

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE	PAGE OF PAGES	
				J	1	60
2. AMENDMENT/MODIFICATION NO. 0003		3. EFFECTIVE DATE 13-May-2004	4. REQUISITION/PURCHASE REQ. NO. W68SBV-3338- ----		5. PROJECT NO.(If applicable)	
6. ISSUED BY WALLA WALLA CONTRACTING DIVISION 201 N THIRD WALLA WALLA WA 99362- ----		CODE W912EF	7. ADMINISTERED BY (If other than item 6) WALLA WALLA PATTI RECORD 509/527- PATTI.C.RECORD@USACE.ARMY.MI WALLA WALLA ----		CODE W912EF	
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				<input checked="" type="checkbox"/>	9A. AMENDMENT OF SOLICITATION NO. W912EF-04-R-0009	
				<input checked="" type="checkbox"/>	9B. DATED (SEE ITEM 11) 19-Mar-2004	
					10A. MOD. OF CONTRACT/ORDER NO.	
					10B. DATED (SEE ITEM 13)	
CODE		FACILITY CODE				
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS						
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input checked="" type="checkbox"/> is extended, <input type="checkbox"/> is not extended.						
Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.						
12. ACCOUNTING AND APPROPRIATION DATA (If required)						
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.						
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.						
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).						
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:						
D. OTHER (Specify type of modification and authority)						
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.						
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) SUPPLY: Digital Exciters for Lower Monumental Dam (Units 1-3), and Lower Granite Dam (Units 1-3), Franklin and Garfield Counties, ... See Summary of Changes for description of changes to the original solicitation dated March 19, ...						
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.						
15A. NAME AND TITLE OF SIGNER (Type or print)			16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
			TEL:		EMAIL:	
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED	16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
_____ (Signature of person authorized to sign)			BY _____ (Signature of Contracting Officer)		14-May-2004	

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION B - SUPPLIES OR SERVICES AND PRICES

1. **BID OPENING DATE HAS BEEN EXTENDED TO FRIDAY, MAY 28, 2004, 2:00 P.M.**
2. Attached is a list of Questions and Answers.
3. Delete and Replace Section B with the attached Revised SECTION B
4. Delete and Replace Section H Special Contract Requirements - 252.236-7001 Contract Drawings, Maps and Specifications with the attached Revised SECTION H, 252.236-7001 Contract Drawings, Maps and Specifications
5. Section L, Appendix I, Table of Mandatory Compliance - Change number 2.4.9 to 2.4.5.9 replace with attached Revised Section L, Appendix I, Table of Mandatory Compliance
6. Replace Wage Rates with the attached Updated version.
7. Delete and Replace Technical Specifications - Section 01270-0 with attached revised copy.
8. Delete and Replace Technical Specifications - Section 03600 with attached revised copy.
9. Delete and Replace Technical Specifications - Section 13080 with attached revised copy.
10. Delete and Replace Technical Specifications - Section 16251 with attached revised copy.
11. Attached are Revised Drawings.

INSTRUCTIONS: The offeror must acknowledge receipt of this amendment by documenting the amendment number and date in Block 14 of Standard Form 33, "Solicitation, Offer and Award."

(End of Summary of Changes)

The following have been added by full text:

QUESTIONS & ANSWERS

Responses to bidder's questions on RFP W912EF-04-R-0009, Digital Exciters for Lower Monumental and Lower Granite Dams, Units 1-3

1. Will the Corps made their equipment shop drawings available at the projects to allow the Contractor to verify schematics and wiring? See contract clause 252.236-7001.3

Response: Clause 252.236-7001 is a list of contract drawings and information only drawings issued with this RFP. The information only drawings includes shop drawings and the list is complete.

2. In what manner will the Government be providing outgoing cable circuit information? See clause 16251-1.3.2.5.

Response: The Government will return Contractor submittals with annotations showing the Government cable identifications and other marked drawings as required.

3. What signals are available from unit 4 to all unit 3's excitation system to provide reactive differential compensation? See clause 16251-2.4.7.

Response: At present all the exciters operate with droop load compensation and no signals are shared between the excitation systems of units 3 and 4.

4. Will the unit 4 excitation system need signals from the unit 3 excitation system for its reactive differential compensation? If so, what are they?

Response: Unit 4 will need reactive differential compensation signals from unit 3 for future use. Provide the bidder's standard signals for reactive differential compensation.

5. Do the four alarms required in clause 16251-2.19.4.4 that go both the S board annunciation system and the SCADA require electrically separate contacts?

Response: No.

6. Clause 16251-2.19.4.4 states that the contractor does not have to make the connections for these alarms in the SCADA equipment. Does this mean the Contractor does not have to provide the cabling between the SCADA and the exciter for the alarms either?

Response: The wiring for the SCADA alarms in the cited clause needs to be terminated by the Contractor in the unit S boards. Wiring to the SCADA from the S boards will be performed by others.

7. Par. 1.3.5.2.a Factory Test

It is better to test for static exciter efficiency on the machine rather than in the factory where conditions would all be simulated.

Response: See amendment for specification change.

8. Par. 2.3.3.2 Auto to Manual Mode

It would make more sense for the Corp have a redundant digital controller complete with AVR, manual control, limiters etc. rather than simply have a manual control backup.

Response: No change to the specification.

9. Par. 2.4.4.2 Rectifier Assembly

Bridge monitoring by sensors have also been permitted by the Corp in the past but not stated in the specification. The specification states air sensors, anemometers.

Response: Bridge temperature sensing and air flow sensing are both requirements of the specifications.

10. Para 2.4.5.5 Manual Voltage Regulator

Field Current Regulation has been accepted by the Corp on past jobs but not stated in the specification.

Response: See amendment for specification change.

11. Para. 2.4.8.1 Cabinet Dimensions

If I interpreted the specification correctly, 90"W, 90"H, 90"D is all the space being provided. This is not enough if this includes the PPT?

Response: See specification. The stated dimensions do not include the PPT.

12. Para. 2.4.8.7 Cabinet Preparation

Sandplasting is not required as a metal preparation for new sheet steel.

Response: See the specification "other means" of cleaning is acceptable.

13. Para. 2.4.27 Test Signal Input

The most common form of checking AVR response is by applying a step function via the summing junction of the AVR. "Circuitry shall be provided for injecting and arbitrary analog voltage input in the voltage sensing hardware path such that the analog sum of the terminal voltage and the analog input is derived and presented to the digital regulator for testing consistent." These test are not commonly practice in the field.

Response: No change to the specification

14. Para. 2.5.8 Protection

Is V/Hz intended to be function separate from the voltage regulator digital controller, e.g. protective relay?

Response: The V/Hz limiter may be integral to the regulator, but the V/Hz protection function shall be a separate protective relay.

15. Para.2.8 Special Test Equipment

Is it intended by the Corp to purchase a Dynamic Frequency Harmonic Analyzer as the special test equipment from the supplier if it is used during the commissioning.

Response: No.

16. Par. 3.4.3.d Special Factory Test

Dynamic performance testing of the excitation system is best performed on the machine rather than in the factory due to limitations of the factory to simulate the actual machine.

Response: See amendment for specificatioin change.

17. Para. 3.4.3.f

Conformance to IEEE 1110 is best performed in the factory rather in the field.

Response: See amendment for specification change.

18. Section 16251, Paragraph 1.1.3 Reads:

“Copies of the existing generator saturation test curves are included in these specifications at the end of this section.” I do not find the curves. These are important in determining field flashing requirements. Please send curves by amendment.

Response: The saturation curves will be added by amendment.

19. Section 01312, Paragraph 1

Can you provide us with a copy of the RMS software or direct us to RMS website?

Response: Website is <http://155.80.93.251/>

20. Section 16251, Paragraph 1.1.4 and Schedule “B”

The pricing schedule includes itemized pricing for the removal and storage of lead based paint (LBP) as well as the disposal of lead based paint. Section 16251, 1.1.4 identifies the potential for asbestos wiring in the equipment. Can you either add a line to the bid price schedule for the abatement and disposal of this material or advise if the wiring in the equipment is or is not asbestos?

Response: A bid item will be added for removal and disposal of asbestos containing material.

21. Section 16251, Paragraph 2.2.5d

Please clarify that there is a requirement for an ungrounded 120V power source for plant critical control equipment in the new excitation equipment enclosure.

Response: The 120 Vac ungrounded power will be provided by the Government.

22. Section 16251, Paragraph 2.4.8.1

Specification section allows for additional height for the PPT feed enclosure, is it acceptable for other enclosures such as resistor assemblies to also exceed the overall cubicle height restriction?

Response: This will be acceptable, providing that there is no interference with other overhead equipment in the powerhouse.

23. Section 16251, Paragraph 2.4.8.2

We request permission to utilize 13ga steel doors that incorporate supports for the doors and comprise the framework of the enclosure. This construction meets current industry design standards while meeting Seismic Zone 3 and 4 requirements. Detail will be provided to the Corps upon request.

Response: No change to the specification.

24. Section 16251, Paragraph 2.4.22

For the calibrated shunt leads, will you please verify the accuracy of the drawings in the contract documents? Alternately, will the government allow the use of transducers to accomplish this function?

Response: There is no change to the specification for use of transducers. See the contract drawings “Cable Installation Schedule Sheet 1” and “Cable Installation Schedule Sheet 2” in the solicitation pertaining to both power plants for the calibrated leads requirement.

25. Section 16251, Paragraph 2.5.6

The field ground relay and grounding brush is to be supplied by the contractor but installed by a separate contractor. Please clarify how this is to be coordinated with the installation of the excitation equipment on this contract or add these items to Schedule “B”.

Response: Installation will be by the Contractor, see amendment for specification change.

26. Section 16251, Paragraph 2.2.1

Is the required experience inclusive of non US installations?

Response: Yes.

27. Drawings:

Will the Corps please provide detail drawings showing internal spaces and access to the generator slip rings and brush assemblies as a part of the contract documents?

Response: Drawings will be provided, see amendment.

28. Can the DC bus be run on top of the generator housing?

Response: No. See amendment.

29. Please confirm that you are requiring a set of 15KV current limiting fuses at the generator lead connection as well as at the PPT approximately 10 feet away?

Response: Only one set of fuses is required at the tap point. See amendment.

30. Can the site supervisor for the installation work be an individual from the installation contractor reporting to the prime contractor's project manager?

Response: It doesn't matter who the supervisors work for as long as they conform to the qualification requirements in Section 01010 paragraph 3.7. Installation work will be in progress at both dam sites simultaneously so two supervisors will be needed.

31. Can the new circuit breaker for the field flashing be installed in the DC panel then be removed for electrical testing?

Response: No, test the breaker in place.

32. Please confirm that there will be a government furnished crane operator for Lower Monumental yet not for Lower Granite.

Response: Confirmed, that is correct. Section 01010 paragraph 21.1 says crane service with the Lower Monumental powerhouse bridge crane will be furnished by the government. Paragraph 21.2 says the contractor can use the Lower Granite powerhouse bridge crane but the contractor must provide the operator.

33. Please confirm that the government requires the contractors to include the costs for the following separate meetings in the pricing. Please advise if all of these meetings will be at the project sites and who must attend:

- a. Pre work Meeting
- b. Quality Control Meeting (01451 para 3.3)
- c. Environmental Protection Meeting (01355 para. 5.2)
- d. Monthly Coordination Meetings to Review the QCS management control system (01312 para 1.9)
- e. Monthly Progress Meetings with contractors Project Manager and Scheduler. (01320 para 3.6)

Response: The costs for the meetings should be included in the contract price because no separate payment will be made for them.

a. Pre work Meeting is held either on-site or in Walla Walla District office.

- b. Quality Control Meeting is held on-site at each location.*
- c. Environmental Protection Meeting is part of the prework meeting.*
- d. Monthly Coordination Meetings to Review the QCS management control system. This is a new spec and compliance is still voluntary. We have no history yet on meetings so you should bid it as you see it.*
- e. Monthly Progress Meetings with contractors Project Manager and Scheduler varies so you should bid it as you see it.*

34. Can the existing Basler PSS-100 Power systems stabilizers be re-used and installed in the new exciters? Or does the USACE want brand new Power Systems Stabilizers on each new exciter?

Response: Do not reuse the existing PSS, but rather, turn it over to the Government upon removal. The Contractor shall provide a new PSS with each excitation system.

35. Section 2.4.5.9 Automatic Failover Control. Does the Manual channel have to be physically and electrically separate from the Auto channel I.e separate microprocessor? or will the USACE accept the typical Auto/Manual channel configuration that shares the same microprocessor, which has been installed and used on previously supplied projects, i.e. John Day Dam, The Dalles, Willamette Valley, Albeni Falls, Carters Dam, etc...

Response: Yes, the manual regulator shall be physically and electrically separate from the auto regulator.

36. Can you still bid if you did not attend the scheduled site visit of April 6, 2004 at 9:00 am?

Response: Yes.

37. If we do not have enough I/O capability, can the hardwire I/Os be routed through a PLC, thence connected to the exciter via RS-485? Or must we connect directly to the exciter via the I/O terminal blocks, providing a direct hardwire connection into the exciter?

Response: This will be at the Contractor's option.

38. Can the contractor provide any type of DC bus that conforms to the current and voltage ratings such as bus with insulated copper bus bars instead of uninsulated copper bus bars?

Response: Insulated copper bus bars will be acceptable, see amendment for specification change.

39. Sheet 2 and 3. Can bus duct routing go on top of the generator deck or does it have to be punched through the barrel?

Response: See amendment.

40. Sheet 2 - Is the footprint and orientation of the new exciter limited within this footprint given?

Response: The equipment location will be limited to footprint shown on the drawings. The orientation will be as shown on the drawings.

41. Asbestos - should there be bid item(s) for asbestos sampling/abatement/disposal?

Response: A bid item will be added by amendment for removal and disposal of asbestos containing materials.

42. Request for a cut away drawing of the generator be included in the drawing set.

Response: Generator cross section drawings will be added to the solicitation by amendment.

43. SECTION 16251, 3.6 "EQUIPMENT FIELD INSTALLATION", SUBPARAGRAPH 3.6.2.3.d "EQUIPMENT TO BE INSTALLED" READS:

AC AND DC CABLES AND CONDUIT, OR BUS, CONNECTING PPT TO GENERATOR TERMINALS AND TO EXCITER CUBICLE AND CONNECTING EXCITER CUBICLE TO COLLECTOR RING BRUSH ASSEMBLY.

SECTION 16251, AT SUBPARAGRAPH 2.4.4.4 "DC CONDUCTORS BETWEEN EXCITER AND COLLECTOR RINGS" READS:

THE DC CONDUCTORS FROM THE EXCITER TO THE COLLECTOR RING BRUSH ASSEMBLY SHALL BE PROPERLY SIZED AND RATED PREFABRICATED NONSEGREGATED PHASE BUS OF RATED ENCLOSED CONSTRUCTION AND BARE COPPER CONDUCTORS. THE NONSEGREGATED PHASE BUS SHALL MEET THE REQUIREMENTS OF PARAGRAPH 2.4.11. THE BUS SHALL BE DESIGNED WITH JOINTS AS REQUIRED TO FACILITATE EASE OF BUS REMOVAL DURING MAINTENANCE.

DISCUSSION:

MAIN UNIT BAY DRAWINGS INDICATE CLEARLY RUNNING BUS FROM THE NEW EXCITATION CUBICLE TO THE OUTSIDE OF THE GENERATOR HOUSING BUT STOPS THE DETAIL AT THIS POINT. AT THE OUTSIDE OF THE GENERATOR HOUSING IS STILL SEVERAL FEET FROM THE SLIP RING BUS ASSEMBLY WITH NO INDICATION OF HOW TO BRIDGE THE GAP.

IS IT ANTICIPATED THAT THE DC BUS GO OVER THE TOP OF THE GENERATOR HOUSING AND ENTER THE EXCITER OPENING BETWEEN STRUCTURAL BEAMS ON TOP OF THE GENERATOR OR SHOULD IT BE ANTICIPATED THAT BUS CAN ENTER THE GENERATOR HOUSING AND BE INSTALLED UNDER THE GENERATOR AIR HOUSING TOP COVER?

WOULD A DESIGN UTILIZING CABLE BUS BE ACCEPTABLE?

Response:

See amendment for dc bus routing.

Cable bus will not be acceptable.

REVISED
SECTION B

LGLMEX03B

SUPPLIES/SERVICES AND PRICES

Item No.	Supplies/Services	Quantity	Unit	Unit Price	Amount
LOWER MONUMENTAL UNITS 1-3					
0001	Design the exciters for Lower Monumental Units 1-3	1	LS	XXXXXX	\$_____
0002	Manufacture, Deliver and Install Excitation System and Appurtenances	3	EA	\$_____	\$_____
0003	Disassemble and Remove Existing Excitation System Hardware and Existing Excitation Cabling	3	EA	\$_____	\$_____
0004	Modify Existing Powerhouse Control Panels	3	EA	\$_____	\$_____
0005	Furnish and Install External Wiring, Cabling, Conduits, and Metal Enclosed Bus Duct	3	EA	\$_____	\$_____
0006	Special Factory Tests (Section 16251, para.3.4.3)	1	LS	XXXX	\$_____
0007	Field Tests (Section 16251, para. 3.5)	1	LS	XXXX	\$_____
0008	Spare Parts (Section 16251, para. 2.7)	1	LS	XXXX	\$_____
0009	Training of Government Personnel in Operation and Maintenance of Excitation Systems (Section 16251, para. 3.8)	1	LS	XXXX	\$_____
0010	Furnish Test Equipment (Section 16251, para. 2.8)	1	LS	XXXX	\$_____
0011	Final Submission of O&M Manuals	1	LS	XXXX	<u>\$5,500.00</u>
0012	As-Built Drawings (Section 01010, para. 23)	1	LS	XXXX	<u>\$3,500.00</u>
0013	Final Submission of Contractor Prepared Drawings (Section 01330, para. 1.9)	1	LS	XXXX	<u>\$3,500.00</u>

0014	Services of Skilled Craftsmen (Optional) (Section 16251, para. 3.9)	20	HR	\$_____	\$_____
0015	Lead Based Paint Removal and Storage (Optional)	10	HR	\$_____	\$_____
0016	Disposal of Lead Based Paint (Optional)	1	CO	\$_____	\$_____
0017	Test wire and dust for Asbestos	1	LS	\$_____	\$_____
0018	Dispose of Asbestos (Optional)	1	LS	\$_____	\$_____
0019	Services of Commissioning Engineer	15	DY	\$_____	\$_____
0020	Transportation for Commissioning Engineer to Lower Monumental Dam site	3	EA	\$_____	\$_____

Total Lower Monumental: \$_____

Item No.	Supplies/Services	Quantity	Unit	Unit Price	Amount
LOWER GRANITE UNITS 1-3					
0021	Design the exciters for Lower Granite Units 1-3	1	LS	XXXXXX	\$_____
0022	Manufacture, Deliver and Install Excitation System and Appurtenances	3	EA	\$_____	\$_____
0023	Disassemble and Remove Existing Excitation System Hardware and Existing Excitation Cabling.	3	EA	\$_____	\$_____
0024	Modify Existing Powerhouse Control Panels	3	EA	\$_____	\$_____
0025	Furnish and Install External Wiring, Cabling, Conduits, and Metal Enclosed Bus Duct	3	EA	\$_____	\$_____
0026	Special Factory Tests (Section 16251, para.3.4.3)	1	LS	XXXX	\$_____
0027	Field Tests (Section 16251, para. 3.5)	1	LS	XXXX	\$_____

0028	Spare Parts (Section 16251, para. 2.7)	1	LS	XXXX	\$_____
0029	Training of Government Personnel in Operation and Maintenance of Excitation Systems (Section 16251, para. 3.8)	1	LS	XXXX	\$_____
0030	Final Submission of O&M Manuals	1	LS	XXXX	<u>\$5,000.00</u>
0031	As-Built Drawings (Section 01010, para. 23)	1	LS	XXXX	<u>\$3,500.00</u>
0032	Final Submission of Contractor Prepared Drawings (Section 01330, para. 1.9)	1	LS	XXXX	<u>\$3,500.00</u>
0033	Services of Skilled Craftsmen (Optional) (Section 16251, para. 3.9)	20	HR	\$_____	\$_____
0034	Lead Based Paint Removal and Storage (Optional)	10	HR	\$_____	\$_____
0035	Disposal of Lead Based Paint (Optional)	1	CO	\$_____	\$_____
0036	Test wire and dust for Asbestos	1	LS	\$_____	\$_____
0037	Dispose of Asbestos (Optional)	1	LS	\$_____	\$_____
0038	Services of Commissioning Engineer	15	DY	\$_____	\$_____
0039	Transportation for Commissioning Engineer to Lower Granite Dam site	3	EA	\$_____	\$_____

Total Lower Granite: \$_____

Schedule Total Lower Monumental Plus Lower Granite: \$_____

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

<u>DIVISION 1</u>	<u>GENERAL REQUIREMENTS</u>
Section	
01010	Supplementary Requirements
01270	Measurement and Payment
01312	Quality Control System (QCS)
01320	Project Schedule
01330	Submittal Procedures
01355	Environmental Protection
01451	Contractor Quality Control
<u>DIVISION 2</u>	<u>SITE CONSTRUCTION</u>
Section	
02090	Lead Based Paint (LBP) Removal and Disposal
<u>DIVISION 3</u>	<u>CONCRETE</u>
Section	
03600	Concrete Removal
<u>DIVISION 13</u>	<u>SPECIAL CONSTRUCTION</u>
Section	
13080	Seismic Restraint for Electrical Equipment
<u>DIVISION 16</u>	<u>ELECTRICAL</u>
Section	
16251	Excitation System

* * * * *

SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 GENERAL INFORMATION

In each instance, the contract price for an item shall constitute full compensation for furnishing all plant, labor, equipment, and materials, and for performing all operations required to complete the work included in the item as herein specified, or as otherwise approved. Notwithstanding the omission or mention of any incident or incidental work, the contract price and payment shall also constitute full compensation for all work incident or incidental to completion of the item, unless such work is otherwise specifically mentioned for separate payment under another item.

2. DESIGN EXCITERS

Design of the excitation systems will be measured for payment as complete pay items (Lump Sum). Payment will be made at the contract lump sum price for Items No. 0001, "Design the exciters for Lower Monumental Units 1-3" and Item No. 0021, "Design the exciters for Lower Granite Units 1-3." These prices and payments shall be full compensation for performing all design work for the excitation systems, complete, as specified and as approved.

3. MANUFACTURE, DELIVER AND INSTALL EXCITATION SYSTEMS

Manufacturing, delivering and installing the excitation systems will be measured for payment as the number of complete excitation systems installed. Payment will be made at the contract unit price for Items Nos. 0002 and 0022, "Manufacture, deliver and install excitation system and appurtenances," which prices and payments shall be full compensation for furnishing all material and equipment and performing all work to manufacture, deliver and install the excitation systems and appurtenances including routine factory tests, complete, as specified and as approved.

4. DISASSEMBLE AND REMOVE EXISTING EXCITERS

Disassembly and removal of the existing excitation system will be measured for payment as the number of existing excitation systems removed. Payment will be made at the contract unit price for Items Nos. 0003 and 0023, "Disassemble and remove existing excitation system hardware and existing excitation cabling," which prices and payments shall be full compensation for furnishing all materials and equipment and performing all work to disassemble, remove and dispose of the existing excitation systems, complete, as specified and as approved.

5. MODIFY EXISTING POWERHOUSE CONTROL PANELS

Modifying the existing powerhouse control panels will be measured for payment as the number of control panels modified. Payment will be made at the contract unit price for Items Nos. 0004 and 0024, "Modify existing powerhouse control panels," which prices and payments shall be full compensation for furnishing all materials and equipment and performing all work to modify the existing powerhouse control panels, complete, as specified and as approved.

6. INSTALL EXTERNAL WIRING, CABLING, CONDUITS, AND METAL ENCLOSED BUS DUCTS

Furnish and install the external wiring, cabling, conduits, and metal enclosed bus ducts will be measured for payment as the number of excitation systems installed for which the items are furnished and installed. Payment will be made at the contract unit price for Items Nos. 0005 and 0025, "Furnish and install external wiring, cabling, conduits, and metal enclosed bus duct," which prices and payments shall be full compensation for furnishing all materials and equipment and performing all work to install the external wiring, cabling, conduits and metal enclosed bus ducts, complete, as specified and as approved.

7. SPECIAL FACTORY TESTING

Special factory testing will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Items Nos. 0006 and 0026, "Special factory tests," which prices and payments shall be full compensation for performing the special factory tests, as specified and as approved.

8. FIELD TESTING

Field testing will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Items Nos. 0007 and 0027, "Field tests," which prices and payments shall be full compensation for performing the field testing of the installed excitation systems, as specified and as approved.

9. SPARE PARTS

Furnishing the spare parts will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Items Nos. 0008 and 0028, "Spare parts," which prices and payments shall be full compensation for furnishing the spare parts, as specified and as approved.

10. TRAINING GOVERNMENT PERSONNEL

Training of Government personnel will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum prices for Items Nos. 0009 and 0029, "Training of Government personnel in operation and maintenance of excitation systems," which prices and payments shall be full compensation for furnishing the O&M training manuals and performing all initial and follow up training, as specified and as approved.

11. FURNISH TEST EQUIPMENT

Furnishing test equipment will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Item No. 0010, "Furnish test equipment," which price and payment shall be full compensation for furnishing the test equipment, as specified and as approved.

12. FURNISH O&M MANUALS

Furnishing the final versions of O&M manuals will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump

sum price for Items Nos. 0011 and 0030, "Final submission of O&M manuals," which prices and payments shall be full compensation for furnishing the final approved versions of O&M manuals, as specified and as approved.

13. AS-BUILT DRAWINGS

As-built drawings will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Items Nos. 0012 and 0031, "As-Built Drawings," which prices and payments shall be full compensation for all work required for preparation, submission, and approval of as-built drawings, complete, as specified and approved.

14. FINAL SUBMISSION OF CONTRACTOR PREPARED DRAWINGS

The final approved version of all Contractor prepared drawings will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Items Nos. 0013 and 0032, "Final submission of Contractor prepared drawings," which prices and payments shall be full compensation for all work required for preparation, submission, and approval of all Contractor prepared drawings, complete, as specified and approved.

15. SERVICES OF SKILLED CRAFTSMAN

Services of skilled craftsman will be measured for payment as the actual number of hours and fractions thereof which the services of one or more skilled craftsmen are used. Fractions of an hour will be measured to the nearest quarter hour. Time will be recorded separately for each required workman and combined for payment. Measurement of work time shall begin when the workman reports to the COR for assignment and end when released from such assignment. Provisions of Contractor supervision, helper labor, tools, and equipment normally available for the performance of the craft work will be considered incidental to the services being performed, and no separate measurement will be made therefore. Payment will be made at the contract unit price per hour for Items Nos. 0014 and 0033, "Services of Skilled Craftsman (Optional)," which prices and payments shall be full compensation for the directed work.

16. LEAD BASED PAINT REMOVAL AND STORAGE

Removal and storage of lead based paint will be measured for payment as the actual number of hours and fractions thereof that a workman works in the removal and storage of lead based paint. Payment will be made at the contract unit price per hour for Items Nos. 0015 and 0034, "Lead based paint removal and storage," which prices and payments shall be full compensation for removing lead based paint and storing the contaminated wastes in containers, complete, as specified and as approved. Supervision, helper labor, and overhead costs will be incidental and no separate payment will be made. The estimated quantity in The Schedule for this item is for canvassing bids and more or less work than indicated may be required.

17. DISPOSAL OF LEAD BASED PAINT

Disposal of lead based paint will be measured for payment as the number of containers disposed of in a hazardous waste disposal facility. Payment will be made at the contract unit price per container for Items Nos. 0016 and 0035, "Disposal of lead based paint," which prices and payments shall be full compensation for loading containers onto transport vehicles, transporting, and disposal of containers, as specified and as approved. Payment for disposal of hazardous waste will not be made until a signed copy of the manifest from the disposal facility certifying the quantity of containers delivered is returned and a copy is furnished to the Government.

18. TESTING FOR ASBESTOS

Testing wire and dust for asbestos will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Items Nos. 0017 and 0036, "Test wire and dust for Asbestos," which prices and payments shall be full compensation for performing testing for presence of asbestos in the control wiring and in the dust in the breaker cabinets, complete, as specified and as approved.

19. DISPOSAL OF ASBESTOS

Disposal of asbestos containing materials will be measured for payment as a complete pay item (Lump Sum). Payment will be made at the contract lump sum price for Items Nos. 0018 and 0037, "Dispose of Asbestos," which prices and payments shall be full compensation for removing, handling, transporting and disposing of asbestos containing materials, complete, as specified and as approved.

20. SERVICES OF COMMISSIONING ENGINEER

Services of commissioning engineer will be measured for payment as the number of calendar days that the services are required, including weekend days and National legal holidays. Payment will be made at the contract unit price per day for Items Nos. 0019 and 0038, "Services of commissioning engineer." These prices and payments shall be full compensation for providing the services of a commissioning engineer as follows:

Payment shall cover the entire period of time that the commissioning engineer is in the service to the Government including the time required to travel by the most direct commercial airline from his/her home station or duty station to the job site. Return travel time will only be allowed from time of first available transportation after release by the Government for return to home station or duty station.

Payment shall cover the daily cost of rental car to transport commissioning engineer from local motel to the Lower Monumental and the Lower Granite work sites and per diem costs for meals and lodging.

No payment will be made for days the commissioning engineer is absent from the jobsite except for nonwork days, National legal holidays, and authorized travel time. No additional or overtime payment will be made to the Contractor when the commissioning engineer is required to work in excess of eight hours per calendar day or forty hours per week.

21. TRANSPORTATION FOR COMMISSIONING ENGINEER

Transportation for the Contractor's commissioning engineer will be measured for payment as the number of round trips from home station to the job site made by the commissioning engineer. Payment will be made at the contract unit price for Item No. 0020, "Transportation for commissioning engineer to Lower Monumental Dam site (Optional)" and Item No. 0039, "Transportation for commissioning engineer to Lower Granite Dam site (Optional)." These prices and payments shall be full compensation for round trip air coach fare from the commissioning engineer's home station or duty station to the job site. No payment will be made for fare and transportation expenses outside of the continental limits of the United States.

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TECHNICAL REQUIREMENTS

SECTION 03600

CONCRETE REMOVAL

TABLE OF CONTENTS

PART 1 - GENERAL

- 1.1 GENERAL INFORMATION
- 1.2 REFERENCES
- 1.3 SUBMITTALS
- 1.4 CONCRETE REMOVAL LOCATION

PART 2 - PRODUCTS

- 2.1 NON-SHRINK GROUT

PART 3 - EXECUTION

- 3.1 HAZARDS
- 3.2 GAS, VAPOR, FUME, DUST, SLURRY AND MIST CONTROL IN POWERHOUSE
- 3.3 TEMPORARY BARRIER
- 3.4 REMOVAL METHOD

TECHNICAL REQUIREMENTS

SECTION 03600

CONCRETE REMOVAL

PART 1 - GENERAL

1.1 GENERAL INFORMATION

The work covered by this section consists of furnishing all material, labor, and equipment, and performing all work for the removal of concrete and the restoration of the concrete surfaces to the required lines and grades as submitted for approval. The Contractor shall provide protection from concrete dust and water damage to existing and new equipment. The Contractor shall take effective measures to control gas, vapor, fumes, dust, slurry and mist during concrete removal operations. The work steps given in this section shall be accomplished in accordance with SECTION 16251.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced to in the text by basic definition only.

Code Of Federal Regulations (CFR)

- 29 CFR 1910 (1997) Occupational Safety and Health Standards
- 29 CFR 1926 (1992) Safety and Health Regulations for Construction

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330.

1.3.1 SD-08 Statements

1.3.1.1 Concrete Removal and Disposal Plan; GA

A plan for concrete removal and disposal shall be submitted showing equipment to be used, equipment protection measures to be taken, and expected noise levels and duration, per specification 03600-3.4.1.

1.3.1.2 Core Drilling Procedure; GA

A core drilling procedure shall be submitted prior to commencement of any core drilling work, per specification 03600-3.4.4; submit together with Concrete Removal and Disposal Plan.

1.3.1.3 Repair Procedure, Concrete Surfaces; GA

A procedure for repair of concrete surfaces shall be submitted prior to commencement of repair work, per specification 03600-3.4.14; submit together with Concrete Removal and Disposal Plan.

1.3.1.4 Repair Procedure, Concrete Overbreakage; GA

A procedure for repair of concrete overbreakage shall be submitted prior to commencement of any repair work, per specification 03600-3.4.6; submit together with Concrete Removal and Disposal Plan.

1.4 CONCRETE REMOVAL LOCATIONS

Location of concrete removal is a penetration through the generator concrete air housing for the exciter bus work as per Section 16251 paragraph 3.12.

PART 2 - PRODUCTS

2.1 NON-SHRINK GROUT

Non-shrink grout shall be inorganic, non-metallic, non-gas-liberating cement-based grout; shall have a minimum 28-day compressive strength of 5000 psi; and shall have no shrinkage (0.0 percent) and a maximum 2.0 percent expansion in the hardened state.

PART 3 - EXECUTION

3.1 HAZARDS

The work areas may be in proximity of energized electrical equipment. Contractor is required to formally train and document safety training for all workers required to work in this area. Spray over onto live equipment is hazardous to workers and equipment and shall not be permitted. Signed safety training sheets will be required to be turned into Contracting Officer to document worker safety training.

