GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[X] ORIGINAL [ ] REVISION NO. ____

Project No. E-25-657 GTRC/~~GIT~~ DATE 9 / 6 / 85

Project Director: D. L. McDowell & S. D. Antolovich School/~~Lab~~ ME/ChE

Sponsor: National Science Foundation

Type Agreement: Grant No. DMR-8420760

Award Period: From 8/15/85 To 7/31/86 (Performance) 10/31/86 (Reports)

Sponsor Amount:	This Change	Total to Date
Estimated:	$	$ 203,000
Funded:	$	$ 100,000

Cost Sharing Amount: $ 161,667 Cost Sharing No: E-25-331

Title: Acquisition of a Computer-Controlled Biaxial Test Facility (Materials Research)

ADMINISTRATIVE DATA OCA Contact John B. Schonk x-4820

1) Sponsor Technical Contact:

Stanley J. Pickart
National Science Foundation
MPS/DMR
Washington, D. C. 20550
(202) 357-7570

2) Sponsor Admin/Contractual Matters:

Stephen G. Burnisky
National Science Foundation
DGC/MPS
Washington, D. C. 20550
(202) 357-9671

Defense Priority Rating: N/A Military Security Classification: N/A

(or) Company/Industrial Proprietary: N/A

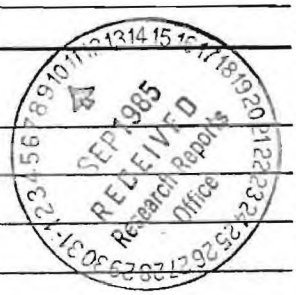
RESTRICTIONS

See Attached NSF Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with GIT

COMMENTS:



COPIES TO:

SPONSOR'S I. D. NO. 02.107.000.86.005

Project Director	Procurement/GTRI Supply Services	GTRC
Research Administrative Network	Research Security Services	Library
Research Property Management	Reports Coordinator (OCA)	Project File
Accounting	Research Communications (2)	Other A. Jones

FORM OCA 65-285

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

Date 11/21/86

Project No. E-25-657 School/~~XXX~~ ME

Includes Subproject No.(s) N/A

Project Director(s) D. L. McDowell & S. D. Antolovich GTRC / ~~XXX~~

Sponsor National Science Foundation

Title Acquisition of a Computer-Controlled Biaxial Test Facility

Effective Completion Date: 7/31/86 (Performance) 10/31/86 (Reports)

Grant/Contract Closeout Actions Remaining:

- [ ] None
- [ ] Final Invoice or Final Fiscal Report
- [ ] Closing Documents
- [X] Final Report of Inventions (sent Questionnaire to P.I.)
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _____

Continues Project No. _____ Continued by Project No. _____

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Library
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Project File
Other I. Newton
A. Jones
R. Embry

FORM OCA 69.285

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

FINAL PROJECT REPORT
NSF FORM 98A

PLEASE READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING

PART I–PROJECT IDENTIFICATION INFORMATION

1. Institution and Address	2. NSF Program	3. NSF Award Number
Georgia Tech Research Corporation Georgia Institute of Technology Atlanta, GA 30332-0420	Instrumentation for Mat'ls. Res. (DMR)	DMR-8420760
	4. Award Period From 8/15/85 To 7/31/86	5. Cumulative Award Amount $203,000.

6. Project Title
Acquisition of a Computer-Controlled Biaxial Test Facility

PART II–SUMMARY OF COMPLETED PROJECT *(FOR PUBLIC USE)*

The purpose of this grant was to enable the Fracture and Fatigue Research Laboratory (FFRL) at Georgia Tech to acquire a high-temperature, computer-controlled, tension-torsion test facility. The FFRL is extremely active in development of constitutive equations for high temperature deformation and damage of Ni base superalloys, Cr-Mo alloys, and stainless steels in addition to complementary micro-structural evaluation. An MTS tension torsion machine with 200 kip axial load capacity, 50 kip-in torque capacity, PDP 11-23 data acquisition and control, and a 7.5 KW induction heating system were procured with the support of this grant. Matching funds of 44% of the equipment cost were provided by Georgia Tech. The system has been constructed, shipped, and is currently being installed. Support from NSF, Industry, NASA, DoE, DoD, and other agencies has been received or requested to develop multi-axial constitutive equations for cyclic viscoplasticity, creep, and creep-fatigue-environment interaction.

