.00	0.0
4.2	0.0	0.0	0.0	0.0	0.00	0.0
4.3	0.0	0.0	0.0	0.0	0.00	0.0
4.4	0.0	0.0	0.0	0.0	0.00	0.0
4.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 12 (volts AC)	Channel 12 (amps-calc)	Channel 13 (volts AC)	Channel 13 (amps-calc)	Channel 14 (amps AC)	Channel 15 (volts AC)
4.6	0.0	0.0	0.0	0.0	0.00	0.0
4.7	0.0	0.0	0.0	0.0	0.00	0.0
4.8	0.0	0.0	0.0	0.0	0.00	0.0
4.9	0.0	0.0	0.0	0.0	0.00	0.0
5.0	0.0	0.0	0.0	0.0	0.00	0.0
5.1	0.0	0.0	0.0	0.0	0.00	0.0
5.2	0.0	0.0	0.0	0.0	0.00	0.0
5.3	0.0	0.0	0.0	0.0	0.00	0.0
5.4	0.0	0.0	0.0	0.0	0.00	0.0
5.5	0.0	0.0	0.0	0.0	0.00	0.0
5.6	0.0	0.0	0.0	0.0	0.00	0.0
5.7	0.0	0.0	0.0	0.0	0.00	0.0
5.8	0.0	0.0	0.0	0.0	0.00	0.0
5.9	0.0	0.0	0.0	0.0	0.00	0.0
6.0	0.0	0.0	0.0	0.0	0.00	0.0
6.1	0.0	0.0	0.0	0.0	0.00	0.0
6.2	0.0	0.0	0.0	0.0	0.00	0.0
6.3	0.0	0.0	0.0	0.0	0.00	0.0
6.4	0.0	0.0	0.0	0.0	0.00	0.0
6.5	0.0	0.0	0.0	0.0	0.00	0.0
6.6	0.0	0.0	0.0	0.0	0.00	0.0
6.7	0.0	0.0	0.0	0.0	0.00	0.0
6.8	0.0	0.0	0.0	0.0	0.00	0.0
6.9	0.0	0.0	0.0	0.0	0.00	0.0
7.0	0.0	0.0	0.0	0.0	0.00	0.0
7.1	0.0	0.0	0.0	0.0	0.00	0.0
7.2	0.0	0.0	0.0	0.0	0.00	0.0
7.3	0.0	0.0	0.0	0.0	0.00	0.0
7.4	0.0	0.0	0.0	0.0	0.00	0.0
7.5	0.0	0.0	0.0	0.0	0.00	0.0
7.6	0.0	0.0	0.0	0.0	0.00	0.0
7.7	0.0	0.0	0.0	0.0	0.00	0.0
7.8	0.0	0.0	0.0	0.0	0.00	0.0
7.9	0.0	0.0	0.0	0.0	0.00	0.0
8.0	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0	0.0	0.0
2.4	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0
2.6	0.0	0.0	0.0	0.0	0.0	0.0
2.7	0.0	0.0	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0
3.1	0.0	0.0	0.0	0.0	0.0	0.0
3.2	0.0	0.0	0.0	0.0	0.0	0.0
3.3	0.0	0.0	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0
3.6	0.0	0.0	0.0	0.0	0.0	0.0
3.7	0.0	0.0	0.0	0.0	0.0	0.0
3.8	0.0	0.0	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0
4.1	0.0	0.0	0.0	0.0	0.0	0.0
4.2	0.0	0.0	0.0	0.0	0.0	0.0
4.3	0.0	0.0	0.0	0.0	0.0	0.0
4.4	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 15 (amps-calc)	Channel 16 (volts AC)	Channel 17 (volts AC)	Channel 17 (amps-calc)	Channel 18 (volts AC)	Channel 18 (amps-calc)
4.6	0.0	0.0	0.0	0.0	0.0	0.0
4.7	0.0	0.0	0.0	0.0	0.0	0.0
4.8	0.0	0.0	0.0	0.0	0.0	0.0
4.9	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.0	0.0
5.1	0.0	0.0	0.0	0.0	0.0	0.0
5.2	0.0	0.0	0.0	0.0	0.0	0.0
5.3	0.0	0.0	0.0	0.0	0.0	0.0
5.4	0.0	0.0	0.0	0.0	0.0	0.0
5.5	0.0	0.0	0.0	0.0	0.0	0.0
5.6	0.0	0.0	0.0	0.0	0.0	0.0
5.7	0.0	0.0	0.0	0.0	0.0	0.0
5.8	0.0	0.0	0.0	0.0	0.0	0.0
5.9	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0	0.0	0.0
6.1	0.0	0.0	0.0	0.0	0.0	0.0
6.2	0.0	0.0	0.0	0.0	0.0	0.0
6.3	0.0	0.0	0.0	0.0	0.0	0.0
6.4	0.0	0.0	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0	0.0	0.0
6.6	0.0	0.0	0.0	0.0	0.0	0.0
6.7	0.0	0.0	0.0	0.0	0.0	0.0
6.8	0.0	0.0	0.0	0.0	0.0	0.0
6.9	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0	0.0	0.0
7.1	0.0	0.0	0.0	0.0	0.0	0.0
7.2	0.0	0.0	0.0	0.0	0.0	0.0
7.3	0.0	0.0	0.0	0.0	0.0	0.0
7.4	0.0	0.0	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0	0.0	0.0
7.6	0.0	0.0	0.0	0.0	0.0	0.0
7.7	0.0	0.0	0.0	0.0	0.0	0.0
7.8	0.0	0.0	0.0	0.0	0.0	0.0
7.9	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
0.0	0.0	0.0	0.0	0.0	0.00	0.0
0.1	0.0	0.0	0.0	0.0	0.00	0.0
0.2	0.0	0.0	0.0	0.0	0.00	0.0
0.3	0.0	0.0	0.0	0.0	0.00	0.0
0.4	0.0	0.0	0.0	0.0	0.00	0.0
0.5	0.0	0.0	0.0	0.0	0.00	0.0
0.6	0.0	0.0	0.0	0.0	0.00	0.0
0.7	0.0	0.0	0.0	0.0	0.00	0.0
0.8	0.0	0.0	0.0	0.0	0.00	0.0
0.9	0.0	0.0	0.0	0.0	0.00	0.0
1.0	0.0	0.0	0.0	0.0	0.00	0.0
1.1	0.0	0.0	0.0	0.0	0.00	0.0
1.2	0.0	0.0	0.0	0.0	0.00	0.0
1.3	0.0	0.0	0.0	0.0	0.00	0.0
1.4	0.0	0.0	0.0	0.0	0.00	0.0
1.5	0.0	0.0	0.0	0.0	0.00	0.0
1.6	0.0	0.0	0.0	0.0	0.00	0.0
1.7	0.0	0.0	0.0	0.0	0.00	0.0
1.8	0.0	0.0	0.0	0.0	0.00	0.0
1.9	0.0	0.0	0.0	0.0	0.00	0.0
2.0	0.0	0.0	0.0	0.0	0.00	0.0
2.1	0.0	0.0	0.0	0.0	0.00	0.0
2.2	0.0	0.0	0.0	0.0	0.00	0.0
2.3	0.0	0.0	0.0	0.0	0.00	0.0
2.4	0.0	0.0	0.0	0.0	0.00	0.0
2.5	0.0	0.0	0.0	0.0	0.00	0.0
2.6	0.0	0.0	0.0	0.0	0.00	0.0
2.7	0.0	0.0	0.0	0.0	0.00	0.0
2.8	0.0	0.0	0.0	0.0	0.00	0.0
2.9	0.0	0.0	0.0	0.0	0.00	0.0
3.0	0.0	0.0	0.0	0.0	0.00	0.0
3.1	0.0	0.0	0.0	0.0	0.00	0.0
3.2	0.0	0.0	0.0	0.0	0.00	0.0
3.3	0.0	0.0	0.0	0.0	0.00	0.0
3.4	0.0	0.0	0.0	0.0	0.00	0.0
3.5	0.0	0.0	0.0	0.0	0.00	0.0
3.6	0.0	0.0	0.0	0.0	0.00	0.0
3.7	0.0	0.0	0.0	0.0	0.00	0.0
3.8	0.0	0.0	0.0	0.0	0.00	0.0
3.9	0.0	0.0	0.0	0.0	0.00	0.0
4.0	0.0	0.0	0.0	0.0	0.00	0.0
4.1	0.0	0.0	0.0	0.0	0.00	0.0
4.2	0.0	0.0	0.0	0.0	0.00	0.0
4.3	0.0	0.0	0.0	0.0	0.00	0.0
4.4	0.0	0.0	0.0	0.0	0.00	0.0
4.5	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 19 (volts AC)	Channel 19 (amps-calc)	Channel 20 (volts AC)	Channel 20 (amps-calc)	Channel 21 (amps AC)	Channel 22 (volts AC)
4.6	0.0	0.0	0.0	0.0	0.00	0.0
4.7	0.0	0.0	0.0	0.0	0.00	0.0
4.8	0.0	0.0	0.0	0.0	0.00	0.0
4.9	0.0	0.0	0.0	0.0	0.30	0.0
5.0	0.0	0.0	0.0	0.0	0.45	0.0
5.1	0.0	0.0	0.0	0.0	0.50	0.0
5.2	0.0	0.0	0.0	0.0	0.52	0.0
5.3	0.0	0.0	0.0	0.0	0.52	0.0
5.4	0.0	0.0	0.0	0.0	0.50	0.0
5.5	0.0	0.0	0.0	0.0	0.47	0.0
5.6	0.0	0.0	0.0	0.0	0.44	0.0
5.7	0.0	0.0	0.0	0.0	0.41	0.0
5.8	0.0	0.0	0.0	0.0	0.39	0.0
5.9	0.0	0.0	0.0	0.0	0.37	0.0
6.0	0.0	0.0	0.0	0.0	0.36	0.0
6.1	0.0	0.0	0.0	0.0	0.34	0.0
6.2	0.0	0.0	0.0	0.0	0.33	0.0
6.3	0.0	0.0	0.0	0.0	0.32	0.0
6.4	0.0	0.0	0.0	0.0	0.31	0.0
6.5	0.0	0.0	0.0	0.0	0.30	0.0
6.6	0.0	0.0	0.0	0.0	0.29	0.0
6.7	0.0	0.0	0.0	0.0	0.29	0.0
6.8	0.0	0.0	0.0	0.0	0.28	0.0
6.9	0.0	0.0	0.0	0.0	0.27	0.0
7.0	0.0	0.0	0.0	0.0	0.27	0.0
7.1	0.0	0.0	0.0	0.0	0.26	0.0
7.2	0.0	0.0	0.0	0.0	0.26	0.0
7.3	0.0	0.0	0.0	0.0	0.26	0.0
7.4	0.0	0.0	0.0	0.0	0.25	0.0
7.5	0.0	0.0	0.0	0.0	0.25	0.0
7.6	0.0	0.0	0.0	0.0	0.25	0.0
7.7	0.0	0.0	0.0	0.0	0.24	0.0
7.8	0.0	0.0	0.0	0.0	0.24	0.0
7.9	0.0	0.0	0.0	0.0	0.24	0.0
8.0	0.0	0.0	0.0	0.0	0.00	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0	0.0	0.0
2.4	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0
2.6	0.0	0.0	0.0	0.0	0.0	0.0
2.7	0.0	0.0	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0	0.0	0.0
3.1	0.0	0.0	0.0	0.0	0.0	0.0
3.2	0.0	0.0	0.0	0.0	0.0	0.0
3.3	0.0	0.0	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.0	0.0
3.6	0.0	0.0	0.0	0.0	0.0	0.0
3.7	0.0	0.0	0.0	0.0	0.0	0.0
3.8	0.0	0.0	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.0	0.0
4.1	0.0	0.0	0.0	0.0	0.0	0.0
4.2	0.0	0.0	0.0	0.0	0.0	0.0
4.3	0.0	0.0	0.0	0.0	0.0	0.0
4.4	0.0	0.0	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0	0.0	0.0

Time (min)	Channel 22 (amps-calc)	Channel 23 (volts AC)	Channel 24 (volts AC)	Channel 24 (amps-calc)	Channel 25 (volts AC)	Channel 25 (amps-calc)
4.6	0.0	0.0	0.0	0.0	0.0	0.0
4.7	0.0	0.0	0.0	0.0	0.0	0.0
4.8	0.0	0.0	0.0	0.0	0.0	0.0
4.9	0.0	121.6	0.0	0.0	0.0	0.0
5.0	0.0	121.7	0.8	0.0	1.0	0.0
5.1	0.0	121.7	1.1	0.0	1.4	0.0
5.2	0.0	121.7	1.1	0.0	1.5	0.0
5.3	0.0	121.7	1.0	0.0	1.5	0.0
5.4	0.0	121.8	0.8	0.0	1.2	0.0
5.5	0.0	121.8	0.7	0.0	0.9	0.0
5.6	0.0	121.8	0.3	0.0	0.8	0.0
5.7	0.0	121.8	0.2	0.0	0.7	0.0
5.8	0.0	121.9	0.2	0.0	0.6	0.0
5.9	0.0	121.9	0.1	0.0	0.5	0.0
6.0	0.0	121.9	0.1	0.0	0.4	0.0
6.1	0.0	121.9	0.1	0.0	0.3	0.0
6.2	0.0	121.9	0.0	0.0	0.3	0.0
6.3	0.0	121.9	0.0	0.0	0.3	0.0
6.4	0.0	121.9	0.0	0.0	0.2	0.0
6.5	0.0	121.9	0.0	0.0	0.2	0.0
6.6	0.0	121.9	0.0	0.0	0.2	0.0
6.7	0.0	121.9	0.0	0.0	0.2	0.0
6.8	0.0	121.9	0.0	0.0	0.2	0.0
6.9	0.0	121.9	0.0	0.0	0.1	0.0
7.0	0.0	121.9	0.0	0.0	0.1	0.0
7.1	0.0	121.9	0.0	0.0	0.1	0.0
7.2	0.0	121.9	0.0	0.0	0.1	0.0
7.3	0.0	121.9	0.0	0.0	0.1	0.0
7.4	0.0	121.9	0.0	0.0	0.1	0.0
7.5	0.0	121.9	0.0	0.0	0.1	0.0
7.6	0.0	121.8	0.0	0.0	0.1	0.0
7.7	0.0	121.9	0.0	0.0	0.1	0.0
7.8	0.0	121.9	0.0	0.0	0.1	0.0
7.9	0.0	121.9	0.0	0.0	0.1	0.0
8.0	0.0	0.1	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0
0.6	0.0	0.0	0.0	0.0
0.7	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.0
0.9	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0
1.1	0.0	0.0	0.0	0.0
1.2	0.0	0.0	0.0	0.0
1.3	0.0	0.0	0.0	0.0
1.4	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.0
1.6	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0
1.8	0.0	0.0	0.0	0.0
1.9	0.0	0.0	0.0	0.0
2.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.0
2.2	0.0	0.0	0.0	0.0
2.3	0.0	0.0	0.0	0.0
2.4	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0
2.6	0.0	0.0	0.0	0.0
2.7	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0
2.9	0.0	0.0	0.0	0.0
3.0	0.0	0.0	0.0	0.0
3.1	0.0	0.0	0.0	0.0
3.2	0.0	0.0	0.0	0.0
3.3	0.0	0.0	0.0	0.0
3.4	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0
3.6	0.0	0.0	0.0	0.0
3.7	0.0	0.0	0.0	0.0
3.8	0.0	0.0	0.0	0.0
3.9	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0
4.1	0.0	0.0	0.0	0.0
4.2	0.0	0.0	0.0	0.0
4.3	0.0	0.0	0.0	0.0
4.4	0.0	0.0	0.0	0.0
4.5	0.0	0.0	0.0	0.0

Time (min)	Channel 26 (volts AC)	Channel 26 (amps-calc)	Channel 27 (volts AC)	Channel 27 (amps-calc)
4.6	0.0	0.0	0.0	0.0
4.7	0.0	0.0	0.0	0.0
4.8	0.0	0.0	0.0	0.0
4.9	0.0	0.0	0.0	0.0
5.0	0.5	0.0	0.0	0.0
5.1	0.6	0.0	0.0	0.0
5.2	0.6	0.0	0.0	0.0
5.3	0.5	0.0	0.0	0.0
5.4	0.4	0.0	0.0	0.0
5.5	0.3	0.0	0.0	0.0
5.6	0.2	0.0	0.0	0.0
5.7	0.1	0.0	0.0	0.0
5.8	0.1	0.0	0.0	0.0
5.9	0.0	0.0	0.0	0.0
6.0	0.0	0.0	0.0	0.0
6.1	0.0	0.0	0.0	0.0
6.2	0.0	0.0	0.0	0.0
6.3	0.0	0.0	0.0	0.0
6.4	0.0	0.0	0.0	0.0
6.5	0.0	0.0	0.0	0.0
6.6	0.0	0.0	0.0	0.0
6.7	0.0	0.0	0.0	0.0
6.8	0.0	0.0	0.0	0.0
6.9	0.0	0.0	0.0	0.0
7.0	0.0	0.0	0.0	0.0
7.1	0.0	0.0	0.0	0.0
7.2	0.0	0.0	0.0	0.0
7.3	0.0	0.0	0.0	0.0
7.4	0.0	0.0	0.0	0.0
7.5	0.0	0.0	0.0	0.0
7.6	0.0	0.0	0.0	0.0
7.7	0.0	0.0	0.0	0.0
7.8	0.0	0.0	0.0	0.0
7.9	0.0	0.0	0.0	0.0
8.0	0.0	0.0	0.0	0.0

Appendix D

QUALITY ASSURANCE

Quality Assurance Statement

Omega Point Laboratories, Inc. is an independent, wholly owned company incorporated in the state of Texas, devoted to engineering, inspection, quality assurance and testing of building materials, products and assemblies. The company has developed and implemented a Quality Assurance Program designed to provide its clients with a planned procedure of order and document processing for inspection and testing services it provides to assure conformity to requirements, codes, standards and specifications. The Program is designed to meet the intent of ANSI 45.2 Quality Assurance Program Requirements for Nuclear Power Plants, and complies with the requirements of the ASME Code, SPPE, Military Standards and other less stringent programs. It is the Laboratory's intention to adhere strictly to this Program, to assure that the services offered to its clients remains of the highest quality and accuracy possible.

The overall responsibility of the supervision, operation and coordination of this Quality Assurance Program is that of the Quality Assurance Manager, a person not involved with the performance of the inspection or testing services, and who is under the full time employ of the Laboratory. This individual is responsible for implementing and enforcing all procedures presented in the Quality Assurance Manual and the Procedures Manual. All personnel involved with activities which fall under the scope of this Program are required to cooperate with the letter and intent of this Program.

All QA Surveillance documents remain on file at the Laboratory, and are available for inspection by authorized personnel in the performance of an on-site QA Audit. All materials, services and supplies utilized herein were obtained with appropriate QA Certifications of Compliance, and the inclusion of these in this report would not be practical nor useful to the reader.

OMEGA POINT ® LABORATORIES

ACCEPTABILITY DOCUMENTATION

PROJECT NO. 14980-117047

FRAMATOME ANP

The following signatures attest to the review and acceptance of each attribute listed regarding the above-noted project:

I. TEST ITEM ASSEMBLY

Omega Point Laboratories, Inc. — Date: 3/16/04

FRAMATOME ANP — Date: 3/16/04

II. VERIFICATION OF ELECTRICAL CIRCUITRY

Omega Point Laboratories, Inc. — Date: 3/16/04

FRAMATOME ANP — Date: 3/16/04

Omega Point Laboratories, Inc.
16015 Shady Falls Road
Elmendorf, Texas 78112-9784
210-635-8100 / FAX: 210-635-8101 / 800-966-5253
www.opl.com / e-mail: moreinfo@opl.com

III. THERMOCOUPLE INSTALLATION

Omega Point Laboratories, Inc. — Date: 3/16/04

FRAMATOME ANP — Date: 3/16/04

IV. VERIFICATION OF:

PRETEST MEGGERING
PRETEST CONDUCTOR RESISTANCE MEASUREMENT
PRETEST LEAKAGE CURRENT DATA COLLECTION

Omega Point Laboratories, Inc. — Date: 3/16/04

FRAMATOME ANP — Date: 3/16/04

V. FINAL PRE-BURN INSPECTION

Omega Point Laboratories, Inc. — Date: 3/16/04

FRAMATOME ANP — Date: 3/16/04

OMEGA POINT LABORATORIES

EVENT LOG

Fire Resistance Test of Horizontal Concrete Slabs Supporting Conduits, Junction Boxes & Fire-Rated Cable

PROJECT NUMBER:

14980-117047

FRAMATOME ANP

EVENT LOG

FRAMATOME ANP
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #117047 for FRAMATOME ANP. The following is a brief description of this project:

Project No. 117047: Fire Resistance Test of Horizontal Concrete Slabs Supporting Fire-Protected Conduits, Junction Boxes and Fire-Rated Electrical Cables

ITEM	DATE	INIT'L
Deg Priest, President of OPL, responds to Framatome ANP request for proposal with proposal number PO3828-01.	8/28/03	CH
Framatome issues P.O.# 141309	12/18	CH
OPL receives Progress Energy Megitt Cable Test Plan from Framatome ANP.	12/18	CH
OPL QA/QC department receives electrical cable from Megitt.	1/2/04	CH
OPL QA/QC personnel order project hardware from the following vendors: T.C. White, Texas Specialty Steel, GE Supply.	1/5/04	CH
Materials received from Texas Specialty Steel.	1/7/04	CH
Received materials from T.C. White.	1/13	CH
Received additional cable from Megitt.	1/14	CH
Received material from G.E. Supply.	1/22	CH
Deg Priest issues wiring diagram drawings.	1/26	
Deg Priest approves the use of the test slab from Framatome project #14980-111850g.	2/3	CH
OPL technicians begin construction of the test article.	2/23	CH
Holes of San Antonio drill the penetrations through the test slab per Framatome drawing "Test Slab Plan View"	2/24	CH
OPL QA/QC personnel verify the slab penetrations.	2/	CH
John Crowther with Framatome here to review test article progress, materials and project documentation.	2/25	CH
OPL technicians continue test article construction.	2/26/04	CH

EVENT LOG

FRAMATOME ANP
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #117047 for FRAMATOME ANP. The following is a brief description of this project:

Project No. 117047: Fire Resistance Test of Horizontal Concrete Slabs Supporting Fire-Protected Conduits, Junction Boxes and Fire-Rated Electrical Cables