3.2 GAS, VAPOR, FUME, DUST, SLURRY AND MIST CONTROL IN POWERHOUSE

3.2.1 General

All necessary measures shall be taken to effect maximum control of al gases, vapors, fumes, dusts and mists created by Contractor operations under this contract. To the maximum extent possible, all dust and dirt shall be removed by vacuum cleaning, unless otherwise approved. Prior to commencement of such operations, the proposed Gas, Vapor, fume, Dust and Mist Control Program shall be submitted. Part of the required Control program shall include the following:

- a. Provision of exhaust ducts which shall discharge outside the powerhouse structure where mechanical ventilation is used. Ventilation systems shall comply with requirements of 29 CFR 1910.4 and 29 CFR 1926.57.
- b. Controlled operation of power-driven tools.
- c. Furnishing and removing of oiled sawdust or other approved dust preventatives in areas which cannot be properly rendered free from excessive dusting by vacuum cleaning or other methods.
- d. Vacuum cleaning (or other acceptable method) of spaces within the powerhouse where dust accumulates.
- e. Only air, electrical, propane, or battery-driven equipment may be used inside the powerhouse.
- f. The powerhouse is pressurized to prevent dust infiltration from the outside. All doors will be kept closed when not being used.
- g. Methods to prevent exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at concentrations above those specified in 29 CFR 1910.1000, 29 CFR 1926.55 and .58.

3.2.2 Additional Provisions

Ventilation systems shall not interfere with traffic inside or outside the Powerhouse. Depending upon the Contractor's plant and equipment and methods of operation, additional provisions for satisfactory gas, vapor, fumes, dusts and mists control will be required and shall be included in the proposed Gas, Vapor, Fume, dust and Mist control Program. Decisions of the government as to the adequacy and extent of the Gas, Vapor, Fume, dust and Mist control Program and prosecution of the work shall be final. The gas, vapor, fume, dust and mist control in the powerhouse shall be considered as incidental to the work and no separate payment will be made therefore.

3.3 TEMPORARY BARRIER

Temporary barriers for the control of dust, debris, and to protect government equipment shall be constructed as required by the GQAR. The design of the barriers shall be submitted for approval, as part of the Concrete Removal and Disposal Plan.

3.4 REMOVAL METHOD

3.4.1 GENERAL

Concrete shall be removed in a manner that will not fracture the surrounding concrete. Reinforced concrete removal shall result in flush, level smooth surface at the lines and grades as submitted for approval. Care shall be taken not to damage reinforcing bar in the existing concrete structure. Explosive or chemical demolition will not be allowed. Adequate equipment shall be provided to remove the pieces of concrete safely and without damage to the surrounding structure. Slurry or tailings generated from sawing or drilling operations shall be confined to the immediate area, and disposed of by vacuuming and mopping. Additional dust control measures shall be implemented per paragraph 3.2 for work inside the powerhouse. A written plan for concrete removal and disposal shall be submitted showing equipment to be used, expected noise levels and duration. All concrete removed shall become the property of the contractor and shall be disposed of in accordance with applicable regulations.

3.4.2 RECOMMENDED PROCEDURE

Saw cutting, wire cutting, or any combination thereof is the recommended method for the concrete removal to be done as part of this contract. In addition to cutting, chipping or grinding may be utilized to bring the concrete profile to the final finished grade. When the portion of concrete to be removed is of such a magnitude that it cannot be extracted in a single piece, additional cutting shall be performed to allow the concrete to be removed in several convenient sized sections.

3.4.3 SAW CUTTING

The saw cuts shall be done using a diamond-bladed saw. Saw cuts shall be straight, uniform, and at a depth that provides for the drainage of water.

3.4.4 CORE DRILLING

Prior to core drilling the Contractor shall research the area to avoid and identify existing embedded piping and raceways. All core drilling equipment shall be securely grounded during cutting operations to avoid electrical shock hazards. Core drill procedures shall be submitted for GQAR approval. No core drilling shall be done without GQAR approval.

3.4.5 CHIPPING

When required, concrete removed by saw cutting, core drilling, or stitch drilling shall be brought to the final required lines and grades by using lightweight chipping hammers, bush hammers grinding or other approved means. Chipping operations shall be such that the over breakage does not exceed 2 inches or extend below the existing grade.

3.4.6 OVERBREAKAGE

Minor overbreakage is defined as overbreakage less than 2 inches deep covering a small, localized area. The surface shall be restored by patching with non-shrink grout. If concrete removal operations produce overbreakage in 2 inches or greater in depth and covering a substantial area, as determined by the Contracting Officer, a grid of small anchor bars shall be drilled and grouted into the concrete to assure adequate anchorage of finishing concrete to the existing concrete. Anchor bars shall be #3 reinforcing bars drilled and grouted a minimum of 4 inches deep into the

overbreak surface. The bars shall be grouted in place with a polyester or vinylester resin adhesive capsule system in accordance with the manufacturer's recommendations. The bar shall be bent to produce a 90 degree hook such that anchor bar projects to a point 1 inch clear of the finished surface. Anchor bars shall be placed on a 6-inch grid or as directed. A 4 x 4 - W1.4 x W1.4 welded wire fabric shall be wired to the anchor bars. The prepared area shall be brush coated with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening. The concrete shall be restored to the required lines and grades using a mortar or concrete with a blend of Portland cement and white cement so that the final color when cured will be the same as adjacent concrete.

3.4.7 EXPOSED REINFORCEMENT

In all areas where concrete removal has exposed reinforcing bars the local area around the bar or conduit shall be chipped back to a depth necessary to allow the bar to be burned off 1 1/2 inches back from the final finished concrete surface as submitted for approval and patched with an approved non-shrink grout.

3.4.8 EXISTING CONCRETE STRENGTH

The existing concrete, to be removed may be expected to range in strength from about 3000 to over 6000 psi. The nominal aggregate size of the concrete is unknown. Zones of honeycomb concrete may also be encountered during the drilling process.

3.4.9 EXISTING EMBEDDED ITEMS

Embedded items in the path of the concrete cutting or drilling operations include, but are not limited to:

- a. Reinforcing steel as well as minor embedded steel at various distances from the concrete faces.
- b. Steel anchors and form tie backs used in placement of the existing concrete. The number and kind are unknown.
- c. Electrical Conduit.

3.4.10 CONCRETE CUTTING TOLERANCES

- a. The concrete cut through the existing concrete shall be accurately located. Wire or saw cuts shall be within 1/8 inch of plan dimensions.
- b. The core drill holes through existing concrete shall be accurately located and drilled. The center of the core drill hole shall enter within 1/2 inch of the contract drawing location and exit within 1/2 inch of the contract drawing location. During the drilling operation, the drill wobble should be minimized to assure a true and straight hole to meet the specified tolerances.

3.4.11 QUALITY CONTROL

A quality control system for the concrete cutting operation shall be established and maintained. The system shall be sufficient to maintain

tolerances such that the final concrete cutting conforms to the tolerances outlined in this section of the specifications. The Government reserves the right to inspect this control system to determine if the tolerances are being adhered to, and direct the Contractor to correct and repair any deviations from these tolerances.

3.4.12 DISPOSAL OF WASTE WATER AND CONCRETE DEBRIS

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that it does not stain, discolor, or affect exposed surfaces of the structure and is not allowed to enter the river or reservoir. As some Project drains lead to the river, waste water shall not be disposed of in Government drains. The method for disposing of wastewater shall be as per the written concrete removal plan. The method for disposing of concrete debris shall be such that it is not allowed to enter the river or reservoir and shall be included in the written concrete removal plan.

3.4.13 REPAIR OF CONCRETE SURFACES

Restoration of the concrete surfaces shall be to the required lines and grades shown using a government approved method. Repair procedure of concrete surfaces shall be submitted for government approval per Paragraph 1.3. The repair procedure shall include detailed information on all materials and methods used.

* * * * *

SUBMITTAL REGISTER (ER 415-1-10)

Contract No:

Title and Location: Lower Monumental & Lower Granite Exciters for Units 1-3

W912EF-4-R-0009

Contractor:

Specification Section:

Activity No.	Transmittal No.	Item No.	Specification Paragraph Number	Description of Items Submitted	Type of Submittal										Classification	Contractor Schedule Dates			Contractor Action			Government Action		Remarks		
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES AND PLANS	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS		INFORMATION ONLY	GOVERNMENT APPROVED	REVIEWER	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE		SUBMIT TO GOVERNMENT	CODE
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
			16251-1.3.4.1	Equipment removal procedure					X						X											
			16251-1.3.4.2	Installation procedure					X						X											
			16251-1.3.4.3	Factory test procedure					X						X											
			16251-1.3.4.4	Field test procedure					X						X											
			16251-1.3.4.5	Contractor furnished training					X						X											
			16251-1.3.4.6	Contractors work supervisors					X						X											
			16251-1.3.5.1	Materials						X					X											
			16251-1.3.5.2	Factory tests						X					X											
			16251-1.3.5.3	Field tests						X					X											
			16251-1.3.6	Operation and maintenance manuals									X		X											
			16251-3.12	Design for routing of dc bus	X	X									X											
			03600-1.3.1.1	Concrete removal and disposal plan				X							X											
			03600-1.3.1.2	Core drilling procedure					X						X											
			03600-1.3.1.3	Repair procedure, concrete surface					X						X											
			03600-1.3.1.4	Repair procedure, concrete overbreakage					X						X											
			13080-1.3.1.1	Seismic restraints including anchorage systems	X										X											
			13080-1.3.1.2	Structural design calculations for seismic restraints	X										X											
			13080-1.3.1.3	Undercut concrete anchors	X									X												
			13080-1.3.1.4	Equipment requirements	X										X											

TECHNICAL REQUIREMENTS

SECTION 13080

SEISMIC RESTRIANT FOR ELECTRICAL EQUIPMENT

TABLE OF CONTENTS

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SYSTEM DESCRIPTION
- 1.3 SUBMITTALS
- 1.4 EQUIPMENT REQUIREMENTS

PART 2 PRODUCTS

- 2.1 BOLT AND NUTS
- 2.2 UNDERCUT CONCRETE ANCHORS

PART 3 EXECUTION

- 3.1 BUILDING DRIFT
- 3.2 ANCHOR BOLTS
- 3.3 EQUIPMENT SEISMIC RESTRANT

TECHNICAL REQUIREMENTS

SECTION 13080

SEISMIC RESTRAINT FOR ELECTRICAL EQUIPMENT

PART 1 GENERAL

The work covered in this section consists of furnishing all labor, equipment and materials to select, design, and provide seismic restraints for all electrical systems and equipment installed as part of the excitation system replacement requiring seismic restraint.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

American Society For Testing And Materials (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 153/A 153M	(1998) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 307	(1997) Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
ASTM A 325	(1997) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 325M	(1997) High-Strength Bolts for Structural Steel Joints (Metric)
ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 563	(1997) Carbon and Alloy Steel Nuts
ASTM A 572/A 572M	(1999) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 603	(1998) Zinc-Coated Steel Structural Wire Rope
ASTM A 653/A 653M	(1999) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM E 488	(1996) Strength of Anchors in Concrete and Masonry Elements

American Society of Mechanical Engineers (ASME)

ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1999) Square and Hex Nuts (Inch Series)
U.S. Army Corps Of Engineers (USACE)	
TI 809-04	(1998) Seismic Design for Buildings
International Building Code Council	
IBC 2000	(2000) International Building Code

1.2 SYSTEM DESCRIPTION

1.2.1 GENERAL REQUIREMENTS

The requirements for seismic protection measures described in this section shall be applied to the equipment and systems below. Seismic protection requirements shall be in accordance with TI 809-04 or IBC 2000. Resistance to lateral forces induced by earthquakes shall be accomplished without consideration of friction resulting from gravity loads.

1.2.2 EQUIPMENT AND SYSTEMS

The seismic restraint for the following miscellaneous equipment and systems shall be developed by the Contractor in accordance with the requirements of this specification:

Electrical Equipment:

Excitation System Equipment Cabinets

1.2.3 CODE REQUIREMENTS FOR TI 809-04

The design for seismic restraints shall be based on a Seismic Use Group IIIIE building occupancy. The seismic design shall be in accordance with Chapter 10 Non-structural Systems and Components of TI 809-04. Use spectral acceleration $S_{DS} = 0.293$, $I_p = 1.50$, and $z=h$. Existing concrete strength shall be taken as $f'c = 3,000$ psi.

1.2.4 CODE REQUIREMENTS FOR IBC 2000

The design for seismic restraints shall be based on a Seismic Use Group III in IBC 2000. The seismic design shall be in accordance with Section 1621 Architectural, Mechanical and Electrical Component Seismic Design Requirements of IBC 2000. Use spectral acceleration $S_{DS} = 0.293$, $I_p = 1.50$, and $z=h$. Existing concrete strength shall be taken as $f'c = 3,000$ psi.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having a "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330, SUBMITTAL PROCEDURES:

1.3.1 SD-01 DATA

1.3.1.1 Seismic Restraints Including Anchorage Systems; GA

Submission shall include vendor contact information, product mechanical specifications, and installation instructions. Anchor test data in accordance with ASTM E 488. Copies of ICBO report for anchors.

1.3.1.2 Structural Design Calculations for Seismic Restraints; GA

Submit structural design calculations which shall be performed by qualified civil or structural engineers who are presently registered professional engineers (PE). The design shall include seismic anchorage design and details. All calculations shall be stamped by a PE.

1.3.1.3 Undercut Concrete Anchors; FIO

Submit manufacturer's product data, reference Part 2 Paragraph "UNDERCUT CONCRETE ANCHORS". Manufacturer's product data shall include but is not limited to detail drawings showing dimensions, material data, allowable loads and detailed installation instructions.

1.3.1.4 Equipment Requirements; GA

Submit within 45 calendar days of Notice to Proceed, together with Design Calculations and Results.

1.3.2 DRAWINGS

Detail Drawings; GA

Submit within 45 calendar days of Notice to Proceed, detail drawings along with catalog cuts, templates, anchorage system including mechanical specifications of anchor bolts, erection and installation details for the items listed. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal, and dimensions; and shall show construction details, reinforcement, anchorage, and installation. All drawings shall be stamped by the PE who performs and stamps the calculations required above. Submit together with Design Review Calculations and Results.

1.3.3 thru 1.3.4 Not Used

1.3.5 REPORTS

Undercut Concrete Anchors Test Report; GA

Submit within 10 days of the completion of testing; reference Paragraph 2.3.

1.4 EQUIPMENT REQUIREMENTS

1.4.1 RIGIDLY MOUNTED EQUIPMENT

All equipment listed in above 1.2.2 Equipment and Systems to be furnished under this contract shall be constructed and assembled to withstand the seismic forces specified above in 1.2.3 or 1.2.4 and 1.2.1. For any rigid equipment which is rigidly attached on both sides of a building expansion joint, flexible joints for electrical conduit, etc., that are capable of accommodating displacements equal to the full width of the joint in both orthogonal directions, shall be provided.

PART 2 PRODUCTS

2.1 BOLTS AND NUTS

Square head and hex head bolts, and heavy hexagon nuts, ASME B18.2.1, ASME B18.2.2, or ASTM A 325 for bolts and nuts. Bolts and nuts exposed to weather shall be galvanized in accordance with ASTM A 153/A 153M.

2.2 UNDERCUT CONCRETE ANCHORS

Undercut concrete anchors shall be bearing-type anchors designed to be installed in a hole with a conical undercut near its blind end. The anchor shall consist of a stud bolt, conical nut, expansion sleeve, distance tube, washer and heavy hex nut. Stud bolts and nuts shall be fabricated from high tensile steel, ASTM A193 Grade B7 or SAE J429 Grade 5 or have a minimum tensile strength of 120 ksi. Concrete anchors used in ceilings shall resist loads as specified in ASME B31.1 Power Piping Code, but shall not be less than 3/4 inch. Product data on concrete anchors, including ICBO test data shall be submitted per Paragraph 1.3.

PART 3 EXECUTION

3.1 BUILDING DRIFT

Seismic braces for a conduit run shall not be attached to two dissimilar structural elements of a building that may respond differentially during an earthquake unless a flexible joint is provided.

3.2 ANCHOR BOLTS

3.2.1 ANCHORAGE

Floor mounted equipment shall use cast-in-place anchor bolts or under-cut anchor bolts, except as specified below. One nut shall be provided on each bolt. Cast-in-place anchor bolts shall conform to ASTM A 307. Anchor bolts shall have an embedded straight length equal to at least 12 times nominal diameter of the bolt. Anchor bolts that exceed the normal depth of equipment foundation pads shall extend into concrete floor to accommodate bolt lengths.

3.2.2 EXPANSION OR CHEMICALLY BONDED ANCHORS

Expansion or chemically bonded anchors shall not be used unless test data in accordance with ASTM E 488 has been provided to verify the adequacy of the

specific anchor and application. Expansion or chemically bonded anchors shall not be used to resist pull-out in overhead and wall installations if the adhesive is manufactured with temperature sensitive epoxies and the location is accessible to a building fire. Expansion and chemically bonded anchors shall be installed in accordance with the manufacturer's recommendations. The allowable forces shall be adjusted for the spacing between anchor bolts and the distance between the anchor bolt and the nearest edge, as specified by the manufacturer.

3.2.2.1 GENERAL TESTING

Expansion and chemically bonded anchors shall be tested in place after installation. The tests shall occur not more than 24 hours after installation of the anchor and shall be conducted by an independent testing agency; testing shall be performed on random anchor bolts as described below.

3.2.2.2 TORQUE WRENCH TESTING

Torque wrench testing shall be done on not less than 50 percent of the total installed expansion anchors and at least one anchor for every piece of equipment containing more than two anchors. The test torque shall equal the minimum required installation torque as required by the bolt manufacturer. Torque wrenches shall be calibrated at the beginning of each day the torque tests are performed. Torque wrenches shall be recalibrated for each bolt diameter whenever tests are run on bolts of various diameters. The applied torque shall be between 20 and 100 percent of wrench capacity. The test torque shall be reached within one half turn of the nut, except for 3/8 inch sleeve anchors which shall reach their torque by one quarter turn of the nut. If any anchor fails the test, similar anchors not previously tested shall be tested until 10 consecutive anchors pass. Failed anchors shall be retightened and retested to the specified torque; if the anchor still fails the test the anchor shall be replaced.

3.2.2.3 PULLOUT TESTING

Expansion and chemically bonded anchors shall be tested by applying a pullout load using a hydraulic ram attached to the anchor bolt. At least 5 percent of the anchors, but not less than 3 per day shall be tested. The load shall be applied to the anchor without removing the nut; when that is not possible, the nut shall be removed and a threaded coupler shall be installed of the same tightness as the original nut. The test setup shall be checked to verify that the anchor is not restrained from withdrawing by the base plate, the test fixture, or any other fixtures. The support for the testing apparatus shall be at least 1.5 times the embedment length away from the bolt being tested. Each tested anchor shall be loaded to the design tension value for the anchor. The anchor shall have no observable movement at the test load. If any anchor fails the test, similar anchors not previously tested shall be tested until 20 consecutive anchors pass. Failed anchors shall be retightened and retested to the specified load; if the anchor still fails the test the anchor shall be replaced.

3.3 EQUIPMENT SEISMIC RESTRAINT

3.3.1 FLOOR MOUNTED EQUIPMENT

3.3.1.1 SHEAR RESISTANCE

Floor mounted equipment shall be bolted to the concrete deck. Requirements for the number and installation of bolts to resist shear forces shall be in accordance with paragraph ANCHOR BOLTS.

3.3.1.2 OVERTURNING RESISTANCE

The ratio of the overturning moment from seismic forces to the resisting moment due to gravity loads shall be used to determine if overturning forces need to be considered in the sizing of anchor bolts. Factor of safety against overturning shall be 1.3. Calculations shall be provided to verify the adequacy of the anchor bolts for combined shear and overturning.

* * * * *

SECTION 16251

LGLMEX0316251

EXCITATION SYSTEM

TABLE OF CONTENTS

PART 1 GENERAL

- 1.1 GENERAL INFORMATION
- 1.2 REFERENCES
- 1.3 SUBMITTALS
- 1.4 GOVERNMENT EQUIPMENT INTERFACE

PART 2 PRODUCTS

- 2.1 MATERIALS
- 2.2 EXCITATION SYSTEM DESCRIPTION
- 2.3 EXCITATION SYSTEM PERFORMANCE CHARACTERISTICS
- 2.4 EXCITATION SYSTEM EQUIPMENT
- 2.5 EXCITATION SYSTEM PROTECTION
- 2.6 SPECIAL TOOLS
- 2.7 SPARE PARTS

PART 3 EXECUTION

- 3.1 ARRANGEMENT AND ASSEMBLY
- 3.2 INTERNAL WIRING
- 3.3 FACTORY ASSEMBLY
- 3.4 FACTORY TESTS
- 3.5 FIELD TESTS
- 3.6 EQUIPMENT FIELD INSTALLATION
- 3.7 CONTRACTOR'S WORK SUPERVISORS
- 3.8 CONTRACTOR-FURNISHED TRAINING
- 3.9 SERVICES OF A SKILLED CRAFTSMAN
- 3.10 CONTRACTOR QUALITY CONTROL
- 3.11 SERVICES OF COMMISSIONING ENGINEER
- 3.12 ROUTING OF DC BUS

SECTION 16251

EXCITATION SYSTEM

PART 1 GENERAL

1.1 GENERAL INFORMATION

1.1.1 Scope of Work

This section covers the work necessary to design, to prepare drawings, data, installation instructions, to manufacture, to shop test, to prepare and load for shipment, and to deliver f.o.b. destination, and to install, make completely operational, and field test three complete digital excitation systems, three Power System Stabilizers, and three Power Potential Transformers for the Lower Monumental Powerhouse Units 1-3 and three complete digital excitation systems, three Power System Stabilizers, and three Power Potential Transformers for the Lower Granite Powerhouse Units 1-3. The work also includes the following items:

- a. Removing the existing six excitation systems' non-rotating parts for these units.
- b. Removing existing excitation power, signal, and control cabling and providing new power, signal, and control cabling for the new exciters.
- c. Providing molded case circuit breakers and the required cabling for exciter field flashing.
- d. Providing training for Lower Monumental and Lower Granite Project personnel on the operation and maintenance of the new exciters.

1.1.2 Description of Generators

The exciters shall supply excitation to the existing hydro generators.

The generators at Lower Monumental Project are 3-phase, 60 Hz, 13.8 KV, salient pole, vertical synchronous generators with 115 percent continuous overload capacity, manufactured by the General Electric Corporation. Units 1 - 3 were placed into service in 1968 and have direct connected vertical shaft shunt wound DC generators with amplidyne motor generator controls.

The generators at Lower Granite Project are 3 - phase, 60 Hz, 13.8 KV, salient pole, vertical synchronous generators with 115 percent continuous overload capability, manufactured by the Westinghouse Electric Corporation. Units 1 - 3 were placed into service in 1975 and 1976 and they have a direct connected vertical shaft, shunt-wound, direct current generator in conjunction with a WTA designed regulator.

The generator ratings, as defined by their nameplates, are as follows:

	Lower Monumental Units 1-3	Lower Granite Units 1-3
Rating (kVA)	142,105	142,105
Power Factor (%)	95	95
Rating (kW)	135,000	135,000
Speed (r/min)	90	90
Temperature Rise (°C)	59	60
Rated Excitation Current, nameplate	1333	1088
Rated Excitation Voltage, nameplate	375	375
Generator Synchronous Reactance (p.u)	0.91	0.975

1.1.3 Generator Characteristic Data

Copies of the existing generator field saturation test curves are included in these specifications at the end of this section. Other pertinent generator characteristics are:

	Lower Monumental Units 1-3	Lower Granite Units 1-3
Field current (A)		
Rated load 1.0 pf (acceptance test)	828	789
Rated load, rated pf (acceptance test)	1023	941
115 % rated load, rated pf (acceptance test)	1132	1020
115% rated load, 1.0 pf (acceptance test)	895	852
Field Resistance at 75 °C (Ohms)	0.2487	0.2426
Field Winding Temperature, (by Resistance), rated load (°C)	59.5	79.4

1.1.4 Asbestos

1.1.4.1 The control wiring at Lower Monumental and Lower Granite may contain asbestos. The wiring at Lower Monumental that may contain asbestos is the wire used on the field reostat resister bank. The Contractor shall test cable insulation at both powerplants to determine if the wire contains asbestos. If the insulation contains asbestos then the Contractor shall handle, contain, and dispose of the wire in accordance with Federal and state laws and regulations. Workers shall wear appropriate safety equipment such as gloves, long sleeve shirts, half mask respirators with HEPA filters, goggles. Wiring shall be double bagged, labeled, and disposed of in a landfill licensed to receive asbestos materials in accordance with law. The Contractor shall submit a copy of the documentation from the landfill to the Government after disposal. All cables that are replaced shall be removed completely.

1.1.4.2 The arc chutes in the existing field breakers and transfer relays (device 83) at Lower Monumental and the arc chutes in the existing field breakers at Lower Granite may contain asbestos. The interior of the breaker cabinets may contain dust from opening and closing of the breakers. Dust shall be tested for asbestos. If dust contains asbestos remove the dust with HEPA filtered vacuum, wet wipes, or other method allowed by law. The Contractor shall handle, contain, transport, and dispose of the asbestos containing materials in accordance with Federal and state laws and regulations. Arc chutes that contain asbestos shall be removed from the breakers and the arc chutes and all other asbestos materials shall be disposed of in a landfill licensed to receive asbestos materials. The Contractor shall submit a copy of the documentation from the landfill to the Government after disposal. Workers shall wear appropriate safety equipment as described in paragraph 1.1.4.1.

1.1.5 Lead Based Paint

Existing cubicles may be coated with Lead Based Paint. Contractor shall conform to the requirements in Section 02090 if work requires disturbing the paint.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

ANSI C34.2 (1973) Semiconductor Power Rectifiers (Withdrawn)

Note: The requirements of ANSI C34.2 are part of this specification even though the standard is no longer in publication. The Contractor shall obtain a historical copy of the standard for use.

ANSI C39.1 (R 1992) Electrical Analog Indicating Instruments

ANSI C50.10 (1990) Rotating Electric Machinery Synchronous Machines

ANSI C50.12 (1989) Salient-Pole Synchronous Generators and Generator/Motors for Hydraulic Turbine Applications

ANSI B1.20.1 (2001) Pipe Threads, General Purpose (inch)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 8 (1999) Concentric-Lay-Stranded Copper Conductors, Hard, Medium, or Soft

ASTM B 187 (2001) Copper Bus Bars, Rod, and Shapes

Solicitation No. W912EF-04-R-0009

ASTM B 188 (2002) Seamless Copper Bus Pipe and Tube

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.1 (2001) Unified Inch Screw Threads (UN and UNR Thread Form)

CODE OF FEDERAL REGULATIONS (CFR)

CFR 29 Part 1910 (2002) Occupational Safety and Health Administration, Labor

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C37.20.1 (2002) Metal-Enclosed Low-Voltage Power Circuit-Breaker Switchgear

IEEE C37.20.2 (1999) Metal-Clad and Station-Type Cubicle Switchgear

IEEE C37.90 (1994) Relays and Relay Systems Associated with Electric Power Apparatus

IEEE C37.90.1 (2002) Surge Withstanding Capability (SWC) Tests for Protective Relays and Relay Systems

IEEE C57.12.01 (1998) Dry-Type Distribution and Power Transformers Including Those with Solid Cast and/or Resin Encapsulated Windings

IEEE C57.12.91 (2001) Test Code for Dry-Type Distribution and Power Transformers

IEEE C57.110 (1998) Recommended Practice for Establishing Transformer Capability When Supplying Non-sinusoidal Load Currents

IEEE 115 (2002) IEEE Guide: Test Procedures for Synchronous Machines

IEEE 383 (1992) Standard for Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations (Reapproved 1992)

IEEE 421.1 (1996) Definitions for Excitation Systems for Synchronous Machines

IEEE 421.2 (1990) Guide for Identification, Testing, and Evaluation of the Dynamic Performance of Excitation Control Systems

IEEE 421.3 (1997) Standard for High-Potential Test Requirements for Excitation Systems for Synchronous Machines

IEEE 421.5 (1992) Recommended Practice for Excitation System Models for Power System Studies

- IEEE 1110 (1991) Guide for Synchronous Generator Modeling Practices in Stability Analyses
- THE INSTRUMENTATION, SYSTEMS, & AUTOMATION SOCIETY (IAS)
- ISA 18.1 (1979) Annunciator Sequences and Specifications
- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
- NEMA 250 (1992) Enclosures for Electrical Equipment (1000 Volts Maximum)
- NEMA AB 1 (2002) Molded-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures
- NEMA AB 3 (2001) Molded Case Circuit Breakers and Their Application
- NEMA SG 3 (1995) Low-Voltage Power Circuit Breakers
- NEMA WC 57 (1998) Control Cables
- NEMA WC 70 (2001) Nonshielded Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
- NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- NFPA 70 (2002) National Electrical Code, 2002 Edition
- UNDERWRITERS LABORATORIES INC. (UL)
- UL 44 (2002) Thermoset-Insulated Wires and Cables
- UL 489 (2003) Molded Case Circuit Breakers and Circuit Breaker Enclosures

1.3 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01330.

1.3.1 SD-01 Data

Within 90 calendar days after date of receipt of signed contract:

1.3.1.1 Names Of Equipment Manufacturers And Performance Capacities; GA
Submit for all equipment to be incorporated into the excitation system.

1.3.1.2 Nameplate Schedule, Including Sizes And Lettering; GA

1.3.1.3 Parts List; GA

The list shall include all parts to be included in the excitation systems, with each part numbered and cross-referenced to the drawings. Each part shall be identified by name, manufacturer, and rating (ohms, farads, etc., as appropriate).

Within 120 calendar days after date of receipt of notice of award:

1.3.1.4. Spare Parts List: GA

The list shall include all spare parts to be furnished under this contract, with each part numbered and cross-referenced to the drawings and parts list. Each part shall be identified by name, manufacturer, rating (ohms, farads, etc., as appropriate) and quantity furnished. All proprietary or house-marked items (such as transformers, inductors, integrated circuits, or printed circuits) shall be identified along with their source. Printed circuit cards that require depot- or factory-level maintenance or that are uneconomical or too complicated to repair shall also be identified.

1.3.1.5 Draft Of Excitation Equipment Mathematical Models and Data; GA

Submit for use in transient stability and longer-term dynamics simulation programs.

The models and data shall be consistent with IEEE 421.5 and the following IEEE committee papers. Models and data are required for control functions including limiters, but not for protective functions that operate for excitation equipment failures. The models shall include minimum, maximum, and typical values for all gains, time constants, and limiters. If equipment supplied is not compatible with IEEE models, special models must be provided with enough detail for unambiguous programming in simulation programs.

a. IEEE Digital Excitation Task Force, "Computer Models for Representation of Digital-Based Excitation Systems," IEEE/PES paper 96 WM 031-5 EC.

b. IEEE Excitation Limiters Task Force, "Recommended Models for Over-excitation Limiting Devices," IEEE Transactions on Energy Conversion, Vol. 10, No. 4, pp. 706-712, December 1995.

c. IEEE Excitation Limiters Task Force, "Under-excitation Limiter Models for Power System Stability Studies," IEEE Transactions on Energy Conversion, Vol. 10, No. 3, pp. 524-531, September 1995.

1.3.2 SD-04 Drawings

Within 60 calendar days after date of receipt of signed contract:

1.3.2.1 Outline Drawings; GA

Including final weight and overall dimensions.

1.3.2.2 Arrangement Drawings; GA

Including power potential transformer.

1.3.2.3 Overall One Line Diagram; GA

1.3.2.4 Schematic Diagrams; GA

1.3.2.5 Wiring Diagrams; GA

Excitation equipment wiring diagrams shall be made as seen by an observer of the actual equipment arrangement, and space shall be provided for addition of devices where mounting space exists on the structure. Information on out going cable circuits will be provided by the Government after award of the contract. The drawings shall provide a space at least 3 inches below and adjacent to terminal blocks in which external cable circuits, conduits, and connections may be shown. The Contractor shall add them to the drawings within 30 calendar days after being furnished by the Government.

1.3.2.6 Bus Connection Between Power Potential Transformer And Excitation Cubicle; GA

1.3.2.7 Generator Bus Tap Design; GA

Including the routing of the conduit.

1.3.2.8 The design for the dc circuit from the exciter to the slip rings; GA

1.3.2.9 Equipment Installation Drawings; GA

Equipment installation drawings, including materials list and cable and conduit schedule.

Within 120 calendar days after date of receipt of signed contract:

1.3.2.10 Circuit Card Schematics; GA.

1.3.2.11 Other Drawings; GA

Additional drawings as required demonstrating that all parts of the equipment being furnished conform to the requirements of the specifications.

Within 30 days after completion and final acceptance of installation:

1.3.2.12 Installation drawings showing as built changes; GA.

1.3.3 SD-07 Schedules and Plans

1.3.3.1 Installation Plan and Schedule; GA

The plan and schedule shall not duplicate information in the installation procedure but shall refer to those procedures with specific information on the manner in which work will be prosecuted on site. The plan shall contain a step-by-step activity listing and a schedule, which demonstrates the dependency of one activity on another. Included in the plan and schedule shall be the number of shifts to be worked and hours per shift, crew sizes, and persons on each shift responsible for superintendency and safe clearance. Activities that

are hazardous, affect plant operation, or require participation by Government personnel shall be included in the plan and schedule.

1.3.4 SD-08 Statements

1.3.4.1 Excitation Equipment Removal Procedure; GA

The procedure shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.

1.3.4.2 Installation Procedures; GA

The procedure shall include a detailed description of the methods and equipment to be used for each operation at each Project, and the sequence of operations. It shall also include the wiring plan for the control board modifications.