PART III–TECHNICAL INFORMATION *(FOR PROGRAM MANAGEMENT USES)*

1. ITEM *(Check appropriate blocks)*	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
				Check (√)	Approx. Date
a. Abstracts of Theses	X(N/A)				
b. Publication Citations	X(N/A)				
c. Data on Scientific Collaborators	X(N/A)				
d. Information on Inventions	X(N/A)				
e. Technical Description of Project and Results		X			
f. Other *(specify)*					

2. Principal Investigator/Project Director Name *(Typed)*	3. Principal Investigator/Project Director Signature	4. Date
David L. McDowell Stephen D. Antolovich		10/15/86

TECHNICAL DESCRIPTION OF PROJECT AND RESULTS

PI/PD David L. McDowell
Co PI/PD Stephen D. Antolovich
NSF Grant DMR-8420760
Award Period: 8/15/85 to 7/31/86

The sole purpose of this grant was to acquire a high-temperature biaxial testing facility to continue our work in the Georgia Tech Fracture and Fatigue Research Laboratory in the areas of multiaxial nonproportional plasticity and viscoplasticity, multiaxial fatigue, multiaxial anisotropic continuum damage concepts, and microstructural aspects on multiaxial damage accumulation in high temperature alloys. The list of equipment specified in the original grant proposal was ordered and procured with essentially no change in scope or equipment. The entire $203,000 from NSF and $161,164 in matching funds from Georgia Tech were spent in acquisition of the system. This total figure of $364,164 (including shipping) was within 0.3% of the total cost of requested equipment in the original budget. The induction heating system was procured from LEPEL Corp.; shipment was received 6/18/86. The axial torsional system and associated peripherals were procured from MTS Systems Corporation; shipment of this system was received 10/2/86. Installation procedures are currently underway. The goal for system operation is early 1987.

Appendices A and B contain copies of actual purchase orders for the MTS equipment and the LEPEL equipment, respectively.

APPENDIX A

GEORGIA INSTITUTE OF TECHNOLOGY

PURCHASE REQUEST

MAKE ALL SPECIFICATIONS CLEAR, COMPLETE AND DETAILED

DATE November 22, 1985 REQUISITION NUMBER

CLASSIFICATION: Capital Outlay
(Supplies, Capital Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

Please make all arrangements for the purchase of the items listed below:

REQUESTED DELIVERY DATE: November 15, 1986 DELIVER TO: Rm. 253 Coon Bldg.
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
	1			MTS Axial Torsion Load Frame, Model #319.50;
				Rated at ±110 kip axial, ±50 kip-in torsional;
				2 Column w/Hydraulic Column Clamps and Lifts. **(see note below)
	1			MTS Model #244.41 Axial Actuator; rated at ±110 kips,
				Stroke of 6", 90 GPM flow rating, and LVDT stroke transducer
	1			MTS Model # 215.45 Rotary Actuator; rated at 50 kip-inches;
				Travel of 100°, ADT angular displacement transducer
	1			Axial Torsion Load Cell, MTS Model #662.03A-01,
				rated @ 100 kip/50 kip-in in fatigue.
	1			Service Manifold, MTS model 290.14B-01, rated at
				50 GPM, 1 pint pressure and return accumulators,
				Solenoid Controller High/Low/Off, full flow pressure
				filter, Servovalve Pilot Pressure supply.
	1			Servovalve, MTS Model # 252.25C-04, Rated at 15 GPM,
				external pilot supply

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
MTS Systems Corporation,	Box 24012, Minneapolis, MN 55424	(612) 937-4000
	(SOLE SOURCE)	

ESTIMATED COST: NOT TO EXCEED $ REMARKS:

APPROVED FOR DEPARTMENT HEAD:

**Max. Load Frame Height = 142" including eye bolts
Min. Vertical Test Space = 45"

SEND ORIGINAL ONLY TO PROCUREMENT OFFICE

REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND DEPARTMENT HEAD APPROVAL SPACES MUST BE COMPLETED.