ITEM	DATE	INIT'L
OPL Technicians continue bolting steel plates to the slab and welding attachments.	2/27/04	CH
Welding Continues per project drawings and details.	3/1	CH
OPL technicians begin construction of of 4' x 8' elecrical wiring circuitry board to drawings issued by Deg Priest	3/1	CH
Welding and circuitry continues.	3/2	CH
John Crowther issues final revision to the test plan.	3/2	CH
John Crowther arrives to assist with and oversee the installation of the electrical cables in the test article.	3/3	CH
T.C. White splice is received.	3/3	CH
John Crowther and Deg Priest discuss the lengths of items DD.		
John Crowther relays directions from Progress Energy to cut 12" from item DD. TC White tube duct is spliced. John Crowther departs OPL.	3/4	CH
OPL technicians adjust cables applying values from Hilti on bolts per John Crowther. Dead weights are installed.		
OPL QA/QC verify test article.	3/5	CH
John Crowther of Framatome and Mike Fletcher of Progress Energy arrive to verify the test article and discuss test details with Deg Priest.	3/8	CH
OPL technicians complete electrical wiring circuitry board.	3/8	CH
OPL QA/QC personnel verify the electrical circuitry with Deg Priest.	3/9/04	CH

EVENT LOG

FRAMATOME ANP
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #117047 for FRAMATOME ANP. The following is a brief description of this project:

Project No. 117047: Fire Resistance Test of Horizontal Concrete Slabs Supporting Fire-Protected Conduits, Junction Boxes and Fire-Rated Electrical Cables

ITEM	DATE	INIT'L
Grubb Engineering personnel arrive to review the test article and discuss meggering details.	3/10/04	CH
Final revisions of electrical wiring drawings (Revision #8) showing color coding in cables is issued by Dee Priest.	3/12	CH
OPI Technician and QA/QC personnel verify length of each cable on the test article.	3/12	CH
Test article is completed	3/12	CH
John Crowther and Cal Banning of Framatome ANP arrive at OPI. The following persons arrived to witness the meggering and fire test of project #117047:	3/15	CH
Alan Mojisi — Progress Energy		
Mike Fletcher — " "		
Tony Manes — " "		
Bruce Kerwe — " "		
Fred Dudek — Meggitt Safety Systems		
Dhanesh Butani — Bechtel Power		
Bobby Grubb and Jeff Diel from Grubb Engineering arrive at OPI to do the Pre-Test Meggering and Conductor Resistance Testing.	3/15	CH
The Pre-Test meggering began at 1:39pm with OPI QA/QC personnel, Dee Priest, Cleda Patton and Connie Humphrey documenting the results. The meggering and conductor resistance testing was completed at 2:10pm.	3/15 3/15/04	CH
Dee Priest and Cleda Patton verified the data acquisition and the electrical wiring circuitry.	3/15 3/15/04	CH

EVENT LOG

FRAMATOME ANP
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #117047 for FRAMATOME ANP. The following is a brief description of this project:

Project No. 117047: Fire Resistance Test of Horizontal Concrete Slabs Supporting Fire-Protected Conduits, Junction Boxes and Fire-Rated Electrical Cables

ITEM	DATE	INIT'L
Another pretest verification was done on two conductors from Cable #3 and two conductors on Cable #2. No discrepancies noted.	3/16/04	CH
On site to witness the fire test of project #117047 are the following personnel:	3/16/04	CH
Deg Priest — Omega Point Labs		
Connie Humphrey — " " "		
Mike Dey — " " "		
Cleda Patton — " " "		
Oscar Estrada — " " "		
Troy Bronstad — " " "		
Richard Beasley — " " "		
Cal Banning — Framatome ANP		
John Crowther — " "		
J.C. Vance — Southern Companies		
Alan Morisi — Progress Energy		
Mike Fletcher — " "		
Tony Maness — " "		
Bruce Lerwe — " "		
Fred Rudek — Meggitt Safety Systems		
Dhanesh Butani — Bechtel Power		
Bobby Stubb — Stubb Engineering		
Jeff Piel — " "		
Deg Priest and Mike Dey run the pre-test leakage current data collection.	3/16	CH
The three hour fire resistance test of Project 14980-117047 began at 9:50am.	3/16	CH
Meggering during test began at 30 minutes into the test with Stubb Engineering technicians Bobby Stubb and Jeff Piel. Connie Humphrey and Cleda Patton, OPL QA/QC personnel documented the results of the meggering.	3/16	CH
	3/16/04	CH

EVENT LOG

FRAMATOME ANP
Client # 14980

NOTE:
This Log is used to document the date and note the significant events during the completion of test project #117047 for FRAMATOME ANP. The following is a brief description of this project:

Project No. 117047: Fire Resistance Test of Horizontal Concrete Slabs Supporting Fire-Protected Conduits, Junction Boxes and Fire-Rated Electrical Cables

ITEM	DATE	INIT'L
The second of the meggering during the test series began at 90 minutes into the test.	3/16/04	CH
The third and final meggering during the test began at 2 hours and 25 minutes into the test.		
The fire test was completed at 12:56 pm and the test article was removed by overhead crane from the test furnace and moved to begin the hose stream test.	3/16	CH
A hose stream test followed the fire test using the 30° spray fog nozzle with 75 p.s.i. from a 20 foot distance of 5 feet for a period of five minutes.	3/16	CH
Post-test meggering began after the test article was mounted on the supports following the hose stream test. Some conductor to conductor resistance testing was done as a part of the post test meggering also. Post test meggering completed at approximately 1:40 pm.	3/16	CH
Visitors witnessing test depart the lab	3/16	CH
Bobby Grubb from Grubb Engineering arrives at OPL to do the Post-Test Cold meggering with Celeda Patton, OPL Quality assurance recording the results.	3/17	CH
The four test cables were pulled from the test article and shipped to Progress Energy.	3/26/04	CH
	3/26/04	CH

- END -

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Framatome
CLIENT/PROJECT NUMBER 14980-117047
RECEIVED FROM GE Supply
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2416 - 14980
DATE RECEIVED 1-21-04
DATE INSPECTED 1-22-04
INSPECTED BY: [illegible]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Ordered	QUANTITY Rec'd	QUANTITY B.O.	I.D. NO.	CERTS MATL Y/N	CERTS REQD Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	ACCEPTANCE Hold	ACCEPTANCE Reject	REMARKS
B-Line B11 Strut	NA	10'	10'	0	B11-10FT HDG/ CHANNEL	Y	N	N	GOOD	X			This material was purchased with a credit card because we did not have an account with GE.
B-Line B52 Strut	NA	10'	10'	0	B52-10FT HDG/13-16 Channel	Y	N	N	GOOD	X			
B-Line B22 Strut	NA	10'	10'	0	B22-10FT HDG/12ga STL CHN	Y	N	N	GOOD	X			
Stainless Steel Clamps B-Line B2000SS4	NA	20	20	0	B2000-SS4	Y	N	N	GOOD	X			

09-016-11/02

gesupply.com

GE Supply
A General Electric Company

4940 Elsenhauer Rd.
Ste. 102
San Antonio, TX 78218
(210) 821-7330
(210) 828-4134 FAX

Omega Point Laboratories, Inc.
16015 Shady Falls Rd.
Elmendorf, Texas 78112-9784

January 28, 2004

To Whom It May Concern:

This is to certify that the material supplied on GE Supply invoice 810-889262, dated 01/21/04, are new and original and in compliance with the requirements specified on the attached order request.

Thank you,

Rocky Haggerty

Rocky Haggerty
Customer Support

PACKING SLIP NUMBER

810 889262

GE Supply

SEND PAYMENT SHOWING INVOICE NUMBER & INVOICE DATE TO:

GE Supply
G.E. SUPPLY CO
CREDIT CARD ORDER

[X]

PAYMENT TERMS
% CASH DISCOUNT AS INDICATED BELOW BY ITEM

PRINT DATE	CUSTOMER NUMBER	CUSTOMER ORDER NUMBER AND DATE	GE SUPPLY JOB NO.	GE SUPPLY ORDER NO.	REL. NO.	PAGE OF	CUSTOMER REFFERENCE
11:02 01/20	0601278	CLEDA PATTON		810 022044	01	1 2	

INVOICE NUMBER	INVOICE DATE	DATE SHIPPED	SHIPPED FROM	SHIPPED VIA	TRANSPORTATION TERMS	CUST REQUESTED DELIVERY
889262	01/20/04	/ /	SAN ANTONIO	WILL CALL	FOB POS CHARGE	01/20/04

BILLED TO
GES CREDIT CARD UNMEASURED

4940 EISENHAUER RD STE 102
SAN ANTONIO TX 78218

SHIP TO
GES CREDIT CARD UNMEASURED

4940 EISENHAUER ROAD, #102
SAN ANTONIO TX 78218

CUSTOMER REQUESTED SHIP VIA

FROM
GE Supply

GES CREDIT CARD UNMEASURED

4940 EISENHAUER ROAD, #102
SAN ANTONIO TX 78218

CUSTOMER ORDER NUMBER AND DATE
CLEDA PATTON

ORDER / RELEASE NO.
022044 01

LINE NO.	MFG. CATALOG-DESCRIPTION	% C.D.	UNIT PRICE	U / M	% DISC.	AMOUNT	QUANTITY SHIPPED	QUANTITY TO BE SHIPPED	
1	B11-10FT HDG\CHANNEL		57636	C		5764		10	780342 P0130021 -01011
2	B52-10FT-HDG\13/16 CHANNEL ($/CFT)		23094	C		2309		10	780342 P0130021 -01022
3	B22-10FT-HDG\12GA STL CHNL ($/CFT)		12072	C		1207		10	780342 P0130021 -00111
4	B2000-SS4		23147	C		4629		20	780342 P0130021 -00000
	SUB TOTAL					13909			
	SALES TAX (38999)					1078			
	CALL CLEDA @ 635-8100 UPON ARRIVAL CLEDA PATTON W/ OMEGA POINT LAB								

SALE OF ANY GOODS COVERED BY THIS INSTRUMENT IS CONDITIONED ON THE TERMS AND CONDITIONS CONTAINED HEREIN INCLUDING THOSE ON THE REVERSE SIDE ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER ARE OBJECTED TO AND WILL NOT BE BINDING ON GE SUPPLY UNLESS SPECIFICALLY ASSENTED TO IN WRITING BY AN AUTHORIZED REPRESENTATIVE OF GE SUPPLY MANAGEMENT.

INVOICE TOTAL

MISC.CHGS.	AMOUNT
SHIPPING/ HANDLING	
CUTTING/ PARALLELING	
OTHER	

ENTERED BY

CHECKED BY

CUSTOMER REFERENCE

BOX / PACK
COILS / REELS
PIECES / PACK
TOTAL

THE UNDERSIGNED STATES THAT THE MATERIALS DESCRIBED ABOVE ARE BEING PURCHASED FOR INCORPORATION INTO THE PROJECT NAMED

THE ABOVE MERCHANDISE RECEIVED BY
(FULL NAME OF CONSIGNEE MSUT BE SIGNED)

Customer Signature

AMOUNT IF PAID BY CHECK

FORM NO. 1206 REV. 08/21/2001

www.gesupply.com

FILE COPY

Page 309

PACKING SLIP NUMBER

810 889262

GE Supply

SEND PAYMENT SHOWING INVOICE NUMBER & INVOICE DATE TO:

GE Supply
G.E. SUPPLY CO
CREDIT CARD ORDER

PAYMENT TERMS
% CASH DISCOUNT AS INDICATED BELOW BY ITEM

FROM

GE Supply

PRINT DATE	CUSTOMER NUMBER	CUSTOMER ORDER NUMBER AND DATE	GE SUPPLY JOB NO.	GE SUPPLY ORDER NO.	REL. NO.	PAGE	CUSTOMER REFFERENCE
11:02 01/20	0601278	CLEDA PATTON		810 022044	01	OF 2 2	

INVOICE NUMBER	INVOICE DATE	DATE SHIPPED	SHIPPED FROM	SHIPPED VIA	TRANSPORTATION TERMS	CUST REQUESTED DELIVERY
889262	01/20/04		SAN ANTONIO	WILL CALL	FOB POS CHARGE	01/20/04

BILLED TO
GES CREDIT CARD UNMEASURED
4940 EISENHAUER RD STE 102
SAN ANTONIO TX 78218

SHIP TO
GES CREDIT CARD UNMEASURED
4940 EISENHAUER ROAD, #102
SAN ANTONIO TX 78218

GES CREDIT CARD UNMEASURED
4940 EISENHAUER ROAD, #102
SAN ANTONIO TX 78218

CUSTOMER ORDER NUMBER AND DATE
CLEDA PATTON

CUSTOMER REQUESTED SHIP VIA

ORDER / RELEASE NO.
022044 01

LINE NO.	MFG. CATALOG-DESCRIPTION	% C.D.	UNIT PRICE	U / M	% DISC.	AMOUNT	QUANTITY SHIPPED	QUANTITY TO BE SHIPPED
	PACK END DATE ___/___/___						TIME ___:_	-
	PICK START DATE ___/___/___						TIME ___:_	-
	TRUCK EXIT DATE ___/___/___						TIME ___:_	-

SALE OF ANY GOODS COVERED BY THIS INSTRUMENT IS CONDITIONED ON THE TERMS AND CONDITIONS CONTAINED HEREIN INCLUDING THOSE ON THE REVERSE SIDE ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER ARE OBJECTED TO AND WILL NOT BE BINDING ON GE SUPPLY UNLESS SPECIFICALLY ASSENTED TO IN WRITING BY AN AUTHORIZED REPRESENTATIVE OF GE SUPPLY MANAGEMENT.

INVOICE TOTAL >

MISC CHGS.	AMOUNT
SHIPPING/ HANDLING	
CUTTING/ PARALLELING	
OTHER	

ENTERED BY

CHECKED BY

CUSTOMER REFERENCE

	BOX / PACK	COILS / REELS	PIECES / PACK
TOTAL >			

Page 310

THE UNDERSIGNED STATES THAT THE MATERIALS DESCRIBED ABOVE ARE BEING PURCHASED FOR INCORPORATION INTO THE PROJECT NAMED

THE ABOVE MERCHANDISE RECEIVED BY
(FULL NAME OF CONSIGNEE MSUT BE SIGNED)

Customer Signature

AMOUNT PAID BY CHECK

14987

Is is not an invoice. The TOTAL amount will be billed to

FORM NO. 1206 REV. 06/21/2001

www.gesupply.com

FILE COPY

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Framatome
CLIENT/PROJECT NUMBER 14980-117047
RECEIVED FROM Wescott
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2414 - 14980
DATE RECEIVED 1-14-04
DATE INSPECTED 1-14-04
INSPECTED BY: [signature]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B.O.	I.D. NO.	COMD MATL Y/N	CERT. RECD Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	ACCEPTANCE Hold	ACCEPTANCE Reject	REMARKS
Fire Cable	NA	Q	1 roll	Q	300208E0034046	Y	N	N	GOOD	X			Receiving verification only
7/C SSM1, 60M													
#10													

09-016-11/02

MEGGITT

MEGGITT SAFETY SYSTEMS INC
1915 VOYAGER AVE. SIMI VALLEY, CA. 93063
805-584-4100 FAX 805-584-9157

Packing Slip

Pickslip	75400
Page	1
Date	1/07/04
Customer No.	68108
Order Number	260500-001 SO
Related P.O.	
Brn/Plt	200

Ship To:

Omega Point Laboratories
Attn: Cleda Patton
16015 Shady Falls Road
Elmdorf TX 78112-9784

Invoice To:

IN HOUSE/MEGGITT SAFETY SYSTEMS
1915 VOYAGER AVENUE
SIMI VALLEY CA 93063

INSP	Priority

Ord Date	Promised	Customer P.O.	F.O.B.	Contract Administrator
10/15/03	11/15/03	Fred Rudek		DIANA COX, EXT 8127

Line	Item Number/Location,Lot	Description	Shipped	Tag	Avail.	UM	Due Date	Schedule B
IN HOUSE SALES ORDER TO PROVIDE TEST CABLES FOR LABORATORY TESTS TO BE PRESENTED TO NRC. MSSI WILL HAVE JOINT RIGHTS SHARING THE QUALIFICATION TO TEST RESULTS								
TEST FACILITY WILL BE READY END OF NOVEMBER								
15.000 *FG Rev.* *Serial # 001*	300208E0034B46J	FIRE CABLE	1			EA	01/15/04	Blank - Sales R

Weight:

Quality Assurance _____ Packer _____ Track/Airbill # _____ Ship Via:

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Framatome
CLIENT/PROJECT NUMBER 14980-117047
RECEIVED FROM JCW Lite
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2413 - 14980
DATE RECEIVED 1-13-03 + 3-3-04
DATE INSPECTED 1-14-03 + 3-3-04
INSPECTED BY: CBallard

ITEM DESCRIPTION	P.O. NO.	QUANTITY Ordered	QUANTITY Rec'd	QUANTITY B.O.	I.D. NO.	CERTIFIED MATL Y/N	CERTIFIED WELD Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	ACCEPTANCE Hold	ACCEPTANCE Reject
4"x2"x 12ga Tube Track	142170	20'	20'	Q	CH4-6C2	Y	Y	N	Good	Y		
Tube Clamp 3-Dir.	142170	10	10	Q	NC-2-750-3N	Y	Y	N	Good	X		
2"x4"x2" Splice	142170CO#1	1	1	Q	SCA-GC2	Y	Y	N	Good	X		
Truss Head Bolt	142170CO#1	Q	8	Q	THBZN-500X0.75	Y	Y	N	Good	X		
Hex Nut	142170CO#1	Q	8	Q	HN-ZN-500	Y	Y	N	Good	X		
Flat WASHER	142170CO#1	Q	8	Q	FLW-ZN-500	Y	Y	N	Good	X		

REMARKS: Change order 142170CO#1 was made to include splice (bolts, nuts + washers) as we could not locate your purchase splice.

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER

14217Q COPY

Date: 2/25/2004
Page: 1 of 1

Order From:	Deliver to:
J. C. White Company, Inc. P.O. Box 5495 Greenville SC 29606 864-288-4692	Omega Point Laboratories, Inc 16015 Shady Falls Road Elmendorf TX 78112 (210) 635-8100

Vendor No:

Your Item Number Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
4"x2"x12 ga Tubetrack Part# CH4-GC-2.0	001	20	Feet	14.14	$282.80
3-Dir. Tube Clamp Part# NC-2-750-3D	002	10	Each	$66.13	$661.30
4" Channel Splice #SC4GC-2 (Bolts, Nuts & washers are included w/splice) JP 3-3-04	003	1	Each	$11.08	$11.08

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."

QA Approval [signature]

Date 2-25-04

Please Quote Purchase Order Number on all correspondence.
Special Instruction: Please include certificate of conformance to Catalog spec.

Subtotal:	$955.18
Freight:	0.00
Tax Amount:	0.00
Total Value:	$955.18

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER
14217Q Page 315

Date: 1/5/2004
Page: 1 of 1

Order From:	Deliver to:
J. C. White Company, Inc. P.O. Box 5495 Greenville SC 29606 864-288-4692	Omega Point Laboratories, Inc 16015 Shady Falls Road Elmendorf TX 78112 (210) 635-8100

Vendor No:

Your Item Number Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
4"x2"x12 ga Tubetrack Part# CH4-GC-2.0	001	20	Feet	14.14	$282.80
3-Dir. Tube Clamp Part# NC-2-750-3D	002	10	Each	$66.13	$661.30

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."
QA Approval [signature]
Date 1-5-04

Please Quote Purchase Order Number on all correspondence.
Special Instruction: Please include certificate of conformance to Catalog spec.

Subtotal:	$944.10
Freight:	0.00
Tax Amount:	0.00
Total Value:	$944.10

080525/11-89

James C. White Company, Inc.
Manufacturer of TUBETRACK®
P.O. Box 5495, Greenville, S.C. 29606
Phone (864) 288-4692 Fax (864) 234-0526

Packing List

Ship To: OMEGA POINT LABORATORIES
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112-9784

Customer PO #	JCWCO Invoice #	Invoice Date	Terms	JCWCO Order #	Customer #	Ship Via
14217Q	38024	1/8/2004	NET 30 DAYS	15894	9145	AAA COOPER

Sold To: OMEGA POINT LABORATORIES
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112-9784

Item	Ordered	Description	Shipped
CH4-GC2	20 FT	CHANNEL, HDGS, 2"X4"X2"X20' COMMERCIAL GRADE MATERIAL - 10 CFR 21 DOES NOT APPLY	20
NC-2-750-3D	10 EA	CLAMP, SS304, 2 TUBE 3/4", 3 DIRECTIONAL COMMERCIAL GRADE MATERIAL - 10 CFR 21 DOES NOT APPLY	10
SHIP	1	Shipping Charges	1

Received
1-13-03

James C. White Company, Inc.
Manufacturer of TUBETRACK®
P.O. Box 5495, Greenville, S.C. 29606
Phone (864) 288-4692 Fax (864) 234-0526

Packing List

Ship To: OMEGA POINT LABORATORIES
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112-9784

Customer PO #	JCWCO Invoice #	Invoice Date	Terms	JCWCO Order #	Customer #	Ship Via
14217Q C.O. 1	38294	3/2/2004	NET 30 DAYS	16153	9145	UPS RED

Sold To: OMEGA POINT LABORATORIES
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112-9784

Item	Ordered	Description	Shipped
SC4-GC2	1 EA	SPLICE, CHAN 2X4X2, HDGS INCLUDES BOLTING	1
THBZN-500X0.75	8 EA	TRUSS HEAD BOLT, ZINC PLATED STL, 1/2-13X.75"	8
HN-ZN-500	8 EA	HEX NUT, ZINC PLATED STEEL, 1/2-13	8
FLW-ZN-500	8 EA	WASHER, FLAT, ZINC PLATED STEEL, 1/2" (ITEMS 2 - 4 ARE BOLTING FOR ITEM 1 AND INCLUDED IN THE PRICE OF THE FITTING)	8

Received
3/3/04

James C. White, Inc.
Manufacturer of TUBETRACK®

Phone: 800-421-9410
Local: 864-288-4692
FAX: 864-234-0526
Mail: P.O. Box 5495, Greenville, SC 29606-5495

TUBETRACK IS A REGISTERED TRADEMARK OF JAMES C. WHITE CO.