1.3.4.3 Factory Test Procedure; GA

A schedule, outline and detailed description of the test methods and equipment to be employed in all factory tests, including test values and rejection criteria and a list of instruments and equipment to be used.

1.3.4.4 Field Test Procedure; GA

A schedule for each Project, outline and detailed description of the test methods and equipment to be employed in all field tests, including test values and rejection criteria.

1.3.4.5 Contractor-Furnished Training; GA

Instructor background and qualifications, course outline and schedules, course material, and subject matter for the theory, and operation and maintenance of the excitation system. After the Operation and Maintenance manuals are approved and available for use, and at least 3 weeks prior to the beginning of training, a synopsis of the training curriculum shall be submitted.

1.3.4.6 Contractors Work Supervisors; GA

Submit information describing qualifications of proposed work supervisors.

1.3.5 SD-09 Reports

1.3.5.1 Materials; FIO

All materials incorporated into the work shall be tested, except as otherwise indicated or where such tests are waived in writing. If the Contractor desires to use stock material not manufactured specifically for the work covered by these specifications, evidence shall be submitted certifying that such material conforms to the requirements of these specifications, in which case detailed tests on these materials may be waived. Unless waived in writing, all tests or trials shall be made in the presence of a Government Quality Assurance Representative

(GQAR). The test reports shall be furnished as soon as practicable after the tests are made and shall be submitted in such form as to provide a means for determining compliance with the applicable specifications for the material tests.

1.3.5.2 Factory Tests; GA

The test report shall include descriptions of the tests performed, test results with tolerances, sample calculations, and the formulas used in determining the results of the tests. Unless waived in writing, all tests or trials shall be made in the presence of a Government Quality Assurance Representative (GQAR). The test reports shall be submitted within 14 calendar days after the tests are made. The following curves and data shall be included in the test report showing the:

- a. Deleted.
- b. Deleted.
- c. Computation of excitation system ripple voltage.
- d. Settings of all adjustable parameters, including the Power System Stabilizer parameters.

1.3.5.3 Field Tests; GA

Unless waived in writing, all field tests or trials shall be witnessed by the GQAR. Field test reports shall include copies of curves showing the characteristics of the exciter as determined by these tests, descriptions of tests performed, sample calculations, and formulas used in determining the results of the tests. Models and test data shall also be included in the field test reports. The test reports shall be submitted within 10 days after the tests are performed.

1.3.6 SD-19 Operation and Maintenance Manuals

Operation and maintenance manuals for all equipment furnished in this contract shall conform to the requirements of paragraph 1.10 Section 01330.

1.4 GOVERNMENT EQUIPMENT INTERFACE

1.4.1 DC Voltage Source-Control

Power from a properly protected, ungrounded, nominal 125 Vdc source, which has a range of 105 Vdc to 139 Vdc, for use in controlling the elements of the excitation and regulating systems.

1.4.2 DC Voltage Source-Field Flashing

Power from a properly protected, ungrounded, nominal 125 Vdc source, which has a range of 105 Vdc to 139 Vdc, for use in field flashing during start-up, not to exceed 80 amps.

1.4.3 AC Voltage Source-Lighting

120 Vac single-phase power for excitation system convenience receptacles and light fixtures.

1.4.4 Potential Transformers

Three potential transformers (PT's), rated 14,400/120 V, connected in a grounded wye configuration are available for each of units 1-3 at Lower Monumental and Lower Granite Project. The PT outputs shall be configured with knife switch test blocks. Connections to the PT signal for the purpose of input to the voltage regulator, PSS, or Line Drop Compensator shall be made so that a knife switch test block is between the connection point and the PT. If knife switch test blocks are not already properly located on the existing government equipment, they shall be supplied and installed by the Contractor.

1.4.5 Current Transformers

Three current transformers (CT), rated 8000:5 A, used for metering and relaying, are available for the power system stabilizers for units 1-3 at Lower Monumental and Lower Granite Projects. One CT, dedicated for the exciter and rated 8000:5 A, is also available on these units. The CT outputs shall be configured with knife switch test blocks. Connections to the CT signal for the purpose of input to the voltage regulator, PSS, or Line Drop Compensator shall be made so that a knife switch test block is between the connection point and the CT. If knife switch test blocks are not already properly located on the existing government equipment, they shall be supplied and installed by the Contractor

1.4.6 Switchboard Contacts

Generator lockout, Generator differential protection, master start relay contacts, and such other control, protective, and relaying devices that are located on existing switchboards.

PART 2 PRODUCTS

2.1 MATERIALS

All materials shall be new, and shall conform to the applicable requirements of these specifications. The classification and grade of materials incorporated in the work shall be in accordance with the specifications designated herein. Substitution of materials from those specified shall not be made except on specific prior written approval. Any materials required in the work not covered by specifications shall be submitted for approval for the purpose intended. Reference to any equipment, article, or catalog number shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may use any equipment, material or article which, in the judgment of the Contracting Officer, is approved as a suitable equal. The use of asbestos or polychlorinated biphenyl's (PCB's) shall not be permitted.

2.2 EXCITATION SYSTEM DESCRIPTION

2.2.1 General

The excitation system shall be a potential source rectifier exciter, including the rectifier assembly and the power potential transformer. The excitation system shall be a full inverting, with three phase rectifying bridges, microprocessor (digital) controlled and capable of continuous operation with powerhouse environmental conditions of 0 °C - 40 °C and 95 percent non-condensing relative humidity. The equipment provided under these specifications shall be a type having an established reputation of two years or more of satisfactory and reliable service, designed for field excitation and voltage regulation of hydroelectric generators 5 MVA and larger. The operation and performance of the equipment furnished shall be guaranteed by the manufacturer to meet the requirements of these specifications. All customer replaceable electronic parts shall be commonly available from commercial suppliers. No custom, selected, or matched parts shall be used.

2.2.2 Protection Against Stray Currents and RF Interference

The excitation system shall be adequately protected against stray currents and voltage surges. The excitation system shall be furnished with shaft voltage suppression for protection of the generator bearings against shaft voltages induced by the excitation system and for protection from generator out-of-step operation. The excitation system shall be designed and tested to be insensitive to radiated high-frequency interference such as that coupled from portable radio transmitters (typically 10-watt output in the 150MHz -174 MHz, 406MHz - 420MHz, 450MHz - 512MHz, 806MHz - 902MHz, 1.850GHz - 10990GHz band) operating within 1 meter of the exciter equipment.

2.2.3 Surge Withstand Capability

The excitation system shall be designed and tested or have been tested for surge withstand capability in accordance with IEEE C37.90.1.

2.2.4 Overspeed Protection

Any excitation system components supplied from the generator leads shall be capable of operation at 140 percent of rated frequency without damage and shall be provided with devices to protect the excitation system in case of overspeed operation.

2.2.5 Power Requirements

The design shall be such that the only requirements for station power are for:

- a. 125 Vdc nominal field flashing as specified in paragraphs 1.4.2 and 2.3.3.3a. The exciter must be operable over the range of 103 to 140 Vdc and shall have adequate self-cooling capability for startup without the need of the 125 Vdc source for auxiliary cooling power;

b. 120 Vac for lighting and convenience outlets;

c. 125 Vdc nominal control power for operation of remote or local automatic control relays and operation of all remote inputs to the exciter including voltage raise/lower, automatic/manual control switching, local/remote control switching, power circuit breaker control, remote indication, annunciation, and protection.

d. 120 V preferred ac ungrounded for plant critical control equipment.

2.2.6 Noise Level

At no time during operation shall the excitation system cause noise levels exceeding 80 dB(A) within three feet of the cubicles.

2.3 EXCITATION SYSTEM PERFORMANCE CHARACTERISTICS

2.3.1 General

The excitation system shall be capable of supplying, without exceeding its nameplate continuous load rating, ample field excitation for the generator when the generator is delivering 115 percent rated kVA at rated power factor, rated frequency, and 105% voltage. It shall meet the requirements for a HIGH INITIAL RESPONSE EXCITATION SYSTEM as per IEEE 421.1. The excitation system shall be capable of supplying excitation system ceiling voltage for a minimum of at least 60 seconds without overheating the excitation system components.

2.3.2 System Characteristics

The excitation system shall be capable of the following performance:

Excitation System Nominal Response (For definitions see IEEE 421.2)	2.0
Source Voltage	70 percent rated
Negative Ceiling Voltage	70 percent of positive Ceiling Voltage

The excitation system shall be capable of achieving the nominal response at the specified source voltage.

2.3.3 Control System Features

2.3.3.1 General

The excitation systems shall be designed and have sufficient capacity for complete automatic operation for startup, normal operation, and shutdown of the generating units. Upon loss of external dc control power, the excitation system shall continue normal operation from back-up control power supply fed from the generator leads with annunciation of the failure of the primary power supply. Indicating lights, or conduction monitor, shall be provided to indicate and locate thyristor and/or diode failure.

2.3.3.2 Automatic and Manual Modes

The excitation system shall have the ability to be operated in either the manual or automatic modes as selected using a manual/automatic mode switch located on the exciter and on the unit switchboard. The manual mode normally is used when the automatic mode has failed and during testing. In either mode, control of the generator terminal voltage is accomplished by varying the amount of current in the field windings. Indicating lights at both control locations shall respond without regard to the position of the local/remote control switch, and shall conform to paragraph 2.4.21.

2.3.3.3 Operation Sequence

The sequence for normal operation in automatic mode shall be as follows:

a. When a generator unit start is initiated and the machine reaches 95 percent rated speed, the excitation system shall initiate field flashing which shall raise the machine terminal voltage to 20 percent rated voltage. The automatic voltage regulator shall then raise the terminal voltage to the normal preset voltage.

b. After the automatic voltage regulator has caused the generator terminal voltage to reach that level prescribed by the automatic voltage regulator set-point for speed-no-load (SNL), the regulator shall be capable of remote adjustment (either manually or through action of automatic synchronizer) to achieve the desired voltage set-point necessary to put the unit on line.

c. Operation of the automatic voltage regulator shall be as described in paragraph 2.4.5. Provisions shall be incorporated for the automatic reduction of excitation to a level safe for continuous operation after a predetermined time at ceiling or at abnormally high levels. If the automatic regulator fails to reduce the excitation to this lower level within the allotted time, automatic transfer to the manual regulator shall occur as described in paragraph 2.4.5. If the level of excitation remains high after transfer to the manual mode after an additional time delay, complete shutdown shall occur.

d. During generator shutdown, the regulator shall automatically reduce the manual and automatic voltage regulator set-points to the generator rated voltage, no-load level.

2.3.3.4 Diagnostics

Diagnostics and self tests shall be automatically performed on power-up of the voltage regulator to verify that the total hardware and software is fully operational. After power-up, the digital computer shall continuously verify that it is performing all of its tasks without error. Both on-line and off-line diagnostics shall be provided as follows:

a. On-Line Diagnostics

Digital control systems shall include software to continuously monitor hardware and software performance in real time with minimum

interference with normal system functions. The performance measurements shall be within 500 milliseconds. On-line diagnostics shall also be capable of the testing and adjusting of all settings, with provisions for remote on-line monitoring using a serial communications port.

b. Off-Line Diagnostics

A comprehensive set of off-line diagnostic programs shall be supplied. These diagnostics shall permit complete maintenance of all hardware elements. The off-line diagnostics shall permit, to the maximum extent possible, the diagnosis and isolation of any hardware fault without requiring additional test equipment. Test points shall provide for insertions of an arbitrary analog signal and for measuring the resulting output. Provision for a complete operational test of the voltage regulator, without energizing the generator, shall be included. All functional units shall be field repairable to the extent that replacement of a failed subassembly or module shall restore the unit to normal operating condition.

2.3.3.5 Terminal Interface and Software

2.3.3.5.1 Terminal Interface and Software for Initial Set-Up

a. Government Furnished Equipment. The Army Corps of Engineers Information Management Office (IMO) will provide a laptop computer for use as an exciter workstation terminal interface. The laptop configuration will include 256MB RAM, 20GB hard disk drive, CD-RW, floppy drive, Ethernet port, 2 USB ports, 1 serial port, 1 parallel port, PS/2 port, video port, PC card slot, Windows 2000 Professional operating system, Microsoft Office Professional suite, and Corps Enterprise Architecture allowed terminal emulation software.

b. Contractor's software shall operate on the Government furnished equipment. Proven software suitable for set-up, adjustment and analysis of the excitation system shall be provided by the Contractor. The requirements of the Contractor provided system shall include the following as a minimum:

(1) System hardware, including the peripherals, communications, display, internal fixed, CD-ROM, floppy disk drives, and all required connectivity cabling.

(2) Digital application software, including the operating system, data base management software, compilers, and other utility programs. If specialized software is required it shall be approved by the Army Corps of Engineer's Information Management Office (IMO) prior to use. Access to the software shall be password and key switch protected. Power failures shall not cause loss of the software.

(3) All equipment required for software editing, including configuration of protective features and changing of set-points at the job-site.

(4) The software shall facilitate step increase/decrease changes in all exciter operating modes including Automatic Voltage Regulator, and Field Current Regulator. The software shall allow the

user to first define the magnitude and direction of the step change and then initiate the step change by an "initiate" command. Provisions shall be supplied to record, download, and view the system response to the software generated step.

2.3.3.5.2 Terminal Interface and Software Installation, Operations and Maintenance (General)

The Army Corps of Engineers IMO will provide all hardware and software for laptop computer operations and maintenance. Installation and maintenance of this hardware and software shall adhere to the following requirements.

- a. Laptops shall be Microsoft 2000 or higher compatible
- b. Government provided terminal emulation software for the laptops are expected to be commercial off the shelf software
- c. The Army Corps of Engineers IMO will perform all hardware and software upgrades for the laptops (to include procurement of hardware and software necessary for the upgrade).
- d. All Government furnished hardware and software shall be within the suite of hardware and software allowed by the Corps' Enterprise Architecture.
- e. The Contractor shall notify the Army Corps of Engineers IMO a minimum of 10 business days in advance when changes in the operating requirements of the contractor provided digital exciters require the government provided hardware and/or software on the laptops to be upgraded.

2.4 EXCITATION SYSTEM EQUIPMENT

2.4.1 General

2.4.1.1 Equipment to be Included

The excitation system provided shall be complete and include but not be limited to the following: primary terminal chamber, current limiting fuses, excitation cubicles, power-potential transformer (PPT), rectifier assembly, AC conductors to transmit power from the PPT to the exciter cubicle, all auxiliaries necessary for satisfactory operation of the regulator such as control transformers, potentiometers, thyristors, transistors, operational amplifiers, digital controllers, resistors, rheostats, reactors, shunts, contactors and relays, and spare parts. The equipment shall be mounted in cubicles and shall be complete in every detail. It shall be ready for operation upon completion of installation and wiring. All additional external items required for proper operation and control shall be provided. All required bus work necessary to transmit dc power from the rectifier bridge to the brush-holders shall be provided by the installation contractor. Existing brush holders and brushes shall be reused with the new exciters. In addition, the installation contractor shall provide the AC bus feed from the generator bus to the high voltage side

of the power potential transformer. All additional external items required for proper operation and control such as control switches, transfer switches, and indicating lights shall be used with the equipment with the equipment provided under these specifications. New exciter field voltage and current meters shall be provided for the generating unit switchboard S panels. The excitation system design shall include the determination of required external items in addition to those devices, which are specifically called out herein. Switchboard devices shall be compatible, in function and appearance, with existing equipment.

2.4.1.2 Adaptation to Plants

The excitation equipment and all assemblies for interconnection of the exciter with existing equipment and facilities shall be custom fabricated for the site such that a minimum of on-site cutting and fitting is required. The equipment and assemblies shall include adaptive features to accommodate minor dimensional variations in existing equipment and structures.

2.4.1.3 Minimum Requirements from Standards

All equipment and materials shall be furnished and installed in accordance with NFPA 70 and the requirements of CFR 29 Part 1910. Omission of details on the Contract drawings, or in the specifications, shall not be construed as permitting deviations from NFPA 70. Rating, tests, and characteristics shall be in accordance with ANSI C50.10, ANSI C50.12, and IEEE 115, each as they apply, unless otherwise definitely specified.

2.4.1.4 Electronic Equipment Components

All electronic equipment, such as amplifiers and logic circuits, shall be of solid state design using industrial or military grade discrete transistors or integrated circuits bearing Joint Electron Device Engineering Council (JEDEC) registered device numbers, where possible. All components shall be suitable for operation at temperatures between 0 and 70 °C.

2.4.1.5 Digital Control Systems

The Contractor shall have responsibility for the design, manufacture, and testing of all digital control systems which are part of the supplied excitation equipment. Memory use for the operation program, configuration, and set-points shall be non-volatile, without the need for changing batteries, or for other maintenance, over the life of the excitation system. Each digital control system shall be equipped with at least one RS-485 communications port for communication with future control systems. In addition, the separate local control panel (LCP) / man machine interface (MMI) panels shall have the capability of communication of information necessary for control, display of operating values and annunciation at remote locations. The digital exciter shall be capable of, and include communication protocol software for Modbus or other non-proprietary packetizing and error checking industry standard communications protocol for external communications. The communications software shall allow the plant distributed control system to perform all operational, display,

monitoring, alarm, and diagnostic features. Documentation for the communication card and communication protocol shall be included in the Operation & Maintenance manuals.

2.4.2 Power Potential Transformer

2.4.2.1 General

Power potential transformers shall be provided and shall be of the three-phase, 60 Hertz, self-cooled, ventilated dry type, or resin encapsulated windings type, conforming to the applicable requirements of IEEE C57.12.01, with 110 kv Basic Insulation Level (BIL) on the high voltage winding. The transformers furnished shall also conform to the recommended practice of IEEE C57.110 and shall be designed specifically for supplying a thyristor-controlled rectifier load. The transformers shall be of sufficient rating to deliver the required input power to the exciters under all generator operating conditions, with an average winding temperature rise by resistance not to exceed 80 °C. Hottest spot winding temperature rise shall not exceed 110 °C.

2.4.2.2 Transformer Mounting

The transformer shall be designed for floor mounting. The transformer shall be furnished with a primary voltage terminal chamber with provisions for the high voltage fuses and for terminating the 15 kV shielded cable. The transformer cabinet shall be built to match the excitation system cabinet and shall be constructed per the requirements described in paragraph 2.4.8. Floor mounts with appurtenances shall be furnished for the PPT.

2.4.2.3 Temperature Indication

The transformer shall also be furnished with a temperature indicator mounted on the transformer windings housing in a manner that facilitates reading of the indicator from the maintenance aisle. The temperature indicator shall be equipped with a minimum of two normally open contacts to provide alarm and trip functions. The contacts shall be wired to terminal blocks in the secondary bus transition section for routing to the exciter cabinet for use in annunciation and excitation trip.

2.4.2.4 Current Transformers and Metering

Three suitable relaying accuracy current transformers (CT's) shall be mounted in the transformer secondary for use with the transformer protection relays.

2.4.2.5 AC Conductors Between PPT and Rectifier Supply Breaker

The AC conductors from the PPT to the rectifier supply circuit breaker shall be of properly sized and rated insulated copper conductor cables suitable for installation in rigid galvanized steel conduit. If the rectifier supply breaker cabinet is designed for location adjacent to the PPT, segregated phase bus will be permitted for the connection. Insulated copper conductor cables shall meet the requirements of paragraph 2.4.12.

2.4.3 Rectifier Supply Breaker

The Contractor shall provide a three-pole, adequately rated, rectifier supply air circuit breaker for the excitation system, conforming to the requirements of NEMA SG 3 and suitable for the excitation system. The breaker shall be provided with arc extinguishers and the operating mechanism shall be trip-free in all positions. It shall be of the drawout type arranged for remote 125 Vdc electrically trip-free operation. The breaker shall be provided with sufficient (a minimum of three type 'a' and three type 'b') auxiliary contacts, including a spare type 'a' and a spare type 'b' contact , meeting the requirements of paragraph 2.4.15. The breaker shall be rated not less than the maximum continuous current of the circuit under the specified full load operating conditions of the generator, and shall also be capable of interrupting the available fault current under maximum possible short circuit conditions. The contacts shall be of the type, which are readily accessible for inspection and replacement. A circuit breaker enclosed in a molded case will not be acceptable. The breaker shall be placed in its mounting cubicle in such a way that it can easily be withdrawn for inspection and testing. A local control switch shall be provided to open and close the exciter breaker at the exciter cubicle.

2.4.4 Rectifier Assembly

2.4.4.1 General

Rectifier assemblies shall be full-inverting type. Thyristors and diodes of rectifier assemblies shall have a minimum rating of 350 percent of the rectifier nameplate RMS voltage rating. Thyristors and diodes shall have a peak inverse voltage rating greater than 2.75 times the PPT nominal secondary voltage. Rectifier assemblies shall be constructed to allow ready access for inspection and replacement of thyristors and diodes. The rectifier assembly shall be placed in its mounting cubicle in such a way the thyristors and diodes can easily be withdrawn for inspection and testing.

2.4.4.2 Rectifier Assembly Cooling

Cooling for rectifier assemblies shall be by forced air convection. Fan cooling shall consist of two sets of fans either of which can supply sufficient cooling air to keep the rectifier assembly within the normal operating temperature limits of the assembly components when delivering rated output continuously. Circuits that supply power to the cooling fans shall be designed such that no single cause initiating event will remove power from both cooling fans. Bridge temperature and cooling air flow monitoring and alarm circuits shall be powered independently from fan cooling power sources. A protective scheme shall be provided to automatically throw over to the alternate set of fans upon loss of primary fans. Manual-auto and lead-lag mode selector switches shall be included for fan operation. Reset switches shall be provided for returning the lead-selected fan to operation. An anemometer or vane switch, or air pressure switch shall be provided for monitoring air flow in the rectifier assemblies. The forced air cooling system shall include air filters. Filters shall be of large cross-sectional area to ensure a low pressure drop and shall be of a type easily replaceable without tools. Inlet air shall not be drawn

from near the floor to prevent rapid clogging of the air filters. Filters shall be either aluminum, electrostatic, washable, permanent, or reusable. If aluminum filters are furnished, they shall contain layers of expanded aluminum laid at right angles to one another to achieve maximum filtering. The rectifier assembly shall have sufficient capacity to allow startup of the generator without the need for external station service power.

2.4.4.3 Rectifier Protective Circuitry

The rectifier assembly shall be supplied with transient overvoltage protection and non-explosion type protective fuses. Protective circuitry shall be furnished to provide a path for the field current and to dissipate the stored energy in the field. The circuitry shall incorporate bi-directional thyristors with a field discharge resistor or similar approved circuitry.

2.4.4.4 DC Conductors Between Exciter and Collector Rings

The DC conductors from the exciter to the collector ring brush assembly shall be of properly sized and rated prefabricated nonsegregated phase bus of rated enclosed construction and bare or insulated copper conductors. The nonsegregated phase bus shall meet the requirements of paragraph 2.4.11. The bus shall be designed with joints as required to facilitate ease of bus removal during maintenance.

2.4.5 Voltage Regulator

2.4.5.1 General

The voltage regulator shall contain automatic and manual regulator sections. The voltage regulator shall be provided with all the required switches, voltage control adjusters, and indicators such that complete local control at the exciter is provided for testing and maintenance purposes. The regulator shall obtain its motive power from the power potential transformer, independent of station ac power and the station battery. The regulator shall obtain power from the station battery for field flashing and for control power. The regulator shall be equipped with adjustable elements excited from the generator potential transformers and current transformers, which will automatically limit the decrease of generator excitation to avoid loss of generator synchronism with the system. Such devices, however, must allow the regulator to reduce the excitation voltage to zero or reverse it to prevent overvoltage in case of operation under line charging conditions or overspeed of the unit. The regulator shall remain in service upon generator load rejection. The manufacturer's standard products will be allowed to be used for the local control devices, subject to approval of the Contracting Officer.

2.4.5.2 Voltage Regulator Characteristics

The synchronous machine voltage regulator shall be a continuously acting regulator with the following characteristics:

Voltage accuracy (with steady-state load ± 0.2 percent conditions within operating range of regulator)

Maximum generator voltage change (with slow changes in ambient temperatures from 15 to 40 °C, after regulator elements have stabilized) ± 0.2 percent

Maximum generator terminal voltage percent of voltage setting (with steady-state conditions, generator open-circuited, generator speed up to 150 percent of nameplate) 105 percent

2.4.5.3 Automatic Voltage Regulator

The automatic voltage regulator (ac regulator) shall control generator terminal voltage by continuous comparison of the average three-phase voltage of the generator with a reliable reference voltage source. The error voltage shall be amplified and applied to the excitation system in such a manner as to adjust generator voltage to reduce the error. The automatic voltage regulator shall be capable of remote operation, and have preset voltage levels representing "minimum" - 11.7 kV, "normal Speed-No-Load (SNL)" - 13.8 kV, and "maximum" - 15.2 kV, and shall provide outputs for interfacing with 125 Vdc remote indicating lights.

2.4.5.4 Automatic Voltage Regulator Exciter Voltage Adjuster

The automatic voltage regulator shall include a generator voltage adjuster, which shall give a range of voltage control of -15 percent to +10 percent of rated voltage. The voltage adjuster shall be suitable for operation with 125 Vdc remote contacts and shall be provided with adjustable limiting functions to stop the adjuster at the range limits and to energize indicating lamps, and Supervisory Control and Data Acquisition (SCADA) inputs, at each end point.

2.4.5.5 Manual Regulator

The manual regulator (dc regulator) shall operate in a similar fashion to the automatic regulator, except that it shall compare generator field voltage or current to a reliable reference source, and control excitation voltage or current to reduce the error between them. All necessary switches shall be provided which will enable manual control of the regulator from the unit switchboard when the selector switch is placed in the remote position. The manual regulator shall be capable of local-manual and remote operation, have preset voltage levels representing "minimum" - 3.5 kV, "normal Speed-No-Load (SNL)" 13.8 kV, and "maximum" - 14.5 kV, and shall provide outputs for interfacing with 125 Vdc remote indicating lights.

2.4.5.6 Manual Voltage Regulator Exciter Voltage Adjuster

The manual voltage regulator shall include an exciter voltage adjuster which shall provide for adjustment of excitation voltage from 25 percent of rated to that excitation voltage required for generator operation at 115 percent rated load, rated power factor, and 105 percent rated generator voltage. The adjuster shall be suitable for 125 Vdc operation, and it shall be configured for remote operation. Adjustable limit functions shall be provided to stop the adjuster at

range limits and also to operate remote indicating lamps to show the upper and lower limit positions. The adjuster shall have provisions to return to the normal no-load voltage position.

2.4.5.7 Automatic/Manual Regulator Transfer

Automatic tracking shall be provided to accomplish bumpless transfer during startup, control mode change, and shutdown from the automatic voltage regulator to the manual voltage regulator or from the manual voltage regulator to the automatic voltage regulator. During regulator transfer, field excitation disturbance shall not exceed 1 percent of the desired excitation. Regulator transfer shall be capable of remote operation and shall provide outputs for interfacing with 125 Vdc remote indicating lights for indication of "manual" or "regulator" mode.

2.4.5.8 Automatic Transfer to Alternate Regulator Settings

The automatic voltage regulator may be tuned by the Government to operate with settings that are different when the power system stabilizer is in service than when the stabilizer is off. The voltage regulator shall be capable of storing these two sets of parameters and shall automatically transfer from one set to the other when the PSS status signal changes. This transfer shall be bumpless and shall be made while the unit is on line.

2.4.5.9 Automatic Failover Control

The voltage regulator shall continuously monitor its own function. When failure of the automatic voltage regulator is detected, (such as with a PT fuse failure, detection of a critical loss of control condition, or a processor failure indicated by the watch-dog timer) transfer to a separate, independent regulator controller operating as a manual regulator shall be automatic and shall not cause generator shutdown. In the event of sustained overexcitation, a transfer from automatic voltage regulation to manual voltage regulation shall occur after an adjustable time delay. If this overexcitation condition persists after an additional adjustable time delay in the manual regulation mode, the excitation system shall automatically shut down and shall initiate a generator shutdown. Auxiliary contacts for indication and annunciation of these failures shall be provided.

2.4.6 Power System Stabilizer (PSS)

2.4.6.1 General

The exciter voltage regulator shall include a Power System Stabilizer (PSS). The PSS can be software implemented or externally hard-wired to the regulator. The PSS provided under these specifications shall be designed for hydroelectric generators 7 MVA and larger. The PSS shall also be a type having demonstrated two years or more of satisfactory service after being tuned to Western Electricity Coordinating Council (WECC) criteria as specified in "Test Procedures for Power System Stabilizers", WSCC Paper dated 1976. The device shall operate to supplement the voltage regulating action by adding an additional signal into the excitation system input. The PSS shall be tunable to provide damping at local mode (1-1.5 Hz) and inertia mode (0.2 to 0.7 Hz) frequencies.

2.4.6.2 Configuration

The PSS shall be of the dual-input design, defined as Type PSS2A in "Computer Models for Representation of Digital-Based Excitation Systems," IEEE/PES paper 96 WM 031-5 EC. The PSS shall be of digital design.

2.4.6.2.1 Limiter

An adjustable limit shall be provided to prevent the stabilizer signal from exceeding -0.25 to 0.3 per unit change in terminal voltage. A "wash-out" function shall be provided to prevent permanent bias of voltage for a steady state speed error. The PSS signal to the automatic voltage regulator input shall be removed when terminal voltage of the generator exceed an adjustable level from $\pm 5\%$ to $\pm 10\%$.

2.4.6.2.2 Low Power Cutoff Circuit

A low power cutoff circuit shall be provided to remove the PSS signal to the regulator. This circuit shall be adjustable from zero to 40 percent of generator real power output.

2.4.6.2.3 Regulator Manual Operation

Logic shall be provided to automatically remove the PSS signal to the regulator when the regulator is operated in the manual mode.

2.4.6.3 Input Signals

PSS input signals shall be electrical power and rotor speed or compensated frequency. The power signal shall be derived from an instantaneous watt transducer or equivalent digital algorithm, using three phase voltage and current input signals. The speed signal shall be derived from a measurement or calculation of compensated terminal frequency. Accuracy of the two measurements shall be within 1% of full range. The effective time constant associated with the power and speed measurements shall be no greater than 20 ms and there shall be less than 10 ms difference between the two input channels. Where compensated frequency is used as the replacement for measured speed, the equipment shall sum terminal voltage with the quadrature component of terminal current. Compensation shall be equivalent to the quadrature synchronous reactance of the generator. This compensation shall be continuously adjustable over a range of 0.0 to 0.5 per unit on the generator per unit base. Direct measurement of terminal frequency is not acceptable as a PSS input.

2.4.6.4 Settings

The PSS shall accommodate the following range of settings:

The high-pass filters shall allow for time constants of up to 20 seconds (T_{W1} , T_{W2} , T_{W3} , T_{W4})

The "mechanical-power" filter shall provide attenuation of at least 40 dB at 10 Hz and shall be of the "ramp-tracking" configuration to minimize

terminal voltage excursions during mechanical power variations. Specifically the stabilizer output change shall not exceed 1% of terminal voltage reference with a stabilizer gain of 10 per unit E_{t-ref} /per unit speed, for mechanical power ramp rates of 0.1 per unit/second. (T_8 , T_9 , N, M selected to meet above criteria).

The stabilizer gain (K_{S1}) shall be adjustable between 0 per unit E_{t-ref} /per unit speed and 50 per unit E_{t-ref} /per unit speed.

The phase lead circuit shall provide for a wide range of phase compensation settings. A normal range of adjustment for the phase lead time constants is:

$T_1 = T_2 = 0.01$ to 6.0 seconds

$T_3 = T_4 = 0.02$ to 6.0 seconds

The software shall allow for addition of a third phase lead stage for special cases.

Stabilizer signal output limits shall be provided. A normal range of adjustment for the limits is:

$V_{STMAX} = 0.0$ to 0.3 per unit

$V_{STMIN} = 0.0$ to -0.25 per unit

If a terminal voltage limiter is not provided as part of the excitation system, the positive stabilizer signal output limit may have to be coordinated with generator overvoltage protections.

All settings must be adjustable while the unit is running.

2.4.6.5 Test and Status Monitoring Features

To ensure that the stabilizer can be properly maintained and tested, all critical internal signals shall be accessible to allow for verification of the correct functional operation of the stabilizer. This function shall be provided through digital data collection or through assignment of computed variables to D/A interfaces. Facilities must be provided to allow for safe testing of the stabilizer with the generator operating on-line.

2.4.7 Line Drop, Droop, and Reactive Differential Compensation

Devices providing for line drop compensation (LDC), to regulate generator VAR output according to transmission line impedance losses, shall be furnished. Devices providing for droop compensation, to reduce the voltage at the generator as a function of the flow of real and reactive current to stabilize sister unit VAR oscillations, shall be furnished. The exciter must be capable of concurrent operation in the Line Drop and Droop compensation modes. Additionally, Reactive Differential Compensation is required. Devices providing for cross current and line drop compensation by direct active measurement of sister unit instantaneous output, shall be furnished.

2.4.8 Equipment Cubicles

2.4.8.1 General

Metal enclosed cubicles of NEMA 250 Type 1 fabrication shall be furnished to house the excitation system and synchronous machine voltage regulator equipment. The complete cubicle lineup, not including the Potential Power Transformer section, shall not exceed 90 inches in width, 90 inches in depth with the doors open perpendicular to the cubicle or pullout drawers fully extended, and 90 inches in height from the floor line to the uppermost projection on the cubicle. This maximum height does not include the enclosure for the feed from the Power Potential Transformer. Lifting angles which are to be removed after installation need not be counted in the dimensional limits. All dimensions shall be verified in the field by the Contractor. All access to internal components shall be by means of hinged doors and shall comply with the working space requirements of NFPA 70. The door openings shall be designed so that they can be fully opened without interfering with existing equipment or structures. The cubicles shall be arc-flash or explosion rated if the equipment has been assessed for arc-flash and shall have appropriate warning signs.