GEORGIA INSTITUTE OF TECHNOLOGY

PURCHASE REQUEST

MAKE ALL SPECIFICATIONS CLEAR, COMPLETE AND DETAILED

DATE November 22, 1985 REQUISITION NUMBER _____

CLASSIFICATION: Capital Outlay
(Supplies, Capital Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

Please make all arrangements for the purchase of the items listed below:

REQUESTED DELIVERY DATE: November 15, 1986 DELIVER TO: Rm. 253 Coon Bldg.
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
	1 lot			Hose sets (Manifold to HPS; Manifold to actuator assemblies)
	1			Hydraulic power supply, MTS model # 510.21; rated at 20 GPM, requiring 460 V, 60 Hz Power, rated at 3000 psi.
	1			Control Console, MTS Model #490.81 (Single Bay)
	1			MTS Model # 448.85 Axial Controller
	1			MTS Model # 448.37 Processor Controller
	1			MTS Model # 448.14 Valve Driver
	1			MTS Model # 448.17 Auto Mode Switch Servo
	2			MTS Model # 448.21 DC Transducer Conditioner (Load & Strain)
	1			MTS Model # 448.22 AC Transducer Conditioner (Stroke)
	1			MTS Model # 448.41 Limit Detector
	1			MTS Model # 448.78 Communications Link

Axial Controller

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
MTS Systems Corporation,	Box 24012, Minneapolis, MN 55424	(612) 937-4000

ESTIMATED COST: NOT TO EXCEED $ _____ REMARKS: _____

APPROVED FOR DEPARTMENT HEAD: _____

SEND ORIGINAL ONLY TO PROCUREMENT OFFICE

REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND DEPARTMENT HEAD APPROVAL SPACES MUST BE COMPLETED.

GEORGIA INSTITUTE OF TECHNOLOGY

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DATE November 22, 1985 REQUISITION NUMBER _____

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(Supplies, Capital Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

Please make all arrangements for the purchase of the items listed below:

REQUESTED DELIVERY DATE: November 15, 1986 DELIVER TO: Rm. 253 Coon Bldg.
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
Torsion Controller	1			MTS Model # 448.85 Torsion Controller
	1			MTS Model # 448.37 Processor Controller
	1			MTS Model # 448.14 Valve Driver
	1			MTS Model # 448.17 Auto Mode Switch Servo
	1			MTS Model # 448.21S (for ADT) DC Transducer Conditioner
	2			MTS Model # 448.21 DC Transducer conditioner (Torque and Strain)
	1			MTS Model # 448.41 Limit Detector
	1			MTS Model # 448.78 Communications Link
	1			MTS Model # 410.80 Digital Function Generator
	1			MTS Model # 413.81 Control Panel

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
MTS Systems Corp.,	P.O. Box 24012, Minneapolis, MN 55424	(612) 937-4000

ESTIMATED COST: NOT TO EXCEED $ _____ REMARKS: _____

APPROVED FOR DEPARTMENT HEAD: _____

SEND ORIGINAL ONLY TO PROCUREMENT OFFICE

REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND DEPARTMENT HEAD APPROVAL SPACES MUST BE COMPLETED.

GEORGIA INSTITUTE OF TECHNOLOGY

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(Supplies, Capital Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

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REQUESTED DELIVERY DATE: November 15, 1986 DELIVER TO: Rm. 253 Coon Bldg.
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
	1			MTS Data/Console Console
	1			MTS Model # 468.20 Test Processor
	1			MTS Model # 468.04 Q-Bus to Device Bus converter with Programmable Clock
	2			MTS Model # 468.35 Micro Segment Generator
	2			MTS Model # 468.43 8 Channel 16 Bit Analog to Digital Converter
	2			MTS Model # 468.55 Communications Link to 448.85
	1			DEC* Micro PDP 11/23 Plus with:
				- 512 KByte Memory
				-22 bit addressing
				-Floating Point Instruction
				-2 RS232 Ports
				-Dual 5¼" Flexible Disk Drive -10 MByte Winchester Hard Disk Drive