CERTIFICATE OF CONFORMANCE/COMPLIANCE

CUSTOMER:
Omega Point Laboratories
16015 Shady Falls Road
Elmendorf, Texas 78112

DATE: 2 March, 2004

OUR SALE NO: 15894

YOUR ORDER NO: 14217Q c/o 1

P.O. ITEM	DESCRIPTION	MATERIAL DESCRIPTION
1	20 FT. CH4-GC2 TUBETRACK Channel	ASTM A1011-Grade 36, Hot Dipped Galvanized after fabrication.
2	10 EA. NC-2-750-3D Tubing Clamp	Type 304 Stainless Steel
3	1 EA. SC4-GC2 TUBETRACK Channel Splice	ASTM A1011-Grade 36, Hot Dipped Galvanized after fabrication.
4	8 EA. THBZN-500X0.75 Truss Head Bolt	Zinc Plated Steel
5	8 EA. HN-ZN-500 Hex Nut	Zinc Plated Steel
6	8 EA. FLW-ZN-500 Flat Washer	Zinc Plated Steel

This is to certify that the material furnished for your order and described above complies to the requirements of the applicable material specifications and meets the applicable requirements of this purchase order and incorporated specifications.

Material is Commercial Grade.

JAMES C. WHITE CO., INC.

BY: _____
John M. Detandt, Quality Assurance

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Framatome
CLIENT/PROJECT NUMBER 14980-112047
RECEIVED FROM Texas Specialty Steel
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2408.14980
DATE RECEIVED 1-7-04
DATE INSPECTED 1-7-04
INSPECTED BY: [signature]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Ordered	QUANTITY Rec'd	QUANTITY B.O.	I.D. NO.	COMM MATL Y/N	CERT REQ'D Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	ACCEPTANCE Hold	ACCEPTANCE Reject	REMARKS
3" Sq. Tube X0.25	142190	1	1	0	3"X0.25	Y	Y	N	Good	X			
3" Sq Tube X.1875	142190	1	1	0	3" X .1875	Y	Y	N	Good	X			
3/8" Sch40 pipe	142190	3	3	0	3/8" Sch40	Y	Y	N	Good	X			
8"X1"X5' Plate	142190	1	1	0	8"x1"x5'	Y	Y	N	Good	X			
12"X12"X½" Plate	142190	2	2	0	12"x12"x½"	Y	Y	N	Good	X			
5"X5"X½"	142190	1	1	0	5"x5"x½"	Y	Y	N	Good	X			
½" ATR	142190	2	2	0	½" ATR	Y	Y	N	Good	X			

09-016-11/02

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER

14219Q

Date: 1/5/2004
Page: 1 of 1

Order From:	Deliver to:
Texas Specialty Steel 12270 Hwy. 181 S San Antonio TX 78223 210-633-0047	Omega Point Laboratories, Inc 16015 Shady Falls Road Elmendorf TX 78112 (210) 635-8100

Vendor No.

Your Item Number Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
3"x3"x0.25" Tube Steel	001	1	Each		$13.78
3"x3"x0.1875" Tube Steel	002	1	Each		$12.89
3/8" Schedule 40 steel pipe	003	3	Each	$21.76	$65.29
8"x1" Steel Plate	004	1	Each		$42.50
12"x12"x 1/2" Steel Plate	005	2	Each	$12.76	$25.53
5"x5"x 1/2" Steel Plate	006	1	Each		$2.25
1/2" All thread rod	007	2 (3)	Each	$4.68	$14.03

gf 1-5-04

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."
QA Approval
Date 1-5-2004

Please Quote Purchase Order Number on all correspondence.

Subtotal:	$176.27
Freight:	0.00
Tax Amount:	0.00
Total Value:	$176.27

080625/11-89

TEXAS SPECIALTY STEEL
12270 Hwy 181 So.
San Antonio, Texas 78223
(210) 633-0047
Fax 633-2344

SALES ORDER 5097 Page 321

Omega Pipe & Supply Inc
16015 Shadow Falls Road
Elmendorf TX 78112

DELIVER TO:

DATE ORDERED	PO #	DATE SHIPPED	SHIPPED VIA	F.O.B.	SALESMAN
12-5-04	142190		OT		

QUANTITY		DESCRIPTION	WEIGHT	PRICE	TOTAL
1		3" Sq Tube x 0.25 5'			13.78
1		3" Sq Tube x.1875 5'			12.59
3		3/8" Sch 40 x 21' Pipe		21.76ea	65.28
1		8" X 1" x 5'			42.50
2		12 x 12 x 1/2 Pl.		12.76ea	25.52
1		5 x 5 x 1/2 Pl			2.25
2		1/2 x All Thread Rod 10'		4.68ea	9.36
		☐ TAXABLE ☐ NON-TAXABLE			183.16

SMI-TEXAS
P. O. Box 911
Seguin, Texas 78156-0911
(830) 372-8200

CERTIFIED MILL TEST REPORT

For additional copies call
(830) 372-8485

We hereby certify that the test results presented here are accurate and conform to the reported grade

David J. Schacht
Quality Assurance Manager

HEAT NO.: [illegible]	SOLD TO	TEXAS SPECIALTY STEEL 12270 HWY 181 SOUTH SAN ANTONIO, TX 78221	SHIP TO	TEXAS SPECIALTY STEEL 12270 HIGHWAY 181 SOUTH SAN ANTONIO, TX 78223-9611	SHIP: 101857/8 BOL #: 32677 INV #: CUST PO #: J-8403 CUST P/N
SECTION: 5"x12"x30'-0" 5" 127x12.7x8.636 GRADE: ASTM A36-01				

CHEMICAL ANALYSIS		PROPERTIES						
	%	MECHANICAL	TEST I		TEST		TEST	
			IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC
C	0.14							
Mn	0.61	Yield Strength	41.5 KSI	287.2 MPA				
P	0.008	Tensile Strength	67.0 KSI	461.9 MPA				
S	0.027	Elongation	31 %	34 %				
Si	0.17	Gauge Length	8 IN	203 MM				
Cu	0.25	Reduction of Area						
Cr	0.10	Bend Test						
Ni	0.07	Diameter						
Mo	0.010	Charpy Impact						
Cb	0.002	Test Temp						
V	0.002	Sample Size						
Sn	0.009	Orientation						
B	0.0001	Hardness						
Ti	0.001							
C.Eq.	0.29							

JOMINY RESULTS - Rockwell C hardness at 1/16th inch increments												GRAIN SIZE	INCLUSION RATING					
1	2	3	4	5	6	7	8	9	10	11	12	METHOD	METHOD					
													TYPE	T	K	T	K	T	K
13	14	15	16	18	20	22	24	26	28	30	32	RESULT	SIZE					

100% MELTED AND MANUFACTURED IN THE USA AND FREE OF MERCURY CONTAMINATION IN THE PROCESS

REMARKS:

This product was manufactured by SMI STEEL INC

AUG 12-2003 0[illegible]

Page 1 of 1

B/L# 281627
Date 12/28/03

NUCOR
BAR MILL GROUP
JEWETT DIVISION

CERTIFIED MILL TEST REPORT

A Division of NUCOR Corporation
Post Office Box 126 Jewett, Texas 75846 Telephone (903) 626-4461 Sales (800) 527-6445

ISO 9002 Registered by SRI Quality System Registrar

Sold To:

Ship To:

Size / Grade	Heat Number	Customer PO Number	C	Mn	Si	S	P	V	Nb	Cu	Cr	Ni	Mo	Sn	Head Test
1 X 4	335-4002	AUS-263295	.15	.64	.16	.028	.006	.004	.000	.34	.11	.11	.019	.010	
A36-03A/A709-03A/SA36-98			Tensile 1: 63100 Yield 1: 40500 Elong% 1: 37												
			Tensile 2: 62400 Yield 2: 40100 Elong% 2: 34												
1 X 6	335-4557	AUS-263273	.13	.66	.18	.029	.003	.004	.004	.30	.13	.23	.004	.008	
A36-03A/A709-03A/SA36-98			Tensile 1: 64000 Yield 1: 44200 Elong% 1: 30												
			Tensile 2: 66300 Yield 2: 44600 Elong% 2: 30												
1 X 5	334-4792	AUS-263473	.15	.75	.20	.040	.003	.008	.007	.38	.32	.24	.053	.009	
A36-03A/A709-03A/SA36-98			Tensile 1: 66000 Yield 1: 45000 Elong% 1: 24												
			Tensile 2: 65100 Yield 2: 43900 Elong% 2: 26												
1/2 X 2 1/2	02-2010	AUS-263138	.15	.64	.19	.040	.020	.000	.009	.39	.11	.12	.040	.000	
A36-03A/A709-03A/SA36-98			Tensile 1: 67300 Yield 1: 45800 Elong% 1: 27												
			Tensile 2: 67500 Yield 2: 45700 Elong% 2: 26												
1/4 X 1 1/2	333-4492	AUS-262834	.14	.77	.22	.035	.008	.005	.008	.46	.24	.16	.061	.015	
A36-03A/A709-03A/SA36-98			Tensile 1: 69000 Yield 1: 48100 Elong% 1: 27												
			Tensile 2: 70100 Yield 2: 50300 Elong% 2: 26												
1 X 8	334-4429	AUS-259310	.16	.77	.23	.046	.012	.005	.004	.47	.17	.13	.047	.012	
A36-03A/A709-03A/SA36-98			Tensile 1: 72200 Yield 1: 47700 Elong% 1: 20												
			Tensile 2: 71900 Yield 2: 44300 Elong% 2: 22												
1 X 10	333-5081	AUS-261471	.15	.97	.22	.013	.006	.003	.004	.33	.10	.10	.035	.013	
A36-03A/A709-03A/SA36-98			Tensile 1: 67300 Yield 1: 45100 Elong% 1: 29												
			Tensile 2: 63000 Yield 2: 44700 Elong% 3: 27												

ELONGATION IN 8 INCH SCALE

MELTED AND MANUFACTURED IN U.S.A.

ALL MATERIAL STRAND CAST

CHIEF METALLURGIST

S/LN 104511
Date 12/23/03

NUCOR
BAR MILL GROUP
JEWETT DIVISION

CERTIFIED MILL TEST REPORT

A Division of NUCOR Corporation
Post Office Box 126 Jewett, Texas 75846 Telephone (903) 626-4461 Sales (800) 527-6445

ISO 9002 Registered by SRI Quality System Registry

Sold To:

Ship To:

Size / Grade	Heat Number / PO Number	C	Mn	Si	S	P	V	Nb	Cu	Cr	Ni	Mo	Bend Ea. Test
8 X 11.5	334-4587 AUS-263135	.13	.75	.25	.035	.009	.003	.013	.51	.12	.20	.035	.010
ASTM A36-03A/A572-03A GD 50		Tensile 1: 63900 Yield 1: 51700 Elong% 1: 21											
		Tensile 2: 72300 Yield 2: 53400 Elong% 2: 28											
3/8 X 10	335-5316 AUS-263135	.16	.77	.17	.030	.011	.006	.004	.36	.13	.09	.029	.011
A36-03A/A709-03A/SA36-98		Tensile 1: 73200 Yield 1: 50290 Elong% 1: 24											
		Tensile 2: 71900 Yield 2: 48500 Elong% 2: 25											
1/2 X 4	334-3444 AUS-263135	.14	.61	.18	.040	.012	.004	.004	.46	.13	.26	.035	.014
A36-03A/A709-03A/SA36-98		Tensile 1: 58100 Yield 1: 46300 Elong% 1: 29											
		Tensile 2: 64000 Yield 2: 43700 Elong% 2: 25											
1/2 X 10	333-4016 AUS-263135	.15	.75	.21	.040	.014	.004	.004	.34	.17	.14	.041	.011
A36-03A/A709-03A/SA36-98		Tensile 1: 72100 Yield 1: 45800 Elong% 1: 25											
		Tensile 2: 70300 Yield 2: 46200 Elong% 2: 25											
1/2 X 12	335-4456 AUS-263135	.17	.82	.24	.034	.009	.035	.005	.44	.16	.10	.032	.012
A36-03A/A709-03A/SA36-98		Tensile 1: 73000 Yield 1: 49600 Elong% 1: 27											
		Tensile 2: 75900 Yield 2: 51000 Elong% 2: 25											
1/2 X 12	334-3703 AUS-263135	.19	.69	.16	.026	.005	.037	.005	.31	.17	.34	.037	.018
A36-03A/A709-03A/SA36-98		Tensile 1: 67100 Yield 1: 46400 Elong% 1: 27											
		Tensile 2: 72400 Yield 2: 49900 Elong% 2: 28											
1 X 12	333-3345 AUS-263135	.15	1.02	.21	.024	.010	.036	.006	.46	.08	.13	.035	.015
A36-03A/A709-03A/SA36-98		Tensile 1: 71600 Yield 1: 43300 Elong% 1: 21											
		Tensile 2: 70000 Yield 2: 44200 Elong% 2: 21											

ELONGATION IN 8 INCH SCALE

MELTED AND MANUFACTURED IN U.S.A.

ALL MATERIAL STRAND CAST

CHIEF METALLURGIST

Page 324

HANNA

Certification

[redacted] 1/12/04 6

Shipped From: Hanna Steel Corporation
Tuscaloosa Division
1701 Boone Blvd
P O Box 426
Northport AL 35476

Cust P.O.: AU8663981
Date Shipped: 1/09/04
Load Tally 3-80526
Invoice # 7E5220

Sold To:

Ship To:

07 4450712 3 SQ 3/16 A500 20.000FT
CONTINUED

B3X7179	.062	.684	.014	.004	.318	.027	.020	.070	.348	.029	.010	.010
	N .0093	Ti .0030	B .0002									

Heat# B3X7179 was melted and manufactured in the USA

A3X2229	.054	.065	.010	.008	.011	.025	.000	.050	.170	.010	.070	.020
	N .0090	Ti .0020	B .0002									

Heat# A3X2229 was melted And manufactured in the USA

Hanna Steel Corporation
1512 Commerce Avenue
P.O. Box 832
Fairfield, Alabama 35064
205 783 1111
DUNS No. 05-402-8764

Randy Kirkland
Manager of QA
Hanna Steel Corporation

HANNA

Certification 946589 1/12/04

Shipped From: Hanna Steel Corporation
Tuscaloosa Division
1701 Boone Blvd
P O Box 428
Northport AL 35476

Cust P.O.: AUS263891
Date Shipped: 1/06/04
Load Tally 5-80526
Invoice # 749220

07 4450412 3 SQ 1/4 HRA500 20.000FT
CONFORMS

Heat #	C	Mn	P	S	Si	Al	Cb	Cr	Cu	Mo	Ni	V
A33236	.186	.660	.013	.013	.010	.040	.000	.000	.026	.000	.000	.001

Heat# A33236 was melted and manufactured in the USA

A33237	.173	.680	.013	.015	.012	.040	.000	.000	.031	.000	.000	.001

Heat# A33237 was melted and manufactured in the USA

06 7351212 PKG 11CA HRA500 20.000FT

3168041	C68164	A500	3001		B	1	52,100	60,100	27.5	379
3168042	C68164	A500	3001		B	1	52,200	60,100	27.5	379

Total Weight 3,878

Heat #	C	Mn	P	S	Si	Al	Cb	Cr	Cu	Mo	Ni	V
C68164	.180	.390	.006	.012	.017	.042	.002	.030	.050	.021	.020	.001
	N .0060	Ti .0010	B .0005									

Heat# C68164 was melted and manufactured in the USA.

07 4450712 3 SQ 3/16 A500 20.000FT

3139524	B3X7179	A500	3001		B/C	1	60,000	67,000	26.5	380
3139524	A3X2229	A500	3001		B/C	1	62,000	69,000	26.3	382

Total Weight 4,809

Hanna Steel Corporation
2812 Commerce Avenue
P O Box 428
Northport, Alabama 35476
205 759 7411
DUNS No. 00-402-3729

	C	Mn	P	S	Si	Al	Cb	Cr	Cu	Mo	Ni	V

Certified Mill Data

HANNA Certification 346585 1/12/04 2

Shipped From: Hanna Steel Corporation
Tuscaloosa Division
1701 Beone Blvd
P O Box 428
Northport AL 35476

Cust P.O.: AUS2618881
Date Shipped: 1/05/04
Load Tally 5-80526
Invoice # 729220

Ship To:

03 7351112 2X6 11GA HRA500 40.000FT
CONTINUED

316#040	B32002	A500	2001		B	1	42.100	58.100	35.5	B71

Total Weight 6,201

Heat #	C	Mn	P	S	Si	Al	Cb	Cr	Cu	Mo	Ni	V
B32002	.026	.340	.012	.014	.037	.037	.000	.000	.023	.000	.000	.000

Heat# B32002 was melted and manufactured in the USA

04 4300412 2 SQ 1/4GR A500 GR.B 20.000FT

31601?6	A33561	A500	2001		B/C	1	64,000	71.000	24.2	B81
31601?6	A33559	A500	2001		B/C	1	55,000	67.000	27.4	B79

Total Weight 5,410

Heat #	C	Mn	P	S	Si	Al	Cb	Cr	Cu	Mo	Ni	V
A33561	.180	.670	.008	.012	.011	.055	.000	.020	.019	.005	.010	.001

Heat# A33561 was melted and manufactured in the USA

Heat #	C	Mn	P	S	Si	Al	Cb	Cr	Cu	Mo	Ni	V
A33559	.160	.670	.012	.021	.009	.057	.000	.031	.024	.005	.020	.001

Heat# A33559 was melted and manufactured in the USA

05 4450412 3 SQ 1/4 HRA500 20.000FT

31392?7	A33236	A500	2001		B/C	1	65,000	70.000	27.2	B81
31392?7	A33237	A500	2001		B/C	1	63,000	71.000	24.8	B79

Total Weight 4,533

Hanna Steel Corporation
3912 Commerce Avenue
P.O. Box 598
Fountain, Arkansas 72206
206 750 1711
DUNS No. 00-402-3704

Cont'd - next page

SHARON TUBE COMPANY P.O. BOX 492, SHARON, PENNA. 16146

Report of CHEMICAL and PHYSICAL Tests for: WATLAND FUEL
WATLAND PA

April 29, 2003

Sharon Tube
Order No. 134961

Customer
Order No. 4503030028

NPS DESCRIPTION	HEAT NUMBER	C	Mn	P	S	Si	Al	Cu	Ni	Cr	Mo	V	Sn	YIELD PSI	ULTIM. PSI	2"% ELG.	HYDRO TEST PSI
1/4",Std,Black Mat,Pe	2141839	0.180	0.380	0.024	0.002	0.015	0.050	0.020	0.010	0.060	.010	.000	0.001	40200	62810	37.0	700
1/4",Std,Galvanized,Pe	2141839	0.180	0.380	0.024	0.002	0.015	0.050	0.020	0.010	0.060	.010	.000	0.001	40200	62810	37.0	700
3/8",Std,Black Mat,Pe	2111798	0.130	0.330	0.016	0.006	0.021	0.043	0.020	0.010	0.020	.000	.000	0.002	37450	58160	39.0	700
3/8",Std,Galvanized,Pe	2230520	0.140	0.340	0.021	0.007	0.021	0.053	0.020	0.010	0.030	.010	.000	0.001	36790	57590	41.0	700

Certified Test Report Type 3.1B in accordance with EN 10204/ISO 3834/DIN 50049. Material has not come in direct contact with mercury. Any of its compounds or any mercury bearing devices during the manufacturing process tests or inspections.

Continuous Buttweld Steel Pipe Meeting the Requirements of ASTM A53 02 TYPE F GRADE A/ASME SA-53 Type F 1997 Edition.
Each length of pipe hydrostatically tested. No weld repairs have been performed.
Yield strength determined @ 0.2% offset. All bend or flatten tests satisfactory.

Steven H. Grabert, Manager, Technical Services, being duly sworn according to law, deposes and says that the figures set forth above are correct, as contained in the figures of Sharon Tube Company.

Texas Specialty Steel
12270 HWY. 181 SOUTH
Phone (210)633-0047
SAN ANTONIO, TEXAS 78223
FAX (210) 633-2344

attn: Cleda

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD
ELMENDORF, TEXAS 78112

Gentlemen;

We hereby certify that the items supplied on this order conform to Applicable standards and specifications.