2.4.8.2 Cubicle Construction

The cubicles shall be of the totally enclosed, free-standing, dead-front type built on a suitable framework of structural steel or by an equivalent approved method. Each cubicle shall consist of rigid, self-supporting, enclosed panels with full length doors or pullout drawers arranged to provide easy access to the equipment. The enclosures shall be made of selected smooth sheet steel panels, suitably supported. Doors and panels used to support instruments and other devices and barriers between compartments shall not be less than No. 12 gauge steel. Doors shall be mounted with manufacturer's standard hinges. Exposed panels on the front and ends of the enclosures shall be bent angle or channel edges with all corner seams welded and ground smooth, or shall be the manufacturer's equivalent construction as approved by the Contracting Officer. The front outside surfaces shall not be drilled or welded for the purpose of attaching wires or mounting devices if such holes or fastenings will be visible from the front. With the exception of nameplates, self-tapping screws will not be allowed.

2.4.8.3 Louvers and Latches

Punched louvers necessary for adequate ventilation shall be provided where required. Louvers shall be designed or screened to prevent the entrance of insects and rodents. All doors shall be equipped with a handle, a three-point latch, and flush lock. The locks shall have removable cores, and six control keys shall be provided for removal of the lock cores.

2.4.8.4 Channel Iron Foundations

Continuous channel iron foundations, complete with bolts and drilled holes for grouting and anchoring to the floor, shall be furnished for the complete length front and rear of the cubicle assembly. Channel construction and drilling shall be as required for mounting the

equipment. The channels shall be designed for flat mounting and the maximum channel depth shall be 2-1/2 inches.

2.4.8.5 Grounding

Each cubicle shall be provided with a continuous interior copper ground bus to which the housing, framework, cable and bus supports, and non-current-carrying metallic parts of all equipment shall be grounded insofar as practicable. Grounding shall conform to paragraph 6.1.2 of IEEE C37.20.1, except that the ground bus bar shall not be less than 1 inch by 1/4 inch in size. Ground connections shall be made by approved clamp-type fittings; soldered connections shall not be used. Splices in ground buses between shipping sections shall be provided with bolted connections having scarified contact surfaces coated with an approved deoxidizing agent. Bus bar splice contact surfaces shall be silver-plated. Jumper cables or copper bars shall be provided for connecting the ground bars at shipping splits. Multigrip clamp-type cable terminals for No. 2/0 AWG cables shall be provided for connection to the station grounding system for each ground bus. Control cable shields shall be grounded only once.

2.4.8.6 Convenience Receptacles, Light Fixtures, and Switches

Lighting switches shall be rated for 20 A, 277 Vac and shall be quiet in operating and suitable for use at full rated capacity on inductive loads. Light fixtures shall be provided with suitable guards in each equipment cubicle. Receptacles shall be duplex, Hospital Grade, with ground, rated for 20 A, 125 Vac with NEMA 5-20R configuration. A convenience receptacle and light fixture with switch shall be provided in each equipment cubicle. The convenience receptacles shall be located towards the front of the equipment cubicles. The location of the receptacle and light switch shall be where access to them can be made without reaching over or under exposed energized conductors.

2.4.8.7 Painting

The interior and exterior steel surfaces of the excitation system equipment enclosures, including the power potential transformer and fuse cabinet enclosures, shall be thoroughly cleaned after fabrication by sandblasting, pickling and rinsing, or by other means. They shall then receive a rust-inhibitive phosphatizing or equivalent treatment prior to painting in accordance with paragraph 6.1.5 of IEEE C37.20.2. Exterior surfaces shall then be primed, filled where necessary, and given not less than two coats of quick air-drying lacquer or synthetic enamel with semigloss finish or heat fused epoxy power coating of a color that matches the color scheme of the plant. Interior surfaces shall receive not less than one coat of corrosion-resisting paint in accordance with the manufacturer's standard practice. Bus ducts shall also be painted to match the existing color scheme at the plants.

2.4.9 Connections

All bolts, studs, machine screws, nuts, and tapped holes shall be in accordance with ASME B1.1. Threads for sizes 1/4 inch to 1 inch, inclusive, shall be NC or UNC series. The sizes and threads of all valves, pipe and fittings, conduit and fittings, tubing and fittings, and connecting equipment shall be in accordance with ASME B1.20.1.

Manufacturer's standard thread and construction may be used on small items, which in the judgment of the Contracting Officer, are integrally replaceable, except that threads for external connections to these items shall meet the above requirements.

2.4.10 Potential Source Power Supply

2.4.10.1 Generator 13.8 kV Bus Tap

The Contractor shall install the tap for exciter power to the 13.8 KV generator bus in such a fashion as to maintain the integrity of the existing Isolated Phase Bus (IPB) system. It is acceptable for the interconnecting cable from the IPB system to the Power Potential Transformer (PPT) to be made in a single rigid metallic conduit provided that high interrupting capacity fuses, in an isolated phase arrangement, are utilized at the tap point before allowing all power cables to be combined into a single conduit.

Contractor shall submit, for government approval, proposed method and routing of such installation prior to commencing work.

2.4.10.2 Current Limiting Fuses

Current limiting fuses shall be sized, specified, and provided by the contractor, taking into account the damage points for cable and equipment, and shall be mounted in the generator air housing. Submit calculations and catalog cuts for approval with the bus tap design.

2.4.10.3 AC Conductors Between Generator Bus and Power Potential Transformer (PPT)

The ac conductors from the generator tap to the power potential transformer shall meet the design standards of the existing generator bus and be of properly sized and rated insulated copper conductor cable and rigid galvanized steel conduit. Insulated copper conductor cable shall meet the requirements of paragraph 2.4.12.

2.4.11 Copper Bars and Rods

Copper bars and shapes for dc ground bus conductors shall conform to the requirements of ASTM B 187 and ASTM B 188.

2.4.12 Insulated Wire and Cable

2.4.12.1 General

All wire and cable used for power, lighting, control, metering, and relaying systems shall be provided by the Contractor and shall conform to the requirements specified herein. Characteristics, including conductor size, stranding, number of conductors, rated circuit voltage, cabling, and other requirements for each type of service, shall be as indicated on the drawings, or as specified under the detailed requirements of these specifications for the particular construction or use, unless otherwise stated. Wire conductors and cables shall comply with the following table: (See next page)

NEC/TRADE TYPE	Conductors	Maximum Operating Temperature	Application	Insulation Type	Conductor Insulation Thickness
SIS	Single Conductor	90° C	Switchboard wiring only	Thermoset 600 volt	0.76 mm
RHH	Single conductor or multiple conductor cable	90° C	Conduit (single conductor) or cable tray (multiple conductor cable) Multiple conductor cables must be tray cable rated for cable tray installation	Conductor-Thermoset 600 volt Cable insulation – non-PVC 600 volt	1.14 mm
RHW	Single conductor or multiple conductor cable	75° C	Conduit (single conductor) or cable tray (multiple conductor cable) Multiple conductor cables must be tray cable rated for cable tray installation	Conductor-Thermoset 600 volt Cable insulation – non-PVC 600 volt	1.14 mm
XHHW	Single conductor or multiple conductor cable	90° C	Conduit (single conductor) or cable tray (multiple conductor cable) Multiple conductor cables must be tray cable rated for cable tray installation	Conductor-Thermoset 600 volt Cable insulation – non-PVC 600 volt	1.14 mm for single conductor 0.76 mm for multiple conductor cable conductors
TC	Multiple Conductor Cable (general) Individual conductors shall be RHH, RHW, or XHHW	75° C	Tray cable rated for cable tray installation	Cable insulation - non-PVC 600 volt	

2.4.12.2 Wire and Cable Schedule

Wire and cable shall be furnished in accordance with the requirements of the Conduit and Cable Schedules, and as indicated on the drawings. Estimated quantities listed in the Conduit and Cable Schedules are approximate for bidding purposes.

2.4.12.3 Governing Standards

Materials, construction and tests, unless otherwise specified, shall conform to the applicable requirements of NEMA WC 70.

2.4.12.4 Rated Circuit Voltages

Wire and cable for circuits operating at 600 volts and below shall have minimum rated circuit voltages in accordance with Section 3 of NEMA WC 70.

2.4.12.5 Conductors

2.4.12.5.1 Material

Conductors shall conform to all the applicable requirements of Section 2 of NEMA WC 70 and shall be annealed copper. Copper conductors may be bare, or tin- or lead-alloy-coated, if required by the type of insulation used.

2.4.12.5.2 Minimum Wire Sizes

Minimum wire size shall be No. 12 AWG for power and lighting circuits; No. 10 AWG for current transformer secondary circuits; No. 14 AWG for potential transformer, relaying, and control circuits; and No. 16 AWG for annunciator circuits.

2.4.12.5.3 Stranding

Conductor stranding classes cited herein shall be as defined in Appendix G of NEMA WC 70. Lighting conductors No. 10 AWG and smaller shall have Class C stranding as defined in Table 1 of ASTM B 8. Any conductors used between stationary and moving devices, such as hinged doors or panels, shall be Class H or K stranding. All other conductors shall have class C stranding.

2.4.12.6 Insulation

2.4.12.6.1 Insulation Voltage Rating and Insulation Level

The rated voltage of the insulation shall be 600 volts for all circuits operating below 2,000 volts, with 100 percent insulation level. The rated voltage of the insulation shall be 15,000 volts for all circuits operating above 2,000 volts, with 133 percent insulation level.

2.4.12.6.2 Insulation Material

Insulation shall be cross-linked-thermosetting-polyethylene (XLPE) type, or an ethylene-propylene-rubber (EPR) type meeting the requirements of

Section 3 of NEMA WC 70. Polyvinyl chloride (PVC) insulation will not be accepted.

2.4.12.6.3 Insulation Thickness

The insulation thickness for single-conductor cables and single conductors of multiple-conductor control cables used for control and related purposes rated below 2,000 volts shall be as required by Section 3 of NEMA WC 70.

2.4.12.7 Shielding

Shielding, where specified for control cables rated below 2,000 volts, shall conform to the requirements of Part 4 of NEMA WC 57.

2.4.12.8 Jackets

All cables shall have jackets meeting the requirements of Section 4.1 of NEMA WC 70, and as specified herein. Individual conductors of multiple-conductor cables shall be required to have jackets only if they are necessary for the conductor to meet other specifications herein. Jackets of single-conductor cables and of individual conductors of multiple-conductor cables, except for shielded cables, shall be in direct contact and adhere or be vulcanized to the conductor insulation. Multiple-conductor cables and shielded single-conductor cables shall be provided with a common jacket, which shall be tightly and concentrically formed around the core. Repaired jacket defects found and corrected during manufacturing are permitted if the cable, including the jacket, afterward fully meets these specifications and the requirements of the applicable standards.

2.4.12.8.1 Jacket Material

The jacket shall be one of the materials listed below, in accordance with the applicable paragraphs of NEMA WC 70. Polyvinyl chloride compounds will not be permitted. Variations from the materials required below will be permitted only if approved for each specific use, upon submittal of sufficient data to prove that they exceed all specified requirements for the particular application.

- a. Neoprene, heavy-duty black.
- b. Chlorosulfonated polyethylene, heavy-duty.
- c. Chlorinated polyethylene, cross-linked, heavy-duty.

2.4.12.8.2 Jacket Thickness

The minimum thickness of the jackets at any point shall be not less than 80 percent of the respective nominal thickness specified below:

- a. Thickness of the jackets of the individual conductors of multiple-conductor cables shall be as required by Section 4.1 of NEMA WC 70, and shall be in addition to the conductor insulation thickness required by Section 3 of NEMA WC 70 for the insulation used. Thickness of the outer jackets or sheaths of the assembled multiple-conductor cables shall be as required by Section 4.1 of NEMA WC 70.

b. Single conductor cables, if nonshielded, shall have a jacket thickness as specified in Section 4.1 of NEMA WC 70. If shielded, the jacket thickness shall be in accordance with the requirements of Section 4.1 of NEMA WC 70.

2.4.12.9 Identification

Only one color-code method shall be used for each cable construction type. Colored braids will not be permitted. Control cable color-coding shall be in accordance with Appendix E of NEMA WC 57. Power cable color-coding shall be black for Phase A, red for Phase B, blue for Phase C, white for grounded neutral, and green for an insulated grounding conductor, if included.

2.4.12.10 Cabling

Individual conductors of multiple-conductor cables shall be assembled with flame and moisture-resistant fillers, binders, and a lay conforming to Part 5 of NEMA WC 57, or Section 5 of NEMA WC 70, as applicable, except that flat twin cables will not be permitted. Fillers shall be used in the interstices of multiple-conductor round cables with a common covering where necessary to give the completed cable a substantially circular cross section. Fillers shall be of a non-hygroscopic material, compatible with the cable insulation, jacket, and other components of the cable. The rubber filled or other approved type of binding tape shall consist of a material that is compatible with the other components of the cable and shall be lapped at least 10 percent of its width.

2.4.12.11 Dimensional Tolerance

The outside diameters of single-conductor cables and of multiple-conductor cables shall not vary more than 5 percent and 10 percent, respectively, from the manufacturer's published catalog data.

2.4.12.12 Flame Tests

All multiple-conductor and single-conductor cable assemblies shall pass the IEEE Standard 383 flame tests, paragraph 2.5, using the ribbon gas burner. Single-conductor cables and individual conductors of multiple-conductor cables shall pass the flame tests of Part 3 of NEMA WC 57 or Section 6 of NEMA WC 70, as applicable. If such tests, however, have previously been made on identical cables, these tests need not be repeated. Instead, certified reports of the original qualifying tests shall be submitted.

2.4.12.13 Independent Tests

The Government may at any time make visual inspections, continuity or resistance checks, insulation resistance readings, power factor tests, or dc high-potential tests at field test values. A cable's failure to pass these tests and inspections, or failure to produce readings consistent with acceptable values for the application, will be grounds for rejection of the cable.

2.4.12.14 Packaging and Marking

The cables shall be furnished one length to a reel or coil. Each length, and the outside of each reel or coil, shall be plainly marked or tagged to indicate the cable length, voltage rating, conductor size, and manufacturer's lot number and reel number. Cables for exclusively dc applications shall be identified as such. Reels shall remain the property of the Contractor.

2.4.12.15 Switchboard Wire

Wiring provided in the existing switchboard shall be single conductor #14 AWG, 600-volt, Type SIS, or approved equal meeting the requirements of UL 44. Stranding shall be Class B or Class C.

2.4.13 Molded Case Circuit Breakers

2.4.13.1 General

Molded case circuit breakers shall conform to the applicable requirements of NEMA AB 1, NEMA AB 3, and UL 489, shall be fully rated, and shall have voltage ratings and interrupting ratings hereinafter stated. The circuit breakers shall be manually operated and shall have trip-free operating mechanisms of the quick-make, quick-break type. All poles of each breaker shall be operated simultaneously by means of a common handle, and shall be enclosed in a common molded plastic case. The operating handles shall clearly indicate whether the breakers are in "On," "Off," or "Tripped" position. All double-pole, 125 Vdc molded case circuit breakers for the control and field flashing circuits shall conform to the applicable requirements of NEMA AB 1 and shall be of the heavy duty type. Circuit breakers shall be equipped with means for a mechanical lockout device.

2.4.13.2 Trip Units

The circuit breakers shall be of the automatic type provided with combination thermal and instantaneous magnetic trip units. Instantaneous magnetic trip units shall be set at approximately 10 times the continuous ratings of the circuit breakers.

2.4.13.3 120 Vac Circuits

Circuit breakers for 120 Vac circuits shall be rated not less than 250 Vdc, and either 120/240 or 240 Vac, and shall have a minimum NEMA interrupting capacity of 10,000 A symmetrical.

2.4.13.4 125 Vdc Circuits

Circuit breakers for 125 Vdc circuits shall be two-pole rated 125/250 or 250 Vdc and shall have a minimum NEMA interrupting capacity of 10,000 Adc.

2.4.14 Field Flashing Source

2.4.14.1 Field Flashing Circuit Breakers

New circuit breaker shall be provided in the spare compartments of the existing dc distribution panels on the unit switchboard panels, located on the generator floor at elevation 640 (Lower Granite) and elevation

444 (Lower Monumental), which will be used for field flashing. The circuit breaker shall meet the requirements of paragraph 2.4.13.1. The distribution panels are General Electric products and the recommended part number of the new breakers is GE TEB 122090.

2.4.14.2 Field Flashing Cable

Field flashing cabling shall be size AWG 2, meeting the insulation requirements of paragraph 2.4.12.6

2.4.15 Auxiliary and Interposing Relays

Auxiliary and interposing relays shall be of the self-reset type and shall be provided with convertible contacts. Relay coils and contacts shall be suitable for continuous operation in 125 Vdc or 120 Vac circuits as required. Contacts shall have a 10 A continuous current rating. The single-contact inductive load interrupting capacity shall be not less than 1.0 A for 125 Vdc or 6 A for 120 Vac. Relays used in 125 Vdc circuits shall operate reliably between 90 and 140 Vdc. Relay coils used in 125 Vdc circuits shall be capable of handling 140 Vdc continuously. All inductive devices, such as relays and solenoids, shall be provided with suppression devices to limit surge voltages, which may be generated when the coil circuits are interrupted.

2.4.16 Protective Relays

If externally mounted protective relaying is required, solid-state type relays shall be provided and mounted in the excitation cubicles. The relays shall conform to the applicable requirements of IEEE C37.90. The relays shall be back-connected, semiflush-mounted, switchboard type with rectangular, dust-tight cases, removable covers and screw connections. The relays shall be drawout type with built-in test facilities arranged so that the relays can be tested in position or withdrawn from the fronts of the cases without opening current transformer secondary circuits, disturbing external circuits, or requiring disconnection of leads from the relay terminals. Each relay shall be provided with one or more operation indicators and/or indicating contactor switches with targets and external target reset devices. The circuits shall be arranged for positive target operation. Seal in contactors and suitable loading resistors shall be provided where required. Separate relay operating functions, such as instantaneous trip attachments, shall have separate targets and contacts. Relay contacts shall be silver-to-silver, electrically independent, chatter proof and non-bouncing. The relays shall meet the transient immunity requirements of IEEE C37.90. Each relay shall control a minimum of two auxiliary contacts for unit shutdown and/or annunciation.

2.4.17 Control and Instrument Switches

Control or instrument switches shall be of the rotary switchboard type with handles on the front and the operating contact mechanism on the rear of the panels. Each switch shall be provided with ample contact stages to perform the functions of the control system. Contacts shall be self-aligning and shall operate with a wiping action. A positive means of maintaining high pressure on closed contacts shall be provided. All control switches shall be capable of operation on 600

Vac or 250 Vdc circuits. The switches shall be capable of continuously carrying 20 A without exceeding a temperature rise of 30 °C. The single-break inductive load interrupting rating of switches shall be not less than 1.5 A for 125 Vdc or 10 A for 115 Vac. Each control switch shall be provided with an escutcheon clearly marked to show each operating position. The switch identifications shall be engraved on the escutcheon plates and on separate nameplates.

2.4.18 Speed Switches

New speed switches shall be furnished and mounted in the permanent magnet generator (PMG) of each unit. They shall be electronic type with contacts that close at and above 95 percent unit speed. The contacts shall meet the requirements of paragraph 2.4.16. Switches shall have a minimum of 1 normally open contact, and 1 normally closed contact. Contacts shall be electrically separate. The speed switches shall be used to initiate start and shutdown of the excitation system.

2.4.19 Exciter Display

2.4.19.1 General

Operation and monitoring functions under normal operating conditions shall be provided through a flush mounted LCD or flat screen display and keypad or touch screen display on the exciter cubicle. The display on the exciter cubicle shall provide for local control of the excitation system, diagnostic display, and fault display. All of the information and controls described in this section shall be accessible by PC through a serial communications interface on the control and display panel. The control panel shall incorporate a software program developed to control and monitor the excitation system. Through use of this program with a PC, a user shall minimally perform on-line changes to the excitation systems application program, observe system programs, status, alarms, and parameters, and change parameter values.

2.4.19.2 Exciter Operation Display

The operation display shall provide indication of operational parameters and status of exciter features through the front panel display and keyboard. The Contractor's standard display parameters shall be provided and shall include the following:

- a. Exciter ID
- b. Regulator AUTO/MANUAL Operation
- c. Automatic and manual regulator voltage set-points
- d. SCR firing status
- e. Limiter and protective device status
- f. Limiter and protective device set-points
- g. PSS status and set-points
- h. Regulator supply breaker status
- i. Control power voltage
- j. Field voltage and current
- k. Regulator supply voltage
- l. Field flash status
- m. Generator Voltage, Current, kW and kVAR

Diagnostic messages and instructions from the on-line diagnostic shall be displayed on the operation display.

2.4.19.3 Alarm display

If a system alarm occurs, the display shall be immediately overwritten with an English language message(s) of the alarmed conditions. All alarms shall be displayed and retained until the alarmed conditions clears and the alarm indication is reset. The first alarmed condition shall be noted on the display screen. All subsequent alarms shall be retained and displayed. Cleared alarm conditions shall be reset individually. A single operation of the RESET pushbutton shall reset all cleared alarm displays. The following alarm conditions shall be provided as a minimum:

- a. AC Regulator Trip
- b. Bridge Overtemperature
- c. Transformer Overtemperature
- d. Regulator Power Supply Single Phase/Phase Balance
- e. Potential Transformer Blown Fuse
- f. Field Overvoltage
- g. Over Excitation Limit
- h. Under Excitation Limit
- i. PPT Secondary Overcurrent
- j. Volts/Hertz
- k. Loss of Excitation
- l. Power System Stabilizer
- m. Fan Failure
- n. Control Power Supply Failure

The above alarms shall also be individual inputs to the exciter annunciator.

2.4.19.4 Unit S Board Annunciators

The following alarms shall be provided, hard-wired, for the unit S board annunciators:

- a. Exciter Trouble
- b. AC Regulator Trip
- c. Excitation Upper Limits
- d. PSS Failure

The same alarms shall be provided as hard-wired inputs to the powerhouse SCADA system. SCADA alarms will be terminated in the unit S panels. The Contractor will not be responsible for the actual connections to the SCADA equipment.

2.4.20 Indicating Instruments

Electrical dial indicating instruments shall be provided for field amps and field voltage, and shall be mounted on the unit control switchboard S panels. The existing control and indicating lights can be reused. The indicating instruments shall be switchboard type, shall conform to the applicable requirements of ANSI C39.1, and shall have an accuracy rating within 1 percent of full-scale value. The instruments shall be back connected for semiflush mounting. Instruments shall have white

dials, circular scales, black scale markings, and black tapered anti-parallax pointers. Instrument cases shall be dust-tight with shadow proof covers, and antiglare windows. Instruments shall be 4 ¼ inch minimum rectangular type with nominal 250-degree scale angle. Instrument scales shall be appropriate for the application. All indicating instruments, which may be required for local adjustments or test, shall be provided.

2.4.21 Indicating Lights

The existing 125 Vdc indicating lamps on the unit control switchboards shall be reused.

2.4.22 Calibrated Leads

Calibrated leads from the field current shunt in the exciter cubicle to the remote field current ammeters shall be provided.

2.4.23 Exciter Annunciator Equipment

Annunciator equipment consisting of the following equipment, and including any additional equipment required for proper operation, shall be provided and flush mounted in the excitation cubicles:

- a. The annunciation equipment shall use solid-state logic units.
- b. The annunciation equipment shall be capable of operation from the ungrounded 125-volt dc station battery with supply voltage variations of 103 to 140 volts. The annunciation circuits shall not introduce grounds on the 125-volt dc system.
- c. The annunciator shall be design and tested for surge withstand capability in accordance with IEEE C37.90.1.
- d. Annunciator indication shall be lighted window or light emitting diode (LED) type. If a lighted window annunciator is provided, each window shall be illuminated individually from the rear. Annunciation windows shall be translucent white with a matte finish and black filled engraving. Window sizes shall be approximately 1 by 3 inches. If a LED indication annunciator is provided, an engraved legend plate shall be provided for each point.
- e. A logic unit shall contain pushbuttons for ACKNOWLEDGE, TEST, AND RESET functions. The pushbuttons shall be momentary-contact type with engraved tags.
- f. The annunciators shall be capable of operation from external "acknowledge" and "reset" commands.
- g. One relay output (reflash) for signaling a remote annunciator shall be provided. All input alarms shall be grouped to operate the reflash contact output.
- h. The annunciator equipment shall be designed so that the operation incorporates ISA-S18.1 Sequence M; that is, the closure of a trouble contact shall simultaneously illuminate, with a flashing light, the appropriate annunciator point- indicator regardless of the number

of other points already activated, and shall output a reflash signal to the remote monitoring device. The point-indicators shall not be automatically extinguished by any means, but shall change from flashing to steady light when the annunciator has been acknowledged. They shall remain energized until the trouble contact has opened and the annunciator has been reset.

i. The annunciators shall incorporate, as a minimum, those alarms identified in paragraph 2.4.19.3.

2.4.24 Flat Cable

Flat cable may be used for interconnecting internal logic card racks. However, flat cables shall not be used on output contacts to powerhouse equipment. Flat cables may be the ribbon type or woven type. Flat cable used for low-voltage data buses shall be of the woven twisted-pair type.

2.4.25 Terminal Blocks

Terminal blocks that do not connect to external cables for powerhouse equipment may be the manufacturer's standard type. All other terminal blocks shall be molded or fabricated type with barriers, rated not less than 600 V with 30 A capacity. Short-circuiting-type terminal blocks shall be furnished for all current transformer secondary leads and shall have provisions for short-circuiting together all leads from each current transformer without opening any circuit. The terminals shall be removable binding, fillister, washer-head screw type, or high-density screw type. Each terminal shall have length and space for connecting two No. 10 AWG conductors to each terminal. White or other light colored marking strips shall be provided for circuit designation. Each connected terminal of each block shall have the circuit designation or wire number placed on the marking strip with permanent marking fluid. Two reversible or spare marking strips shall be furnished with each block and at least 10 percent spare terminals shall be provided.

2.4.26 Test Blocks

Test blocks shall be of the back-connected, semiflush mounted, switchboard type with removable covers and shall be provided with knife switches. Test blocks shall be rated not less than 250 volts, 10 amperes, and shall be capable of withstanding a dielectric test of 1,500 volts, 60 Hertz, for one minute. The cases shall be dust tight and shall have a black finish. All test blocks shall be arranged to isolate completely the instruments from the instrument transformers and other external circuits so that no other device will be affected, and means shall be provided for testing either from an external source of energy or from the instrument transformers by means of multiple test plugs. The test blocks and plugs shall be arranged so that the current transformer secondary circuits cannot be open-circuited in any position while the test plugs or cover plugs are in place, being inserted, or being removed.

2.4.27 Test Signal Inputs

Circuitry shall be provided for injecting an arbitrary analog voltage input in the voltage sensing hardware path such that the analog sum of the terminal voltage and the analog input is derived and presented to the digital regulator for testing consistent with IEEE STD 421.2, paragraph 6.3.1. In addition, a manual jog button will be provided that injects a preset step analog signal into the analog sensing circuitry, reference, or summing junction hardware. The size of the jog shall be adjustable from 0 to 15% of the terminal voltage under no load. The analog signal injection circuitry shall interface to the exciter through the test blocks.

2.4.28 Nameplates

2.4.28.1 Device Nameplates

Each item of equipment mounted on the excitation cubicle and on the remote panels shall be provided with an engraved nameplate. Nameplates shall be made of laminated sheet plastic or of anodized aluminum approximately 1/8 inch thick, engraved to provide white letters on a black background. The size of the letters shall be no less than 3/16 inch high. The nameplates shall be fastened to the panels in proper positions with black finished roundhead screws.

2.4.29.2 Equipment Nameplates

The manufacturer shall supply and attach to the excitation cubicle assembly a nameplate and may attach a trademark. Manufacturer nameplate information shall include the following:

- a. Manufacturer's name
- b. Date of manufacture
- c. Serial number
- d. Rated voltage
- e. Maximum and minimum voltages
- f. Rated current
- g. Maximum current
- h. Regulator characteristics

2.5 EXCITATION SYSTEM PROTECTION

2.5.1 General

The following protective features shall be provided as part of the exciter control system or as relaying mounted separately, as indicated in paragraph 2.4.16.

2.5.2 Overexcitation Limiter

An adjustable overexcitation limiter (OEL) shall be provided to automatically limit the excitation of the generator to a safe value with the excitation under control of the regulator. The OEL shall allow inverse-time overload of the generator field circuit consistent with thermal limitations. The primary control shall limit excitation for field circuit overload after an adjustable time delay, but shall automatically return to normal voltage regulation when the overload is relieved. The limiter shall prevent field winding overheating under conditions of repetitive field forcing. The device shall be provided

with one set of electrically separate contacts, which close when the device is in the limiting mode.

2.5.3 Underexcitation Limiter

An adjustable underexcitation limiter (UEL) shall be provided to automatically limit the decrease of generator excitation below that which may result in pullout of the generator. The characteristics of the minimum excitation limiter shall closely match the manufacturer's capability curves. This minimum excitation limit curve shall be user selectable. The UEL shall be provided with one set of electrically separate contacts, which close when in the limiting mode.

2.5.4 Fault Overcurrent Protection

Three single-phase, very inverse time overcurrent relays, or one three-phase very inverse overcurrent relay in a common housing with independent elements for each phase, shall be provided for excitation transformer overcurrent protection.

2.5.5 Phase Balance

Power potential transformer phase balance current protection, to provide indication of a blown current limiting fuse, thyristor misfire, or single phasing of the power potential transformer, shall be provided.

2.5.6 Field Ground Detector

2.5.6.1 Field Ground Detector Relay

Field ground detection relays shall be provided. These relays shall be suitable for mounting in an approved location in the individual unit control switchboards. The field ground detector shall be suitable for detecting a ground resistance of 5,000 ohms or less. The Contractor shall provide auxiliary relays and wiring necessary to automatically disconnect the relay leads during field flashing to avoid false battery ground indications.

2.5.6.2 Shaft Grounding Brush

In conjunction with the ground detection, a shaft grounding brush shall be provided for mounting by a separate contractor. A support and conductor required to ground the shaft to the plant ground shall be provided. The ground brush shall be located below the generator rotor.

2.5.7 Volts/Hertz Limiter

A volts/hertz limiter shall be provided which is responsive to both varying voltage and varying frequency and shall act through the regulator circuitry to take corrective action to prevent damage due to heating during low-frequency operations. This device shall be provided with one set of electrically separate contacts which close when the device is in the limiting mode.

2.5.8 Volts/Hertz Protection

Volts/hertz protection shall be provided to protect the generator armature and power potential transformer windings from overheating during low-frequency operations. This protection shall be in addition to the volts/hertz limiter and shall be coordinated to operate at a slightly higher volts/hertz level than the volts/hertz limiter. This protection shall be adjustable and operate unit trip contacts from the exciter into Government alarm and shutdown circuits.

2.5.9 Emergency Shutdown

If serious trouble requiring shutdown of the generator and its removal from service should occur, the excitation system shall be capable of being automatically de-energized. This operation shall include interrupting all sources of generator field current and dissipation of the stored energy in the field. Any internal faulted condition of the excitation system that requires immediate shutdown of the exciter shall also operate the exciter unit trip contact to operate the governor shutdown circuits.

2.6 SPECIAL TOOLS

All special wrenches, tools, slings, and other equipment that may be necessary or unique for assembling or dismantling any part of the excitation system and auxiliary equipment, including lifting devices for the excitation supply breaker, shall be supplied. One complete set shall be furnished for each Project for a total of two complete tool sets furnished. All tools and equipment shall become and remain the property of the Government. The wrenches and tools shall be supplied in steel boxes equipped with trays and lids to separate and identify the various items.

2.7 SPARE PARTS

All spare parts furnished shall be interchangeable with and shall be of the same material and workmanship as the corresponding original parts. Spare parts to be furnished for the generator excitation systems shall include the following. One complete set of the following spare parts shall be furnished for each Project for a total of two complete sets furnished.

- a. Two complete replacement sets of all main power thyristors and diodes in the excitation system rectifier bridge assembly.
- b. One power capacitor of each type, if required.
- c. One power transistor of each type, if required.
- d. One saturable core reactor of each type, if required.
- e. One control transformer, auxiliary power supplies or isolating transformers, auxiliary instruments or coupling transformer, and choke or inductor of each type and rating as applicable.
- f. One complete set of operating coils, springs, stationary and moving contact assemblies, and auxiliary contacts as required for each type and size of ac and dc contactor and auxiliary switch as applicable.

- g. One complete set of annunciator spares including 1 annunciator power supply, 2 input modules of each type, 1 logic module of each type, and 1 annunciator auxiliary relay of each type.
- h. One speed sensor, tachometer set.
- i. One power supply of each type.
- j. One protective and auxiliary relay of each type.
- k. Two complete rectifier assembly cooling fan sets.
- l. One rectifier Supply Breaker
- m One control switch of each type as applicable.
- n. One printed circuit card of each type with components.
- o. One printed circuit card receptacle of each type, if required.
- p One printed circuit card extender of each type, if required.
- q One Power System Stabilizer
- r Ten indicating lamps of each type, if applicable.
- s. One indicating lamp puller, if applicable.
- t. quart containers of finish paint (touch-up) for the exciter and transformer cubicles (outside surfaces).