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
MTS Systems Corp.,	P.O. Box 24012, Minneapolis, MN 55424	(612) 937-4000

ESTIMATED COST: NOT TO EXCEED $ REMARKS:

APPROVED FOR DEPARTMENT HEAD:

*Purchasing through MTS includes this component in System Warranty (See page 6)

SEND ORIGINAL ONLY TO PROCUREMENT OFFICE

REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND DEPARTMENT HEAD APPROVAL SPACES MUST BE COMPLETED.

GEORGIA INSTITUTE OF TECHNOLOGY

PURCHASE REQUEST

MAKE ALL SPECIFICATIONS CLEAR, COMPLETE AND DETAILED

DATE November 22, 1985 REQUISITION NUMBER

CLASSIFICATION: Capital Outlay
(Supplies, Capital Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

Please make all arrangements for the purchase of the items listed below:

REQUESTED DELIVERY DATE: November 15, 1986 DELIVER TO: Rm. 253 Coon Bldg.
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
	1			DEC* VT240 Video Graphics Terminal
	1			DEC* LA50 Printer
	1 lot			System Cables
	1			MTS 773 BASIC, including:
				1. MTS 773.00 Foundation BASIC
				2. MTS 773.10 MTS 468 Device Diagnostics
				3. MTS 773.34 Advanced Test Command for Micro Segment Generator
				4. MTS 773.41 Advanced Data Acquisition
				5. MTS 773.55 Communications Link (448 Series)
				6. MTS 773.73 Test Program Function
				7. MTS 773.74 Configuration Status
				8. MTS 773.75 Software Development Modules
				9. MTS 773.86 Text Support
				10. MTS 773.88 VT 240 Graphics
				11. MTS 796.21 DECX Diagnostics

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
MTS Systems Corp.,	P.O. Box 24012, Minneapolis, MN 55424	(612) 937-4000

ESTIMATED COST: NOT TO EXCEED $ REMARKS:

APPROVED FOR DEPARTMENT HEAD:

*Purchasing through MTS includes this component in System Warranty (See page 6)

SEND ORIGINAL ONLY TO PROCUREMENT OFFICE

REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND DEPARTMENT HEAD APPROVAL SPACES MUST BE COMPLETED.

GEORGIA INSTITUTE OF TECHNOLOGY

PURCHASE REQUEST

MAKE ALL SPECIFICATIONS CLEAR, COMPLETE AND DETAILED

DATE November 22, 1985 REQUISITION NUMBER

CLASSIFICATION: Capital Outlay
(Supplies, Capital Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

Please make all arrangements for the purchase of the items listed below:

REQUESTED DELIVERY DATE: November 15, 1986 DELIVER TO: Rm 253 Coon Bldg,
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
	1			MTS Model # 632.68B-01 Extensometer with
				1.0 in gauge length, ±0.100 in. axial travel,
				±5° torsional travel (High Temp. Quartz Rod for Induction Heated Specimen)
	1			MTS Model #646.255 Axial Torsion Hydraulic
				Collet Grips rated 55 kips axial, 20 kip-in
				torsional; includes 2" dia. collets and
				water cooling.
	1 lot			System Services from MTS, including:
				1. Project Management and Coordination;
				2. System inspection and calibration by
				qualified MTS personnel before shipment
				from Minneapolis;
				3. One year system warranty
				4. System Documentation
				5. On-site Installation

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
MTS Systems Corp.,	P.O. Box 24012, Minneapolis, MN 55424	(612)937-4000

ESTIMATED COST: NOT TO EXCEED $337,210 REMARKS:

APPROVED FOR DEPARTMENT HEAD:

SEND ORIGINAL ONLY TO PROCUREMENT OFFICE

REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND DEPARTMENT HEAD APPROVAL SPACES MUST BE COMPLETED.