PURCHASE ORDER NO. 142190

QUALITY CONTROL REPRESENTATIVE

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME: Framatome-ANP
CLIENT/PROJECT NUMBER: 14980-117047
RECEIVED FROM: Meggitt Safety Systems
PROJECT LOCATION: Omega Point Labs

REPORT NUMBER: 2407 . 14980
DATE RECEIVED: 1-2-04
DATE INSPECTED: 1-5-04
INSPECTED BY: [illegible]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	QUANTITY Rec'd	QUANTITY B.O.	I.D. NO	(CRDM) MAIL Y/N	ETM RECD Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	ACCEPTANCE Hold	ACCEPTANCE Reject	REMARKS
Fire Cable 4/C #8	NA	8	Roll	8	300217E0040822	Y	N	N	GOOD	X			
Fire Cable 8/C #12	NA	8	Roll	8	300283E0040828	Y	N	N	GOOD	X			
Fire Cable 7/C #14	NA	8	Roll	8	300286E0040844	Y	N	N	GOOD	X			

Receiving only

CONSIGNEE DELIVERY RECEIPT

Freight Bill #	CONSIGNEE	SHIPPER
759205116 R0 TNBR#:	OMEGA POINT LABORATORIES 16015 SHADY FALLS RD	MEGGITT SAFETY SYS INC SV 1915 VOYAGER AVE
Date: 12/19/2003	ELMENDORF TX 78112-9784	SIMI VALLEY CA 93063

H/U	PCS	HM	DESCRIPTION	WGT-LBS	NMFC	PCF	CLASS	RATE	CHARGES
			FXFW PO# FREDKUDEK 805-584-4100 :SHIP PHONE #						
	3		EACH BOX IS 48"X48"X74" FIRE CABLE	75			060		
			VANH12/23/2003 EZ-FLYER 000423 FUEL SURCHG LTL SHPT4.70% BEFORE: SGO 12/29/2003 FXF INTERREG						
3	3		PREPAID - WILL INVOICE SHIPPER	75					

ANY ADDITIONAL SERVICES MAY RESULT IN ADDITIONAL CHARGES
CHARGES SUBJECT TO CHANGE

B/L # 74945 0.00

P.O. # FREDKUDEK

Received by:

Date: 12-22-03 Arrive: 12:25 Depart:

Delv. Driver: Tony 3 Driver #: 32563

~~DELV WITH S/W INTACT~~ 3 # of Skids Delv

☐ CLEAR ☐ SHORT ☐ OVER ☐ DAMAGE

EXCEPTIONS:

FedEx Freight

FedEx Freight East
P.O. BOX 840
HARRISON, AR 72602-0840
Toll-Free

MEGGITT
MEGGITT SAFETY SYSTEMS INC
1915 VOYAGER AVE. SIMI VALLEY, CA. 93063
805-584-4100 FAX 805-584-9157

Packing Slip

Picksllp	74945
Page	1
Date	12/19/03
Customer No.	68108
Order Number	260500-000 SO
Related P.O.	
Brn/Pll	200

INSP	Priority

Ship To:

Omega Point Laboratories
Attn: Cleda Patton
16015 Shady Falls Road
Elmdorf TX 78112-9784

Invoice To:

IN HOUSE/MEGGITT SAFETY SYSTEMS
1915 VOYAGER AVENUE
SIMI VALLEY CA 93063

Ord Date	Promised	Customer P.O.	F.O.B.	Contract Administrator
10/15/03	11/15/03	Fred Rudek		DIANA COX, EXT 8127

Line	Item Number/Location,Lot	Description	Shipped	Tag	Avail.	UM	Due Date	Schedule B
IN HOUSE SALES ORDER TO PROVIDE TEST CABLES FOR LABORATORY TESTS TO BE PRESENTED TO NRC. MSSI WILL HAVE JOINT RIGHTS SHARING THE QUALIFICATION TO TEST RESULTS								
TEST FACILITY WILL BE READY END OF NOVEMBER								
14.000 *FG* *Rev.*	300217E0040B12J	FIRE CABLE	1			EA	11/15/03	Blank - Sales R
Serial # 001								
17.000 *FG* *Rev.*	300283E0040B28J	FIRE CABLE	1			EA	11/15/03	Blank - Sales R
Serial # 001								
18.000 *FG* *Rev.*	300286E0040B44J	FIRE CABLE	1			EA	11/15/03	Blank - Sales R
Serial # 001								

12/19/03

Weight:

Quality Assurance | Packer | Track/Airbill # | Ship Via: Ground

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Omega Point Labs
CLIENT/PROJECT NUMBER OPL Equipment
RECEIVED FROM PMC
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2303 . OPL
DATE RECEIVED 2-11-02
DATE INSPECTED 3-11-02
INSPECTED BY: [signature]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	Rec'd	B.O.	I.D. NO.	CONT. MATL Y/N	CERT. RECD Y/N	CONTAINER INTEGRITY	EXCEPTIONS	ACCEPTANCE Accept	Hold	Reject	REMARKS
Chromel TC Wire	134540	10#	11#	0	KKP-16 Spool-00395248	Y	Y	Good	None	K			
Alumel TC Wire	134540	10#	11#	0	KKN-16 Spool-00395246	Y	Y	Good	None	K			

09-016-9/97

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER
13454Q Page 334

Date: 1/31/2002
Page: 1 of 1

Order From: PMC
680 Hayward Street
Manchester
NH 03103
603-622-3500

Deliver to: Omega Point Laboratories, Inc
16015 Shady Falls Road
Elmendorf
TX 78112
(210) 635-8100

Vendor No: 0024

Your Item Number / Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
KP-16 Chromel TC Wire	001	10.00	Pounds	$23.20	$232.00
KN-16 Alumel TC Wire	002	10.00	Pounds	$27.00	$270.00
Calibration Services	003	2.00	Each	$8.50	$17.00

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements"
QA Approval C Dalton
Date 1-31-2002

Please Quote Purchase Order Number on all correspondence.

Special Instructions: Please include Certificate of Conformance to attached Specification Sheet and Calibration Data traceable to NIST

Subtotal:	$519.00
Freight:	0.00
Tax Amount:	0.00
Total Value:	$519.00

080625 11 89

OMEGA POINT LABORATORIES
MATERIAL PURCHASING SPECIFICATIONS

SPECIFICATION NUMBER: MS-04-1345AQ-OPL

VENDOR: PMC Corporation

VENDOR PRODUCT NUMBER	PRODUCT DESCRIPTION
KP-16	Bare Chromel Thermocouple Wire (16 gauge)
KN-16	Bare Alumel Thermocouple Wire (16 gauge)

Material as defined above shall be provided in accordance with the Critical Characteristics as listed below:

TEST	DESCRIPTION	TEMPERATURE RANGES MIN. - MAX
ASTM E220-96	Std. Test Method for Calibration of Thermocouples by Comparison	32°F - 2300°F
Thermocouple Type K	Table 2 "Calibration Uncertainties in Calibrating Thermocouples by Comparison Method – Temperatures in Degrees Fahrenheit	

Note: Temperature deviations above 2000°F are for reference only when using 16 gauge wire.

QUALITY ASSURANCE REQUIREMENTS

1.0 QUALITY PROGRAM

Seller shall furnish this item in accordance with Quality Program approved by Omega Point Laboratories. Material specified herein is to be produced and tested in accordance with vendor quality standards, methods, guidelines and manufacturing instructions as defined in that Quality Program.

2.0 QUALITY VERIFICATION

Receiving Inspection - Buyer shall inspect items upon receipt to verify compliance with purchase order requirements. Rejected items shall be returned at seller's expense.

Document Review - Final acceptance shall be based on satisfactory review of required certifications and/or supporting documents.

3.0 CERTIFICATIONS

3.1 Certification that supplied materials comply with this material specification and listing Critical Characteristics shall be provided. This certificates shall reference Omega Point Labs purchase order number and specification number for all material furnished under this specification. This Certification shall be signed by the appropriate vendor representative.

3.2 The material furnished under this specification shall be a product that complies with the following:

3.2.1 Has been tested and passed all tests specified herein.

3.2.2 Manufacturing methods for this material have not changed. Vendor will advise Omega Point in writing of any changes in the manufacturing prior to material manufacture.

3.2.3 Raw materials used in the manufacture of this material meet Vendor specifications.

4.0 AUDITS/RIGHTS OF ACCESS

Omega Point Labs reserves the right to audit your facility to verify compliance with the purchase order and specification requirements with a minimum ten (10) day notice.

5.0 IDENTIFICATION

Seller shall identify each item with a unique traceability number by physical marking or tagging. These identification numbers shall be traceable to certifications and packing lists.

6.0 PACKING/SHIPPING

All materials shall be packaged in air tight, moisture free containers and shall be free of foreign substances such as dirt, oil, grease or other deleterious materials.

All materials shall be suitably crated, boxed or otherwise prepared for shipment to prevent damage during handling and shipping.

QUALITY ASSURANCE APPROVAL:

CBatton

Title QA Assist

Date 1-31-02

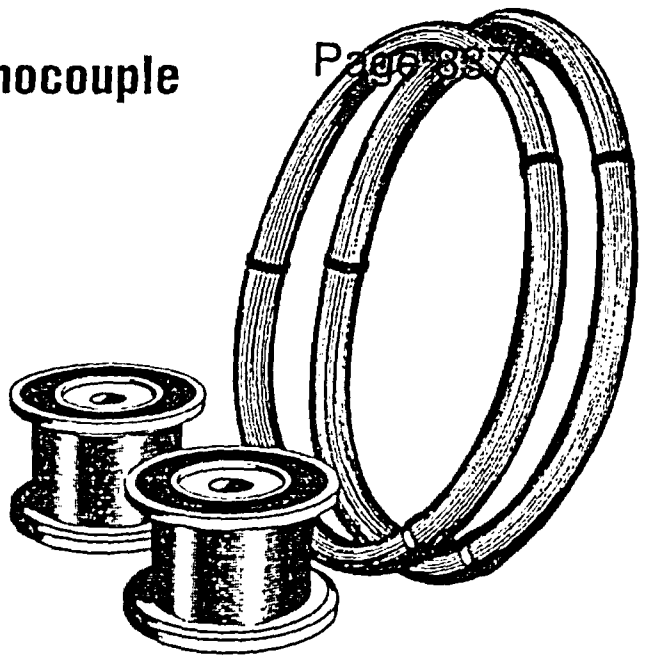
AVL Verification

Class: A

PMC®

Bare Thermocouple Wire

Page 837



PMC is continuously committed to meet the specific needs of the industry and it's customers. In order to meet this committment, PMC has become a full service company. Therefore along with insulated wire product capabilities, PMC operates high speed stranders and spooling equipment to provide a full line of bare wire items.

Customers may select from the items listed below as matched pairs to meet standard limits of error. On most items, variations are available to meet particular applications, including special limits of error or extension grade tolerances.

You will find our qualified sales and engineering staff eager to assist you in these selections.

SOLID BARE THERMOCOUPLE WIRE PART NUMBERS												
		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N		
WIRE GA B&S	WIRE SIZE DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -	STANDARD PACKAGE COIL/REEL LBS
8	.128	JP-8	JN-8	KP-8	KN-8	—	—	EP-8	EN-8	NP-8	NN-8	COIL 50#
14	.064	JP-14	JN-14	KP-14	KN-14	TP-14	TN-14	EP-14	EN-14	NP-14	NN-14	REEL 50#
16	.050	JP-16	JN-16	KP-16	KN-16	TP-16	TN-16	EP-16	EN-16	NP-16	NN-16	REEL 25#
18	.040	JP-18	JN-18	KP-18	KN-18	TP-18	TN-18	EP-18	EN-18	NP-18	NN-18	REEL 10#
20	.032	JP-20	JN-20	KP-20	KN-20	TP-20	TN-20	EP-20	EN-20	NP-20	NN-20	REEL 10#
24	.020	JP-24	JN-24	KP-24	KN-24	TP-24	TN-24	EP-24	EN-24	NP-24	NN-24	REEL 5#
26	.015	JP-26	JN-26	KP-26	KN-26	TP-26	TN-26	EP-26	EN-26	NP-26	NN-26	REEL 5#
28	.012	JP-28	JN-28	KP-28	KN-28	TP-28	TN-28	EP-28	EN-28	NP-28	NN-28	REEL 1#
30	.010	JP-30	JN-30	KP-30	KN-30	TP-30	TN-30	EP-30	EN-30	NP-30	NN-30	REEL 1#
— STRANDED BARE THERMOCOUPLE WIRE PART NUMBERS —												
16 7/24	.060	JP-16F	JN-16F	KP-16F	KN-16F	TP-16F	TN-16F	EP-16F	EN-16F	NP-16F	NN-16F	REEL 40#
18 19/30	.050	JP-1819	JN-1819	KP-1819	KN-1819	TP-1819	TN-1819	EP-1819	EN-1819	NP-1819	NN-1819	REEL 30#
18 7/26	.048	JP-18F	JN-18F	KP-18F	KN-18F	TP-18F	TN-18F	EP-18F	EN-18F	NP-18F	NN-18F	REEL 30#
20 7/28	.037	JP-20F	JN-20F	KP-20F	KN-20F	TP-20F	TN-20F	EP-20F	EN-20F	NP-20F	NN-20F	REEL 15#
24 7/32	.024	JP-24F	JN-24F	KP-24F	KN-24F	TP-24F	TN-24F	EP-24F	EN-24F	NP-24F	NN-24F	REEL 5#

The above part numbers represent the more popular constructions. However, other designs are available upon request.

PMC CORPORATION
57 Harvey Road
Londonderry, NH
03053

Tel. (603) 432-9473
FAX (800) 639-5701

® Registered Trademark of PMC Corporation

© 1995 PMC Corporation

© 1995 PMC Corporation

Upper > temperature limits for bare thermocouple wire

UPPER TEMPERATURE LIMITS FOR BARE THERMOCOUPLE WIRE							
THERMOCOUPLE TYPE	ANSI SYMBOL	WIRE GAUGE (A.W.G.)					
		8 GA.	14 GA.	16 GA.	20 GA.	24 GA.	28 GA.
IRON-CONSTANTAN™	J	1400°F (760°C)	1100°F (600°C)	900°F (500°C)	900°F (500°C)	700°F (370°C)	700°F (370°C)
CHROMEL™-ALUMEL™	K	2300°F (1260°C)	2000°F (1100°C)	2000°F (1100°C)	1800°F (1000°C)	1600°F (870°C)	1600°F (870°C)
COPPER-CONSTANTAN™	T	—	700°F (370°C)	500°F (260°C)	500°F (260°C)	400°F (200°C)	400°F (200°C)
CHROMEL™-CONSTANTAN™	E	1600°F (870°C)	1200°F (650°C)	1000°F (550°C)	1000°F (550°C)	800°F (430°C)	800°F (430°C)
NICROSIL™-NISIL™	N	2300°F (1260°C)	2000°F (1100°C)	2000°F (1100°C)	1800°F (1000°C)	1600°F (870°C)	1600°F (870°C)

™Trademark. Hoskins Mfg Co.

Approximate > yields for bare solid thermocouple wire

— BARE SOLID THERMOCOUPLE WIRE FEET/LB —											
		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N	
Wire GA B&S	Wire Size DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -
6	.162	14 2	12 6	13	13	12 6	12.6	13	12 6	13	13
8	.128	22 8	20.2	21	21	19 8	20 2	21	20 2	21	21
14	.064	91 2	80 9	83	83	80 5	80 9	83	80 9	83	83
16	.050	144	127	130	130	128	128	130	127	130	130
18	.040	233	207	212	212	203	203	212	207	212	212
20	.032	365	324	331	331	324	324	331	324	331	331
24	.020	925	821	838	838	820	820	838	821	838	838
26	.015	1478	1312	1340	1340	1299	1299	1340	1312	1340	1340
28	.012	2353	2089	2130	2130	2062	2062	2130	2089	2130	2130
30	.010	3736	3316	3370	3370	3294	3294	3370	3316	3370	3370
36	.005	14940	13260	13500	13500	13250	13250	13500	13260	13500	13500

Approximate > yields for bare stranded thermocouple wire

— BARE STRANDED THERMOCOUPLE WIRE FEET/LB —											
		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N	
Wire GA B&S	Wire Size DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -
14 7/22	.073	83	74	75	76	74	74	75	74	75	76
16 7/24	.060	132	117	119	121	117	117	119	117	119	121
18 19/30	.050	197	175	177	180	173	175	177	175	177	180
18 7/26	.048	211	187	190	193	186	187	190	187	190	193
20 7/28	.037	336	298	303	307	295	298	303	298	303	307
22 7/30	.030	534	474	480	488	471	474	480	474	480	488
24 7/32	.024	952	833	833	833	737	833	833	833	833	833

PRICING POLICY > Shipments will be invoiced at PMC's prices in effect at time of shipment. Quotations are given with an escalation clause and prices, terms and conditions are subject to change without prior notice. PMC will, however, make every attempt to hold to current quoted prices. All prices quoted are in United States currency and shall be subject to correction for errors. Unless otherwise stated in writing to PMC.

REELS, SPOOLS & COILS > All shipments, unless specified otherwise by PMC, are made on non-returnable reels, spools or coils in one continuous length.

SHORTAGES & RETURNS > All claims for shortage or incorrect material must be made within 10 days after receipt of the goods to which such claim pertains. Goods may only be returned for credit within 1 month of the date of authorization. Goods that are special in any way shall not be returned to PMC. Material returned for any reason, without written authorization will be refused and returned at shipper's expense. A return request must be processed through our Londonderry, N.H. sales office.

TOLERANCES > Due to allowances in manufacturing processes for wire, cable and similar products, PMC reserves the right to ship a variation of ± 10% from the quantity of such goods ordered. Physical tolerances shown are nominal. Shipping weights are an average of all types of conductors and are listed for estimating only. These weights can vary substantially due to different types of spools, reels and/or conductors.

The material contained in this document is presented in good faith and believed to be reliable and accurate. However, because testing conditions may vary and material quality or information that may be provided in whole or part by others may be beyond our control, no warranty expressed or implied is given and PMC Corporation can assume no liability for

PMC A DIVISION OF ROCKBESTOS-SURPRENANT CABLE CORP., INC.
680 HAYWARD STREET, MANCHESTER, NH 03103 (603) 622-3500
SPECIALIZING IN WIRE & CABLE FOR THE SENSOR INDUSTRY FAX (800) 639-5701

CERTIFICATE OF CALIBRATION

TO: OMEGA POINT LABS
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112

Date: 02/11/02
Cust PO#: 13454Q
Job #: PSO055960-1+2

CALIBRATION RESULTS ARE TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) AND MEET SPECIAL LIMITS DEVIATION TOLERANCES AS DEFINED IN ISA MC96.1 (FORMERLY ANSI) AND ASTM E 230-93, IPTS90, AND AMS 2750 REV C.

TEST RESULTS FOR: SPOOLS PMC P/N: KKP-16 Spool 00395248 TOTAL: 11 LBS.
KKN-16 Spool 00395246 11 LBS

Test Temperature (°F)	Inside End	Outside End	Test Temperature (°F)	Inside End	Outside End
800	-1.9	-2.0	2000	-5.6	-5.2
1000	-0.5	-0.5	2300	-6.4	-5.8
1500	-2.0	-1.9			

REPORTED RESULTS ARE DEVIATIONS FROM TEST TEMPERATURES. FOR CORRECTION FACTORS REVERSE THE SIGNS.

THE MATERIAL REFERENCED ABOVE HAS BEEN CALIBRATED UTILIZING TECHNIQUES CONSISTENT WITH THE GUIDELINES SET FORTH IN ANSI Z540-1 AND ASTM E-220. THIS IS TO CERTIFY THE MATERIAL FURNISHED ON THIS SHIPMENT ARE IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS OF THE ABOVE REFERENCED CUSTOMER PURCHASE ORDER. INSPECTION AND TEST RECORDS ARE ON FILE AND AVAILABLE FOR CUSTOMER REVIEW.

SECONDARY STANDARD THERMOCOUPLE: TYPE K
REEL # POS LEG: 00291335
REEL # NEG LEG: 00291346
CALIBRATION DATE: 3/17/00

NIST #:263094C&A
263094B&D
(SINGLE USE THERMOCOUPLE FROM CALIBRATED REEL)

DIGITAL VOLT METER
MODEL: KAYE INSTRUMENTS: X1525C
SERIAL #: 306172
CALIBRATION DUE DATE: 07/25/02

EDC 100RC SERIAL# 15075
CERTIFICATE # 01-020
DUE 07/10/02

ICE POINT THERMOCOUPLE REFERENCE
MODEL, KAYE INSTRUMENTS: K-170-SP
SERIAL #: 306179
CALIBRATION DUE DATE: 07/25/02

HART DIGITAL THERMOMETER
SERIAL# 15448
DUE 05/21/02

Calibration Certificate Acceptance
Item Alumel & Chromel Thermocouple Wire
SN Spools 00395248 + 00395246 Q/A Eng
NIST Traceability Adequate
As Found/As Left Values
Calibration Data Sufficient
Tolerance Range Adequate
Date of Review 3-11-02 3/11/02
OPL QA/QC Dept. Eng./Dept. Mgr.

QUALITY ASSURANCE TECHNICIAN 2-11-02
DATE

PMC Division of RSCC
680 Hayward Street
Manchester, NH 03103
Phone: (603) 622-3500 Fax: (603) 622-7023

Delivery Note

35607

Ship To: OMEGA POINT LABS
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112

Attention: CLEDA

Ship Date	Customer P.O.	Ship Via	Due Date	
Feb 11 2002	13454Q	UPS GROUND	FEB 05 2002	Page : 1

Item and Description	Qty Ordered	Back ordered	Qty Shipped
1. KP-16 Spool#: 00395248-CAR	10	0	11
2. KN-16 Spool#: 00395246-CAR	10	0	11
3. CALIBRATION CHARGE CALIBRATION CHARGE. Item 1 & 2 to be calibrated at 800, 1000, 1500, 2000 & 2300°F I/O to ASTME E220-96	1	0	1

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Omega Point Labs
CLIENT/PROJECT NUMBER OPL Equipment
RECEIVED FROM PMC
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 1924. OPL
DATE RECEIVED 9-15-99
DATE INSPECTED 9-15-99
INSPECTED BY: CBatton

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	Rec'd	B.O.	I.D. NO.	(X) IN MATL Y/N	CERT. REQ'D Y/N	CONTAINER INTEGRITY	EXCEPTION	ACCEPTANCE Accept	Hold	Reject	REMARKS
Alumel TC Wire	121180	10#	9.1#	0	KN-16 Spool# 00264200	Y	Y	Good	None	X			
Chromel TC Wire	121180	10#	9.2#	0	KP-16 Spool# 00268408	Y	Y	Good	None	X			
Fiberglass TC Wire		15K		15K	on back order.								

FORM
1/28/93

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER 12118

Date:9/2/1999
Page: 1 of 1

Order From: PMC
680 Hayward Street
Manchester
NH 03103
603-622-3500

Deliver to: Omega Point Laboratories, Inc
16015 Shady Falls Road
Elmendorf
TX 78112-9784
(210) 635-8100

Vendor No: 0024

Your Item Number / Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
Fiberglass TC Wire KK-FB/FB-24	001	15.00	Thousand	$182.00	$2,730.00
Calibration Services	002	1.00	Each	207.00	207.00
KP-16 Chromel TC Wire Rec'd 9/15/99	003	10.00	Pounds	$27.00	$270.00
KN-16 Alumel TC Wire Rec'd 9/15/99	004	10.00	Pounds	$27.00	$270.00
Calibration Services	005	2.00	Each	$8.50	$17.00

See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements.
QA Approval [signature]
Date 9-2-99

Please Quote Purchase Order Number on all correspondence.

Subtotal:	$3,847.00
Freight:	0.00
Tax Amount:	0.00
Total Value:	$3,847.00

Special Instructions:
Please provide calibration services per attached Material Purchasing Specification and QA Requirements.

ation

DeC625 11 89

OMEGA POINT LABORATORIES
PURCHASING SPECIFICATIONS

SPECIFICATION NUMBER: MS-12118Q-OPL

VENDOR: PMC Corporation

VENDOR PRODUCT NUMBER: KK-FB/FB-24

PRODUCT DESCRIPTION: Fiberglass Braided Thermocouple Wire

Material as defined above shall be provided in accordance with the Critical Characteristics as listed below:

TEST	DESCRIPTION	SPECIFICATION RANGES MINIMUM	MAXIMUM
ASTM E230-93	Std. Temperature-EMF Tables for Standardized Thermocouples	Temp. RAnge +32°F to +545°F Special Limits of Error ±2°F	
		Temp. Range +545°F to 2300°F Special Limits of Error ±.4%	

QUALITY ASSURANCE REQUIREMENTS

1.0 QUALITY PROGRAM
Seller shall furnish this item in accordance with Quality Program approved by Omega Point Laboratories. Material specified herein is to be produced and tested in accordance with vendor quality standards, methods, guidelines and manufacturing instructions as defined in that Quality Program.