The Contractor shall complete the Spare Parts Receipt and shall submit a copy of the completed and signed receipt to the Contracting Officer after the spare parts and documentation have been delivered to the Government. Blank copy of spare parts receipt is attached at the end of this section.

2.8 SPECIAL TEST EQUIPMENT

The Contractor shall furnish all test equipment and tools that are required for performing the small signal performance testing of IEEE 421.2, para.7.2, and for performing step and frequency testing of IEEE 421.2. Step test equipment shall allow ± 10 percent, ± 5 percent, and ± 2 percent voltage and/or current input steps at the exciter input terminals. All test equipment shall be new and may be used by the Contractor for performing required field tests. After completion of the work the test equipment and tools shall be put into the original containers and all but the equipment used for frequency response testing shall be turned over to the Government Inspector, and shall remain the property of the Government.

PART 3 EXECUTION

3.1 ARRANGEMENT AND ASSEMBLY

The location and general arrangement of the equipment shall be as shown on the drawings with minor variances for installation and connection to existing installed equipment. Modifications of the equipment arrangement or equipment device requirements shall be subject to approval. The exciter shall be completely assembled, wired, and tested at the factory. The equipment shall be shipped as completely assembled and wired as feasible so as to require a minimum of installation work. Each shipping section of the equipment shall be properly match marked to facilitate assembly and shall be provided with removable lifting channels with eye bolts for attachment of crane slings to facilitate lifting and handling. All hardware and material necessary for assembly shall be furnished. Any relay, indicating instrument, or other device which cannot withstand the hazards of shipment when mounted in place on the equipment, or which are to be mounted in a separate location, shall be carefully packed and shipped separately. These pieces shall be marked with the number of the panel on which they are to be mounted and fully identified so they can be readily mounted and connected. All finished painted surfaces and metal work shall be wrapped suitably or otherwise protected from damage during shipment. Major components in the excitation cubicles shall be identified with painted letters or numbers or suitable labels, corresponding to the identifications shown on approved shop drawings. The Contractor shall furnish all labor, tools, equipment, and materials needed for removal of the existing equipment and installation of the excitation system. Unless otherwise specified or directed, all excitation system installation and erection procedures shall be in accordance with those outlined in IEEE 1095.

3.2 INTERNAL WIRING

All enclosures and devices shall be completely wired to designated terminal blocks for connection to external devices. The Contractor's standard cables and methods of cable terminations may be used between standard modules within the cubicles. Wiring, where not installed in channels or ducts, shall be formed into compact wire bundles suitable bound together and properly supported. No splices shall be permitted in any of the wiring. Hinge wire shall be used between stationary panels and swinging doors and shall be formed in wire loops, which will provide rotation around the longitudinal axis of the conductors. Hinge wire shall be Class K stranding. Any wiring extending beyond the equipment cubicles shall be terminated at 600 V terminal blocks except excitation system power leads such as generator field leads, shunt leads, etc. Special attention shall be given to terminal wiring arrangements on the terminal blocks to permit individual conductors of each external cable to be terminated on adjacent terminal points. The wire (terminal point) designations used on the Contractor's wiring diagrams may be according to the Contractor's standard practice; however, additional wire and cable designations for identifications of external circuits may be required. Prints of wiring and terminal drawings submitted for approval will be marked and returned to the Contractor for addition of the Government's designations to the terminal strips, along with any rearrangement of points required.

3.3 FACTORY ASSEMBLY

Complete assembly of the excitation cubicle, the high-voltage fuse cabinets, and the power potential transformer cubicle are required.

The exciter system shall be completely assembled at the factory before testing.

3.4 FACTORY TESTS

3.4.1 General

Factory tests on the excitation system shall be made in accordance with applicable requirements of ANSI C34.2, except as herein definitely stated, and the Contractor's approved procedure. All tests required herein shall be witnessed by the Government Quality Assurance Representative (GQAR), unless waived in writing, and no equipment shall be shipped until it has been approved for shipment. The GQAR shall be given notification of factory tests two weeks before they are to be performed. The waiver of any tests, or the witnessing thereof by the GQAR, shall not relieve the Contractor of the responsibility of meeting the requirements of these specifications. All test equipment, instruments, and personnel, shall be furnished by the Contractor. The cost of performing the routine tests shall be included in the prices bid in the schedule for the equipment. The cost of performing the Special Tests shall be included in the bid schedule under the bid item for "Perform Special Factory Test".

3.4.2 Routine Tests

Each excitation system shall be subjected to routine tests, including but not restricted to the following:

- a. Dielectric tests in accordance with ANSI C34.2.
- b. Rated voltage tests.
- c. Functional sequencing check of circuit components for proper operation.
- d. Tests of excitation system power potential transformer in accordance with IEEE C57.12.91.
- e. Surge withstand test in accordance with IEEE C37.90.1. If the type of exciter being provided has passed the surge tests, documentation of the test may be provided en lieu of performing the test again.
- f. High Potential Tests in accordance with IEEE 421.3.

3.4.3 Special Factory Tests

The Contractor shall perform the following special factory tests on the excitation system for one of each type provided. At the Contractor's option, test items "d" and "e", listed below, may be performed as field tests, and shall conform to the requirements of paragraph 3.5.

- a. Rated current test. Subject to approval, a test at 110 percent rated current and reduced voltage as outlined in ANSI C34.2 may be substituted.

b. Heat run to determine maximum temperature rise. This test shall include a heat run at exciter rated output. Subject to the approval of the Contracting Officer a heat run at 110 percent rated current and reduced voltage as outlined in ANSI C34.2 may be substituted in lieu of the heat run at rated output.

c. Phase control range.

d. Tests to determine the transient performance. These tests shall include determination of the excitation system voltage response time and excitation system ceiling voltage. Excitation system voltage response time and excitation system ceiling voltage shall be determined with the excitation system at rated load field voltage and loaded with a resistance equal to generator field resistance at 75 °C. The voltage response time and ceiling voltage shall be determined as outlined in IEEE 421.2, Section 3.

e. Test to demonstrate performance at extremes of input voltage to the exciter.

f. Reserved.

g. Excitation system short-time overload capability.

h. Excitation system rectifier assembly current unbalance. The maximum unbalance of currents in the parallel paths of the rectifier assembly shall not exceed ± 10 percent.

i. Verify that all functional and operational performance requirements of the PSS, as outlined in paragraph 2.4.7, including integration of the requirement for two sets of parameters described in paragraph 2.4.6.8.

j. All other electrical parts, such as voltage adjusters and similar devices, shall be tested individually in accordance with industry standards. Where parts are in quantity production and routine tests are made and such routine tests are in accordance with the industry standards, individual tests of such parts will not be required. However, in either event, certified test data covering each part shall be submitted.

3.5 SPECIAL FIELD TESTS

3.5.1 General

One excitation system of each type provided shall be field tested by and at the expense of the Contractor to determine whether the contractor's guarantees and the requirements of these specifications have been fulfilled. The tests shall be made in accordance with the applicable requirements of ANSI C50.10, ANSI C50.12, and IEEE 115, except as herein definitely stated. All test equipment, including their calibration, equipment instrument transformers, temporary installations and personnel, shall be furnished by the Contractor. Test procedure outlines shall include a list of instruments and equipment to be used and wiring diagrams showing all temporary connections to the existing powerhouse equipment.

3.5.2 Operational Tests

The entire excitation system shall be subjected to operational tests and adjustment to show compliance with all performance requirements of these specifications. The following additional special field tests shall be made on the excitation system for one generator of each type provided.

3.5.2.1 Test for Wave Form Deviation Factor

Oscillograms shall be taken of the wave form of the voltage of each phase of the stator winding when the generator is operating at rated voltage and frequency at no load.

3.5.2.2 Tests for Excitation System Performance

These tests shall consist of taking oscillograms of the generator voltage variations as step errors of up to 5 percent are introduced into the regulator sensing circuit under the following conditions:

- a. Rated load, without PSS
- b. Rated load, with PSS
- c. Open-circuited, without PSS
- d. Open-circuited, with PSS
- e. As loads of up to 100 percent of rated load at rated power factor are rejected at the machine terminals.

Under loaded conditions, the terminal voltage overshoot shall not exceed 5 percent. Open-circuited, the terminal voltage overshoot shall not exceed 15 percent. Response shall be damped.

3.5.2.3 Efficiency Tests

These tests shall include the determination of the excitation system losses. Losses measured shall include as applicable, those losses listed in paragraph 5.3.5.2 of ANSI C34.2. Excitation losses shall also include the calculated I^2R losses in the dc bus from the excitation cubicle to the generator collector rings and the total power supplied to the excitation system auxiliaries when in service under steady-state conditions.

3.5.2.4 Underexcitation Limiter Tests

The underexcitation limiter shall be tested by operating the generator at various real power settings and decreasing the excitation until the limiter operates. Record a table of real and reactive power levels, terminal voltage, and field current, and construct a graph of the operating points.

3.5.2.5 Overexcitation Limiter Tests.

The overexcitation limiters (OEL) may be tested at a reduced level, then returned to their proper settings. The timed OEL shall be tested by placing a large step into the voltage regulator and observing the excitation levels. The inverse-time curve of the OEL shall be verified by testing the instantaneous limiter at several values and timing the return to the OEL setting.

3.5.2.6 Frequency Response Test.

Perform a test of overall frequency response of the voltage regulating control system, with the unit on line and the PSS off line, to verify the on-line regulator performance. Quantities measured shall include field voltage and current, PSS output, terminal voltage, and terminal real and reactive power.

3.5.2.7 Small Signal Performance Testing

The contractor shall use an external analog step change signal to demonstrate compliance with paragraph 7.1 and 7.2 of IEEE 421.2.

3.6 EQUIPMENT FIELD INSTALLATION

3.6.1 Equipment Removal

3.6.1.1 General

The work included under this section consists of the removal of the existing non-rotating excitation system equipment, which shall be accomplished in accordance with the Contractor's approved excitation equipment removal procedure. To the maximum extent practicable, it shall not disturb the integrity of the existing shaft and bearings.

3.6.1.2 Equipment To Be Removed

Existing cables, which serve equipment to be removed shall be disconnected at both ends and shall be completely removed. Exposed conduit which is part of the existing excitation system and which will not be used for the excitation system shall be removed entirely or removed to the embedded part, as applicable. Ends of abandoned embedded conduit shall be plugged flush at the concrete surface with a suitable conduit fitting. The following existing equipment shall be removed:

- a. Excitation cubicles.
- b. M/G sets.
- c. All abandoned and unused power, control, and instrument cables and conduit.

3.6.1.3 Disposition of Removed Equipment.

The Power System Stabilizers, amplifiers, and associated circuitry removed from the units shall remain the property of the Government. The PSS's shall be carefully removed, cleaned, and stored onsite at a location directed by the Contracting Officer. All other materials that are removed and not reinstalled shall become the property of the

Contractor, removed from the project site, and shall be properly disposed of in accordance with applicable State and Federal laws. Materials that cannot be removed daily shall be temporarily stored in areas approved by the Contracting Officer.

3.6.2 Equipment Installation

3.6.2.2 General

The contractor shall furnish all necessary cable, conduit, fittings, and miscellaneous materials for all power and control connections between the new excitation equipment and Government control and power boards. The excitation system shall be installed, by the contractor, complete and ready for commercial operation of the generator. The equipment shall be installed in the locations shown on the contract drawings. Any changes in the locations shown on the contract drawings shall be approved by the Contracting Officer and shall be shown on the shop drawings of the equipment submitted for approval. Wrenches, tools, and special equipment supplied by the excitation system manufacturer for equipment installation, which are damaged during erection shall be replaced at no additional cost to the Government.

3.6.2.3 Equipment to Be Installed

Based on the installation instructions, the specifications and the contract drawings, the Contractor shall install, connect with all control and power wiring, and make ready for field testing the following equipment:

- a. Synchronous machine voltage regulator and excitation system, including voltage and current devices, and circuit breakers.
- b. Power potential transformer, complete with primary voltage and secondary voltage buses and current limiting fuses.
- c. New nameplates, where required, on reused external control, annunciation, and protection devices which provide remote control and monitoring of the new excitation system.
- d. Ac and dc cables and conduit, or bus, connecting PPT to generator terminals and to exciter cubicle and connecting exciter cubicle to collector ring brush assembly.
- e. Field flashing source equipment.
- f. Software on the operator machine interface and the exciter diagnostics workstation Government-provided hardware.
- h. New exciter field voltage and current meters and exciter control switch on the unit switchboard S panels.

3.6.2.4 Control Board Modifications

Modifications to existing control boards necessary for interface of the excitation equipment shall be made in accordance with the Government-provided control drawings and approved installation instructions.

Field Flashing Source

3.6.2.4.1 Circuit Breaker

A new circuit breaker shall be installed in the existing DC panel on unit switchboard. After installation has been completed, the following tests shall be made in the presence of the GQAR.

- a. Electrical Operation Test
- b. Mechanical Operation Test

3.6.3 Wiring, Cables, and Terminations

3.6.3.2 General

Leads for control wiring within the generator air housing shall be furnished and installed in rigid galvanized steel conduits, where practicable, unless specified otherwise, herein. Calibrated shunt leads for the remote generator field ammeter shall be installed by the Contractor. Conduits shall be arranged, as far as practicable, to make removal unnecessary when the generator is dismantled. All leads from the excitation cubicle to the generator switchboard shall be furnished and installed as part of the excitation system installation.

3.6.3.2 Installation

All wire and cable shall be installed in accordance with NFPA 70 requirements. All necessary materials, tools, and equipment required for proper handling and installation of wire and cable in conduits, cable trays, and elsewhere shall be furnished. Except for spares, each wire and cable shall be connected to the associated equipment at both ends and shall be continuous and without splices between the equipment termination points. Wire and cable shall be pulled in a manner that will preclude damage to the conductor, insulation, or jacket. Any cable damage during installation shall be removed and replaced. Installation of wire and cable shall include installation of all supporting devices and all terminations required to complete the circuits as required. Wire and cable shall not be pulled into conduit runs until the conduit has been checked and determined to be clean and dry by pulling a clean, dry, tight-fitting rag through each run. Only approved lubricants may be used to facilitate pulling of conductors. Cable trays shall be cleaned of all dirt and trash before pulling conductors. Cable trays shall be cleaned of all dirt and trash before pulling cable. Cables shall be placed straight and parallel in the trays.

3.6.3.3 Equipment Wiring

Cables and wires entering switchboards, exciter cubicles, cabinets, and similar equipment will require routing within the equipment to the applicable terminal blocks. Where not installed in wiring channels and ducts, cables and wires shall be formed into compact groups suitably bound together and properly supported.

3.6.3.4 Terminations

All cable and wire connections shall be made at terminal blocks except, if applicable, for the power potential transformer high-voltage and low-voltage cable buses. Shielded power conductors shall be terminated with stress cones with the shielding grounded at each stress cone. Unshielded conductors for circuits above 1,000 V shall be terminated with a corona preventive tape. The shield and shield-insulating jacket of shielded signal cables and conductors shall be maintained to a point as close to the terminals as possible. The shield-insulating jacket shall not be stripped from the shield except where necessary to make the ground connection. All signal cable shields shall be grounded at one end only.

3.6.3.5 Identification

All multiple-conductor cables shall be clearly identified with the cable designation by either embossed 1-inch diameter brass tags or by embossed aluminum band markers. Tags or band markers shall be securely fastened to the cables at each termination, junction, or pull box where cables enter or leave cable trays and as required at other points of access. Wires and individual conductors of control and power cables shall be identified with nonmetallic tube-type markers at each termination. Wire markers shall be heat shrink tube type, machine printed and shall be suitable for contact with rubber or neoprene or plastic. Tubing shall be sized to fit the wire being marked and shall have black marking on a light colored background. Installed markers shall be uniform in position on the wire and legends shall be visible when wires are terminated on terminal blocks or equipment. A written certificate from an approved independent testing laboratory shall be furnished to indicate that the markers will not stain or discolor after 20 years service when subjected to an accelerated aging test while in contact with wire insulating materials. Identification on tags and markers shall be as shown on the drawings or as directed. The Government will provide marked drawings to the Contractor before the installation of the first excitation system.

3.6.3.6 Installation Tests

After installation, but just prior to terminal connection, each conductor shall be tested as follows:

- a. A 1,000 V "Megger" test shall be performed with all other conductors in each cable or conduit grounded. The final insulation resistance of each conductor shall not be less than 1 megohm.
- b. A continuity test of each conductor from terminal to terminal shall be performed.
- c. Records shall be kept of all tests, indicating the "Megger" readings, high-voltage tests, continuity test, and conductor identification markings. Prior to testing, the test record form shall have been submitted and approved.
- d. Any length of wire or cable failing under these tests shall be replaced at no additional cost to the Government.
- e. The Contractor shall furnish all instruments and personnel for these tests.

f. Tests shall be witnessed by the GQAR and the test form shall provide room for his signature.

3.6.4 Conduits, Fittings, and Accessories

Conduit to be installed under this contract shall be run exposed for connecting circuits between items of equipment. Conduit, fittings, and accessories shall be installed in accordance with details shown on the drawings and as specified herein. All conduit shall be Rigid Metal Conduit (RMC) only.

a. All conduit bends shall have a radius of not less than 10 times the inside diameter of the conduit.

b. No threadless fittings or running-thread couplings shall be used on conduit runs.

c. Metal conduits shall be cut only with a tool approved for the purpose. All cuts shall be square and the conduit opening shall not be constricted. After cutting and threading, conduit ends shall be reamed to remove rough edges and burrs, and the entire conduit shall be thoroughly cleaned to remove all cuttings, dirt, and oil from its interior. Threads shall be clean cut. Threaded joints in metal conduit and terminations in cast boxes shall have the threads coated with an approved joint compound, and shall be screwed tight to make the joint watertight and to provide electrical continuity of a give conduit system. Suitable watertight conduit hubs and bushings shall be provided where conduit terminates within a box, terminal cabinet, or accessory that has no threaded hub or fitting to receive threaded conduit.

d. All conduits shall be installed in a manner to ensure against trouble from the collection of trapped condensation, and all runs shall be arranged to avoid traps wherever possible.

e. Pull boxes shall be furnished and installed, complete with covers, in conduit runs as required by NFPA 70 and good practice in the trade, regardless of whether the boxes are specified on the drawings.

f. Conduit shall be installed with a minimum of bending and cutting. Conduits not dimensioned as to location shall be installed approximately where shown on the drawings with limited adjustment to avoid interference with other work. Conduit shall be rigidly attached with approved supports and anchors to the surface over which it is run. The maximum spacing of supports for the exposed conduit shall be 8 feet. Supports for exposed conduit on concrete surfaces shall be fastened securely to the concrete with approved anchors. Wooden, fibrous, or similar plugs inserted into the concrete will not be accepted.

g. The entire metallic conduit system installed in the powerhouse by the excitation system contractor shall be electrically continuous and thoroughly grounded. No welding or brazing of the grounding conductor to the conduit will be allowed. All grounding connections to the conduit shall be made by means of listed grounding bushings or by an approved pressure type connector.

3.7 CONTRACTOR'S WORK SUPERVISORS

At least one full-time employee of the Contractor shall be available at each worksite anytime contract work is performed on site to supervise and direct the work. Supervisors shall be present at the sites during disassembly and installation and shall be responsible for providing complete and correct direction of all disassembly and installation work, commissioning, and field testing. The supervisors shall initiate instructions for all actions necessary for the proper inspection, handling, assembly and testing of the equipment. The supervisors shall keep a record of all measurements taken during installation and shall provide copies on request or on completion of installation of each unit. The supervisors shall keep all as-built drawings current and provide copies or the final as-built (final drawings) upon completion of the work. The supervisors shall be fluent in the spoken and written English language. The supervisor shall have been engaged in similar excitation installation work, as is specified herein for a minimum of 3 years, and shall have performed this work at a minimum of two different powerhouses and on at least two hydraulic generating units. The Supervisors qualifications, experience, a verifying contact, name and phone number, shall be submitted for at least two such facilities.

3.8 CONTRACTOR-FURNISHED TRAINING

No later than 30 days prior to the first excitation system being placed in service at each Project, an initial training session shall be conducted in the theory, operation, and maintenance of the generator excitation system. The course shall be of 40 hours minimum duration Monday through Thursday (4 days at 10 hours per day) for approximately ten Government personnel at each of the two projects. The course shall include excitation system design, theory of basic circuits, troubleshooting of printed circuit cards, and excitation system trouble analysis. Course material shall include the use of site-specific Operations and Maintenance Manuals, to the maximum extent possible. The number of copies of O&M manuals required for the initial training is in addition to the number of copies of O&M manuals required in paragraph 1.10, Section 01330. Training shall not begin until approved Operation and maintenance Manuals are available for use during the training session. After the O&M manuals are completed, approved, bound, and available for use and at least 3 weeks prior to the beginning of the training, the Contractor shall submit a synopsis of the training and curriculum. The course shall include in depth hands-on training for each student on the setup, displays, and excitation parameter changing on the operator-exciter interface panel. Additionally, a separate minimum eight hour course (3 sessions 8 hours each session shall be conducted which covers operation only. The operations course shall be provided for three different groups of operations personnel at each project site. The three operator sessions shall be scheduled one week apart from each other to maximize government benefit as operators work rotating shift work with only one operator at any one time. The Government may videotape the training sessions for future use by the Government. Within ten calendar days following installation of the three exciters at each Project, a follow-up training session shall be conducted covering the operation and maintenance of the equipment to allow the Project personnel to ask experienced questions. This course shall be of 20 hours minimum

duration (2 days at 10 hours per day) for approximately 10 Government personnel at each project. Course material shall include the use of final approved copies of Operations and Maintenance Manuals. The number of copies of O&M manuals required for the follow-up training is in addition to the number of copies of O&M manuals required in paragraph 1.10, Section 01330. All training shall be conducted during project maintenance crews work days which are Mondays through Thursdays as specified in Section 01010, paragraph 11.2.

3.9 SERVICES OF A SKILLED CRAFTSMAN

Services of a skilled craftsman will be required if the Government discovers work at either of the two Projects that is within the scope of the contract and must be performed but is not included in the drawings and specifications and is not included in any change orders. The additional work could consist of electrical work, mechanical work, metalwork machining, drilling, cutting, grinding, or welding metalwork, or similar work. The Contractor shall furnish all tools and equipment as incidental items for all skilled craftsman work. The Contractor shall perform this work only when directed, in writing by the Contracting Officer. Prices for skilled craftsman hours included in applicable items in the schedule are the prices to be paid only for this additional directed work and these prices shall not be used when negotiating change orders.

3.10 CONTRACTOR QUALITY CONTROL

The Contractor shall establish and maintain quality control as required in Section 01451 to insure compliance with contract requirements and maintain records of his quality control as required in paragraph DOCUMENTATION in SECTION 01451 for all operations. Copies in duplicate of these records and tests, as well as the records of corrective action taken when results are unsatisfactory, shall be furnished to the Contracting Officer within 24 hours following the inspection or test.

3.11 SERVICES OF COMMISSIONING ENGINEER

3.11.1 General

The Contractor shall furnish the services of a Commissioning Engineer. The commissioning engineer shall have a minimum of 5 years experience in the startup of excitation systems and the commissioning of generators.

3.11.2 Duties

The commissioning engineer shall give and be responsible for giving complete and correct direction during the initial starting and all subsequent operation of the equipment until the testing and commissioning of all excitation systems is completed. Additionally, the commissioning engineer shall assist Government personnel and a separate Government contractor by entering voltage regulator and power system stabilizer equipment parameter settings, test the equipment with the settings, and provide test results. The parameter settings will be given to the commissioning engineer by the separate contractor. This will require the commissioning engineer and the separate contractor to be at the project site at the same time. Advanced coordination between the commissioning engineer and the separate contractor for each time they will jointly be on-site must be done through the Contracting Officer. After the Contracting Officer and the Contractor have established a date for performing on-site work, the commissioning engineer shall report to the applicable project site for the agreed to time period.

3.12 ROUTING OF DC BUS

The Contractor shall make an opening in the generator concrete air housing at both the Lower Granite and Lower Monumental Powerhouse generators for routing of the dc bus below the generator deck plates to the brush riggings. Reference Section 03600 for concrete work. Means shall be provided in the dc bus for generator rotor removal. The Contractor shall provide a design showing the bus routing including a detailed electrical design. The design for the penetration through the concrete generator air housing shall be stamped by a registered professional structural engineer and submitted for approval including calculations, details, procedures, and materials.

4. SUMMARY OF SUBMITTALS.

Submittal Register ENG Form 4288 to be furnished by the Contractor shall include the following:

<u>Paragraph</u>	<u>Item</u>	<u>SD</u>	<u>AEA</u>
16251-1.3.1.1	Equipment manufacturers and performance capacities	01	HDC
16251-1.3.1.2	Nameplate schedule	01	HDC
16251-1.3.1.3	Parts list	01	HDC
16251-1.3.1.4	Spare parts list	01	HDC
16251-1.3.1.5	Excitation equipment math models	01	HDC
16251-1.3.2.1	Outline drawings	04	HDC
16251-1.3.2.2	Arrangement drawings	04	HDC
16251-1.3.2.3	Overall one line diagram	04	HDC
16251-1.3.2.4	Schematic diagrams	04	HDC
16251-1.3.2.5	Wiring diagrams	04	HDC
16251-1.3.2.6	Bus connection between power potential transformer and excitation cubicle	04	HDC
16251-1.3.2.7	Generator bus tap design	04	HDC
16251-1.3.2.8	Design of dc circuit to slip rings	04	HDC
16251-1.3.2.9	Equipment installation drawings	04	HDC
16251-1.3.2.10	Circuit card schematics	04	HDC
16251-1.3.2.11	Other drawings	04	HDC
16251-1.3.2.12	As-built drawings	04	HDC
16251-1.3.3.1	Installation plan and schedule	07	HDC
16251-1.3.4.1	Equipment removal procedure	08	HDC
16251-1.3.4.2	Installation procedure	08	HDC
16251-1.3.4.3	Factory test procedure	08	HDC
16251-1.3.4.4	Field test procedure	08	HDC
16251-1.3.4.5	Contractor furnished training	08	HDC
16251-1.3.4.6	Contractors work supervisors	08	HDC
16251-1.3.5.1	Materials	09	C
16251-1.3.5.2	Factory tests	09	HDC
16251-1.3.5.3	Field tests	09	HDC
16251-1.3.6	Operation and maintenance manuals	19	HDC
16251-3.12	Design for routing of dc bus	01/04	HDC

<u>Code for Submittal Description</u> <u>(SD)</u>	<u>Action Element for Approval (AEA)</u>
01 - Data	C - Contractor
04 - Drawings	AE - Architect Engineer
06 - Instructions	ED - Engineering Division
07 - Schedules and Plans	CD - Construction Division
08 - Statements	EDA - Engineering Division, Architectural Design
09 - Reports	EDC - Engineering Division, Soils/Civil Design
13 - Certificates	EDE - Engineering Division, Electrical Design
14 - Samples	EDG - Engineering Division, Geology & Dam Safety
18 - Records	EDH - Engineering Division, Hydraulic Design
19 - O & M Manuals	EDM - Engineering Division, Mechanical Design
	EDS - Engineering Division, Structural Design
	EDSP - Engineering Division, Specifications
	ECC - Environmental Compliance Coordinator
	HDC - Hydroelectric Design Center

(Spare Parts Receipts 2 pages and
Saturation Test Curves 2 pages follow)

* * * * *

**SPARE PARTS RECEIPT
LOWER GRANITE DAM**

Contract No.: _____

Contract Name: _____

Contractors Name: _____

Technical Specification Number: 16251

Paragraph Number: 2.7

List of Spare Parts Delivered (Quantity and Description): *

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

All spare parts required in the technical specification section are included: Yes No

All documentation required in the technical specification is complete and included: Yes No

VERIFICATION: The above spare parts receipt is complete and correct, all required spare parts have been turned over to the Government, and all documentation is complete and included with the spare parts.

Contractor's Representative

Date

Government's Representative

Date

*Attach additional sheets as necessary.

**SPARE PARTS RECEIPT
LOWER MONUMENTAL DAM**

Contract No.: _____

Contract Name: _____

Contractors Name: _____

Technical Specification Number: 16251

Paragraph Number: 2.7

List of Spare Parts Delivered (Quantity and Description): *

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- 8. _____
- 9. _____
- 10. _____

All spare parts required in the technical specification section are included: Yes No

All documentation required in the technical specification is complete and included: Yes No

VERIFICATION: The above spare parts receipt is complete and correct, all required spare parts have been turned over to the Government, and all documentation is complete and included with the spare parts.

Contractor's Representative

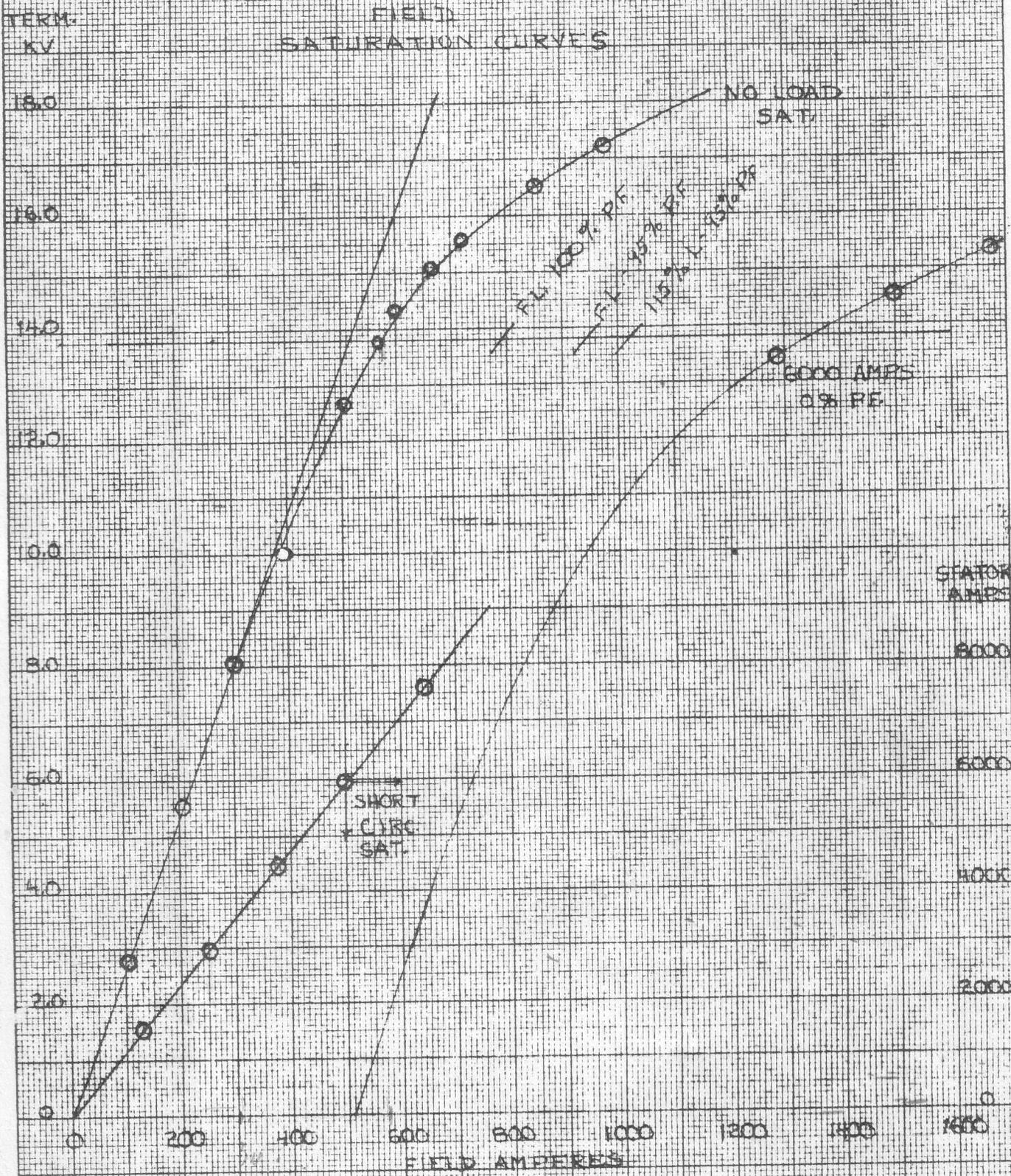
Date

Government's Representative

Date

*Attach additional sheets as necessary.