APPENDIX B

GEORGIA INSTITUTE OF TECHNOLOGY

PURCHASE REQUEST

MAKE ALL SPECIFICATIONS CLEAR, COMPLETE AND DETAILED

DATE April 29, 1986 REQUISITION NUMBER E-25-684

CLASSIFICATION: Capital Outlay
(Supplies, Capitol Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

Please make all arrangements for the purchase of the items listed below:

REQUESTED DELIVERY DATE: July 1, 1986 DELIVER TO: Rm. 2 Coon Bldg.
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
	1			Lepel Model T-7.5-3-KC-SW(T) (or equivalent) induction heating generator with solid state power control and solid state rectifiers, for operation with 460 volt, 60 cycle, three phase line current.
				Specifications: (see attached)

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
LEPEL Corporation	59-21 Queens Midtown Expressway Maspeth, NY 11378 ATTN: Robert J. Donahue	(718)426-4580

ESTIMATED COST: NOT TO EXCEED $ 18,170 REMARKS:

APPROVED FOR DEPARTMENT HEAD:

END ORIGINAL ONLY TO PROCUREMENT OFFICE REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND

SPECIFICATIONS FOR LEPEL INDUCTION HEATING GENERATOR

FLOOR MODEL T-7.5-3-KC-SW (A)(J) and (T)

1. Generator Enclosure Dimensions

Standard Cabinet: 30" wide, 56" high, 40" deep.

2. Enclosure

The heavy gauge aluminum frame and steel base of the cabinet are mounted on industrial type casters for mobility. The panels of the cabinet are heavy gauge sheet aluminum.

3. Power Input

Approximately 17 KVA. 95% power factor, 50 or 60 cycle, 3 phase, 460 volts.

4. Power Output

7.5 kilowatts (tested in accordance with NEMA and IEEE standards). All generators are rated for continuous duty.

5. Output Frequency

200 to 450 kilocycles

6. Controls

(a) Control circuits. 115 V AC (obtained with an isolation transformer).
(b) Filament start-stop pushbuttons mounted on generator.
(c) All control wires terminate at a terminal strip for complete remote control operation if desired.

7. Indicating Meters

(a) Plate Current
(b) Grid Current
(c) Filament Voltage

8. Pilot Lights

Filament on (green)
Plate on (red)

9. Tank Circuit

(a) The tank coil is water cooled and mounted on ceramic supports. it is provided with 15 adjustable taps.

These can be adjusted for the proper matching of all load coils.

(b) The capacitor rating is .0076 MFD, 14 KV. The capacitor is a water cooled ceramic, the casing is at ground potential.

10. Grid Coil

Wide range externally adjustable variable grid control, to regulate grid current externally with every load condition while the generator is in operation.

11. Protective Devices

(a) Grid current overload relay (automatic reset).
(b) Plate current overload relay (automatic reset).
(c) Water flow switch to prevent damage to the oscillator tube.
(d) Magnetic circuit breaker on incoming power line.
(e) Interlocks on all access doors.
(f) Time delay unit to insure adequate pre-heating of all tubes.

12. Personnel Safety

(a) Access panels are equipped with safety switches which automatically shut off the plate power when panels are removed.
(b) One side of the R.F. output is at ground potential.
(c) Control receptacles. 115 V AC with grounded terminal.

13. Transformers

Transformers are provided with five taps each, to permit the proper adjustment of filament and plate voltages.

14. Tube Complement

Oscillator Tube #6960 or equal.
Power Supply (Thyratron Control) Three Rectifiers #872
Three Thyratrons #678

When the generator is supplied with Primary Saturable Reactor or Variable Transformer, or Silicon Controlled Rectifier Power Controls, the unit will b equipped with six Silicon Diode Rectifiers.

15. Available Power Output Controls

A. Stepless Thyratron Control to regulate the power output of the generator from practically zero to maximum.

Electronic Pulsing (Optional at extra charge) (for use with Thyratron Control only) for electronic timing of short and accurate heating cycles.