2.0 QUALITY VERIFICATION
Receiving Inspection - Buyer shall inspect items upon receipt to verify compliance with purchase order requirements. Rejected items shall be returned at seller's expense.
Document Review - Final acceptance shall be based on satisfactory review of required certifications and/or supporting documents.

3.0 CERTIFICATIONS
3.1 Certification that supplied materials comply with this material specification and listing Critical Characteristics shall be provided. This certificates shall reference Omega Point Labs purchase order number and specification number for all material furnished under this specification. This Certification shall be signed by the appropriate vendor representative.
3.2 The material furnished under this specification shall be a product that complies with the following:
3.2.1 Has been tested and passed all tests specified herein.

3.2.2 Manufacturing methods for this material have not changed. Vendor will advise Omega Point in writing of any changes in the manufacturing prior to material manufacture.

3.2.3 Raw materials used in the manufacture of this material meet Vendor specifications.

4.0 AUDITS/RIGHTS OF ACCESS

Omega Point Labs reserves the right to audit your facility to verify compliance with the purchase order and specification requirements with a minimum ten (10) day notice.

5.0 IDENTIFICATION

Seller shall identify each item with a unique traceability number by physical marking or tagging. These identification numbers shall be traceable to certifications and packing lists.

6.0 PACKING/SHIPPING

All materials shall be packaged in air tight, moisture free containers and shall be free of foreign substances such as dirt, oil, grease or other deleterious materials.

All materials shall be suitably crated, boxed or otherwise prepared for shipment to prevent damage during handling and shipping.

QUALITY ASSURANCE APPROVAL

Cleda Patton

Title Sr. Adm. Assist.

Date 9-2-99

AVL Verification

Class: B

PMC CORPORATION
680 HAYWARD STREET, MANCHESTER, NH 03103 • (603) 622-3500
SPECIALIZING IN WIRE & CABLE FOR THE SENSOR INDUSTRY • FAX (800) 639-5701

CERTIFICATE OF CALIBRATION

SPOOL #00268408

TO: OMEGA POINT LABS, INC.
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112

Date: 9/08/99
Cust PO#: 12118Q
Job #: PSO044306-3,4

CALIBRATION RESULTS ARE TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) AND MEET STANDARD LIMITS DEVIATION TOLERANCES AS DEFINED IN ISA MC96.1 (FORMERLY ANSI) AND ASTM E 230.

TEST RESULTS FOR: PMC P/N: KP-16 Total LBS: 9.2#

Test Temperature (°F)	Inside End	Outside End
800	-0.2	+0.5
1000	-0.6	+0.4
1500	-1.1	-0.2
2000	-3.0	-2.4
2300	-2.3	-3.8

REPORTED RESULTS ARE DEVIATIONS FROM TEST TEMPERATURES. FOR CORRECTION FACTORS REVERSE THE SIGNS.

THE MATERIAL REFERENCED ABOVE HAS BEEN CALIBRATED UTILIZING TECHNIQUES CONSISTENT WITH THE GUIDELINES SET FORTH IN ANSI Z540-1 AND ASTM E-220. THIS IS TO CERTIFY THE MATERIAL FURNISHED ON THIS SHIPMENT ARE IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS OF THE ABOVE REFERENCED CUSTOMER PURCHASE ORDER. INSPECTION AND TEST RECORDS ARE ON FILE AND AVAILABLE FOR CUSTOMER REVIEW.

SECONDARY STANDARD THERMOCOUPLE: TYPE K
REEL # POS LEG: 28560
REEL # NEG LEG: 28561
CALIBRATION DATE:12/1/98

NIST #: 260959C&A
260959B&D
/SINGLE USE THERMOCOUPLE FROM CALIBRATED REEL)

DIGITAL VOLT METER
MODEL: KAYE INSTRUMENTS: X1525S
SERIAL #: 306171
CALIBRATION DUE DATE: 01/05/00

NIST #:811/260640-98

ICE POINT THERMOCOUPLE REFERENCE
MODEL, KAYE INSTRUMENTS: K-170-SP
SERIAL #: 306178
CALIBRATION DUE DATE: 01/05/00

NIST #: G47265,G47009
752203,752807

QUALITY ASSURANCE TECHNICIAN DATE 9/8/99

QUALITY ASSURANCE MANAGER DATE 9/8/99

PMC CORPORATION
680 HAYWARD STREET, MANCHESTER, NH 03103 • (603) 622-3500
SPECIALIZING IN WIRE & CABLE FOR THE SENSOR INDUSTRY • FAX (800) 639-5701

CERTIFICATE OF CALIBRATION

SPOOL #00264200

TO: OMEGA POINT LABS, INC.
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112

Date: 9/08/99
Cust PO#: 12118Q
Job #: PSO044306-3,4

CALIBRATION RESULTS ARE TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) AND MEET STANDARD LIMITS DEVIATION TOLERANCES AS DEFINED IN ISA MC96.1 (FORMERLY ANSI) AND ASTM E 230.

TEST RESULTS FOR: PMC P/N: KN-16 Total LBS: 9.1#

Test Temperature (°F)	Inside End	Outside End
800	-0.2	+0.5
1000	-0.6	+0.4
1500	-1.1	-0.2
2000	-3.0	-2.4
2300	-2.3	-3.8

REPORTED RESULTS ARE DEVIATIONS FROM TEST TEMPERATURES. FOR CORRECTION FACTORS REVERSE THE SIGNS.

THE MATERIAL REFERENCED ABOVE HAS BEEN CALIBRATED UTILIZING TECHNIQUES CONSISTENT WITH THE GUIDELINES SET FORTH IN ANSI Z540-1 AND ASTM E-220. THIS IS TO CERTIFY THE MATERIAL FURNISHED ON THIS SHIPMENT ARE IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS OF THE ABOVE REFERENCED CUSTOMER PURCHASE ORDER. INSPECTION AND TEST RECORDS ARE ON FILE AND AVAILABLE FOR CUSTOMER REVIEW.

SECONDARY STANDARD THERMOCOUPLE: TYPE K
REEL # POS LEG: 28560
REEL # NEG LEG: 28561
CALIBRATION DATE:12/1/98

NIST #: 260959C&A
260959B&D
(SINGLE USE THERMOCOUPLE FROM CALIBRATED REEL)

DIGITAL VOLT METER
MODEL: KAYE INSTRUMENTS: X1525S
SERIAL #: 306171
CALIBRATION DUE DATE: 01/05/00

NIST #:811/260640-98

ICE POINT THERMOCOUPLE REFERENCE
MODEL, KAYE INSTRUMENTS: K-170-SP
SERIAL #: 306178
CALIBRATION DUE DATE: 01/05/00

NIST #: G47265,G47009
752203,752807

Christopher LeCuyer 9/8/99
QUALITY ASSURANCE TECHNICIAN DATE

Edward Vallone 9/8/99
QUALITY ASSURANCE MANAGER DATE

OMEGA POINT LABORATORIES
PURCHASING SPECIFICATIONS

SPECIFICATION NUMBER: MS-12118Q-OPL

VENDOR: PMC CORPORATION

VENDOR PRODUCT NUMBER: KP-16 & KN-16

PRODUCT DESCRIPTION: Chromel & Alumel TC Wire

Material as defined above shall be provided in accordance with the Critical Characteristics as listed below:

TEST	DESCRIPTION	SPECIFICATION RANGES MINIMUM	MAXIMUM
Upper Temperature Limits for bare Thermocouple Wire		2000° F (1100° C)	

QUALITY ASSURANCE REQUIREMENTS

1.0 QUALITY PROGRAM

Seller shall furnish this item in accordance with Quality Program approved by Omega Point Laboratorie Material specified herein is to be produced and tested in accordance with vendor quality standarc methods, guidelines and manufacturing instructions as defined in that Quality Program.

2.0 QUALITY VERIFICATION

Receiving Inspection - Buyer shall inspect items upon receipt to verify compliance with purchase ord requirements. Rejected items shall be returned at seller's expense.

Document Review - Final acceptance shall be based on satisfactory review of required certificatio and/or supporting documents.

3.0 CERTIFICATIONS

3.1 Certification that supplied materials comply with this material specification and listing Critic Characteristics shall be provided. This certificates shall reference Omega Point Labs purchased ord number and specification number for all material furnished under this specification. This Certificati shall be signed by the appropriate vendor representative.

3.2 The material furnished under this specification shall be a product that complies with the followin

3.2.2 Manufacturing methods for this material have not changed. Vendor will advise Omega Point writing of any changes in the manufacturing prior to material manufacture.

3.2.3 Raw materials used in the manufacture of this material meet Vendor specifications.

4.0 AUDITS/RIGHTS OF ACCESS

Omega Point Labs reserves the right to audit your facility to verify compliance with the purchase order a specification requirements with a minimum ten (10) day notice.

5.0 IDENTIFICATION

Seller shall identify each item with a unique traceability number by physical marking or tagging. The identification numbers shall be traceable to certifications and packing lists.

6.0 PACKING/SHIPPING

All materials shall be packaged in air tight, moisture free containers and shall be free of forei substance such as dirt, oil, grease or other deleterious materials.

All material shall be suitably crated, boxed or otherwise prepared for shipment to prevent damage duri handling and shipping.

QUALITY ASSURANCE APPROVAL

Oleda Patton

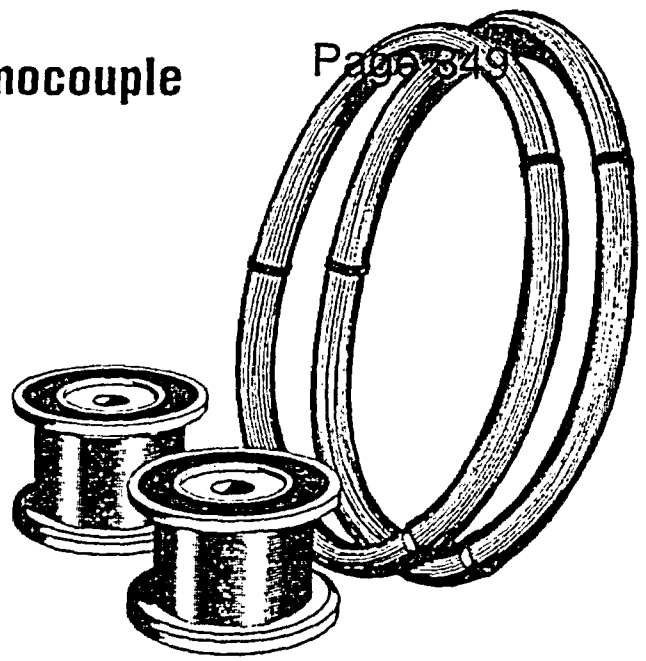
Title Sr. Adm. Assist

Date 9-2-99

AVL Verification

Class: ____B_____

Bare Thermocouple Wire



PMC is continuously committed to meet the specific needs of the industry and it's customers. In order to meet this committment, PMC has become a full service company. Therefore along with insulated wire product capabilities, PMC operates high speed stranders and spooling equipment to provide a full line of bare wire items.

Customers may select from the items listed below as matched pairs to meet standard limits of error. On most items, variations are available to meet particular applications, including special limits of error or extension grade tolerances.

You will find our qualified sales and engineering staff eager to assist you in these selections.

— SOLID BARE THERMOCOUPLE WIRE PART NUMBERS —												
		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N		
WIRE GA B&S	WIRE SIZE DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -	STANDARD PACKAGE COIL/REEL LBS
8	.128	JP-8	JN-8	KP-8	KN-8	—	—	EP-8	EN-8	NP-8	NN-8	COIL 50#
14	.064	JP-14	JN-14	KP-14	KN-14	TP-14	TN-14	EP-14	EN-14	NP-14	NN-14	REEL 50#
16	.050	JP-16	JN-16	KP-16	KN-16	TP-16	TN-16	EP-16	EN-16	NP-16	NN-16	REEL 25#
18	.040	JP-18	JN-18	KP-18	KN-18	TP-18	TN-18	EP-18	EN-18	NP-18	NN-18	REEL 10#
20	.032	JP-20	JN-20	KP-20	KN-20	TP-20	TN-20	EP-20	EN-20	NP-20	NN-20	REEL 10#
24	.020	JP-24	JN-24	KP-24	KN-24	TP-24	TN-24	EP-24	EN-24	NP-24	NN-24	REEL 5#
26	.015	JP-26	JN-26	KP-26	KN-26	TP-26	TN-26	EP-26	EN-26	NP-26	NN-26	REEL 5#
28	.012	JP-28	JN-28	KP-28	KN-28	TP-28	TN-28	EP-28	EN-28	NP-28	NN-28	REEL 1#
30	.010	JP-30	JN-30	KP-30	KN-30	TP-30	TN-30	EP-30	EN-30	NP-30	NN-30	REEL 1#
— STRANDED BARE THERMOCOUPLE WIRE PART NUMBERS —												
16 7/24	.060	JP-16F	JN-16F	KP-16F	KN-16F	TP-16F	TN-16F	EP-16F	EN-16F	NP-16F	NN-16F	REEL 40#
18 19/30	.050	JP-1819	JN-1819	KP-1819	KN-1819	TP-1819	TN-1819	EP-1819	EN-1819	NP-1819	NN-1819	REEL 30#
18 7/26	.048	JP-18F	JN-18F	KP-18F	KN-18F	TP-18F	TN-18F	EP-18F	EN-18F	NP-18F	NN-18F	REEL 30#
20 7/28	.037	JP-20F	JN-20F	KP-20F	KN-20F	TP-20F	TN-20F	EP-20F	EN-20F	NP-20F	NN-20F	REEL 15#
24 7/32	.024	JP-24F	JN-24F	KP-24F	KN-24F	TP-24F	TN-24F	EP-24F	EN-24F	NP-24F	NN-24F	REEL 5#

The above part numbers represent the more popular constructions. However, other designs are available upon request.

PMC CORPORATION
57 Harvey Road
Londonderry, NH
03053

Tel. (603) 432-9473
FAX (800) 639-5701

® Registered Trademark of PMC Corporation

© 1995 PMC Corporation

© 1995 PMC Corporation

Upper > temperature limits for bare thermocouple wire

UPPER TEMPERATURE LIMITS FOR BARE THERMOCOUPLE WIRE							
THERMOCOUPLE TYPE	ANSI SYMBOL	WIRE GAUGE (A.W.G.)					
		8 GA.	14 GA.	16 GA.	20 GA.	24 GA.	28 GA.
IRON-CONSTANTAN™	J	1400°F (760°C)	1100°F (600°C)	900°F (500°C)	900°F (500°C)	700°F (370°C)	700°F (370°C)
CHROMEL™-ALUMEL™	K	2300°F (1260°C)	2000°F (1100°C)	2000°F (1100°C)	1800°F (1000°C)	1600°F (870°C)	1600°F (870°C)
COPPER-CONSTANTAN™	T	—	700°F (370°C)	500°F (260°C)	500°F (260°C)	400°F (200°C)	400°F (200°C)
CHROMEL™-CONSTANTAN™	E	1600°F (870°C)	1200°F (650°C)	1000°F (550°C)	1000°F (550°C)	800°F (430°C)	800°F (430°C)
NICROSIL™-NISIL™	N	2300°F (1260°C)	2000°F (1100°C)	2000°F (1100°C)	1800°F (1000°C)	1600°F (870°C)	1600°F (870°C)

™Trademark, Hoskins Mfg Co.

Approximate > yields for bare solid thermocouple wire

— BARE SOLID THERMOCOUPLE WIRE FEET/LB —											
		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N	
Wire GA B&S	Wire Size DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -
6	.162	14 2	12.6	13	13	12 6	12 6	13	12 6	13	13
8	.128	22 8	20.2	21	21	19 8	20 2	21	20.2	21	21
14	.064	91 2	80.9	83	83	80 5	80 9	83	80 9	83	83
16	.050	144	127	130	130	128	128	130	127	130	130
18	.040	233	207	212	212	203	203	212	207	212	212
20	.032	365	324	331	331	324	324	331	324	331	331
24	.020	925	821	838	838	820	820	838	821	838	838
26	.015	1478	1312	1340	1340	1299	1299	1340	1312	1340	1340
28	.012	2353	2089	2130	2130	2062	2062	2130	2089	2130	2130
30	.010	3736	3316	3370	3370	3294	3294	3370	3316	3370	3370
36	.005	14940	13260	13500	13500	13250	13250	13500	13260	13500	13500

Approximate > yields for bare stranded thermocouple wire

— BARE STRANDED THERMOCOUPLE WIRE FEET/LB —											
		TYPE J		TYPE K		TYPE T		TYPE E		TYPE N	
Wire GA B&S	Wire Size DIA.	Iron JP +	Constantan JN -	Chromel KP +	Alumel KN -	Copper TP +	Constantan TN -	Chromel EP +	Constantan EN -	Nicrosil NP +	Nisil NN -
14 7/22	.073	83	74	75	76	74	74	75	74	75	76
16 7/24	.060	132	117	119	121	117	117	119	117	119	121
18 19/30	.050	197	175	177	180	173	175	177	175	177	180
18 7/26	.048	211	187	190	193	186	187	190	187	190	193
20 7/28	.037	336	295	303	307	295	298	303	298	303	307
22 7/30	.030	534	474	480	488	471	474	480	474	480	488
24 7/32	.024	952	833	833	833	737	833	833	833	833	833

PRICING POLICY > Shipments will be invoiced at PMC's prices in effect at time of shipment. Quotations are given with an escalation clause and prices, terms and conditions are subject to change without prior notice. PMC will, however, make every attempt to hold to current quoted prices. All prices quoted are in United States currency, and shall be subject to correction for errors. Unless otherwise stated in writing to PMC.

REELS, SPOOLS & COILS > All shipments, unless specified otherwise by PMC, are made on non-returnable reels, spools or coils in one continuous length.

SHORTAGES & RETURNS > All claims for shortage or incorrect material must be made within 10 days after receipt of the goods to which such claim pertains. Goods may only be returned for credit within 1 month of the date of authorization. Goods that are special in any way shall not be returned to PMC. Material returned for any reason, without written authorization will be refused and returned at shipper's expense. A return request must be processed through our Londonderry, N.H. sales office.

TOLERANCES > Due to allowances in manufacturing processes for wire, cable and similar products, PMC reserves the right to ship a variation of ± 10% from the quantity of such goods ordered. Physical tolerances shown are nominal. Shipping weights are an average of all types of conductors and are listed for estimating only. These weights can vary substantially due to different types of spools, reels and/or conductors.

The material contained in this document is presented in good faith and believed to be reliable and accurate. However, because testing conditions may vary and material quality or information that may be provided in whole or part by others may be beyond our control, no warranty, expressed or implied, is given and PMC Corporation can assume no liability for

FIBERGLASS Braided Thermocouple and Extension Wire

PRODUCT CODE: FB/FB

Our customers have grown to expect only the highest quality products from PMC.

This construction is one of the earliest insulations used and is perhaps still the most widely used. It consists of the single conductors insulated with a fiberglass braid then impregnated with a special binder to improve moisture and abrasion resistance. The singles are then laid parallel and a braided jacket of the same material is applied and impregnated.

While wire gauge size, calibration and atmosphere will affect maximum useful temperature in applications, This insulation is designed to withstand a maximum continuous use at 900°F (482°C) and a single exposure use at 1000°F (537°C). (Note: Impregnations retained to 400°F (204°C)).

You will find our qualified sales and engineering staff eager to assist in selecting a design to meet the requirements of your specific application. Variations of this construction including protective metal coverings for improved abrasion resistance are available upon request.

Typical applications include aerospace, aluminum mills, foundries, ovens, furnaces, heat treating, plastics industry, sensor leads as well as others.

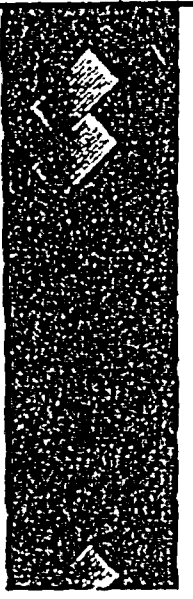
Calibrated conductors for high system accuracy

900°F (482°C) Braided fiberglass insulation for abrasion resistance at high temperatures

900°F (482°C) Braided fiberglass jacket for additional flexibility and abrasion resistance at high temperatures

GRADE OF WIRE	GAUGE SIZE	WIRE TYPE	PART NUMBERS					
			TYPE J	TYPE K	TYPE T	TYPE E	TYPE N	TYPE RSX
THERMOCOUPLE	16	SOLID	J-FB/FB-16	K-FB/FB-16	T-FB/FB-16	E-FB/FB-16	N-FB/FB-16	
THERMOCOUPLE	20	SOLID	J-FB/FB-20	K-FB/FB-20	T-FB/FB-20	E-FB/FB-20	N-FB/FB-20	
THERMOCOUPLE	20 7/28	STRANDED	J-FB/FB-20F	K-FB/FB-20F	T-FB/FB-20F	E-FB/FB-20F	N-FB/FB-20F	
THERMOCOUPLE	24	SOLID	J-FB/FB-24	K-FB/FB-24	T-FB/FB-24	E-FB/FB-24	N-FB/FB-24	
EXTENSION	16	SOLID	JX-FB/FB-16	KX-FB/FB-16	TX-FB/FB-16	EX-FB/FB-16	NX-FB/FB-16	RSX-FB/FB-16
EXTENSION	20	SOLID	JX-FB/FB-20	KX-FB/FB-20	TX-FB/FB-20	EX-FB/FB-20	NX-FB/FB-20	RSX-FB/FB-20

The above part numbers represent the more popular constructions. However, other designs are available upon request.