U.S.C.E. LOWER GRANITE LOCK DAM - UNIT NO. 1
 142105 KVA - 3.8 KV - 5945 AMPERES - 0.95 P.F.
 3 PHASE - 60 HZ - 90 RPM - FR. 80 - 46 1/2 X 70
 VERTICAL WATERWHEEL GENERATOR



10 X 10 TO THE CM. 359-14
 KEUFFEL & ESSER CO. MADE IN U.S.A.

SC 82P0670

W. EGIDIO

11/5/75

CURVE NO. 672785

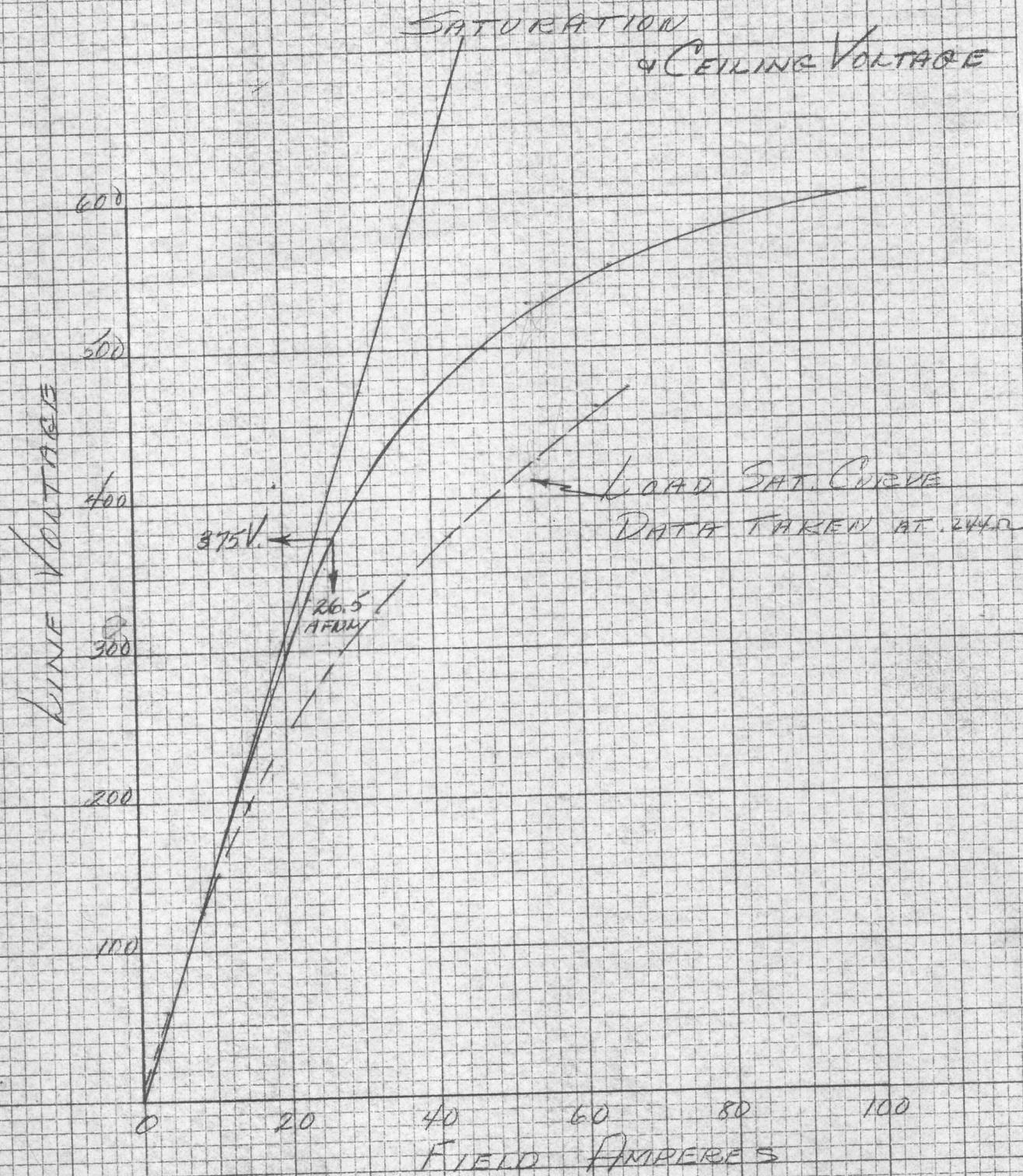
7392456-A

EV-12-500KW-90RPM-375V.

MACH. NO. 7392456

5-25-67

REQ. 438-9000 I.L. 10 H.O. DAMSTEDT



REVISED 2-26-68

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., U.S.A.

FN-521-A (8-50)

SECTION H Special Contract Requirements

Revised Drawing List. Four revised drawings.

252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS
(AUG 2000).

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical specifications by references, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall--

- (1) Check all drawings furnished immediately upon receipt;
- (2) Compare all drawings and verify the figures before laying out the work;
- (3) Promptly notify the Contracting officer of any discrepancies;
- (4) Be responsible for any errors which might have been avoided by complying with this paragraph (b);

and

- (5) Reproduce and print contract drawings and specifications as needed.

(c) In general --

- (1) Large-scale drawings shall govern small scale drawings; and
- (2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the mis-description of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or mis-described details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings.

FILE NUMBER	SHEET NUMBER	TITLE	REVISION NUMBER	DATE
LMG-1-0-1/193	0	LOWER MONUMENTAL LOCK AND DAM LOWER GRANITE LOCK AND DAM UNITS 1-3 EXCITER REPLACEMENT		
		LOWER MONUMENTAL - UNITS 1-3 EXCITATION REPLACEMENT		
LMP-5.8-0-0A0/1	0	PROJECT LOCATION VICINITY MAP, AND DRAWING INDEX	1	5-5-04

LMP-5.8-6-1E11/1A	1	MAIN UNIT BAYS - EQUIPMENT REMOVAL		
LMP-5.8-6-1E11/1B	2	MAIN UNIT BAYS - EL. 444.0	1	5-5-04
LMP-5.8-6-1E11/2	3	SECTIONS & DETAILS		
LMP-5.8-6-9A24/1	4	EXCITATION SYSTEM EXTERNAL CONNECTIONS		
LMP-5.8-6-9A24/2	5	EXCITATION SYSTEM BLOCK DIAGRAM		
LMP-5.8-6-9A53/1	6	CABLE REMOVAL SCHEDULE, SHEET 1		
LMP-5.8-6-9A53/2	7	CABLE REMOVAL SCHEDULE, SHEET 2		
LMP-5.8-6-9A53/3	8	CABLE INSTALLATION SCHEDULE, SHEET 1		
LMP-5.8-6-9A53/4	9	CABLE INSTALLATION SCHEDULE, SHEET 2		
		FOR INFORMATION ONLY		
		GOVERNMENT REFERENCE DRAWINGS		
LMP-1.1-6-1E11/1	10	TYPICAL MAIN UNIT BAYS - EL. 444.0		
LMP-1.1-6-1E11/7	11	MAIN UNIT BAYS SECTIONS & DETAILS - SHEET 1		
LMP-1.1-6-9E4/1	12	GENERATOR SWITCHBOARD S1-S3		
LMP-1.1-6-9E21/1	13	UNIT ONE LINE DIAGRAM		
LMP-1.1-6-9E24/1	14	MAIN UNIT CONTROL SCHEMATIC DIAGRAM - SHEET 1		
LMP-1.1-6-9E24/2	15	MAIN UNIT CONTROL SCHEMATIC DIAGRAM - SHEET 2		
LMP-1.1-6-9E24/3	16	VOLTAGE REGULATOR SCHEMATIC		
LMP-1.1-6-9E26/1	17	MAIN UNITS FUNCTIONAL SCHEMATIC DIAGRAM		
LMP-1.1-6-9E51/4	18	UNITS 1-3 VOLTAGE REGULATOR TERMINAL CONNECTIONS		

		GENERAL ELECTRIC REFERENCE DRAWINGS		
44C320761	19	OUTLINE (EXCITATION SWITCHGEAR)		
44D207973 - SHT 3A	20	EXCITATION CUBICLE		
		LOWER GRANITE - UNITS 1-3 EXCITATION REPLACEMENT		
GDP-5.17-0-0A0/1	0	PROJECT LOCATION VICINITY MAP, AND DRAWING INDEX	1	5-5-04
GDP-5.17-6- 1E11/1A	1	MAIN UNIT BAYS - EQUIPMENT REMOVAL		
GDP-5.17-6- 1E11/1B	2	MAIN UNIT BAYS - EL. 640.0	1	5-5-04
GDP-5.17-6- 1E11/2	3	SECTION & DETAILS		
GDP-5.17-6- 9A24/1	4	EXCITATION SYSTEM EXTERNAL CONNECTIONS		
GDP-5.17-6- 9A24/2	5	EXCITATION SYSTEM BLOCK DIAGRAM		
GDP-5.17-6- 9A53/1	6	CABLE REMOVAL SCHEDULE, SHEET 1		
GDP-5.17-6- 9A53/2	7	CABLE REMOVAL SCHEDULE, SHEET 2		
GDP-5.17-6- 9A53/3	8	CABLE INSTALLATION SCHEDULE, SHEET 1		
GDP-5.17-6- 9A53/4	9	CABLE INSTALLATION SCHEDULE, SHEET 2		
		FOR INFORMATION ONLY		
		GOVERNMENT REFERENCE DRAWINGS		
GDP-1-6-1E11/1	10	TYPICAL MAIN UNIT BAYS - EL. 640.0		
GDP-1-6-1E11/7	11	MAIN UNIT BAYS SECTIONS & DETAILS - SHEET 1		
GDP-1-6-9E4/1A	12	GENERATOR SWITCHBOARD S1-S3		
GDP-1-6-9E21/1A	13	UNIT ONE LINE DIAGRAM		

GDP-1-6-9E24/1A	14	MAIN UNIT CONTROL SCHEMATIC DIAGRAM - SHEET 1		
GDP-1-6-9E24/2A	15	MAIN UNIT CONTROL SCHEMATIC DIAGRAM - SHEET 2		
GDP-1-6-9E24/3A	16	VOLTAGE REGULATOR SCHEMATIC DIAGRAM		
GDP-1-6-9E26/1A	17	MAIN UNITS FUNCTIONAL SCHEMATIC DIAGRAM		
GDP-1-6-9A51/2A	18	CONTROL JUNCTION BOX & VOLTAGE REGULATOR TERMINAL CONNECTIONS		
		WESTINGHOUSE ELECTRIC REFERENCE DRAWINGS		
149D821	19	WTA VOLTAGE REGULATOR - CONNECTION DIAGRAM CUBICLE 2		
149D822	20	WTA VOLTAGE REGULATOR - CONNECTION DIAGRAM CUBICLE 3		
149D823	21	WTA VOLTAGE REGULATOR - CONNECTION DIAGRAM CUBICLE 5		
149D865	22	WTA VOLTAGE REGULATOR - CONNECTION DIAGRAM CUBICLE 4		
1116F79	23	VERTICAL HYDRO GENERATOR EXCITER ASSEMBLY		

(End of drawing list)

Contract drawings created on CADD will be available in electronic form for use by the Contractor. No For Information Only drawings are available on CADD. CADD drawings are identified as such by the Computer Aided Design and Drafting symbol near the title block. The Contractor assumes all risks associated in using electronic CADD drawings. The contract drawings shall govern if there are any discrepancies between the electronic copy and the contract drawing. The Contractor shall promptly notify the Contracting Officer of any discrepancies. The Government will not be responsible to correct the electronic CADD drawing. If contract modifications are issued, the associated electronic CADD drawings will not be available to the Contractor. Electronic copies of CADD drawings are only available in Intergraph Microstation format. The Government will provide the files on CD ROM. If the Contractor requires different media, such as floppy disks, the Contractor shall be responsible for all conversions required for their use and associated conversion inaccuracies.

(End of Clause)

REVISED
SECTION L - Appendix 1
TABLE OF MANDATORY COMPLIANCE

The Offeror shall provide a statement as to the Offeror's technical proposal meets all of the technical requirements as specified below in the following Table of Mandatory Compliance.

1. TABLE OF MANDATORY COMPLIANCE

The format for the Table of MANDATORY COMPLIANCE is shown below. The form may be filled in and submitted if there is adequate room to include references to applicable text in Offeror's proposal. If additional room is required, the submitted Table of MANDATORY COMPLIANCE shall follow the same format and order shown.

The defined paragraphs listed under SPECIFICATION PARAGRAPH include all subordinate paragraphs, which are part of that defined paragraph.

TABLE OF MANDATORY COMPLIANCE

SPECIFICATION SECION 16251 PARAGRAPH	PROPOSAL REFERENCE LOCATION	DEFINITION CODES <u>C</u> <u>A X</u>	ADDITIONAL INFORMATION
1.1.1			
2.2.1			Mandatory requirements from this section are that the exciters shall be potential source rectifier exciters, including the rectifier assembly and the power potential transformer. It is also a mandatory requirement that the exciters shall be full inverting, with three phase rectifying bridges and microprocessor (digital) controlled.
2.3.3.1			
2.3.3.2			
2.3.3.4			
2.4.5.1			It is mandatory that the voltage regulator shall have automatic or manual regulator sections

SPECIFICATION SECION 16251	PROPOSAL REFERENCE	DEFINITION CODES <u>C</u> <u>A X</u>	ADDITIONAL INFORMATION
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PARAGRAPH	LOCATION		
2.4.5.7			It is mandatory that automatic tracking is available to provide automatic transfer during startup, control mode change and shutdown from the automatic voltage regulator to the manual voltage regulator.
* 2.4.5.9			It is mandatory that the voltage regulator shall continuously monitor its own function. When failure of the automatic voltage regulator is detected, transfer to a separate, independent regulator controller operating as a manual regulator shall be automatic and shall not cause generator shutdown.
2.4.6.2			
2.4.7			It shall be mandatory that devices providing for line drop compensation to regulate generator VAR output according to transmission line impedance losses shall be furnished. Devices providing for droop compensation to reduce the voltage at the generator as a function of the flow of real and reactive current to stabilize sister unit VAR oscillations shall also be furnished. Additionally, reactive differential compensation is a mandatory requirement.

SPECIFICATION SECTION 16251 PARAGRAPH	PROPOSAL REFERENCE LOCATION	DEFINITION CODES C A X	ADDITIONAL INFORMATION
2.5.9			It shall be mandatory that the exciter shall be

			capable of being automatically de-energized if serious trouble requiring shutdown of the generator and its removal from service should occur.
3.5.2			

General Decision Number: WA030001 04/16/2004 WA1

Superseded General Decision Number: WA020001

State: Washington

Construction Types: Heavy (Heavy, and Dredging) and Highway

Counties: Washington Statewide.

HEAVY AND HIGHWAY AND DREDGING CONSTRUCTION PROJECTS (Excludes D.O.E. Hanford Site in Benton and Franklin Counties)

Modification Number	Publication Date
0	06/13/2003
1	01/23/2004
2	02/06/2004
3	02/13/2004
4	03/05/2004
5	03/12/2004
6	04/16/2004

CARP0001-008 06/01/2003

	Rates	Fringes
Carpenters:		
COLUMBIA RIVER AREA - ADAMS, BENTON, COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY, FRANKLIN, GRANT, OKANOGAN (EAST OF THE 120TH MERIDIAN) AND WALLA WALLA COUNTIES		
GROUP 1:.....	\$ 23.88	6.75
GROUP 2:.....	\$ 24.99	6.75
GROUP 3:.....	\$ 24.15	6.75
GROUP 4:.....	\$ 23.88	6.75
GROUP 5:.....	\$ 59.17	6.75
GROUP 6:.....	\$ 28.02	6.75
SPOKANE AREA: ASOTIN, GARFIELD, LINCOLN, PEND OREILLE, SPOKANE, STEVENS AND WHITMAN COUNTIES		
GROUP 1:.....	\$ 23.21	6.75
GROUP 2:.....	\$ 24.31	6.75
GROUP 3:.....	\$ 23.47	6.75
GROUP 4:.....	\$ 23.21	6.75
GROUP 5:.....	\$ 57.50	6.75
GROUP 6:.....	\$ 27.30	6.75

CARPENTERS CLASSIFICATIONS

GROUP 1: Carpenter; Burner-Welder; Rigger and Signaler;

Insulators (all types), Acoustical, Drywall and Metal Studs, Metal Panels and Partitions; Floor Layer, Sander, Finisher and Astro Turf; Layout Carpenters; Form Builder; Rough Framers; Outside or Inside Finisher, including doors, windows, and jams; Sawfiler; Shingler (wood, composition) Solar, Fiberglass, Aluminum or Metal; Scaffold Erecting and Dismantling; Stationary Saw-Off Bearer; Wire, Wood and Metal Lather Applicator

GROUP 2: Millwright, machine erector

GROUP 3: Piledriver - includes driving, pulling, cutting, placing collars, setting, welding, or creosote treated material, on all piling

GROUP 4: Bridge, dock and wharf carpenters

GROUP 5: Divers

GROUP 6: Divers Tender

DEPTH PAYY FOR DIVERS:

Each foot over 50-100 feet	\$1.00
Each foot over 100-175 feet	2.25
Each foot over 175-250 feet	5.50

HAZMAT PROJECTS:

Anyone working on a HAZMAT job (task), where HAZMAT certification is required, shall be compensated at a premium, in addition to the classification working in as follows:

LEVEL D + \$.25 per hour - This is the lowest level of protection. No respirator is used and skin protection is minimal.

LEVEL C + \$.50 per hour - This level uses an air purifying respirator or additional protective clothing.

LEVEL B + \$.75 per hour - Uses same respirator protection as Level A. Supplied air line is provided in conjunction with a chemical "splash suit".

LEVEL A +\$1.00 per hour - This level utilizes a fully encapsulated suit with a self-contained breathing apparatus or a supplied air line.

CARP0003-006 06/01/2003

SOUTHWEST WASHINGTON: CLARK, COWLITZ, KLICKITAT, LEWIS(Piledriver only), PACIFIC (South of a straight line made by extending the north boundary line of Wahkiakum County west to Willapa Bay to the Pacific Ocean), SKAMANIA AND WAHAKIYAKUM COUNTIES and INCLUDES THE ENTIRE PENINSULA WEST OF WILLAPA BAY

SEE ZONE DESCRIPTION FOR CITIES BASE POINTS

ZONE 1:

	Rates	Fringes
Carpenters:		
CARPENTERS; ACOUSTICAL.....	\$ 26.94	10.33
DIVERS TENDERS.....	\$ 29.45	10.33
DIVERS.....	\$ 64.00	10.33
DRYWALL.....	\$ 26.94	10.33
FLOOR LAYERS & FLOOR FINISHERS (the laying of all hardwood floors nailed and mastic set, parquet and wood-type tiles, and block floors, the sanding and finishing of floors, the preparation of old and new floors when the materials mentioned above are to be installed); INSULATORS (fiberglass and similar irritating materiils.....		
	\$ 27.09	10.33
MILLWRIGHTS.....	\$ 27.44	10.33
PILEDRIVERS.....	\$ 27.44	10.33

DEPTH PAY:

50 TO 100 FEET \$1.00 PER FOOT OVER 50 FEET
 100 TO 150 FEET 1.50 PER FOOT OVER 100 FEET
 150 TO 200 FEET 2.00 PER FOOT OVER 150 FEET

Zone Differential (Add up Zone 1 rates):

Zone 2 - \$0.85
 Zone 3 - 1.25
 Zone 4 - 1.70
 Zone 5 - 2.00
 Zone 6 - 3.00

BASEPOINTS: ASTORIA, LONGVIEW, PORTLAND, THE DALLES, AND VANCOUVER, (NOTE: All dispatches for Washington State Counties: Cowlitz, Wahkiakum and Pacific shall be from Longview Local #1707 and mileage shall be computed from that point.)

ZONE 1: Projects located within 30 miles of the respective city hall of the above mentioned cities
 ZONE 2: Projects located more than 30 miles and less than 40 miles of the respective city of the above mentioned cities
 ZONE 3: Projects located more than 40 miles and less than 50 miles of the respective city of the above mentioned cities
 ZONE 4: Projects located more than 50 miles and less than 60 miles of the respective city of the above mentioned cities.
 ZONE 5: Projects located more than 60 miles and less than 70 miles of the respective city of the above mentioned cities
 ZONE 6: Projects located more than 70 miles of the respected

city of the above mentioned cities

CARP0770-003 06/01/2003

	Rates	Fringes
Carpenters:		
CENTRAL WASHINGTON:		
CHELAN, DOUGLAS (WEST		
OF THE 120TH MERIDIAN),		
KITTTITAS, OKANOGAN		
(WEST OF THE 120TH		
MERIDIAN) AND YAKIMA		
COUNTIES		
ACCOUSTICAL WORKERS.....	\$ 20.98	9.22
CARPENTERS AND		
DRYWALL APPLICATORS.....	\$ 20.72	9.22
CARPENTERS ON		
CREOSOTE MATERIAL.....	\$ 20.82	9.22
DIVERS TENDER.....	\$ 31.17	9.50
DIVERS.....	\$ 70.07	9.50
INSULATION APPLICATORS....	\$ 20.72	9.22
MILLWRIGHT AND		
MACHINE ERECTORS.....	\$ 29.40	9.22
PILEDRIVER, BRIDGE		
DOCK AND WHARF		
CARPENTERS.....	\$ 28.40	9.22
PILEDRIVER, DRIVING,		
PULLING, CUTTING,		
PLACING COLLARS,		
SETTING, WELDING OR		
CRESOTE TREATED		
MATERIAL, ALL PILING.....	\$ 28.60	9.22
SAWFILERS, STATIONARY		
POWER SAW OPERATORS,		
FLOOR FINISHER, FLOOR		
LAYER, SHINGLER,		
FLOOR SANDER OPERATOR		
AND OPERATORS OF		
OTHER STATIONARY WOOD		
WORKING TOOLS.....	\$ 20.85	9.22
WESTERN WASHINGTON:		
CLALLAM, GRAYS HARBOR,		
ISLAND, JEFFERSON,		
KING, KITSAP, LEWIS		
(excludes piledrivers		
only), MASON, PACIFIC		
(North of a straight		
line made by extending		
the north boundary line		
of Wahkiakum County		
west to the Pacific		
Ocean), PIERCE, SAN		
JUAN, SKAGIT,		
SNOHOMISH, THURSTON AND		
WHATCOM COUNTIES		

ACOUSTICAL WORKERS.....	\$ 28.56	9.50
CARPENTERS AND DRYWALL APPLICATORS.....	\$ 28.40	9.50
CARPENTERS ON CREOSOTE MATERIAL.....	\$ 28.50	9.50
DIVERS TENDER.....	\$ 31.17	9.50
DIVERS.....	\$ 70.07	9.50
INSULATION APPLICATORS.....	\$ 28.40	9.50
MILLWRIGHT AND MACHINE ERECTORS.....	\$ 29.40	9.50
PILEDRIVER, BRIDGE, DOCK & WHARF CARPENTERS.....	\$ 28.40	9.50
PILEDRIVER, DRIVING, PULLING, CUTTING, PLACING COLLARS, SETTING, WELDING OR CRESOTE TREATED MATERIAL, ALL PILING.....	\$ 28.60	9.50
SAWFILERS, STATIONARY POWER SAW OPERATORS, FLOOR FINISHER, FLOOR LAYER, SHINGLER, FLOOR SANDER OPERATOR AND OPERATORS OF OTHER STATIONARY WOOD WORKING TOOLS.....	\$ 28.53	9.50

(HOURLY ZONE PAY: WESTERN AND CENTRAL WASHINGTON - ALL CLASSIFICATIONS EXCEPT MILLWRIGHTS AND PILEDRIERS)

Hourly Zone Pay shall be paid on jobs located outside of the free zone computed from the city center of the following listed cities:

Seattle	Olympia	Bellingham
Auburn	Bremerton	Anacortes
Renton	Shelton	Yakima
Aberdeen-Hoquiam	Tacoma	Wenatchee
Ellensburg	Everett	Port Angeles
Centralia	Mount Vernon	Sunnyside
Chelan	Pt. Townsend	

Zone Pay:

0 -25 radius miles	Free
25-35 radius miles	\$1.00/hour
35-45 radius miles	\$1.15/hour
45-55 radius miles	\$1.35/hour
Over 55 radius miles	\$1.55/hour

(HOURLY ZONE PAY: WESTERN AND CENTRAL WASHINGTON - MILLWRIGHT AND PILEDRIVER ONLY)

Hourly Zone Pay shall be computed from Seattle Union Hall, Tacoma City center, and Everett City center

Zone Pay:
 0 -25 radius miles Free
 25-45 radius miles \$.70/hour
 Over 45 radius miles \$1.50/hour

ELEC0046-001 12/01/2003

CALLAM, JEFFERSON, KING AND KITSAP COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 36.85	3%+11.56
Electrician.....	\$ 33.50	3%+11.56

ELEC0048-003 01/01/2004

CLARK, KLUCKITAT AND SKAMANIA COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 31.40	3%+12.35
Electrician.....	\$ 31.15	3%+12.35

ELEC0073-001 07/01/2003

ADAMS, FERRY, LINCOLN, PEND OREILLE, SPOKANE, STEVENS, WHITMAN COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 24.37	3%+11.03
Electrician.....	\$ 23.97	3%+11.03

ELEC0076-002 07/01/2003

GRAYS HARBOR, LEWIS, MASON, PACIFIC, PIERCE, AND THURSTON COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 33.32	3%+12.06
Electrician.....	\$ 30.02	3%+12.06

ELEC0077-002 02/01/2003

	Rates	Fringes
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Line Construction:

CABLE SPLICERS.....	\$ 37.95	3.875%+7.45
GROUNDMEN.....	\$ 23.72	3.875%+5.70
LINE EQUIPMENT MEN.....	\$ 29.14	3.875%+5.70
LINEMEN, POLE SPRAYERS, HEAVY LINE EQUIPMENT MAN....	\$ 33.88	3.875%+7.45
POWDERMEN, JACKHAMMERMEN....	\$ 25.41	3.875%+5.70
TREE TRIMMER.....	\$ 23.81	3.875%+5.70

ELEC0112-005 06/01/2003

ASOTIN, BENTON, COLUMBIA, FRANKLIN, GARFIELD, KITTITAS, WALLA
WALLA, YAKIMA COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 30.71	3%+10.98
Electrician.....	\$ 29.25	3%+10.98

ELEC0191-003 09/01/2003

ISLAND, SAN JUAN, SNOHOMISH, SKAGIT AND WHATCOM COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 33.72	3%+9.83
Electrician.....	\$ 30.66	3%+9.83

ELEC0191-004 09/01/2003

CHELAN, DOUGLAS, GRANT AND OKANOGAN COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 29.33	3%+9.78
Electrician.....	\$ 26.66	3%+9.78

ELEC0970-001 06/01/2003

COWLITZ AND WAHKIAKUM COUNTIES

	Rates	Fringes
Cable splicer.....	\$ 31.57	3%+9.40
Electrician.....	\$ 28.70	3%+9.40

ENGI0302-003 06/01/2003

CHELAN (WEST OF THE 120TH MERIDIAN), CLALLAM, DOUGLAS (WEST OF THE 120TH MERIDIAN), GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, KITTITAS, MASON, OKANOGAN (WEST OF THE 120TH MERIDIAN), SAN JUNA, SKAGIT, SNOHOMISH, WHATCOM AND YAKIMA (WEST OF THE 120TH MERIDIAN) COUNTIES

PROJECTS: CATEGORY A PROJECTS (EXCLUDES CATEGORY B PROJECTS, AS SHOWN BELOW)

Zone 1 (0-25 radius miles):

	Rates	Fringes
Power equipment operators:		
Group 1A.....	\$ 30.30	9.40
Group 1AA.....	\$ 30.82	9.40
Group 1AAA.....	\$ 31.33	9.40
Group 1.....	\$ 29.79	9.40
Group 2.....	\$ 29.34	9.40
Group 3.....	\$ 28.97	9.40
Group 4.....	\$ 26.80	9.40

Zone Differential (Add to Zone 1 rates):

Zone 2 (26-45 radius miles) - \$.70
 Zone 3 (Over 45 radius miles) - \$1.00

BASEPOINTS: Aberdeen, Bellingham, Bremerton, Everett, Kent, Mount Vernon, Port Angeles, Port Townsend, Seattle, Shelton, Wenatchee, Yakima

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1AAA - Cranes-over 300 tons, or 300 ft of boom (including jib with attachments)

GROUP 1AA - Cranes 200 to 300 tons, or 250 ft of boom (including jib with attachments); Tower crane over 175 ft in height, base to boom

GROUP 1A - Cranes, 100 tons thru 199 tons, or 150 ft of boom (including jib with attachments); Crane-overhead, bridge type, 100 tons and over; Tower crane up to 175 ft in height base to boom; Loaders-overhead, 8 yards and over; Shovels, excavator, backhoes-6 yards and over with attachments

GROUP 1 - Cableway; Cranes 45 tons thru 99 tons, under 150 ft of boom (including jib with attachments); Crane-overhead, bridge type, 45 tons thru 99 tons; Derricks on building work; Excavator, shovel, backhoes over 3 yards and under 6 yards; Hard tail end dump articulating off-road equipment 45 yards and over; Loader- overhead 6 yards to, but not including 8 yards; Mucking machine, mole, tunnel, drill and/or shield; Quad 9, HD 41, D-10; Remote control operator on rubber tired earth moving equipment; Rollagon; Scrapers-self propelled 45 yards and over; Slipform pavers; Transporters, all truck or track type

GROUP 2 - Barrier machine (zipper); Batch Plant Operator-Concrete; Bump Cutter; Cranes, 20 tons thru 44 tons with attachments; Crane-overhead, bridge type-20 tons through 44 tons; Chipper; Concrete Pump-truck mount with boom attachment; Crusher; Deck Engineer/Deck Winches (power); Drilling machine; Excavator, shovel, backhoe-3 yards and under; Finishing Machine, Bidwell, Gamaco and similar equipment; Guardrail punch; Horizontal/directional drill operator; Loaders-overhead under 6 yards; Loaders-plant feed; Locomotives-all; Mechanics-all; Mixers-asphalt plant; Motor patrol graders-finishing; Piledriver (other than crane mount); Roto-mill, roto-grinder; Screedman, spreader, topside operator-Blaw Knox, Cedar Rapids, Jaeger, Caterpillar, Barbar Green; Scraper-self propelled, hard tail end dump, articulating off-road equipment-under 45 yards; Subgrade trimmer; Tractors, backhoes-over 75 hp; Transfer material service machine-shuttle buggy, blaw knox-roadtec; Truck crane oiler/driver-100 tons and over; Truck Mount portable conveyor; Yo Yo Pay dozer

GROUP 3 - Conveyors; Cranes-thru 19 tons with attachments; A-frame crane over 10 tons; Drill oilers-auger type, truck or crane mount; Dozers-D-9 and under; Forklift-3000 lbs. and over with attachments; Horizontal/directional drill locator; Outside hoists-(elevators and manlifts), air tuggers, strato tower bucket elevators; Hydralifts/boom trucks over 10 tons; Loader-elevating type, belt; Motor patrol grader-nonfinishing; Plant oiler- asphalt, crusher; Pumps-concrete; Roller, plant mix or multi-lift materials; Saws-concrete; Scrpers-concrete and carry-all; Service engineer-equipment; Trenching machines; Truck Crane Oiler/Driver under 100 tons; Tractors, backhoe 75 hp and under

GROUP 4 - Assistant Engineer; Bobcat; Brooms; Compressor; Concrete finish machine-laser screed; Cranes-A frame-10 tons and under; Elevator and Manlift-permanent or shaft type; Gradechecker, Stakehop; Forklifts under 3000 lbs. with attachments; Hydralifts/boom trucks, 10 tons and under; Oil distributors, blower distribution and mulch seeding operator; Pavement breaker; Posthole digger, mechanical; Power plant; Pumps, water; Rigger and Bellman; Roller-other than plant mix; Wheel Tractors, farmall type; Shotcrete/gunite equipment operator

CATEGORY B PROJECTS: 95% OF THE BASIC HOURLY RATE FOR EACH GROUP PLUS FULL FRINGE BENEFITS APPLICABLE TO CATEGORY A PROJECTS SHALL APPLY TO THE FOLLOWING PROJECTS. REDUCED RATES MAY BE PAID ON THE FOLLOWING:

1. Projects involving work on structures such as buildings and bridges whose total value is less than \$1.5 million excluding mechanical, electrical, and utility portions of the contract.
2. Projects of less than \$1 million where no building is involved. Surfacing and paving including, but

utilities excluded.

3. Marine projects (docks, wharfs, ect.) less than \$150,000.

HANDLING OF HAZARDOUS WASTE MATERIALS: Personnel in all craft classifications subject to working inside a federally designed hazardous perimeter shall be eligible for compensation in accordance with the following group schedule relative to the level of hazardous waste as outlined in the specific hazardous waste project site safety plan.

H-1 Base wage rate when on a hazardous waste site when not outfitted with protective clothing.

H-2 Class "C" Suit - Base wage rate plus \$.25 per hour.

H-3 Class "B" Suit - Base wage rate plus \$.50 per hour.

H-4 Class "A" Suit - Base wage rate plus \$.75 per hour.

 ENGI0302-009 06/01/2002

CHELAN (WEST OF THE 120TH MERIDIAN), CLALLAM, DOUGLAS (WEST OF THE 120TH MERIDIAN), GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, KITTITAS, MASON, OKANOGAN (WEST OF THE 120TH MERIDIAN), SAN JUNA, SKAGIT, SNOHOMISH, WHATCOM AND YAKIMA (WEST OF THE 120TH MERIDIAN) COUNTIES

ON PROJECTS DESCRIBED IN FOOTNOTE A BELOW, THE RATE FOR EACH GROUP SHALL BE 95% OF THE BASE RATE PLUS FULL FRINGE BENEFITS. ON ALL OTHER WORK, THE FOLLOWING RATES APPLY.