B. Primary Saturable Reactor Control regulates the R.F. power output from approximately 100 watts to 7.5 kilowatts. The reactor is connected to the primary side of the plate transformer.

Input Control Current:	0-2 Amps D.C.
Input Control Voltage:	0-80 Volts D.C.

The Reactor is provided with a manual control knob calibrated from 0-100. The Reactor can also be used with most automatic temperature control equipment, provided it is driven with a small silicon controlled rectifier.

Lepel SCR Driver #050-0009 (Optional at extra charge)

Control Winding 120 Ohms	50 M.A. maximum
Output Voltage	95 V. D.C.
Output Current	4.4 Amps
Line Voltage	115 V. A.C.

The Primary Saturable Reactor is internally mounted.

C. Solid State Power Controls are of the thyristor type, having the following specifications:

1. Input voltage: 460 volts ± 10% or 230 volts ± 10%, 3 phase, 50/60 hertz.

2. General Description: Digital Logic Circuitry is employed to control the firing sequency of the thyristors (SCR) in the DPC power controller.

3. The thyristor assembly controls the three phase input to the plate transformer. Also, provides automatic phase current balance to within ± 2%.

4. Soft start. Adjustable ramp provided.

5. Range of control: 0 to 100%.

6. Instantaneous overcurrent trip will stop all SCR conduction within 1/2 cycle.

7. Rapid fault sensing does not require fuses for protection of solid state components.

8. Phase failure and phase reversal protection.

9. Undervoltage and temperature protection.

10. Signal Inputs: 0-5 MA-DC, or 0-5 volts DC.

11. All solid state circuitry.

12. Smooth continuous power control over the entire range.

13. Provisions for electronic "keying."

14. Manual control.

15. Provisions for switching from "Manual" to "Automatic" control.

16. The thyristor controller is located in the main cabinet.

17. Solid state rectifiers are supplied with this output control, as a standard feature.

18. Response time approximately 40 milliseconds.

16. Weight

Generator	- Net 995 lbs.
Saturable Reactor	- Net 500 lbs.

17. Water Requirements

4 gallons per minute under full load.
Water pressure from 35 to 60 lbs. per sq. in.
Water temperature not to exceed 86°F (at inlet).

18. Cooling Systems for Cabinets

Standard: One 12" fan which draws fresh air into the cabinet.

19. Standards

Must follow applicable specifications of the following:

A. Federal Communications Commission
B. Occupational Safety and Health Standards (OSHA).
C. IEEE: Standard, Test Code and Recommended Practice for induction and Dielectric Heating Equipment.

GEORGIA INSTITUTE OF TECHNOLOGY

PURCHASE REQUEST

MAKE ALL SPECIFICATIONS CLEAR, COMPLETE AND DETAILED

DATE April 29 1986 REQUISITION NUMBER E-25-684

CLASSIFICATION: Capital Outlay
(Supplies, Capital Outlay or Equipment)

TO: PROCUREMENT OFFICE

FROM: Mechanical Engineering

Please make all arrangements for the purchase of the items listed below:

REQUESTED DELIVERY DATE: July 1, 1986 DELIVER TO: Rm. 2 Coon Bldg.
ATLANTA, GEORGIA 30332

ITEM NO.	QUANTITY	UNIT		SPECIFICATIONS (If Model No. is shown, also give mfg's. Name)
	1			RWWEX-10 water-to-water heat exchanger and water recirculation
	1			LCT-4 Load coil transformer with 12:1 and 12:3 adaptors and connection kit

RECOMMENDED SOURCE OR SOURCES:

NAME	ADDRESS	TELEPHONE NUMBER
EPEL Corporation	59-21 Queens Midtown Expressway Maspeth, NY 11378	(718)426-4580

ESTIMATED COST: NOT TO EXCEED $ 6,400 REMARKS:

APPROVED FOR DEPARTMENT HEAD:

PAGE 1 OF 1 PAGES

SEND ORIGINAL ONLY TO PROCUREMENT OFFICE REQUISITION NUMBER, DELIVERY POINT, SPECIFICATIONS AND