PMC CORPORATION
57 Harvey Road
Londonderry, NH
03053

Tel. (603) 432-9473
FAX (603) 432-0435

PMC Division of RSCC
680 Hayward Street
Manchester, NH 03103
Phone: (603) 622-3500 Fax: (603) 622-7023

Delivery Note

14191

Ship To: OMEGA POINT LABS
16015 SHADY FALLS ROAD
ELMENDORF, TX 78112

Attention: CLEDA

Ship Date	Customer P.O.	Ship Via	Due Date	
Sep 08 1999	12118Q	UPS GROUND	SEP 09 1999	Page : 1

Item and Description	Qty Ordered	Back ordered	Qty Shipped
1. KP-16 Spool#: 00268408	10	0	9.2
1. KN-16 Spool#: 00264200	10	0	9.1
1. CALIBRATION CHARGE CALIBRATION CHARGE items 3 & 4 at 800, 1000, 1500, 2000 & 2300°F I/O	1	0	1

Q/A RECEIVING REPORT

CLIENT/PROJECT NAME Omega Point Labs
CLIENT/PROJECT NUMBER OPL Equipment
RECEIVED FROM SSC Lab Division
PROJECT LOCATION Omega Point Labs

REPORT NUMBER 2388-OPL
DATE RECEIVED 7-8-03
DATE INSPECTED 7-8-03
INSPECTED BY: [illegible]

ITEM DESCRIPTION	P.O. NO.	QUANTITY Order	Rec'd	B.O.	I.D. NO.	COND MATL Y/N	LBIF REQD Y/N	SAFETY RELATED Y/N	CONTAINER INTEGRITY	ACCEPTANCE Accept	Hold	Reject	REMARKS
Dial Indicator 5"	140360	1	1	0	020640234	Y	Y	N	Good	X			
Dial Indicator 5"		1	1	0	013232851								
Dial Indicator 5"		1	1	0	012980987								
Dial Indicator 2"		1	1	0	031120776								
Dial Indicator 2"		1	1	0	031120775								
Dial Indicator 2"		1	1	0	031120779								
Dial Indicator 2"		1	1	0	030486489								
Dial Indicator 2"		1	1	0	030486483								
0-15 psi Pressure Gage		1	1	0	02LED05								
0-60 psi Pressure Gage		1	1	0	AD565								
0-100 psi Pressure Gage		1	1	0	98LED02								

Calibration Services

OMEGA POINT LABORATORIES
16015 SHADY FALLS RD.
ELMENDORF, TEXAS 78112
PH. (210) 635-8100
FAX (210) 635-8101

PURCHASE ORDER 14036Q Page 354

Date: 6/13 /2003
Page: 1 of 1

Order From: SSC Lab Division
7715 Distribution Dr.
Little Rock
AR 72209
501-562-2900

Deliver to: Omega Point Laboratories, Inc
16015 Shady Falls Road
Elmendorf
TX 78112
(210) 635-8100

Vendor No:

Your Item Number / Item Description	Our Reference	Qty Ordered	Units	Unit Cost	Extension
0-15psi Pressure Gage SN: 02LE005	001	1.00	Each	$45.00	$45.00
0-60psi Pressure Gage SN: AD565	002	1.00	Each	$45.00	$45.00
0-100psi Pressure Gage SN: 98LE002	003	1.00	Each	$45.00	$45.00
5" Dial Indicator SN:020640234	004	1.00	Each	$20.00	$20.00
5" Dial Indicator SN:013232851	005	1.00	Each	$20.00	$20.00
5" Dial Indicator SN:012980987	006	1.00	Each	$20.00	$20.00
2" Dial Indicator SN:031120776	007	1.00	Each	$20.00	$20.00
2" Dial Indicator SN:031120775	008	1.00	Each	$20.00	$20.00
2" Dial Indicator SN:031120779	009	1.00	Each	$20.00	$20.00
2" Dial Indicator SN: 030486489	010	1.00	Each	$20.00	$20.00
2" Dial Indicator SN: 030486483	011	1.00	Each	$20.00	$20.00

CALIBRATION CERT. REQUIREMENTS
1. Statement of NIST traceability
2. NIST test or I.D. number
3. As Found
4. As Left Values
5. Uncertainties of calibration measurements
6. Calibration data
7. Calibration certificates must show accreditation to ISO/IEC 17025

"See Special Instructions Regarding Purchasing Specifications for Quality Assurance Requirements."
QA Approval
Date 6-13-03

Please Quote Purchase Order Number on all correspondence.
Special Instructions: Please include Certificate of Conformance to attached Specification Sheet and Calibration Data traceable to NIST.

Subtotal:	$295.00
Freight:	0.00
Tax Amount:	0.00
Total Value:	$295.00

020625/11-

VENDOR PURCHASING SPECIFICATION AND QUALITY ASSURANCE REQUIREMENTS

Vendor: SSC Lab-Division
Purchase Order No. 140369

Any of the following Quality Assurance requirements shall be incorporated as conditions to this procurement when corresponding box is marked. Failure to comply with any requirement specified may result in rejection and/or return of shipment at seller's expense.

1.0 QUALITY PROGRAM

☒ Seller shall furnish all items on this Purchase Order in accordance with Quality Program approved by Buyer.

2.0 Quality Verification

When additional quality verification activities are required as a condition to this procurement, invoices will not be paid until satisfactory completion of such activities.

☒ Receiving Inspection- Buyer shall inspect items upon receipt to verify compliance with purchase order requirements. Rejected items shall be returned at seller's expense.

☐ Independent Laboratory Tests- Samples of materials furnished shall be tested independently for conformance to specification requirements prior to final acceptance. Rejected materials shall be returned at seller's expense.

☒ Document Review- Final acceptance shall be based on satisfactory review or required certifications and other supporting documents.

3.0 CERTIFICATIONS

When certifications are required as a condition to this procurement, the seller shall furnish one reproducible copy either with or prior to each shipment. Shipments will not be accepted and invoices will not be paid until certifications are in buyer's possession.

☐ Certificate of Compliance/Conformance Required – Certification that materials and /or services comply with purchase order requirements. Certification shall reference purchase order number and traceability numbers (when applicable).

☐ Certified Test Report Required – Certification that material complies with applicable material specification (s) and the purchase order. Include actual results of required tests.

☒ Certificate of Calibration Required - Certification shall be traceable to National Bureau of Standards. (NIST, Nat'l Inst. of Science & Technology).

4.0 AUDITS/RIGHT OF ACCESS

☒ The buyer reserves the right to audit your facility to verify compliance with purchase order, code and specification requirements with (10) days notice.

☒ Shipments shall only originate form facilities approved by the buyer.

☐ Buyer reserves the right to inspect any or all work included in this order at seller's facility with as early notice as practicable.

5.0 IDENTIFICATION

☐ Seller shall identify each item with a unique traceability number by physical marking or tagging. Traceability numbers shall be traceable to certifications and packing lists.

☒ Seller shall identify each container with a unique identification number. The identification number shall be traceable to certifications and packing lists.

6.0 10CFR.PART 21

☐ The material, equipment and/or services to be furnished under this purchase order are involved in the testing of basic components of a Nuclear Regulatory Commission (NRC) licensed facility. Accordingly, the seller is subject to the provisions of 10 CFR, Part 21 (Reporting of Defects and Noncompliance)

7.0 PACKING/SHIPPING

☒ All materials shall be packaged in air tight, moisture free containers and shall be free from all foreign substance such as dirt, oil, grease or other deleterious material.

☐ All materials and equipment shall be suitable crated, boxed or otherwise prepared for shipment to prevent damage during handling and shipping. Wherever practical, equipment shall be palletized for ease of unloading and storage at destination. Each container shall be clearly marked with buyer's purchase order number.

QUALITY ASSURANCE APPROVAL _____ DATE 6/13/03

SSC LAB DIVISION
a Division of System Scale Corporation
Employee Owned

"Quality You Can Measure"

CERTIFICATE NO: 34187-0010

Page 1 of 1

Page 85

ACCREDITED
Cert. #1754.01
Calibration Laboratory
ISO / IEC / 17025

CERTIFICATE OF CALIBRATION

SSC LAB DIVISION certifies that this instrument conforms to original manufacturers specifications or to tolerances indicated below and has been calibrated using standards with accuracies traceable to a National Measurement Institute, or to accepted values of natural physical constants, or have been derived by ratio techniques. This certificate complies with ISO / IEC 17025 & ANSI Z540. Unless otherwise stated, the M& T E for which this certificate is issued, based on interpretation of data, was found to meet the required specification. Reported uncertainty represents expanded uncertainty at approximately 95% confidence level, coverage factor of k=2.

Customer:	OMEGA POINT LAB.	Date of Issue/Calibration:	06/23/2003
Location:	16015 SHADY FALLS RD. ELMENDORF TX 78112	Next Calibration Due:	06/23/2004
		Note: Many factors may cause out of calibration condition prior to due date.	
P.O. #:	14036Q	Metrologist:	Sean Rainey
Manufacturer:	McDANIEL CONTROLS INC.	Model:	316SS
Nomenclature:	GAGE- PRESSURE	Serial Number:	98LE002
Range:	0-100 PSI	Equipment ID:	98LE002

Calibration Data Temp 68°F Humidity 38%

Calibration Accuracy: ± 1 DIV

Note: if the AS LEFT column is blank, no adjustments were required.

APPLIED	AS FOUND	AS LEFT	UNCERTAINTY	PROCEDURE #
25 LBS	25.10	25.10	2.9 PSI	NA17-20MP-06
50 LBS	50.20	50.20	2.9 PSI	
75 LBS	75.71	75.71	2.9 PSI	
100 LBS	101.23	101.23	2.9 PSI	

STANDARDS(S) USED

Identification Number	Description	Calibration Date	Expiration Date	Traceability Number
SSC30LD029	CALIBRATOR- PRESSURE	7/30/2002	7/30/2003	100135700
SSC30LD031	TRANSDUCER- PRESSURE	7/30/2002	7/31/2003	1000135702

Calibration Certificate Acceptance

Item 0-100PSI Pressure Gage

SN 98LE002

	Q/A	Eng.
NIST Traceability Adequate		
As Found/As Left Values		
Calibration Data Sufficient		
Tolerance Range Adequate		
Date of Review:	7-8-03	7/14/03

OPL QA/QC Dept.

Eng / Dept. Mgr.

Gary McCourt
Chief Metrology Engineer

Comments:

This certificate may not be reproduced, except in full, without the written consent of SSC Lab Division.

CERT. NUMBER: 24592:1073468065

Rothe Development, Inc.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Grubb Engineering_ INC.

P.O.Box 65
Converse, TX 78109

MFG: Assoc Res
MODEL: 2956A
NOMEN: VAR VOLT MEG-CHEK
S/N: 720
CUST. ID:

CAL DATE: 1/7/04
DUE DATE: 1/7/05

CONTROL NO: 290 - 24592
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 002034477
CUSTOMER P.O.:
RECEIVED CONDITION: OUT OF TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 12Mo.
TEMPERATURE: 73.0°F
RELATIVE HUMIDITY: 25%

DATE RECEIVED: 1/2/04

COMMENTS:

ATTACHMENTS: CALIBRATION DATA 2 SHEETS

All calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI / NCSL Z540-1-1994, ANSI / ISO / IEC 17025, ISO / IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR ≥ 4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
162	ROTHE	180	001	8/22/2004
173	FLUKE	8050A	3074382	7/15/2004

APPROVED BY: _____ ☑ CMS ☐ QCO DATE: 1/8/04

RDMSD 1001
11/03
This certificate may not be reproduced, except in full, without written approval of Rothe Development, Inc. Metrology Services Division

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: ASSOCIATED REASEARCH MODEL 2956A MEG-CHECK

CUSTOMER: Grubb Engineering
WO NUMBER: 00203447
SERIAL: 720
CUST ID:

DATE: 7 Jan 04
TECH: [signature]
INST NO: 24592

CALIBRATION DATA TAKEN

INCOMING ✓
OUTGOING

CONDITION OF EQUIPMENT

IN TOLERANCE
OUT OF TOLERANCE ✓ *

VOLTAGE METER ACCURACY

METER INDICATION	MIN	READING	MAX
1000	900	1011	1100 V
2000	1900	2039	2100
3000	2900	3040	3100
4000	3900	3976	4100
5000	4900	4930	5100

MEGOHMS METER ACCURACY

RANGE	METER INDICATION	MIN	READING	MAX	
0.1	2.0	2.45	2.86	2.55 mA	*
	2.8	1.735	2.00	1.835	
	4.0	1.20	1.56	1.30	
	8.0	.575	.793	.675	
	20.0	.200	.314	.300	
1	2.0	245	304	255 uA	
10	2.0	24.5	29.9	25.5	
100	2.0	2.45	3.06	2.55	*

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: ASSOCIATED REASEARCH MODEL 2956A MEG-CHECK

CUSTOMER: Grubb Engineering
WO NUMBER: 002034477
SERIAL: 720
CUST ID:

DATE: 7 Jan 04
TECH: [signature]
INST NO: 24592

CALIBRATION DATA TAKEN

INCOMING
OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓
OUT OF TOLERANCE

VOLTAGE METER ACCURACY

METER INDICATION	MIN	READING	MAX
1000	900	1005	1100 V
2000	1900	2026	2100
3000	2900	3034	3100
4000	3900	3973	4100
5000	4900	4933	5100

MEGOHMS METER ACCURACY

RANGE	METER INDICATION	MIN	READING	MAX
0.1	2.0	2.45	2.48	2.55 mA
	2.8	1.735	1.76	1.835
	4.0	1.20	1.25	1.30
	8.0	.575	.631	.675
	20.0	.200	.250	.300
1	2.0	245	248	255 uA
10	2.0	24.5	24.8	25.5
100	2.0	2.45	2.54	2.55

DOC. DATE: 2/21/2000

Rothe Development, Inc. 4614 Sinclair Road San Antonio, Texas 78222
METROLOGY SERVICES DIVISION TRACEABLE TO NIST (210)648-3131 Fax (210)648-4091

CHARGE # 107 CONTROL # CS299 - 24592 Work Order #

00203447

CUSTOMER

RECEIVED FROM: Grubb Engineering_ INC. DATE: 7/2/2004
PHONE #: 210-658-7250
FAX #:
ADDRESS: P.O.Box 65
Converse, TX 78109
CONTACT NAME: Mr. JEFFREY PIEL
PURCHASE ORDER #:

ITEM

MFG: Assoc Res
MODEL: 2956A
NOMEN.: VAR VOLT MEG-OHM
S/N: 720
CUST ID:
ACCESS
RCVD: pouch w/ leads

CUSTOMER COMMENTS/REQUIREMENTS: TAX 7.975% BOBBY GRUBB

OUR PO:

DATA:

RECEIVED:	RETURNED:	CALIBRATION INTERVAL: 12 Mo.	CALD AT:
( ) IN TOLERANCE	(X) IN TOLERANCE		(X) RDMSD
(X) OUT OF TOLERANCE	( ) LIMITED CALIBRATION	CAL DATE: 7 Jan 04	( ) ON-SITE
( ) INOPERATIVE	( ) REPAIR ONLY	DUE DATE: 7 Jan 05	( ) SUB
	( ) NO ACTION DATA 2		

ENVIRONMENTAL CONDITIONS:	SPECIFICATIONS:	PROCEDURE:	RDMSD TECH:	SERVICE CODE:
73 °F	(X) MFG	(X) MFG	PIS	F
25 %RH	( ) RDMSD:	( ) RDMSD:		
	( ) OTHER:	( ) OTHER:		

FAULT/SYMPTOM: Megohm Meter out of tolerance
All resistance reading were high
Cal Seal broken on adjustment pot.

WORK PERFORMED: Cal Data Taken. replaced tube in resistance circuit. Adjusted unit.

CAL

TR#'s: 162, 173

LIMITED CALIBRATION:

COMMENTS:

CKT REF	QTY	PART #	DESCRIPTION	COST	REPAIR LABOR HOURS: .75		
	1	12AU7A	Tube	16	76	PARTS TOTAL	16 76
						REPAIR LABOR	37 50
						SHIPPING	
						TEAR DOWN CHARGE	
						CALIBRATION	100 00
						TAX 0.00	12 15
						TOTAL	166 41

SHIP VIA: DATE:

RDMSD 2002 11/03

RCVD BY
(SIGNED): (PRINTED):

CERT. NUMBER: 18912:1075190803

Rothe Development, Inc.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Grubb Engineering_ INC.

P.O.Box 65
Converse, TX 78109

MFG: Assoc Res
MODEL: 2956A
NOMEN: Hypot
S/N: 837
CUST. ID:

CAL DATE: 1/27/04
DUE DATE: 7/27/04

CONTROL NO: 290 - 18912
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 002034707
CUSTOMER P.O.:
RECEIVED CONDITION: IN TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 6Mo.
TEMPERATURE: 72.0°F
RELATIVE HUMIDITY: 26%

DATE RECEIVED: 1/14/04

COMMENTS:

ATTACHMENTS:

All calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI / NCSL Z540-1-1994, ANSI / ISO / IEC 17025, ISO / IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR ≥ 4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
173	FLUKE	8050A	3074382	7/15/2004
162	ROTHE	180	001	8/22/2004

APPROVED BY: Peter J Hommel ☑ CMS ☐ QCO DATE: 1/28/04

RDMSD 1001
11/03
This certificate may not be reproduced, except in full, without written approval of Rothe Development, Inc. Metrology Services Division

EQUIPMENT DELIVERY RECEIPT

Date: 1/28/04

ROTHE DEVELOPMENT, INC.
4614 SINCLAIR ROAD
SAN ANTONIO, TX 78222
OFFICE 210-648-3131
FAX 210-648-4091

Customer #: CS290
Company: Grubb Engineering_ INC.
Contact: Mr. JEFFREY PIEL
Address: P.O.Box 65
City: Converse TX 78109
Phone: 210-658-7250

W.O. #	Customer P.O.	Mfgr.	Model	Serial No.	RDMSD ID #	Cust. I.D. #
002034707		Assoc Res	2956A	837	18912	

1

☐ For commercial carrier shipment item/s packaged in accordance with RDWI 2000, Section 12.0

ITEMS RECEIVED BY:
Printed name: _____ Date: _____

Signature: _____

RDMSD 3001
4/24/03

Rothe Development, Inc. 4614 Sinclair Road San Antonio, Texas 78222
METROLOGY SERVICES DIVISION TRACEABLE TO NIST (210)648-3131 Fax (210)648-4091

CHARGE # 107 CONTROL # 05290 - 18912 Page 864

00203956

CUSTOMER

RECEIVED FROM: Grubb Engineering, INC. DATE: 6/29/2004
PHONE #: 210-658-[illegible]
ADDRESS: P.O.Box 65 FAX #:
Converse, TX 78109
CONTACT NAME: Mr. JEFFREY PIEL
PURCHASE ORDER #:

ITEM

MFG: Reese Fox
MODEL: [illegible]
NOMEN: Hypot
S/N: 847
CUST ID:
ACCESS
RCVD: Cables

CUSTOMER COMMENTS/REQUIREMENTS: TAX 7.8758 BOBBY GRUBB

OUR PO:

DATA:

RECEIVED:	RETURNED:	CALIBRATION INTERVAL: 6 Mo.	CAL'D AT.
(X) IN TOLERANCE	(X) IN TOLERANCE		(X) RDMSD
( ) OUT OF TOLERANCE	( ) LIMITED CALIBRATION	CAL DATE: 2 Jul 04	( ) ON-SITE
( ) INOPERATIVE	( ) REPAIR ONLY	DUE DATE: 2 Jan 05	( ) SUB
	( ) NO ACTION		

ENVIRONMENTAL CONDITIONS:	SPECIFICATIONS:	PROCEDURE:	RDMSD TECH:	SERVICE CODE.
73 °F	(X) MFG	(X) MFG	PJS	J
38 %RH	( ) RDMSD:	( ) RDMSD:		
	( ) OTHER:	( ) OTHER		

FAULT/SYMPTOM:

WORK PERFORMED:

CAL

TR#S: 173, 162

LIMITED CALIBRATION:

COMMENTS:

CKT REF	QTY	PART #	DESCRIPTION	COST	REPAIR LABOR HOURS:	
:					PARTS TOTAL	
					REPAIR LABOR	
					SHIPPING	
					TEAR DOWN/ CHARGE	
					CALIBRATION	100.00
					TAX 6.00	7.75
					TOTAL 7.75	107.75

SHIP VIA: DATE:

RDMSD 2002 11/03

RCVD BY
(SIGNED): (PRINTED):

1 OF 1

CERT. NUMBER: 16958:1073294914

Rothe Development, Inc.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Grubb Engineering_ INC.