WORK PERFORMED ON HYDRAULIC DREDDGES:
 Zone 1 (0-25 radius miles):

	Rates	Fringes
Power equipment operators:		
GROUP 1		
TOTAL PROJECT COST		
\$300,000 AND OVER.....	\$ 28.51	9.40
TOTAL PROJECT COST		
UNDER \$300,000.....	\$ 26.96	8.40
GROUP 2		
TOTAL PROJECT COST		
\$300,000 AND OVER.....	\$ 28.62	9.40
TOTAL PROJECT COST		
UNDER \$300,000.....	\$ 27.06	8.40
GROUP 3		
TOTAL PROJECT COST		
\$300,000 AND OVER.....	\$ 28.97	9.40
TOTAL PROJECT COST		
UNDER \$300,000.....	\$ 27.38	8.40
GROUP 4		
TOTAL PROJECT COST		
\$300,000 AND OVER.....	\$ 29.02	9.40
TOTAL PROJECT COST		
UNDER \$300,000.....	\$ 27.43	8.40
GROUP 5		

TOATL PROJECT COST		
\$300,000 AND OVER.....\$	30.45	9.40
TOTAL PROJECT COST		
UNDER \$300,000.....\$	28.75	8.40
GROUP 6		
TOTAL PROJECT COST		
\$300,000 AND OVER.....\$	28.51	9.40
TOTAL PROJECT COST		
UNDER \$300,000.....\$	26.96	8.40

Zone Differential (Add to Zone 1 rates):

Zone 2 (26-45 radius miles) - \$.70
 Zone 3 (Over 45 radius miles) - \$1.00

BASEPOINTS: Aberdeen, Bellingham, Bremerton, Everett, Kent, Mount Vernon, Port Angeles, Port Townsend, Seattle, Shelton, Wenatchee, Yakima

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1 - ASSISTANT MATE (DECKHAND)
 GROUP 2 - OILER
 GROUP 3 - ASSISTANT ENGINEER (ELECTRIC, DIESEL, STEAM OR BOOSTER PUMP); MATES AND BOATMEN
 GROUP 4 - CRANEMAN, ENGINEER WELDER
 GROUP 5 - LEVERMAN, HYDRAULIC
 GROUP 6 - MAINTENANCE

CATEGORY B PROJECTS: 95% OF THE BASIC HOURLY RATE FOR EACH GROUP PLUS FULL FRINGE BENEFITS APPLICABLE TO CATEGORY A PROJECTS SHALL APPLY TO THE FOLLOWING PROJECTS. REDUCED RATES MAY BE PAID ON THE FOLLOWING:

1. Projects involving work on structures such as buildings and bridges whose total value is less than \$1.5 million excluding mechanical, electrical, and utility portions of the contract.
2. Projects of less than \$1 million where no building is involved. Surfacing and paving including, but utilities excluded.
3. Marine projects (docks, wharfs, ect.) less than \$150,000.

HEAVY WAGE RATES (CATEGORY A) APPLIES TO CLAM SHELL DREDGE, HOE AND DIPPER, SHOVELS AND SHOVEL ATTACHMENTS, CRANES AND BULLDOZER

HANDLING OF HAZARDOUS WASTE MATERIALS: Personnel in all craft classifications subject to working inside a federally designed hazardous perimeter shall be eligible for compensation in accordance with the following group schedule relative to the level of hazardous waste as outlined in the specific hazardous waste project site safety plan.

H-1 Base wage rate when on a hazardous waste site when not outfitted with protective clothing.

H-2 Class "C" Suit - Base wage rate plus \$.25 per hour.

H-3 Class "B" Suit - Base wage rate plus \$.50 per hour.

H-4 Class "A" Suit - Base wage rate plus \$.75 per hour.

ENGI0370-002 08/01/2003

ADAMS, ASOTIN, BENTON, CHELAN (EAST OF THE 120TH MERIDIAN),
COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY,
FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN (EAST OF THE 120TH
MERIDIAN), PEND OREILLE, SPOKANE, STEVENS, WALLA WALLA, WHITMAN
AND YAKIMA (EAST OF THE 120TH MERIDIAN) COUNTIES

ZONE 1:

	Rates	Fringes
Power equipment operators:		
GROUP 1A.....	\$ 20.94	7.37
GROUP 1.....	\$ 21.49	7.37
GROUP 2.....	\$ 21.81	7.37
GROUP 3.....	\$ 22.42	7.37
GROUP 4.....	\$ 22.58	7.37
GROUP 5.....	\$ 22.74	7.37
GROUP 6.....	\$ 23.02	7.37
GROUP 7.....	\$ 23.29	7.37
GROUP 8.....	\$ 24.39	7.37

ZONE DIFFERENTIAL (Add to Zone 1 rate): Zone 2 - \$2.00

Zone 1: Within 45 mile radius of Spokane, Moses Lake, Pasco,
Washington; Lewiston, Idaho

Zone 2: Outside 45 mile radius of Spokane, Moses Lake,
Pasco, Washington; Lewiston, Idaho

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1A: Boat Operator; Crush Feeder; Oiler; Steam Cleaner

GROUP 1: Bit Grinders; Bolt Threading Machine; Compressors
(under 2000 CFM, gas, diesel, or electric power); Deck Hand;
Drillers Helper (Assist driller in making drill rod
connections, service drill engine and air compressor, repair
drill rig and drill tools, drive drill support truck to and
on the job site, remove drill cuttings from around bore hole
and inspect drill rig while in operation); Fireman & Heater
Tender; Grade Checker; Hydro-seeder, Mulcher, Nozzleman;
Oiler Driver, & Cable Tender, Mucking Machine; Pumpman;
Rollers, all types on subgrade, including seal and chip
coatings (farm type, Case, John Deere & similar, or
Compacting Vibrator), except when pulled by Dozer with
operable blade; Welding Machine

GROUP 2: A-frame Truck (single drum); Assistant Refrigeration
Plant (under 1000 ton); Assistant Plant Operator, Fireman or
Pugmixer (asphalt); Bagley or Stationary Scraper; Belt
Finishing Machine; Blower Operator (cement); Cement Hog;

Compressor (2000 CFM or over, 2 or more, gas diesel or electric power); Concrete Saw (multiple cut); Distributor Leverman; Ditch Witch or similar; Elevator Hoisting Materials; Dope Pots (power agitated); Fork Lift or Lumber Stacker, hydra-lift & similar; Gin Trucks (pipeline); Hoist, single drum; Loaders (bucket elevators and conveyors); Longitudinal Float; Mixer (portable-concrete); Pavement Breaker, Hydra-Hammer & similar; Power Broom; Railroad Ballast Regulation Operator (self-propelled); Railroad Power Tamper Operator (self-propelled); Railroad Tamper Jack Operator (self-propelled); Spray Curing Machine (concrete); Spreader Box (self-propelled); Straddle Buggy (Ross & similar on construction job only); Tractor (Farm type R/T with attachment, except Backhoe); Tugger Operator

GROUP 3: A-frame Truck (2 or more drums); Assistant Refrigeration Plant & Chiller Operator (over 1000 ton); Backfillers (Cleveland & similar); Batch Plant & Wet Mix Operator, single unit (concrete); Belt-Crete Conveyors with power pack or similar; Belt Loader (Kocal or similar); Bending Machine; Bob Cat; Boring Machine (earth); Boring Machine (rock under 8 inch bit) (Quarry Master, Joy or similar); Bump Cutter (Wayne, Saginaw or similar); Canal Lining Machine (concrete); Chipper (without crane); Cleaning & Doping Machine (pipeline); Deck Engineer; Elevating Belt-type Loader (Euclid, Barber Green & similar); Elevating Grader-type Loader (Dumor, Adams or similar); Generator Plant Engineers (diesel or electric); Gunnite Combination Mixer & Compressor; Locomotive Engineer; Mixermobile; Mucking Machine; Posthole Auger or Punch; Pump (grout or jet); Soil Stabilizer (P & H or similar); Spreader Machine; Tractor (to D-6 or equivalent) and Traxcavator; Traverse Finish Machine; Turnhead Operator

GROUP 4: Concrete Pumps (squeeze-crete, flow-crete, pump-crete, Whitman & similar); Curb Extruder (asphalt or concrete); Drills (churn, core, calyx or diamond)(operate drilling machine, drive or transport drill rig to and on job site and weld well casing); Equipment Serviceman; Greaser & Oiler; Hoist (2 or more drums or Tower Hoist); Loaders (overhead & front-end, under 4 yds. R/T); Refrigeration Plant Engineer (under 1000 ton); Rubber-tired Skidders (R/T with or without attachments); Surface Heater & Plant Machine; Trenching Machines (under 7 ft. depth capacity); Turnhead (with re-screening); Vacuum Drill (reverse circulation drill under 8 inch bit)

GROUP 5: Backhoe (under 45,000 gw); Backhoe & Hoe Ram (under 3/4 yd.); Carrydeck & Boom Truck (under 25 tons); Cranes (25 tons & under), all attachments including clamshell, dragline; Derricks & Stifflegs (under 65 tons); Drilling Equipment(8 inch bit & over) (Robbins, reverse circulation & similar)(operates drilling machine, drive or transport drill rig to and on job site and weld well casing); Hoe Ram; Piledriving Engineers; Paving (dual drum); Railroad Track Liner Operatr (self-propelled); Refrigeration Plant Engineer

(1000 tons & over); Signalman (Whirleys, Highline Hammerheads or similar)

GROUP 6: Asphalt Plant Operator; Automatic Subgrader (Ditches & Trimmers)(Autograde, ABC, R.A. Hansen & similar on grade wire); Backhoe (45,000 gw and over to 110,000 gw); Backhoes & Hoe Ram (3/4 yd. to 3 yd.); Batch Plant (over 4 units); Batch & Wet Mix Operator (multiple units, 2 & incl. 4); Blade Operator (motor patrol & attachments, Athey & Huber); Boom Cats (side); Cable Controller (dispatcher); Clamshell Operator (under 3 yds.); Compactor (self-propelled with blade); Concrete Pump Boom Truck; Concrete Slip Form Paver; Cranes (over 25 tons, to and including 45 tons), all attachments including clamshell, dragline; Crusher, Grizzle & Screening Plant Operator; Dozer, 834 R/T & similar; Draglines (under 3 yds.); Drill Doctor; H.D. Mechanic; H.D. Welder; Loader Operator (front-end & overhead, 4 yds. incl. 8 yds.); Multiple Dozer Units with single blade; Paving Machine (asphalt and concrete); Quad-Track or similar equipment; Roller (finishing asphalt pavement); Roto Mill (pavement grinder); Scrapers, all, rubber-tired; Screed Operator; Shovel (under 3 yds.); Tractors (D-6 & equivalent & over); Trenching Machines (7 ft. depth & over); Tug Boat Operator
Vactor guzzler, super sucker

GROUP 7: Backhoe (over 110,000 gw); Backhoes & Hoe Ram (3 yds & over); Blade (finish & bluetop) Automatic, CMI, ABC, Finish Athey & Huber & similar when used as automatic; Cableway Operators; Concrete Cleaning/Decontamination machine operator; Cranes (over 45 tons to but not including 85 tons), all attachments including clamshell and dragline; Derricks & Stiffleys (65 tons & over); Elevating Belt (Holland type); Heavy equipment robotics operator; Loader (360 degrees revolving Koehring Scooper or similar); Loaders (overhead & front-end, over 8 yds. to 10 yds.); Rubber-tired Scrapers (multiple engine with three or more scrapers); Shovels (3 yds. & over); Whirleys & Hammerheads, ALL

GROUP 8: Cranes (85 tons and over, and all climbing, overhead, rail and tower), all attachments including clamshell, dragline; Loaders (overhead and front-end, 10 yards and over); Helicopter Pilot

BOOM PAY: (All Cranes, Including Tower)

180 ft to 250 ft	\$.30 over scale
Over 250 ft	\$.60 over scale

NOTE:

In computing the length of the boom on Tower Cranes, they shall be measured from the base of the Tower to the point of the boom.

HAZMAT:

Anyone working on HAZMAT jobs, working with supplied air shall receive \$1.00 an hour above classification.

ENGI0370-006 06/01/2002

ADAMS, ASOTIN, BENTON, CHELAN (EAST OF THE 120TH MERIDIAN), COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN (EAST OF THE 120TH MERIDIAN), PEND OREILLE, SPOKANE, STEVENS, WALLA WALLA, WHITMAN AND YAKIMA (EAST OF THE 120TH MERIDIAN) COUNTIES

WORK PERFORMED ON HYDRAULIC DREDGES

	Rates	Fringes
Hydraulic Dredge		
GROUP 1:.....	\$ 24.73	6.27
GROUP 2:.....	\$ 25.10	6.27
GROUP 3:.....	\$ 25.13	6.27
GROUP 4:.....	\$ 25.52	6.27
GROUP 5:.....	\$ 24.63	6.27

- GROUP 1: Assistant Mate (Deckhand) and Oiler
- GROUP 2: Assistant Engineer (Electric, Diesel, Steam, or Booster Pump); Mates and Boatmen
- GROUP 3: Engineer Welder
- GROUP 4: Leverman, Hydraulic
- GROUP 5: Maintenance

HEAVY WAGE RATES APPLIES TO CLAM SHELL DREDGE, HOE AND DIPPER, SHOVELS AND SHOVEL ATTACHMENTS, CRANES AND BULLDOZERS.

ENGI0612-001 06/01/2002

LEWIS, PIERCE, PACIFIC (THAT PORTION WHICH LIES NORTH OF A PARALLEL LINE EXTENDED WEST FROM THE NORTHERN BOUNDARY OF WAHKAIKUM COUNTY TO THE SEA IN THE STATE OF WASHINGTON) AND THURSTON COUNTIES

PROJECTS:
CATEGORY A PROJECTS (excludes Category B projects, as shown below)

	Rates	Fringes
Power equipment operators:		
WORK PERFORMED ON		
HYDRAULIC DREDGES:Total		
Project cost \$300,000		
and over		
GROUP 1.....	\$ 28.51	9.40
GROUP 2.....	\$ 28.62	9.40
GROUP 3.....	\$ 28.97	9.40
GROUP 4.....	\$ 29.02	9.40
GROUP 5.....	\$ 30.45	9.40
GROUP 6.....	\$ 28.51	9.40
WORK PERFORMED ON		
HYDRAULIC DREDGES:Total		
Project Cost under		

\$300,000

GROUP 1.....	\$ 26.96	8.40
GROUP 2.....	\$ 27.06	8.40
GROUP 3.....	\$ 27.38	8.40
GROUP 4.....	\$ 27.43	8.40
GROUP 5.....	\$ 28.75	8.40
GROUP 6.....	\$ 26.96	8.40

ZONE 2 (26-45 radius miles) - Add \$.70 to Zone 1 rates

ZONE 3 (Over 45 radius miles) - Add \$1.00 to Zone 1 rates

BASEPOINTS: Tacoma, Olympia, and Centralia

CATEGORY B PROJECTS - 95% of the basic hourly rate for each group plus full fringe benefits applicable to Category A projects shall apply to the following projects: Reduced rates may be paid on the following:

1. Projects involving work on structures such as buildings and structures whose total value is less than \$1.5 million excluding mechanical, electrical, and utility portions of the contract.
2. Projects of less than \$1 million where no building is involved. Surfacing and paving included, but utilities excluded.
3. Marine projects (docks, wharfs, etc.) less than \$150,000

WORK PERFORMED ON HYDRAULIC DREDGES:

- GROUP 1: Assistant Mate (Deckhand
- GROUP 2: Oiler
- GROUP 3: Assistant Engineer (Electric, Diesel, Steam or Booster Pump); Mates and Boatmen
- GROUP 4: Craneman, Engineer Welder
- GROUP 5: Leverman, Hydraulic GROUP 6: Maintenance

HEAVY WAGE RATES APPLIES TO CLAM SHEEL DREDGE, HOE AND DIPPER, SHOVELS AND SHOVEL ATTACHMENTS, CRANES AND BULLDOZERS

HANDLING OF HAZARDOUS WASTE MATERIALS

- H-1 - When not outfitted with protective clothing of level D equipment - Base wage rate
- H-2 - Class "C" Suit - Base wage rate + \$.25 per hour
- H-3 - Class "B" Suit - Base wage rate + \$.50 per hour
- H-4 - Class "A" Suit - Base wage rate +\$.75 per hour

ENGI0612-002 06/01/2003

LEWIS, PIERCE, PACIFIC (portion lying north of a parallel line extending west from the northern boundary of Wahkaikum County to the sea) AND THURSTON COUNTIES

ON PROJECTS DESCRIBED IN FOOTNOTE A BELOW, THE RATE FOR EACH GROUP SHALL BE 90% OF THE BASE RATE PLUS FULL FRINGE BENEFITS. ON ALL OTHER WORK, THE FOLLOWING RATES APPLY.

Zone 1 (0-25 radius miles):

	Rates	Fringes
Power equipment operators:		
GROUP 1A.....	\$ 30.30	9.40
GROUP 1AA.....	\$ 30.82	9.40
GROUP 1AAA.....	\$ 31.33	9.40
GROUP 1.....	\$ 29.79	9.40
GROUP 2.....	\$ 29.34	9.40
GROUP 3.....	\$ 28.97	9.40
GROUP 4.....	\$ 26.80	9.40

Zone Differential (Add to Zone 1 rates):

Zone 2 (26-45 radius miles) = \$.70

Zone 3 (Over 45 radius miles) - \$1.00

BASEPOINTS: CENTRALIA, OLYMPIA, TACOMA

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1 AAA - Cranes-over 300 tons or 300 ft of boom
(including jib with attachments)

GROUP 1AA - Cranes- 200 tonsto 300 tons, or 250 ft of boom
(including jib with attachments; Tower crane over 175 ft in
height, bas to boom

GROUP 1A - Cranes, 100 tons thru 199 tons, or 150 ft of boom
(including jib with attachments); Crane-overhead, bridge
type, 100 tons and over; Tower crane up to 175 ft in height
base to boom; Loaders-overhead, 8 yards and over; Shovels,
excavator, backhoes-6 yards and over with attachments

GROUP 1 - Cableway; Cranes 45 tons thru 99 tons under 150 ft
of boom (including jib with attachments); Crane-overhead,
bridge type, 45 tons thru 99 tons; Derricks on building work;
Excavator, shovel, backhoes over 3 yards and under 6 yards;
Hard tail end dump articulating off-road equipment 45 yards
and over; Loader- overhead, 6 yards to, but not including, 8
yards; Mucking machine, mole, tunnel, drill and/or shield;
Quad 9 HD 41, D-10; Remote control operator on rubber tired
earth moving equipment; Rollagon; Scrapers-
self-propelled 45 yards and over; Slipform pavers;
Transporters, all track or truck type

GROUP 2 - Barrier machine (zipper); Batch Plant Operator-
concrete; Bump Cutter; Cranes, 20 tons thru 44 tons with
attachments; Crane-Overhead, bridge type, 20 tons through 44
tons; Chipper; Concrete pump-truck mount with boom
attachment; Crusher; Deck engineer/deck winches (power);
Drilling machine; Excavator, shovel, backhoe-3 yards and
under; Finishing machine, Bidwell, Gamaco and similar
equipment; Guardrail punch; Loaders, overhead under 6 yards;
Loaders-plant feed; Locomotives-all; Mechanics- all; Mixers,
asphalt plant; Motor patrol graders, finishing; Piledriver

(other than crane mount); Roto-mill, roto- grinder;
Screedman, spreader, topside operator-Blaw Knox, Cedar
Rapids, Jaeger, Caterpillar, Barbar Green; Scraper-self-
propelled, hard tail end dump, articulating off-road
equipment- under 45 yards; Subgrader trimmer; Tractors,
backhoe over 75 hp; Transfer material service machine-shuttle
buggy, Blaw Knox- Roadtec; Truck Crane oiler/driver-100 tons
and over; Truck Mount Portable Conveyor; Yo Yo pay

GROUP 3 - Conveyors; Cranes through 19 tons with attachments;
Crane-A-frame over 10 tons; Drill oilers-auger type, truck or
crane mount; Dozer-D-9 and under; Forklift-3000 lbs. and over
with attachments; Horizontal/directional drill locator;
Outside Hoists-(elevators and manlifts), air tuggers, strato
tower bucket elevators; Hydralifts/boom trucks over 10 tons;
Loaders-elevating type, belt; Motor patrol
grader-nonfinishing; Plant oiler- asphalt, crusher;
Pump-Concrete; Roller, plant mix or multi-lfit materials;
Saws-concrete; Scrapers, concrete and carry all; Service
engineers-equipment; Trenching machines; Truck crane
oiler/driver under 100 tons; Tractors, backhoe under 75 hp

GROUP 4 - Assistant Engineer; Bobcat; Brooms; Compressor;
Concrete Finish Machine-laser screed; Cranes A-frame 10 tons
and under; Elevator and manlift (permanent and shaft type);
Forklifts-under 3000 lbs. with attachments; Gradechecker,
stakehop; Hydralifts/boom trucks, 10 tons and under; Oil
distributors, blower distribution and mulch seeding operator;
Pavement breaker; Posthole digger-mechanical; Power plant;
Pumps-water; Rigger and Bellman; Roller-other than plant mix;
Wheel Tractors, farmall type; Shotcrete/gunite equipment
operator

FOOTNOTE A- Reduced rates may be paid on the following:

1. Projects involving work on structures such as buildings
and bridges whose total value is less than \$1.5 million
excluding mechanical, electrical, and utility portions of the
contract.
2. Projects of less than \$1 million where no building is
involved. Surfacing and paving included, but utilities
excluded.
3. Marine projects (docks, wharfs, etc.) less than \$150,000.

HANDLING OF HAZARDOUS WASTE MATERIALS: Personnel in all
craft classifications subject to working inside a federally
designated hazardous perimeter shall be eligible for
compensation in accordance with the following group schedule
relative to the level of hazardous waste as outlined in the
specific hazardous waste project site safety plan.

H-1 Base wage rate when on a hazardous waste site when not
outfitted with protective clothing

H-2 Class "C" Suit - Base wage rate plus \$.25 per hour.

H-3 Class "B" Suit - Base wage rate plus \$.50 per hour.

H-4 Class "A" Suit - Base wage rate plus \$.75 per hour.

ENGI0701-002 01/01/2004

CLARK, COWLITZ, KLICKKITAT, PACIFIC (SOUTH), SKAMANIA, AND WAHAKIYAKUM COUNTIES

	Rates	Fringes
Power equipment operators: (See Footnote A)		
ZONE 1:		
GROUP 1.....	\$ 29.51	9.70
GROUP 1A.....	\$ 30.99	9.70
GROUP 1B.....	\$ 32.46	9.70
GROUP 2.....	\$ 28.25	9.70
GROUP 3.....	\$ 27.47	9.70
GROUP 4.....	\$ 26.93	9.70
GROUP 5.....	\$ 26.32	9.70
GROUP 6.....	\$ 23.91	9.70

Zone Differential (add to Zone 1 rates):
Zone 2 - \$1.50
Zone 3 - 3.00

For the following metropolitan counties: MULTNOMAH; CLACKAMAS; MARION; WASHINGTON; YAMHILL; AND COLUMBIA; CLARK; AND COWLITZ COUNTY, WASHINGTON WITH MODIFICATIONS AS INDICATED:

All jobs or projects located in Multnomah, Clackamas and Marion Counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Highway 26 and West of Mile Post 30 on Highway 22 and all jobs or projects located in Yamhill County, Washington County and Columbia County and all jobs or projects located in Clark & Cowlitz County, Washington except that portion of Cowlitz County in the Mt. St. Helens "Blast Zone" shall receive Zone I pay for all classifications.

All jobs or projects located in the area outside the identified boundary above, but less than 50 miles from the Portland City Hall shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone III pay for all classifications.

For the following cities: ALBANY; BEND; COOS BAY; EUGENE; GRANTS PASS; KLAMATH FALLS; MEDFORD; ROSEBURG

All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone I pay for all classifications.

All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone III pay for all classifications.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: CONCRETE: Batch Plant and/or Wet Mix Operator, three units or more; CRANE: Helicopter Operator, when used in erecting work; Whirley Operator, 90 ton and over; LATTICE BOOM CRANE: Operator 200 tons through 299 tons, and/or over 200 feet boom; HYDRAULIC CRANE: Hydraulic Crane Operator 90 tons through 199 tons with luffing or tower attachments; FLOATING EQUIPMENT: Floating Crane, 150 ton but less than 250 ton

GROUP 1A: HYDRAULIC CRANE: Hydraulic Operator, 200 tons and over (with luffing or tower attachment); LATTICE BOOM CRANE: Operator, 200 tons through 299 tons, with over 200 feet boom; FLOATING EQUIPMENT: Floating Crane 250 ton and over

GROUP 1B: LATTICE BOOM CRANE: Operator, 300 tons through 399 tons with over 200 feet boom; Operator 400 tons and over; FLOATING EQUIPMENT: Floating Crane 350 ton and over

GROUP 2: ASPHALT: Asphalt Plant Operator (any type); Roto Mill, pavement profiler, operator, 6 foot lateral cut and over; BLADE: Auto Grader or "Trimmer" (Grade Checker required); Blade Operator, Robotic; BULLDOZERS: Bulldozer operator over 120,000 lbs and above; Bulldozer operator, twin engine; Bulldozer Operator, tandem, quadnine, D10, D11, and similar type; Bulldozere Robotic Equipment (any type; CONCRETE: Batch Plant and/or Wet Mix Operator, one and two drum; Automatic Concrete Slip Form Paver Operator; Concrete Canal Line Operator; Concrete Profiler, Diamond Head; CRANE: Cableway Operator, 25 tons and over; HYDRAULIC CRANE: Hydraulic crane operator 90 tons through 199 tons (with luffing or tower attachment); TOWER/WHIRLEY OPERATOR: Tower Crane Operator; Whirley Operator, under 90 tons; LATTICE BOOM CRANE: 90 through 199 tons and/or 150 to 200 feet boom; CRUSHER: Crusher Plant Operator; FLOATING EQUIPMENT: Floating Clamshell, etc.operator, 3 cu. yds. and over; Floating Crane (derrick barge) Operator, 30 tons but less than 150 tons; LOADERS: Loader operator, 120,000 lbs. and above; REMOTE CONTROL: Remote controlled earth-moving equipment; RUBBER-TIRED SCRAPERS: Rubber- tired scraper operator, with tandem scrapers, multi-engine; SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER OPERATOR: Shovel, Dragline, Clamshell, operator 5 cu. yds and over; TRENCHING MACHINE: Wheel Excavator, under 750 cu. yds. per hour (Grade Oiler required); Canal Trimmer (Grade Oiler required); Wheel Excavator, over 750 cu. yds. per hour; Band Wagon (in conjunction with wheel excavator); UNDERWATER EQUIPMENT:

Underwater Equipment Operator, remote or otherwise; HYDRAULIC HOES-EXCAVATOR: Excavator over 130,000 lbs.

GROUP 3: BULLDOZERS: Bulldozer operator, over 70,000 lbs. up to and including 120,000 lbs.; HYDRAULIC CRANE: Hydraulic crane operator, 50 tons through 89 tons (with luffing or tower attachment); LATTICE BOOM CRANES: Lattice Boom Crane-50 through 89 tons (and less than 150 feet boom); FORKLIFT: Rock Hound Operator; HYDRAULIC HOES-EXCAVATOR: excavator over 80,000 lbs. through 130,000 lbs.; LOADERS: Loader operator 60,000 and less than 120,000; RUBBER-TIRED SCRAPERS: Scraper Operator, with tandem scrapers; Self-loading, paddle wheel, auger type, finish and/or 2 or more units; SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER OPERATOR: Shovel, Dragline, Clamshell operators 3 cu. yds. but less than 5 cu yds.

GROUP 4: ASPHALT: Screed Operator; Asphalt Paver operator (screeman required); BLADE: Blade operator; Blade operator, finish; Blade operator, externally controlled by electronic, mechanical hydraulic means; Blade operator, multi-engine; BULLDOZERS: Bulldozer Operator over 20,000 lbs and more than 100 horse up to 70,000 lbs; Drill Cat Operator; Side-boom Operator; Cable-Plow Operator (any type); CLEARING: Log Skidders; Chippers; Incinerator; Stump Splitter (loader mounted or similar type); Stump Grinder (loader mounted or similar type); Tub Grinder; Land Clearing Machine (Track mounted forestry mowing & grinding machine); Hydro Axe (loader mounted or similar type); COMPACTORS SELF-PROPELLED: Compactor Operator, with blade; Compactor Operator, multi-engine; Compactor Operator, robotic; CONCRETE: Mixer Mobile Operator; Screed Operator; Concrete Cooling Machine Operator; Concrete Paving Road Mixer; Concrete Breaker; Reinforced Tank Banding Machine (K-17 or similar types); Laser Screed; CRANE: Chicago boom and similar types; Lift Slab Machine Operator; Boom type lifting device, 5 ton capacity or less; Hoist Operator, two (2) drum; Hoist Operator, three (3) or more drums; Derrick Operator, under 100 ton; Hoist Operator, stiff leg, guy derrick or similar type, 50 ton and over; Cableway Operator up to twenty (25) ton; Bridge Crane Operator, Locomotive, Gantry, Overhead; Cherry Picker or similar type crane; Carry Deck Operator; Hydraulic Crane Operator, under 50 tons; LATTICE BOOM CRANE OPERATOR: Lattice Boom Crane Operator, under 50 tons; CRUSHER: Generator Operator; Diesel-Electric Engineer; Grizzly Operator; Drill Doctor; Boring Machine Operator; Driller-Percussion, Diamond, Core, Cable, Rotary and similar type; Cat Drill (John Henry); Directional Drill Operator over 20,000 lbs pullback; FLOATING EQUIPMENT: Diesel-electric Engineer; Jack Operator, elevating barges, Barge Operator, self-unloading; Piledriver Operator (not crane type) (Deckhand required); Floating Clamshell, etc. Operator, under 3 cu. yds. (Fireman or Diesel-Electric Engineer required); Floating Crane (derrick barge) Operator, less than 30 tons; GENERATORS: Generator Operator; Diesel-electric Engineer; GUARDRAIL EQUIPMENT: Guardrail Punch Operator (all types); Guardrail Auger Operator (all types); Combination

Guardrail machines, i.e., punch auger, etc.; HEATING PLANT: Surface Heater and Planer Operator; HYDRAULIC HOES EXCAVATOR: Robotic Hydraulic backhoe operator, track and wheel type up to and including 20,000 lbs. with any or all attachments; Excavator Operator over 20,000 lbs through 80,000 lbs.; LOADERS: Belt Loaders, Kolman and Ko Cal types; Loaders Operator, front end and overhead, 25,000 lbs and less than 60,000 lbs; Elevating Grader Operator by Tractor operator, Sierra, Euclid or similar types; PILEDRIVERS: Hammer Operator; Piledriver Operator (not crane type); PIPELINE, SEWER WATER: Pipe Cleaning Machine Operator; Pipe Doping Machine Operator; Pipe Bending Machine Operator; Pipe Wrapping Machine Operator; Boring Machine Operator; Back Filling Machine Operator; REMOTE CONTROL: Concrete Cleaning Decontamination Machine Operator; Ultra High Pressure Water Jet Cutting Tool System Operator/Mechanic; Vacuum Blasting Machine Operator/mechanic; REPAIRMEN, HEAVY DUTY: Diesel Electric Engineer (Plant or Floating); Bolt Threading Machine operator; Drill Doctor (Bit Grinder); H.D. Mechanic; Machine Tool Operator; RUBBER-TIRED SCRAPERS: Rubber-tired Scraper Operator, single engine, single scraper; Self-loading, paddle wheel, auger type under 15 cu. yds.; Rubber-tired Scraper Operator, twin engine; Rubber-tired Scraper Operator, with push-ull attachments; Self Loading, paddle wheel, auger type 15 cu. yds. and over, single engine; Water pulls, water wagons; SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER OPERATOR: Diesel Electric Engineer; Stationary Drag Scraper Operator; Shovel, Dragline, Clamshell, Operator under 3 cy yds.; Grade-all Operator; SURFACE (BASE) MATERIAL: Blade mounted spreaders, Ulrich and similar types; TRACTOR-RUBBERED TIRED: Tractor operator, rubber-tired, over 50 hp flywheel; Tractor operator, with boom attachment; Rubber-tired dozers and pushers (Michigan, Cat, Hough type); Skip Loader, Drag Box; TRENCHING MACHINE: Trenching Machine operator, digging capacity over 3 ft depth; Back filling machine operator; TUNNEL: Mucking machine operator

GROUP 5: ASPHALT: Extrusion Machine Operator; Roller Operator (any asphalt mix); Asphalt Burner and Reconditioner Operator (any type); Roto-Mill, pavement profiler, ground man; BULLDOZERS: Bulldozer operator, 20,000 lbs. or less or 100 horse or less; COMPRESSORS: Compressor Operator (any power), over 1,250 cu. ft. total capacity; COMPACTORS: Compactor Operator, including vibratory; Wagner Pactor Operator or similar type (without blade); CONCRETE: Combination mixer and Compressor Operator, gunite work; Concrete Batch Plant Quality Control Operator; Beltcrete Operator; Pumpcrete Operator (any type); Pavement Grinder and/or Grooving Machine Operator (riding type); Cement Pump Operator, Fuller-Kenyon and similar; Concrete Pump Operator; Grouting Machine Operator; Concrete mixer operator, single drum, under (5) bag capacity; Cast in place pipe laying machine; maginnis Internal Full slab vibrator operator; Concrete finishing mahine operator, Clary, Johnson, Bidwell, Burgess Bridge deck or similar type; Curb Machine Operator, mechanical Berm, Curb and/or Curb and Gutter; Concrete Joint