P.O.Box 65
Converse, TX 78109

MFG: Biddle
MODEL: 247000
NOMEN: DIG LOW RES OHM
S/N: 7386
CUST. ID:

CAL DATE: 1/5/04
DUE DATE: 1/5/05

CONTROL NO: 290 - 16958
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 002034474
CUSTOMER P.O.:
RECEIVED CONDITION: IN TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 12Mo.
TEMPERATURE: 72.0°F
RELATIVE HUMIDITY: 28%

DATE RECEIVED: 1/2/04

COMMENTS:

ATTACHMENTS:

All calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI / NCSL Z540-1-1994, ANSI / ISO / IEC 17025, ISO / IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR ≥ 4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
75	JRL	NMN	75	1/8/2004
166	RAM/SIMP.	10-500A	7254	12/1/2004
72	HP	3490A	1637A05174	3/10/2004

APPROVED BY: Peter J. Stemmer ☑ CMS ☐ QCO DATE: 1/8/04

This certificate may not be reproduced, except in full, without written approval of Rothe Development, Inc. Metrology Services Division

Rothe Development, Inc. 4613 Sinclair Road San Antonio, Texas 78222
METROLOGY SERVICES DIVISION TRACEABLE TO NIST (210)648-3131 Fax (210)648-4091

CHARGE # 107 CONTROL # CS290 - 16958 PO NUMBER 00202447 1

CUSTOMER

RECEIVED FROM: Grubb Engineering, INC. DATE: 1/2/2004
PHONE #: 210-658-7250
FAX #:
ADDRESS: P.O.Box 65
Converse, TX 78109
CONTACT NAME: Mr. JEFFREY RIEL
PURCHASE ORDER #:

ITEM

MFG.: Biddle
MODEL.: 247000
NOMEN: DIG LOW RES OHM
S/N: 7386
CUST ID:
ACCESS
RCVD: leads 2 piece Unit

CUSTOMER COMMENTS/REQUIREMENTS: TAX 7.875% BOBBY GRUBB

OUR PO:

DATA:

RECEIVED:	RETURNED:	CALIBRATION INTERVAL: 12 Mo.	CAL'D AT:
(X) IN TOLERANCE	(X) IN TOLERANCE	CAL. DATE: 5 Jan 04	(X) RDMSD
( ) OUT OF TOLERANCE	( ) LIMITED CALIBRATION	DUE DATE: 5 Jan 05	( ) ON-SITE
( ) INOPERATIVE	( ) REPAIR ONLY		( ) SUB
	( ) NO ACTION		

ENVIRONMENTAL CONDITIONS:	SPECIFICATIONS:	PROCEDURE:	RDMSD TECH:	SERVICE CODE:
72 °F	(X) MFG	(X) MFG	PJS	J
28 %RH	( ) RDMSD:	( ) RDMSD:		
	( ) OTHER:	( ) OTHER		

FAULT/SYMPTOM:

WORK PERFORMED:

CAL

TR#'s: 75, 166, 72

LIMITED CALIBRATION:

COMMENTS:

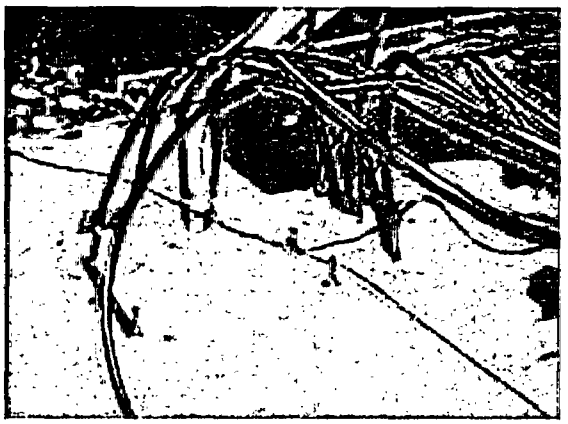
CKT REF	QTY	PART #	DESCRIPTION	COST	REPAIR LABOR HOURS:		
					PARTS TOTAL		
					REPAIR LABOR		
					SHIPPING		
					TEAR DOWN CHARGE		
					CALIBRATION		
					TAX 0.09	~~1.25~~ 9	~~00~~ 84
					TOTAL	134	84

SHIP VIA: DATE:

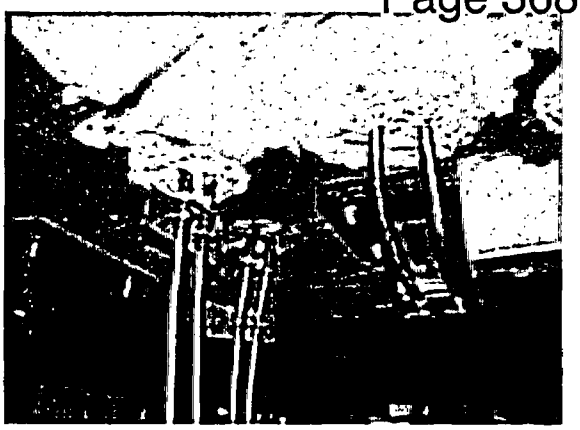
RDMSD 2007 4/03 RCVD BY (SIGNED): (PRINTED):

Appendix E

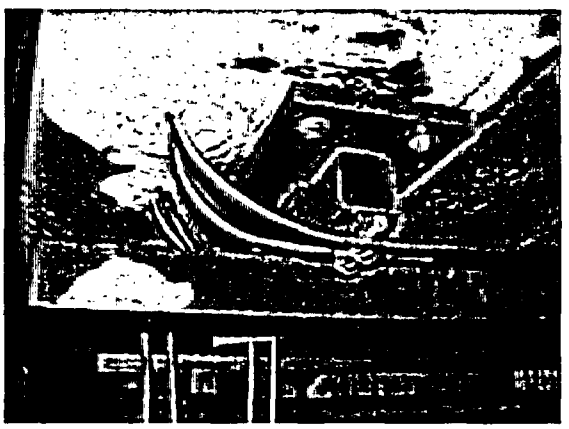
PHOTOGRAPHS



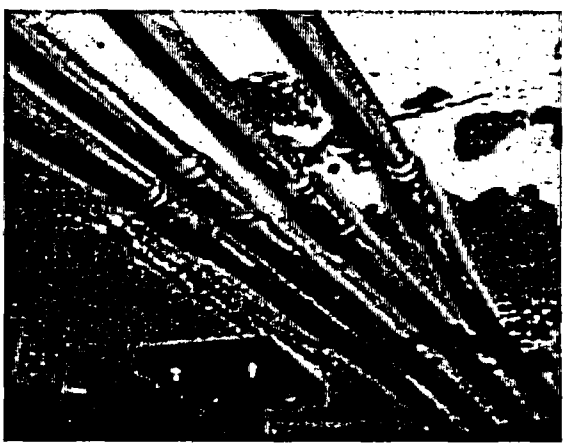
#1: Cables passing in and out of heated area.



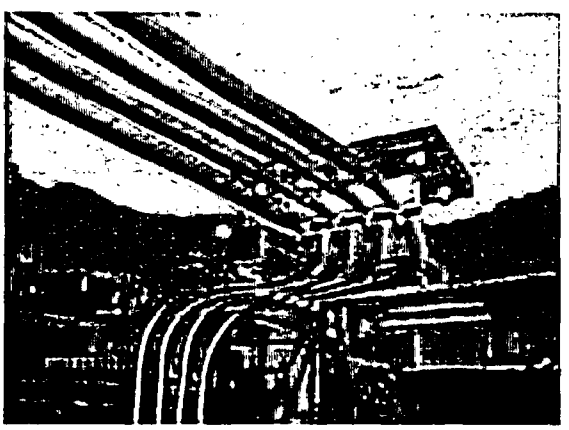
#2: Cables on exposed side of slab.



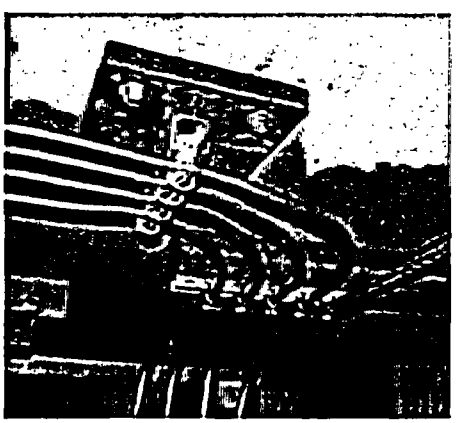
#3: Incoming cables on hot side of slab.



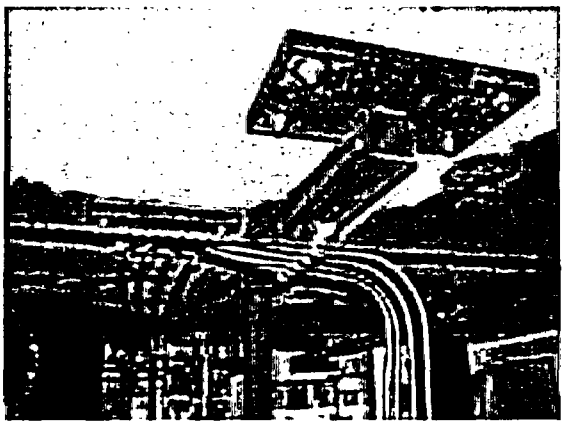
#4: Splices at mid-length.



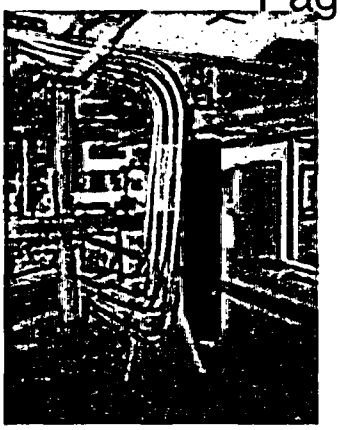
#5: Horizontal to vertical transition.



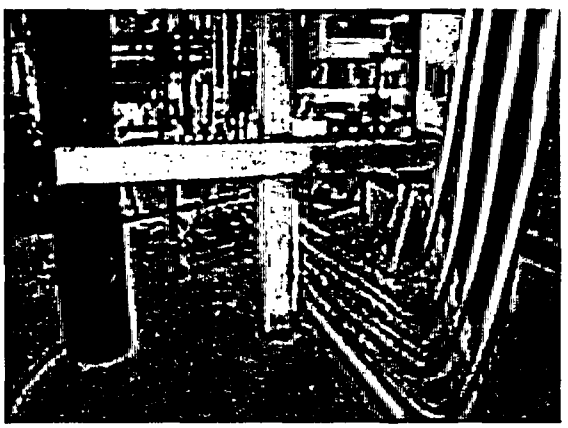
#6: Horizontal to vertical transition.



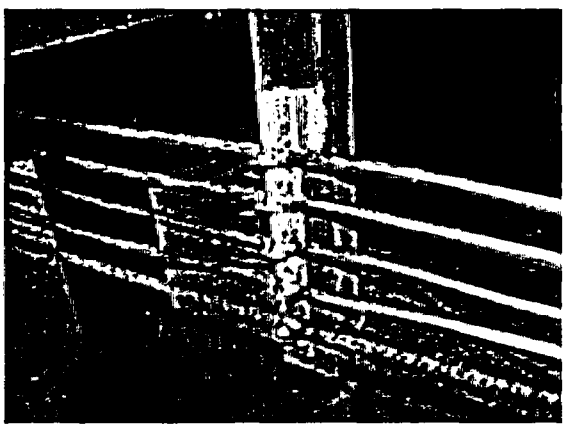
#7: Horizontal to vertical transition.



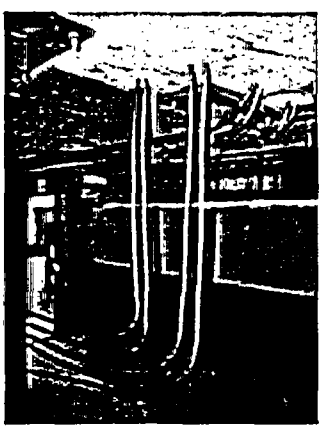
#8: Vertical and horizontal runs.



#9: Horizontal run.

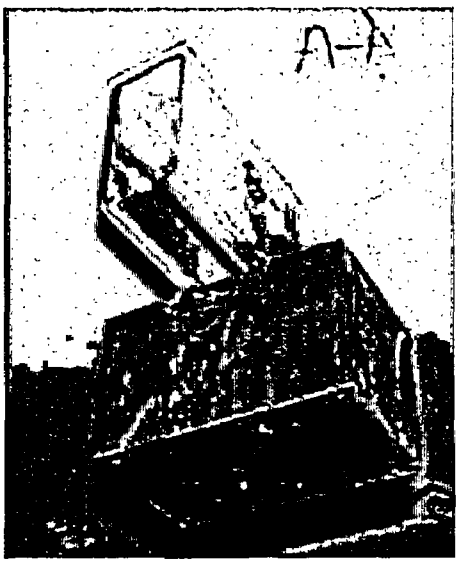


#10: Supports at center of horizontal run.

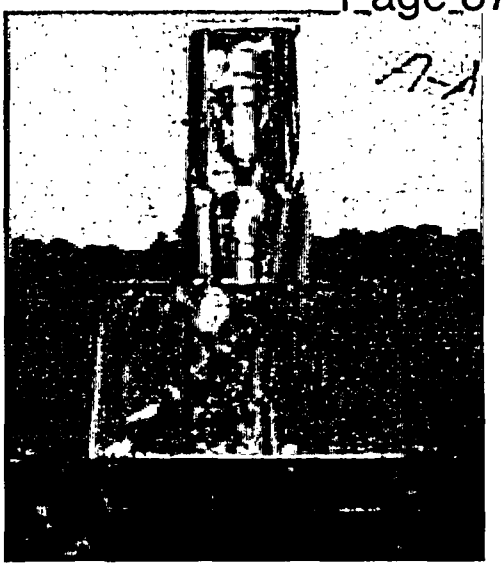


#11: Cables running up and through slab.

#12: Cables running up and through slab.

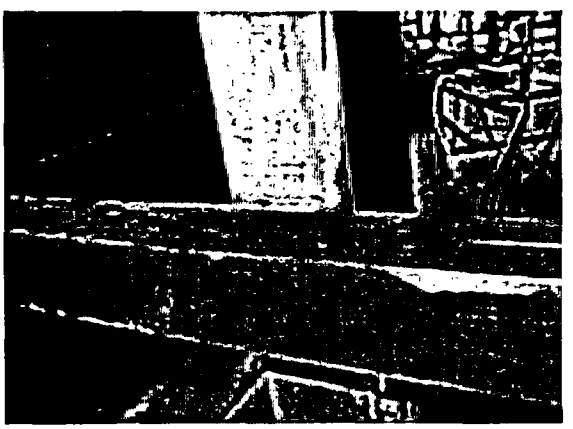


#13: Loaded strut (Sec.AA)

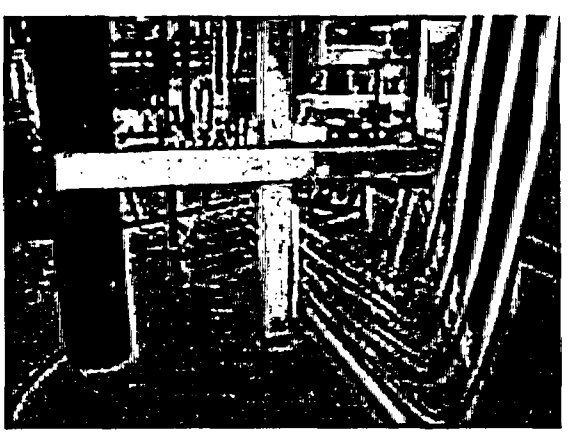


#14: End view of loaded strut.

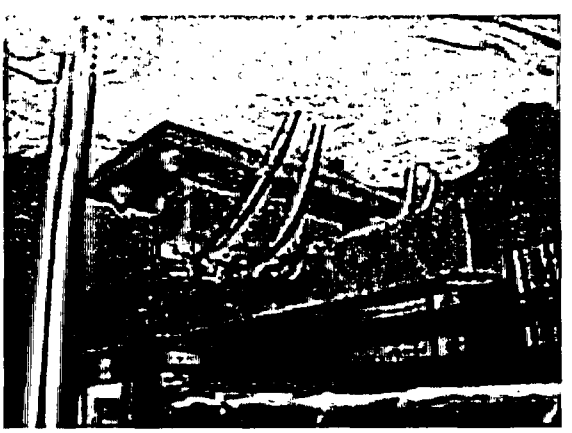
#15: Center support attachment details.



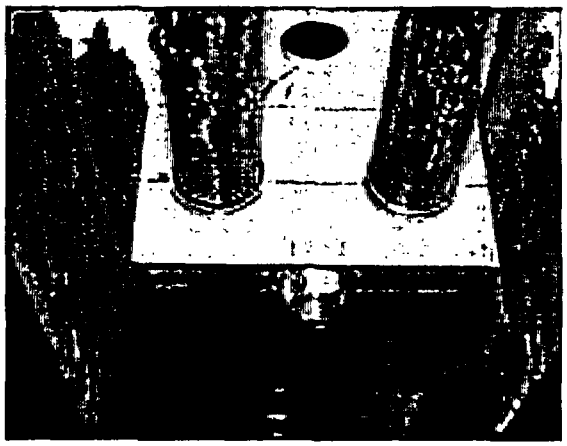
#16: Center support load.



#17: Center support with load & cables.

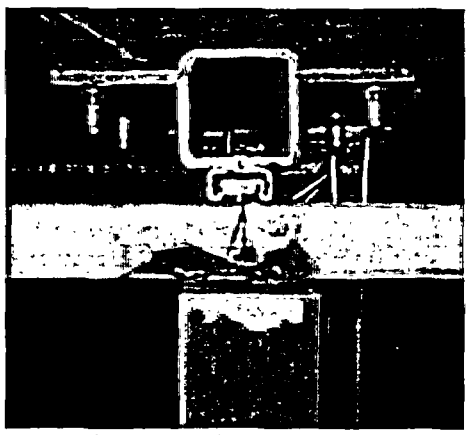


#18: Cables entering heated area.

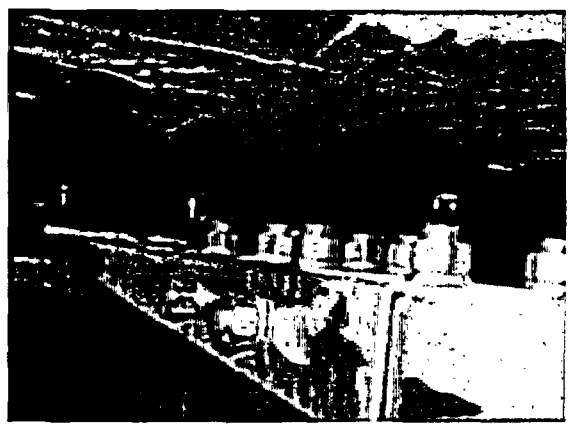


#19: Shimmed supports in raceway.

#20: Loaded raceway support.

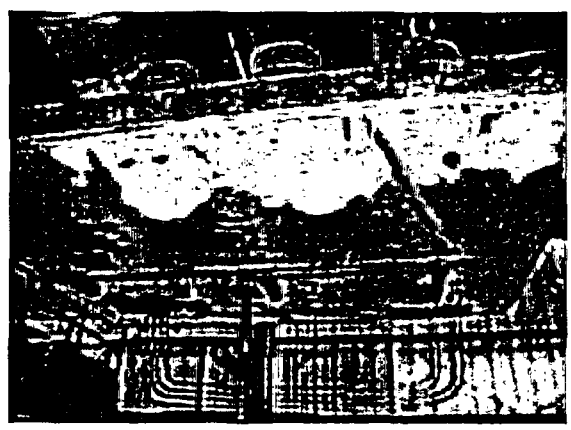


#21: Loaded raceway splice.

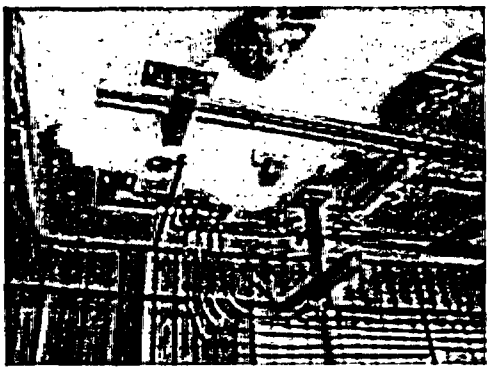


#22: Raceway splice.

#23: Completed test assembly.

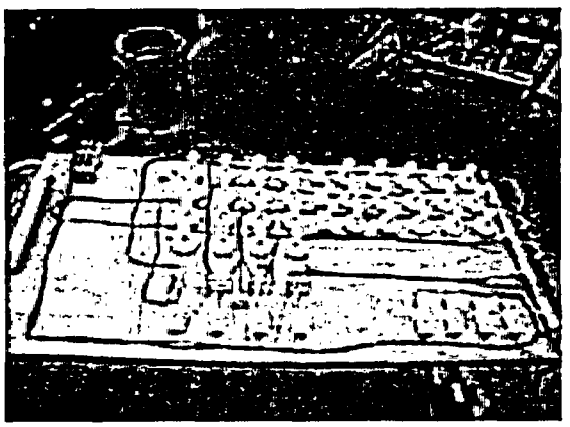


#24: Completed test assembly.

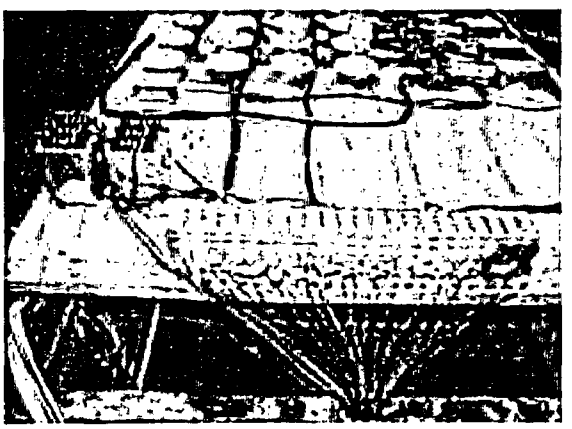


#25: Completed test assembly.

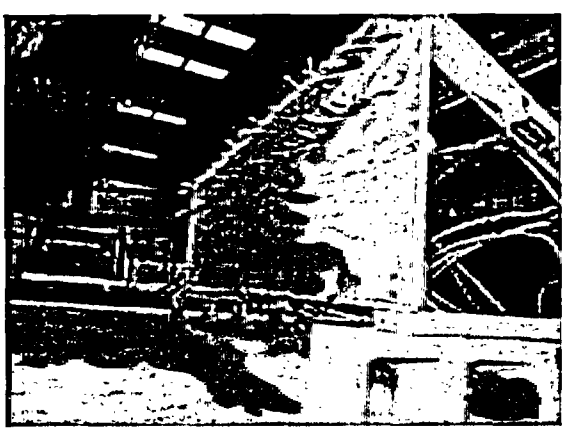
#26: Placing the assembly on the furnace.



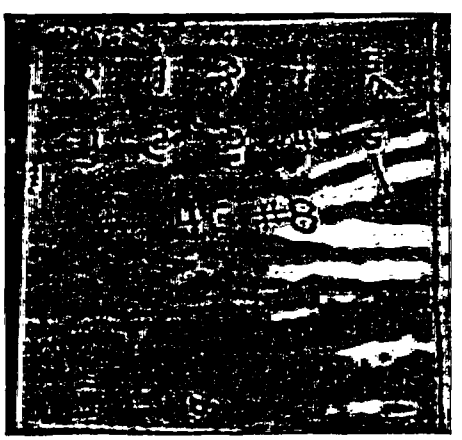
#27: Switchboard.



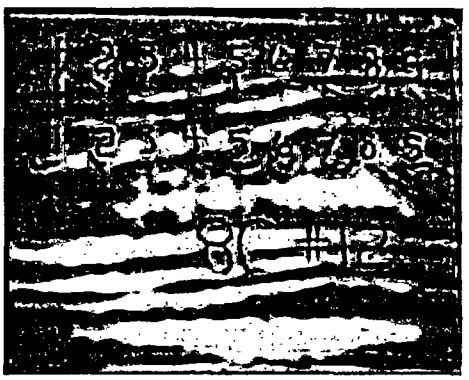
#28: Connections to the computer.



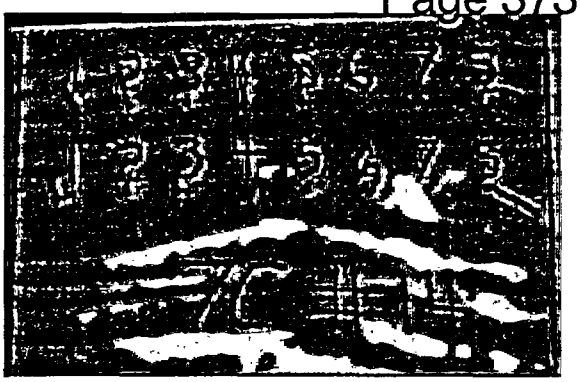
#29: Megger connections to all cables.



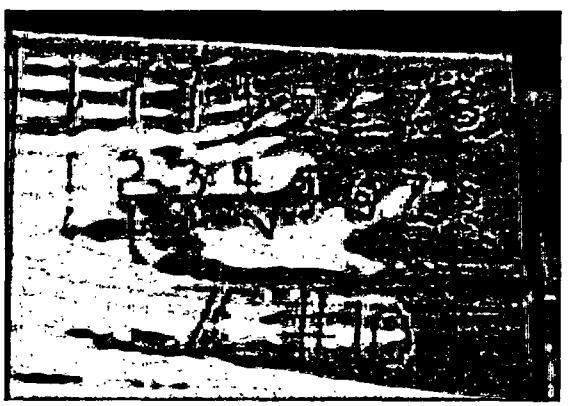
#30: 4/C #8 connections.



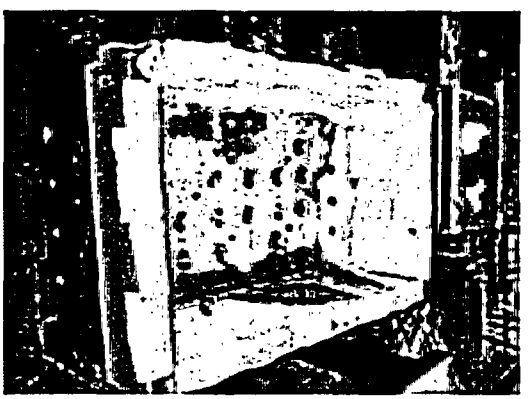
#31: 8/C #12 connections.



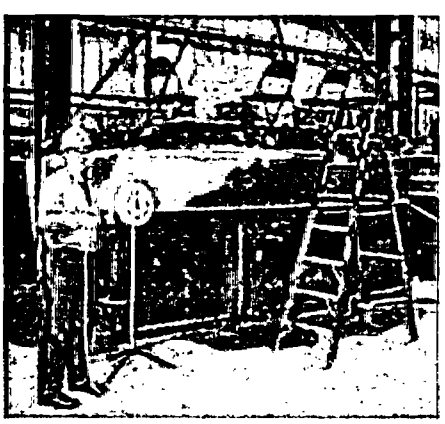
#32: 7/C #14 connections.



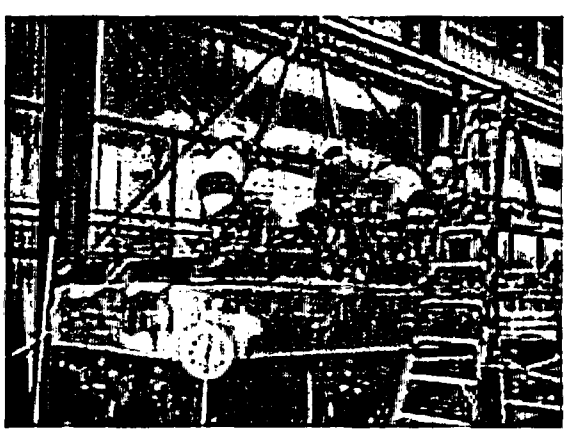
#33: 7/C #10 connections.



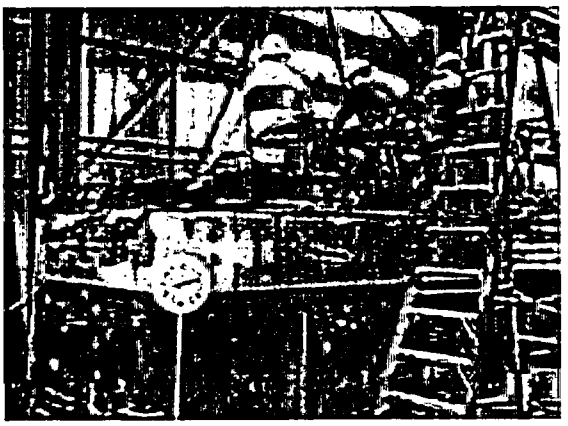
#34: Overhead view of test furnace.



#35: Start of fire test.

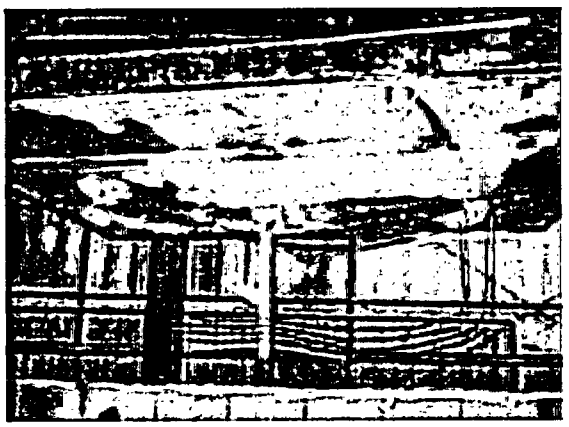


#36: Meggering at 32 minutes.

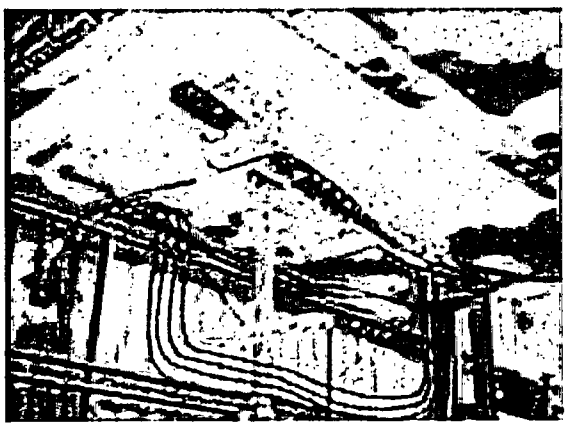


#37: Meggering at 2h 13 min.

#38: Lifting specimen at end of test.

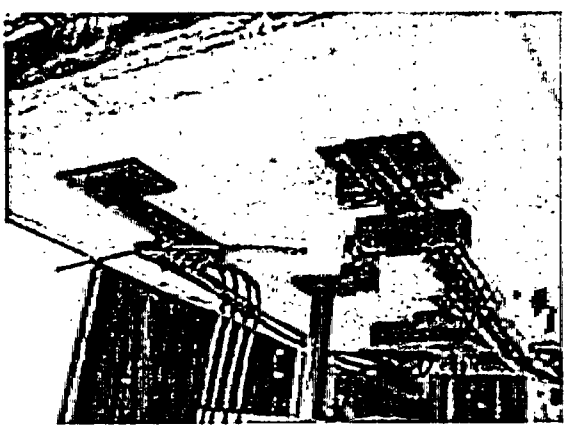


#39: Specimen after fire exposure.

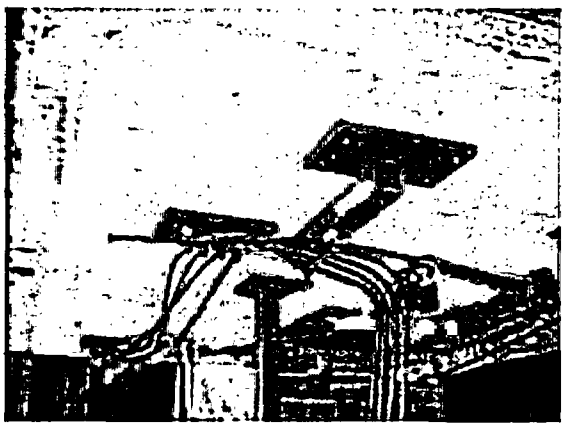


#40: Specimen after fire exposure.

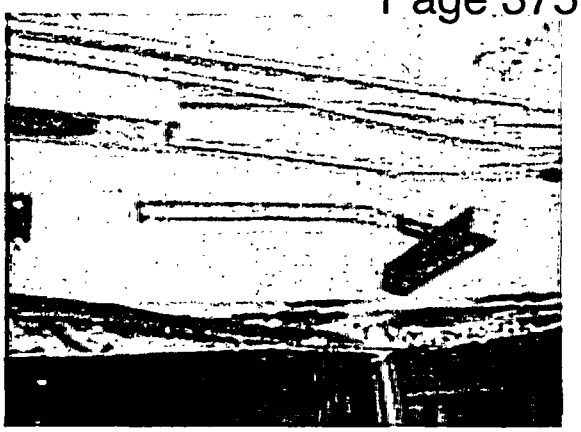
#41: Specimen after fire exposure.



#42: Specimen ready for hose stream test.

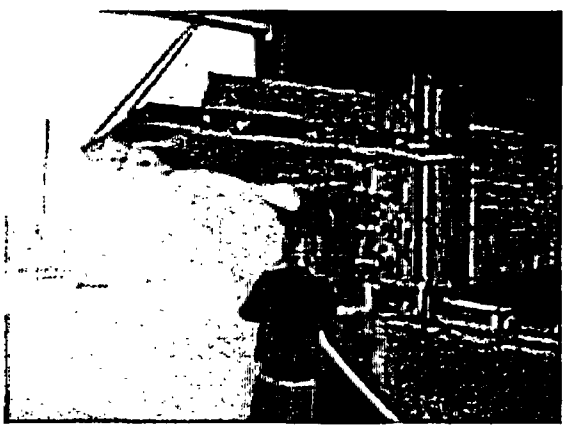


#43: Specimen before hose stream test.



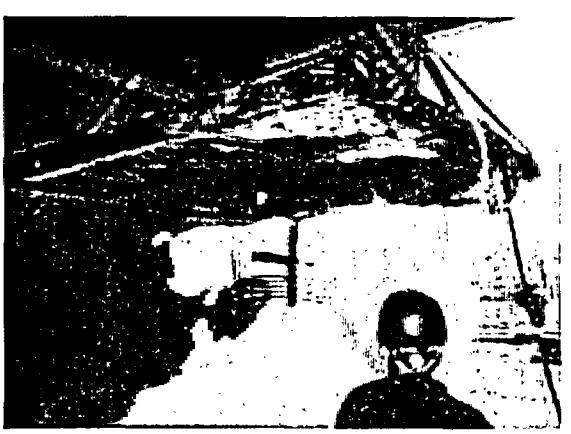
#44: Cantilevered load on strut.

#45: Adjusting pressure on hose stream.

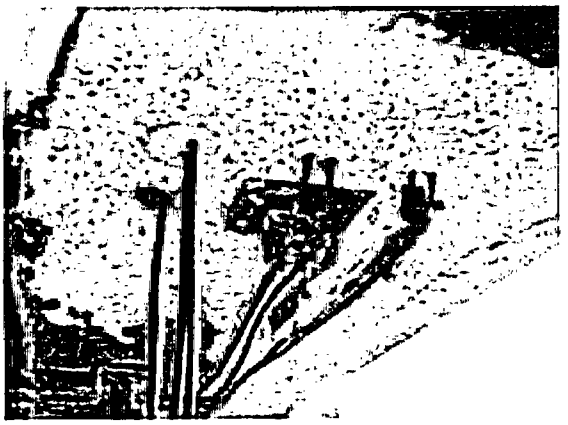


#46: Hose stream test.

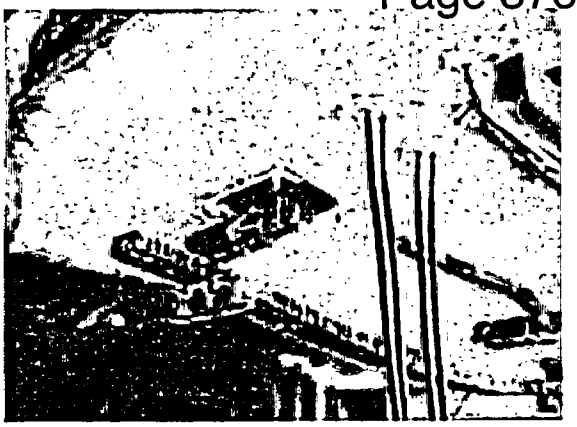
#47: Hose stream test.



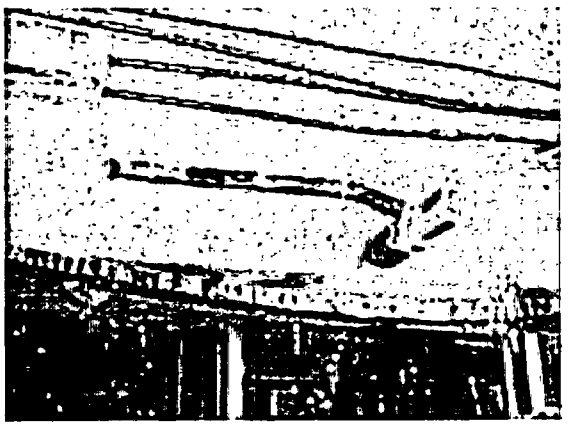
#48: Hose stream test.



#49: Cables post-hose stream test.

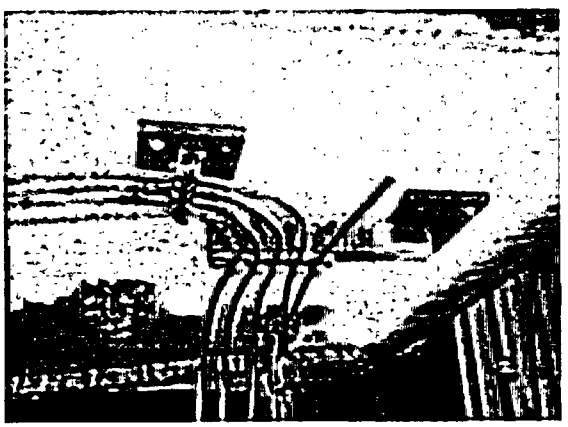


#50: Cables post-hose stream test.



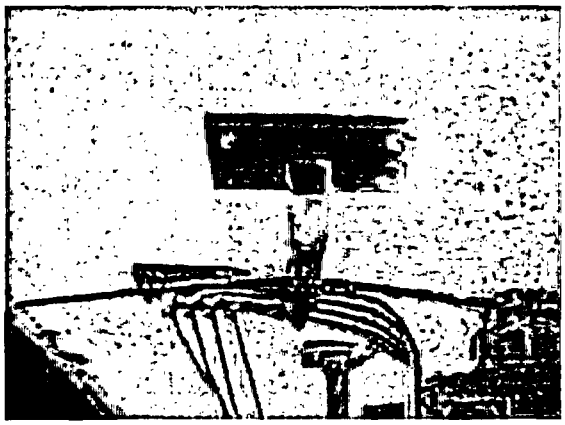
#51: Cables and cantilevered load.

#52: Cables after hose stream test.

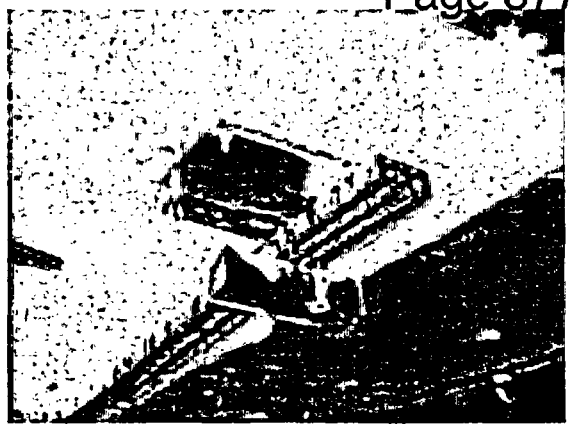


#53: Cables after hose stream test.

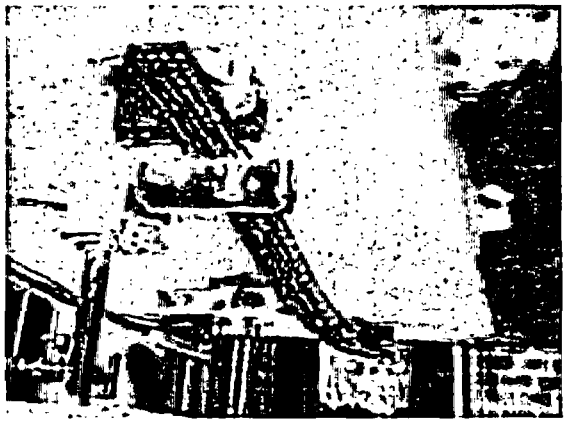
#54: Cables after hose stream test.



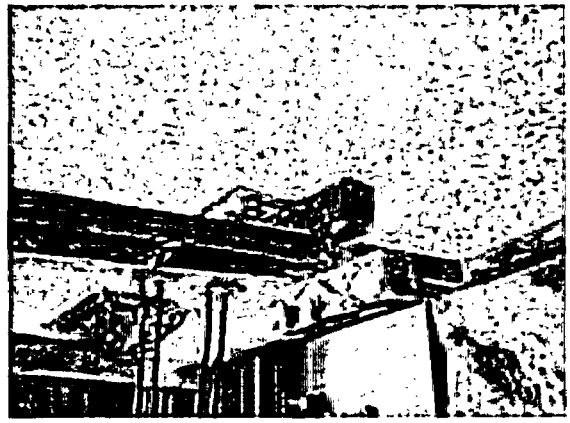
#55: Cables after hose stream test.



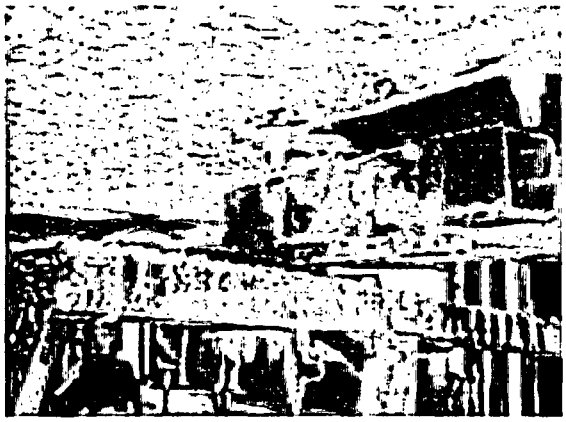
#56: Tube Track after hose stream test.



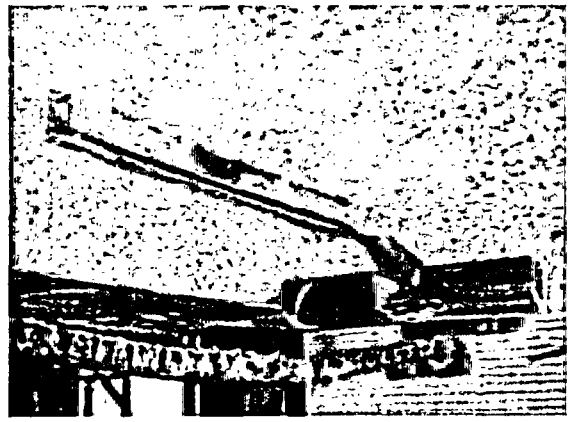
#57: Tube Track after hose stream test.



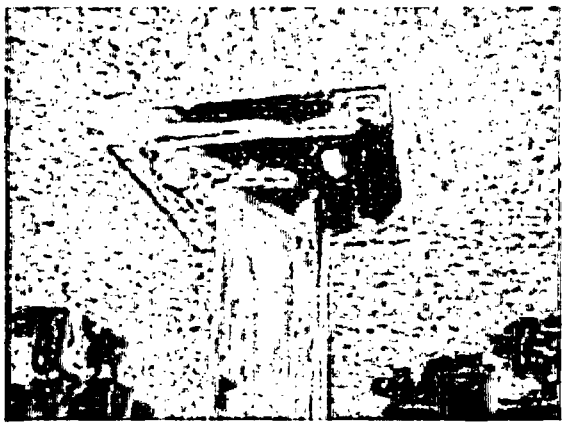
#58: Loaded support after hose stream test.



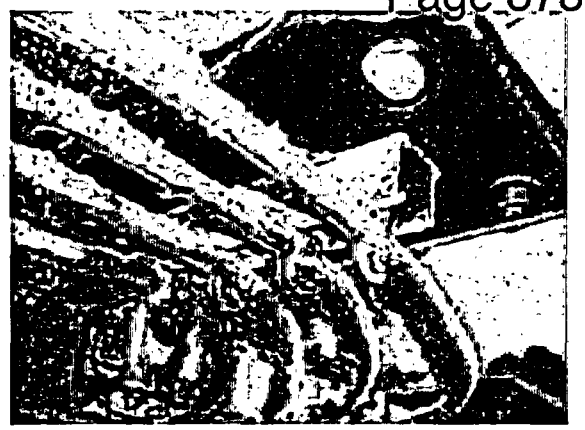
#59: Loaded support after hose stream test.



#60: Cantilevered load after hose stream test.

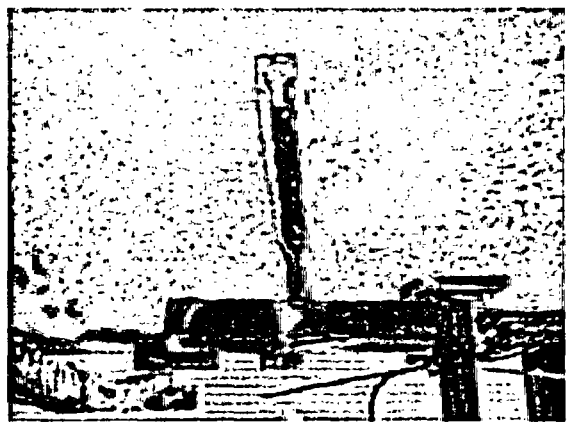


#61: Center cable support.

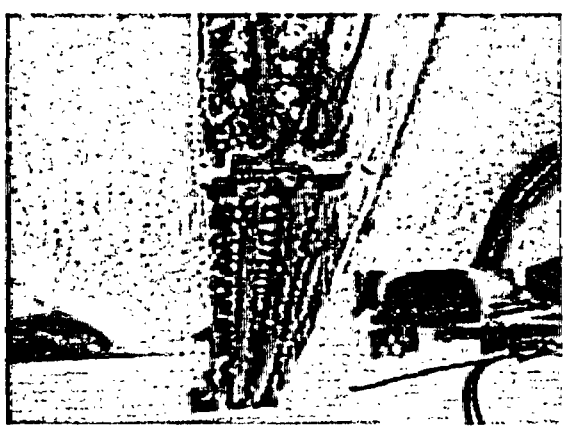


#62: Cable supports.

#63: Cable supports.



#64: Cantilevered load.



#65: Cableway supports.

#66: Typical damage on cable caused by galvanized strut.