Machine Operator; Concrete Planer Operator; Tower Mobile Operator; Power Jumbo Operator setting slip forms in tunnels; Slip Form Pumps, power driven hydraulic lifting device for concrete forms; Concrete Paving Machine Operator; Concrete Finishing Machine Operator; Concrete Spreader Operator; CRANE: Helicopter Hoist Operator; Hoist Operator, single drum; Elevator Operator; A-frame Truck Operator, Double drum; Boom Truck Operator; HYDRAULIC CRANE OPERATOR: Hydraulic Boom Truck, Pittman; DRILLING: Churn Drill and Earth Boring Machine Operator; Vacuum Truck; Directional Drill Operator over 20,000 lbs pullback; FLOATING EQUIPMENT: Fireman; FORKLIFT: Fork Lift, over 10 ton and/or robotic; HYDRAULIC HOES EXCAVATORS: Hydraulic Backhoe Operator, wheel type (Ford, John Deere, Case type); Hydraulic Backhoe Operator track type up to and including 20,000 lbs.; LOADERS: Loaders, rubber-tired type, less than 25,000 lbs; Elevating Grader Operator, Tractor Towed requiring Operator or Grader; Elevating loader operator, Athey and similar types; OILERS: Service oiler (Greaser); PIPELINE-SEWER WATER: Hydra hammer or simialr types; Pavement Breaker Operator; PUMPS: Pump Operator, more than 5 (any size); Pot Rammer Operator; RAILROAD EQUIPMENT: Locomotive Operator, under 40 tons; Ballast Regulator Operator; Ballast Tamper Multi-Purpose Operator; Track Liner Operator; Tie Spacer Operator; Shuttle Car Operator; Locomotive Operator, 40 tons and over; MATERIAL HAULRS: Cat wagon DJBs Volvo similar types; Conveyored material hauler; SURFACING (BASE) MATERIAL: Rock Spreaders, self-propelled; Pulva-mixer or similar types; Chiip Spreading machine operator; Lime spreading operator, construction job siter; SWEEPERS: Sweeper operator (Wayne type) self-propelled construction job site; TRACTOR-RUBBER TIRED: Tractor operator, rubber-tired, 50 hp flywheel and under; Trenching machine operator, maximum digging capacity 3 ft depth; TUNNEL: Dinkey

GROUP 6: ASPHALT: Plant Oiler; Plant Fireman; Pugmill Operator (any type); Truck mounted asphalt spreader, with screed; COMPRESSORS: Compressor Operator (any power), under 1,250 cu. ft. total capacity; CONCRETE: Plant Oiler, Assistant Conveyor Operator; Conveyor Operator; Mixer Box Operator (C.T.B., dry batch, etc.); Cement Hog Operator; Concrete Saw Operator; Concrete Curing Machine Operator (riding type); Wire Mat or Brooming Machine Operator; CRANE: Oiler; Fireman, all equipment; Truck Crane Oiler Driver; A-frame Truck Operator, single drum; Tugger or Coffin Type Hoist Operator; CRUSHER: Crusher Oiler; Crusher Feederman; CRUSHER: Crusher oiler; Crusher feederman; DRILLING: Drill Tender; Auger Oiler; FLOATING EQUIPMENT: Deckhand; Boatman; FORKLIFT: Self-propelled Scaffolding Operator, construction job site (exclduing working platform); Fork Lift or Lumber Stacker Operator, construction job site; Ross Carrier Operator, construction job site; Lull Hi-Lift Operator or Similar Type; GUARDRAIL EQUIPMENT: Oiler; Auger Oiler; Oiler, combination guardrail machines; Guardrail Punch Oiler; HEATING PLANT: Temporary Heating Plant Operator; LOADERS: Bobcat, skid steer (less than 1 cu yd.); Bucket Elevator

Loader Operator, BarberGreene and similar types; OILERS: Oiler; Guardrail Punch Oiler; Truck Crane Oiler-Driver; Auger Oiler; Grade Oiler, required to check grade; Grade Checker; Rigger; PIPELINE-SEWER WATER: Tar Pot Fireman; Tar Pot Fireman (power agitated); PUMPS: Pump Operator (any power); Hydrostatic Pump Operator; RAILROAD EQUIPMENT: Brakeman; Oiler; Switchman; Motorman; Ballast Jack Tamper Operator; SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER, ETC. OPERATOR: Oiler, Grade Oiler (required to check grade); Grade Checker; Fireman; SWEEPER: Broom operator, self propelled, construction job site; SURFACING (BASE) MATERIAL: Roller Operator, grading of base rock (not asphalt); Tamping Machine operartor, mechanical, self-propelled; Hydrographic Seeder Machine Operator; TRENCHING MACHINE: Oiler; Grade Oiler; TUNNEL: Conveyor operator; Air filtration equipment operator

ENGI0701-003 06/01/2003

CLARK, COWLITZ, KCLICKITAT, PACIFIC (SOUTH), SKAMANIA, AND WAHAKIYAKUM COUNTIES

DREDGING:

	Rates	Fringes
Dredging:		
ZONE A		
ASSISTANT ENGINEER.....	\$ 30.74	9.25
ASSISTANT MATE.....	\$ 26.96	9.25
LEVERMAN, DIPPER, FLOATING CLAMSHELL.....	\$ 32.99	9.25
LEVERMAN, HYDRAULIC.....	\$ 32.99	9.25
TENDERMAN.....	\$ 29.71	9.25
ZONE B		
ASSISTANT ENGINEER.....	\$ 32.74	9.25
ASSISTANT MATE.....	\$ 28.96	9.25
LEVERMAN, DIPPER, FLOATING CLAMSHELL.....	\$ 34.99	9.25
LEVERMAN, HYDRAULIC.....	\$ 34.99	9.25
TENDERMAN.....	\$ 31.71	9.25
ZONE C		
ASSISTANT ENGINEER.....	\$ 33.74	9.25
ASSISTANT MATE.....	\$ 29.96	9.25
LEVERMAN, DIPPER, FLOATING CLAMSHELL.....	\$ 35.99	9.25
LEVERMAN, HYDRAULIC.....	\$ 35.99	9.25
TENDERMAN.....	\$ 32.71	9.25

ZONE DESCRIPTION FOR DREDGING:

ZONE A - All jobs or projects located within 30 road miles of Portland City Hall.

ZONE B - Over 30-50 road miles from Portland City Hall.

ZONE C - Over 50 road miles from Portland City Hall.

*All jobs or projects shall be computed from the city hall by

the shortest route to the geographical center of the project.

IRON0014-005 07/01/2003

ADAMS, ASOTIN, BENTON, COLUMBIA, DOUGLAS, FERRY, FRANKLIN,
GARFIELD, GRANT, LINCOLN, OKANOGAN, PEND ORIELLE, SPOKANE,
STEVENS, WALLA WALLA AND WHITMAN COUNTIES

	Rates	Fringes
Ironworker.....	\$ 26.32	12.45

IRON0029-002 07/01/2003

CLARK, COWLITZ, KLUCKITAT, PACIFIC, SKAMANIA, AND WAHKAIKUM
COUNTIES

	Rates	Fringes
Ironworker.....	\$ 27.82	12.45

IRON0086-002 07/01/2003

YAKIMA, KITTITAS AND CHELAN COUNTIES

	Rates	Fringes
Ironworker.....	\$ 27.47	12.45

IRON0086-004 07/01/2003

CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS,
MASON, PIERCE, SKAGIT, SNOHOMISH, THURSTON, AND WHATCOM COUNTIES

	Rates	Fringes
Ironworker.....	\$ 28.57	12.45

LABO0001-002 07/01/2003

ZONE 1:

	Rates	Fringes
Laborers: CALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS, MASON, PACIFIC (NORTH OF STRAIGHT LINE MADE BY EXTENDING THE NORTH BOUNDARY WAHKAIAKUM		

COUNTY WEST TO THE
PACIFIC OCEAN), PIERCE,
SAN JUAN, SKAGIT,
SNOHOMISH, THURSTON AND
WHATCOM COUNTIES

GROUP 1.....	\$ 17.71	7.20
GROUP 2.....	\$ 20.03	7.20
GROUP 3.....	\$ 24.71	7.20
GROUP 4.....	\$ 25.19	7.20
GROUP 5.....	\$ 25.55	7.20

CHELAN, DOUGLAS (WEST
OF THE 120TH MERIDIAN),
KITTITAS AND YAKIMA
COUNTIES

GROUP 1.....	\$ 14.59	7.20
GROUP 2.....	\$ 16.91	7.20
GROUP 3.....	\$ 18.63	7.20
GROUP 4.....	\$ 19.11	7.20
GROUP 5.....	\$ 19.47	7.20

ZONE DIFFERENTIAL (ADD TO ZONE 1 RATES):

ZONE 2 - \$.70
ZONE 3 - \$1.00

BASE POINTS: CHELAN, SUNNYSIDE, WENATCHEE, AND YAKIMA

ZONE 1 - Projects within 25 radius miles of the respective
city hall
ZONE 2 - More than 25 but less than 45 radius miles from the
respective city hall
ZONE 3 - More than 45 radius miles from the respective city
hall

BASE POINTS: BELLINGHAM, MT. VERNON, EVERETT, SEATTLE, KENT,
TACOMA, OLYMPIA, CENTRALIA, ABERDEEN, SHELTON, PT. TOWNSEND,
PT. ANGELES, AND BREMERTON

ZONE 1 - Projects within 25 radius miles of the respective
city hall
ZONE 2 - More than 25 but less than 45 radius miles from the
respective city hall
ZONE 3 - More than 45 radius miles from the respective city
hall

LABORERS CLASSIFICATIONS

GROUP 1: Landscaping and Planting; Watchman; Window
Washer/Cleaner (detail clean-up, such as but not limited to
cleaning floors, ceilings, walls, windows, etc., prior to
final acceptance by the owner)

GROUP 2: Batch Weighman; Crusher Feeder; Fence Laborer;
Flagman; Pilot Car

GROUP 3: General Laborer; Air, Gas, or Electric Vibrating
Screed; Asbestos Abatement Laborer; Ballast Regulator

Machine; Brush Cutter; Brush Hog Feeder; Burner; Carpenter Tender; Cement Finisher Tender; Change House or Dry Shack; Chipping Gun (under 30 lbs.); Choker Setter; Chuck Tender; Clean-up Laborer; Concrete Form Stripper; Curing Laborer; Demolition (wrecking and moving including charred material); Ditch Digger; Dump Person; Fine Graders; Firewatch; Form Setter; Gabian Basket Builders; Grout Machine Tender; Grinders; Guardrail Erector; Hazardous Waste Worker (Level C); Maintenance Person; Material Yard Person; Pot Tender; Rip Rap Person; Riggers; Scale Person; Sloper Sprayer; Signal Person; Stock Piler; Stake Hopper; Toolroom Man (at job site); Topper-Tailer; Track Laborer; Truck Spotter; Vinyl Seamer

GROUP 4: Cement Dumper-Paving; Chipping Gun (over 30 lbs.); Clary Power Spreader; Concrete Dumper/Chute Operator; Concrete Saw Operator; Drill Operator (hydraulic, diamond, aiartrac); Faller and Bucker Chain Saw; Grade Checker and Transit Person; Groutmen (pressure) including post tension beams; Hazardous Waste Worker (Level B); High Scaler; Jackhammer; Laserbeam Operator; Manhole Builder-Mudman; Mortarman and Hodcarrier; Nozzleman (concrete pump, green cutter when using combination of high pressure air and water on concrete and rock, sandblast, gunite, shotcrete, water blaster, vacuum blaster); Pavement Breaker; Pipe Layer and Caulker; Pipe Pot Tender; Pipe Reliner (not insert type); Pipe Wrapper; Power Jacks; Railroad Spike Puller-Power; Raker-Asphalt; Rivet Buster; Rodder; Sloper (over 20 ft); Spreader (concrete); Tamper and Similar electric, air and glas operated tool; Timber Person-sewer (lagger shorer and cribber); Track Liner Power; Tugger Operator; Vibrator; Well Point Laborer

GROUP 5: Caisson Worker; Miner; Powderman; Re-Timberman; Hazardous Waste Worker (Level A).

LABO0238-004 06/01/2003

ADAMS, ASOTIN, BENTON, COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN, PEND OREILLE, STEVENS, SPOKANE, WALLA WALLA AND WHITMAN COUNTIES

	Rates	Fringes
Laborers:		
ZONE 1:		
GROUP 1.....	\$ 17.36	6.50
GROUP 2.....	\$ 19.46	6.50
GROUP 3.....	\$ 19.73	6.50
GROUP 4.....	\$ 20.00	6.50
GROUP 5.....	\$ 20.28	6.50
GROUP 6.....	\$ 21.65	6.50

Zone Differential (Add to Zone 1 rate): \$2.00

BASE POINTS: Spokane, Moses Lake, Pasco, Lewiston

Zone 1: 0-45 radius miles from the main post office.
Zone 2: 45 radius miles and over from the main post office.

LABORERS CLASSIFICATIONS

GROUP 1: Flagman; Landscape Laborer; Scaleman; Traffic Control Maintenance Laborer (to include erection and maintenance of barricades, signs and relief of flagperson); Window Washer/Cleaner (detail cleanup, such as, but not limited to cleaning floors, ceilings, walls, windows, etc. prior to final acceptance by the owner)

GROUP 2: Asbestos Abatement Worker; Brush Hog Feeder; Carpenter Tender; Cement Handler; Clean-up Laborer; Concrete Crewman (to include stripping of forms, hand operating jacks on slip form construction, application of concrete curing compounds, pumpcrete machine, signaling, handling the nozzle of squeezecrete or similar machine, 6 inches and smaller); Confined Space Attendant; Concrete Signalman; Crusher Feeder; Demolition (to include clean-up, burning, loading, wrecking and salvage of all material); Dumpman; Fence Erector; Firewatch; Form Cleaning Machine Feeder, Stacker; General Laborer; Grout Machine Header Tender; Guard Rail (to include guard rails, guide and reference posts, sign posts, and right-of-way markers); Hazardous Waste Worker, Level D (no respirator is used and skin protection is minimal); Miner, Class "A" (to include all bull gang, concrete crewman, dumpman and pumpcrete crewman, including distributing pipe, assembly & dismantle, and nipper); Nipper; Riprap Man; Sandblast Tailhoseman; Scaffold Erector (wood or steel); Stake Jumper; Structural Mover (to include separating foundation, preparation, cribbing, shoring, jacking and unloading of structures); Tailhoseman (water nozzle); Timber Bucker and Faller (by hand); Track Laborer (RR); Truck Loader; Well-Point Man; All Other Work Classifications Not Specially Listed Shall Be Classified As General Laborer

GROUP 3: Asphalt Raker; Asphalt Roller, walking; Cement Finisher Tender; Concrete Saw, walking; Demolition Torch; Dope Pot Firemen, non-mechanical; Driller Tender (when required to move and position machine); Form Setter, Paving; Grade Checker using level; Hazardous Waste Worker, Level C (uses a chemical "splash suit" and air purifying respirator); Jackhammer Operator; Miner, Class "B" (to include brakeman, finisher, vibrator, form setter); Nozzleman (to include squeeze and flo-crete nozzle); Nozzleman, water, air or steam; Pavement Breaker (under 90 lbs.); Pipelayer, corrugated metal culvert; Pipelayer, multi-plate; Pot Tender; Power Buggy Operator; Power Tool Operator, gas, electric, pneumatic; Railroad Equipment, power driven, except dual mobile power spiker or puller; Railroad Power Spiker or Puller, dual mobile; Rodder and Spreader; Tamper (to include operation of Barco, Essex and similar tampers); Trencher, Shawnee; Tugger Operator; Wagon Drills; Water Pipe Liner; Wheelbarrow (power driven)

GROUP 4: Air and Hydraulic Track Drill; Brush Machine (to include horizontal construction joint cleanup brush machine, power propelled); Caisson Worker, free air; Chain Saw Operator and Faller; Concrete Stack (to include laborers when laborers working on free standing concrete stacks for smoke or fume control above 40 feet high); Gunitite (to include operation of machine and nozzle); Hazardous Waste Worker, Level B (uses same respirator protection as Level A. A supplied air line is provided in conjunction with a chemical "splash suit"); High Scaler; Laser Beam Operator (to include grade checker and elevation control); Miner, Class C (to include miner, nozzleman for concrete, laser beam operator and rigger on tunnels); Monitor Operator (air track or similar mounting); Mortar Mixer; Nozzleman (to include jet blasting nozzleman, over 1,200 lbs., jet blast machine power propelled, sandblast nozzle); Pavement Breaker (90 lbs. and over); Pipelayer (to include working topman, caulker, collarman, jointer, mortarman, rigger, jacker, shorer, valve or meter installer); Pipewrapper; Plasterer Tender; Vibrators (all)

GROUP 5 - Drills with Dual Masts; Hazardous Waste Worker, Level A (utilizes a fully encapsulated suit with a self-contained breathing apparatus or a supplied air line); Miner Class "D", (to include raise and shaft miner, laser beam operator on riases and shafts)

GROUP 6 - Powderman

 LABO0238-006 07/01/2003

COUNTIES EAST OF THE 120TH MERIDIAN: ADAMS, ASOTIN, BENTON, COLUMBIA, DOUGLAS, FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN, PEND OREILLE, STEVENS, SPOKANE, WALLA WALLA, WHITMAN

	Rates	Fringes
Hod Carrier.....	\$ 20.95	6.50

 LABO0335-001 06/01/2003

CLARK, COWLITZ, KCLICKITAT, PACIFIC (SOUTH OF A STRAIGHT LINE MADE BY EXTENDING THE NORTH BOUNDARY LINE OF WAHKIAKUM COUNTY WEST TO THE PACIFIC OCEAN), SKAMANIA AND WAHKIAKUM COUNTIES

	Rates	Fringes
Laborers:		
ZONE 1:		
GROUP 1.....	\$ 22.92	7.40
GROUP 2.....	\$ 23.44	7.40
GROUP 3.....	\$ 23.84	7.40
GROUP 4.....	\$ 24.18	7.40
GROUP 5.....	\$ 20.70	7.40

GROUP 6.....	\$ 18.54	7.40
GROUP 7.....	\$ 15.71	7.40

Zone Differential (Add to Zone 1 rates):

Zone 2 \$ 0.65
 Zone 3 - 1.15
 Zone 4 - 1.70
 Zone 5 - 2.75

BASE POINTS: GOLDENDALE, LONGVIEW, AND VANCOUVER

ZONE 1: Projects within 30 miles of the respective city all.

ZONE 2: More than 30 miles but less than 40 miles from the respective city hall.

ZONE 3: More than 40 miles but less than 50 miles from the respective city hall.

ZONE 4: More than 50 miles but less than 80 miles from the respective city hall.

ZONE 5: More than 80 miles from the respective city hall.

LABORERS CLASSIFICATIONS

GROUP 1: Asphalt Plant Laborers; Asphalt Spreaders; Batch Weighman; Broomers; Brush Burners and Cutters; Car and Truck Loaders; Carpenter Tender; Change-House Man or Dry Shack Man; Choker Setter; Clean-up Laborers; Curing, Concrete; Demolition, Wrecking and Moving Laborers; Dumpers, road oiling crew; Dumpmen (for grading crew); Elevator Feeders; Guard Rail, Median Rail Reference Post, Guide Post, Right of Way Marker; Fine Graders; Fire Watch; Form Strippers (not swinging stages); General Laborers; Hazardous Waste Worker; Leverman or Aggregate Spreader (Flaherty and similar types); Loading Spotters; Material Yard Man (including electrical); Pittsburgh Chipper Operator or Similar Types; Railroad Track Laborers; Ribbon Setters (including steel forms); Rip Rap Man (hand placed); Road Pump Tender; Sewer Labor; Signalman; Skipman; Slopers; Spraymen; Stake Chaser; Stockpiler; Tie Back Shoring; Timber Faller and Bucker (hand labor); Toolroom Man (at job site); Tunnel Bullgang (above ground); Weight-Man-Crusher (aggregate when used)

GROUP 2: Applicator (including pot power tender for same), applying protective material by hand or nozzle on utility lines or storage tanks on project; Brush Cutters (power saw); Burners; Choker Splicer; Clary Power Spreader and similar types; Clean-up Nozzleman-Green Cutter (concrete, rock, etc.); Concrete Power Buggyman; Concrete Laborer; Crusher Feeder; Demolition and Wrecking Charred Materials; Gunité Nozzleman Tender; Gunité or Sand Blasting Pot Tender; Handlers or Mixers of all Materials of an irritating nature (including cement and lime); Tool Operators (includes but not limited to: Dry Pack Machine; Jackhammer; Chipping Guns; Paving Breakers); Pipe Doping and Wrapping; Post Hole Digger, air, gas or electric; Vibrating Screed; Tampers; Sand Blasting (Wet); Stake-Setter; Tunnel-Muckers, Brakemen, Concrete Crew, Bullgang (underground)

GROUP 3: Asbestos Removal; Bit Grinder; Drill Doctor; Drill Operators, air tracks, cat drills, wagon drills, rubber-mounted drills, and other similar types including at crusher plants; Gunite Nozzleman; High Scalers, Strippers and Drillers (covers work in swinging stages, chairs or belts, under extreme conditions unusual to normal drilling, blasting, barring-down, or sloping and stripping); Manhole Builder; Powdermen; Concrete Saw Operator; Pwdermen; Power Saw Operators (Bucking and Falling); Pumpcrete Nozzlemen; Sand Blasting (Dry); Sewer Timberman; Track Liners, Anchor Machines, Ballast Regulators, Multiple Tampers, Power Jacks, Tugger Operator; Tunnel-Chuck Tenders, Nippers and Timbermen; Vibrator; Water Blaster

GROUP 4: Asphalt Raker; Concrete Saw Operator (walls); Concrete Nozzelman; Grade Checker; Pipelayer; Laser Beam (pipelaying)-applicable when employee assigned to move, set up, align; Laser Beam; Tunnel Miners; Motorman-Dinky Locomotive-Tunnel; Powderman-Tunnel; Shield Operator-Tunnel

GROUP 5: Traffic Flaggers

GROUP 6: Fence Builders

GROUP 7: Landscaping or Planting Laborers

LABO0335-010 06/01/2003

CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH OF A STRAIGHT LINE MADE BY EXTENDING THE NORTH BOUNDARY LINE OF WAHKIAKUM COUNTY WEST TO THE PACIFIC OCEAN), SKAMANIA AND WAHKIAKUM COUNTIES

	Rates	Fringes
Hod Carrier.....	\$ 24.69	7.40

* PAIN0005-002 06/01/2003

STATEWIDE EXCEPT CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH), SKAMANIA, AND WAHKIAKUM COUNTIES

	Rates	Fringes
Painters: STRIPERS.....	\$ 21.25	6.42

PAIN0005-004 03/01/2004

CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS, MASON, PIERCE, SAN JUAN, SKAGIT, SNOHOMISH, THURSTON AND WHATCOM COUNTIES

	Rates	Fringes
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Painter.....\$ 24.36 6.41

PAIN0005-006 07/01/2003

ADAMS, ASOTIN; BENTON AND FRANKLIN (EXCEPT HANFORD SITE);
CHELAN, COLUMBIA, DOUGLAS, FERRY, GARFIELD, GRANT, KITTITAS,
LINCOLN, OKANOGAN, PEND OREILLE, SPOKANE, STEVENS, WALLA WALLA,
WHITMAN AND YAKIMA COUNTIES

	Rates	Fringes
Painters:		
Application of Cold Tar Products, Epoxies, Polyure thanes, Acids, Radiation Resistant Material, Water and Sandblasting, Bridges, Towers, Tanks, Stacks, Steeple.....	\$ 19.97	6.22
Brush, Roller, Striping, Steam-cleaning and Spray....	\$ 18.97	6.22
Lead Abatement, Asbestos Abatement.....	\$ 19.97	6.22
TV Radio, Electrical Transmission Towers.....	\$ 20.72	6.22

*\$.70 shall be paid over and above the basic wage rates
listed for work on swing stages and high work of over 30 feet.

PAIN0055-002 07/01/2003

CLARK, COWLITZ, KLUCKITAT, PACIFIC, SKAMANIA, AND WAHKIAKUM
COUNTIES

	Rates	Fringes
Painters:		
Brush & Roller.....	\$ 17.61	6.12
High work - All work 60 ft. or higher.....	\$ 18.36	6.12
Spray and Sandblasting.....	\$ 18.21	6.12

PAIN0055-007 06/01/2003

CLARK, COWLITZ, KLUCKITAT, SKAMANIA and WAHKIAKUM COUNTIES

	Rates	Fringes
Painters:		
HIGHWAY AND PARKING LOT STRIPER.....	\$ 24.79	5.75

PLAS0072-004 06/01/2003

ADAMS, ASOTIN, BENTON, CHELAN, COLUMBIA, DOUGLAS, FERRY,
FRANKLIN, GARFIELD, GRANT, KITTITAS, LINCOLN, OKANOGAN, PEND
OREILLE, SPOKANE, STEVENS, WALLA WALLA, WHITMAN, AND YAKIMA
COUNTIES

	Rates	Fringes
Cement Mason		
ZONE 1:.....	\$ 22.33	7.03
Zone Differential (Add to Zone 1 rate): Zone 2 - \$2.00		

BASE POINTS: Spokane, Pasco, Moses Lake, Lewiston
Zone 1: 0 - 45 radius miles from the main post office
Zone 2: Over 45 radius miles from the main post office

PLAS0528-001 06/01/2003

CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS,
MASON, PACIFIC (NORTH), PIERCE, SAN JUAN, SKAGIT, SNOHOMISH,
THURSTON, AND WHATCOM COUNTIES

	Rates	Fringes
Cement Masons:		
CEMENT MASON.....	\$ 28.52	10.42
COMPOSITION, COLOR MASTIC, TROWEL MACHINE, GRINDER, POWER TOOLS, GUNNITE		
NOZZLE.....	\$ 28.77	10.42

PLAS0555-002 12/01/2003

CLARK, COWLITZ, KLUCKITAT, PACIFIC (SOUTH), SKAMANIA, AND
WAHKIAKUM COUNTIES

ZONE 1:

	Rates	Fringes
Cement Masons:		
CEMENT MASONS DOING BOTH COMPOSITION/POWER MACHINERY AND SUSPENDED/HANGING SCAFFOLD.....	\$ 25.96	10.50
CEMENT MASONS ON SUSPENDED, SWINGING AND/OR HANGING SCAFFOLD.....	\$ 25.50	10.50
CEMENT MASONS.....	\$ 25.04	10.50

COMPOSITION WORKERS AND
 POWER MACHINERY
 OPERATORS.....\$ 25.50 10.50

Zone Differential (Add To Zone 1 Rates):
 Zone 2 - \$0.65
 Zone 3 - 1.15
 Zone 4 - 1.70
 Zone 5 - 2.75

BASE POINTS: BEND, CORVALLIS, EUGENE, LONGVIEW, MEDFORD,
 PORTLAND, SALEM, THE DALLES, VANCOUVER

ZONE 1: Projects within 30 miles of the respective city hall
 ZONE 2: More than 30 miles but less than 40 miles from the
 respective city hall.
 ZONE 3: More than 40 miles but less than 50 miles from the
 respective city hall.
 ZONE 4: More than 50 miles but less than 80 miles from the
 respective city hall.
 ZONE 5: More than 80 miles from the respective city hall

 PLUM0032-002 01/01/2004

CLALLAM, KING AND JEFFERSON COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 34.43	14.33

 PLUM0032-003 01/01/2004

CHELAN, KITTITAS (NORTHERN TIP), DOUGLAS (NORTH), AND OKANOGAN
 (NORTH) COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 26.38	11.68

 PLUM0044-003 06/01/2003

ADAMS (NORTHERN PART), ASOTIN (CLARKSTON ONLY), FERRY (EASTERN
 PART), LINCOLN (EASTERN PART), PEND ORIELLE, STEVENS, SPOKANE,
 AND WHITMAN COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 26.01	10.74

 PLUM0082-001 01/01/2004

CLARK (NORTHERN TIP INCLUDING WOODLAND), COWLITZ, GRAYS HARBOR,
 LEWIS, MASON (EXCLUDING NE SECTION), PACIFIC, PIERCE SKAMANIA,

THURSTON AND WAHKIAKUM COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 30.40	13.17

PLUM0265-003 01/01/2004

ISLAND, SKAGIT, SNOHOMISH, SAN JUAN AND WHATCOM COUNTIES

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 30.20	13.17

PLUM0290-003 10/01/2003

CLARK (ALL EXCLUDING NORTHERN TIP INCLUDING CITY OF WOODLAND)

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 32.53	13.28

PLUM0598-005 06/01/2003

ADAMS (SOUTHERN PART), ASOTIN (EXCLUDING THE CITY OF CLARKSTON), BENTON, COLUMBIA, DOUGLAS (EASTERN HALF), FERRY (WESTERN PART), FRANKLIN, GARFIELD, GRANT, KITTITAS (ALL BUT NORTHERN TIP), KLUCKITAT, LINCOLN (WESTERN PART), OKANOGAN (EASTERN), WALLA WALLA AND YAKIMA COUNTIES

	Rates	Fringes
Plumber.....	\$ 30.38	14.20

PLUM0631-001 01/01/2004

MASON (NE SECTION), AND KITSAP COUNTIES

	Rates	Fringes
Plumbers and Pipefitters All new construction, additions, and remodeling of commercial building projects such as: cocktail lounges and taverns, professional buildings, medical clinics, retail stores, hotels and motels, restaurants and fast		

food types, gasoline service stations, and car washes where the plumbing and mechanical cost of the project is less than \$100,000.....\$ 20.85 4.58

All other work where the plumbing and mechanical cost of the project is \$100,000 and over.....\$ 29.29 13.17

 TEAM0037-002 06/01/2003

CLARK, COWLITZ, KLUCKITAT, PACIFIC (South of a straight line made by extending the north boundary line of Wahkiakum County west to the Pacific Ocean), SKAMANIA, AND WAHAKIAKUM COUNTIES

	Rates	Fringes
Truck drivers:		
ZONE 1		
GROUP 1.....	\$ 23.90	8.78
GROUP 2.....	\$ 24.02	8.75
GROUP 3.....	\$ 24.15	8.75
GROUP 4.....	\$ 24.41	8.75
GROUP 5.....	\$ 24.63	8.75
GROUP 6.....	\$ 24.79	8.75
GROUP 7.....	\$ 24.99	8.75

Zone Differential (Add to Zone 1 Rates):
 Zone 2 - \$0.65
 Zone 3 - 1.15
 Zone 4 - 1.70
 Zone 5 - 2.75

BASE POINTS: ASTORIA, THE DALLES, LONGVIEW AND VANCOUVER

ZONE 1: Projects within 30 miles of the respective city hall.

ZONE 2: More than 30 miles but less than 40 miles from the respective city hall.

ZONE 3: More than 40 miles but less than 50 miles from the respective city hall.

ZONE 4: More than 50 miles but less than 80 miles from the respective city hall.

ZONE 5: More than 80 miles from the respective city hall.

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: A Frame or Hydra lifrt truck w/load bearing

surface; Articulated dump truck; Battery Rebuilders; Bus or Manhaul Driver; Concrete Buggies (power operated); Concrete pump truck; Dump Trucks, side, end and bottom dumps, including Semi Trucks and Trains or combinations there of: up to and including 10 cu. yds.; Lift Jitneys, Fork Lifts (all sizes in loading, unloading and transporting material on job site); Loader and/or Leverman on Concrete Dry Batch Plant (manually operated); Pilot Car; Pickup truck; Solo Flat Bed and misc. Body Trucks, 0-10 tons; Truck Tender; Truck Mechanic Tender; Water Wagons (rated capacity) up to 3,000 gallons; Transit Mix and Wet or Dry Mix - 5 cu. yds. and under; Lubrication Man, Fuel Truck Driver, Tireman, Wash Rack, Steam Cleaner or combinations; Team Driver; Slurry Truck Driver or Leverman; Tireman

GROUP 2: Boom truck/hydra lift or retracting crane; Challenger; Dumpsters or similar equipment all sizes; Dump Trucks/articulated dumps 6 cu to 10 cu.; Flaherty Spreader Driver or Leverman; Lowbed Equipment, Flat Bed Semi-trailer or doubles transporting equipment or wet or dry materials; Lumber Carrier, Driver-Straddle Carrier (used in loading, unloading and transporting of materials on job site); Oil Distributor Driver or Leverman; Transit mix and wet or dry mix trucks: over 5 cu. yds. and including 7 cu. yds.; Vacuum trucks; Water truck/Wagons (rated capacity) over 3,000 to 5,000 gallons

GROUP 3: Ammonia nitrate distributor driver; Dump trucks, side, end and bottom dumps, including Semi Trucks and Trains or combinations thereof: over 10 cu. yds. and including 30 cu. yds. includes Articulated dump trucks; Selfpropelled street sweeper; Transit mix and wet or dry mix truck: over 7 cu yds. and including 11 cu yds.; Truck Mechanic-Welder-Body Repairman; Utility and cleanup truck; Water Wagons (rated capacity) over 5,000 to 10,000 gallons

GROUP 4: Asphalt burner; Dump Trucks, side, end and bottom cumps, including Semi-Trucks and Trains or combinations thereof: over 30 cu. yds. and including 50 cu. yds. includes articulated dump trucks; Fire guard; Transit Mix and Wet or Dry Mix Trucks, over 11 cu. yds. and including 15 cu. yds.; Water Wagon (rated capacity) over 10,000 gallons to 15,000 gallons

GROUP 5: Dump Trucks, side, end and bottom dumps, including Semi Trucks and Trains or combinations thereof: over 50 cu. yds. and including 60 cu. yds. includes articulated dump trucks

GROUP 6: Bulk cement spreader w/o auger; Dry prebatch concrete mix trucks; Dump trucks, side, end and bottom dumps, including Semi Trucks and Trains of combinations thereof: over 60 cu. yds. and including 80 cu. yds., and includes articulated dump trucks; Skid truck

GROUP 7: Dump Trucks, side, end and bottom dumps, including

Semi Trucks and Trains or combinations thereof: over 80 cu. yds. and including 100 cu. yds., includes articulated dump trucks; Industrial lift truck (mechanical tailgate)

 TEAM0174-001 06/01/2003

CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS, MASON, PACIFIC (North of a straight line made by extending the north boundary line of Wahkiakum County west to the Pacific Ocean), PIERCE, SAN JUAN, SKAGIT, SNOHOMISH, THURSTON AND WHATCOM COUNTIES

	Rates	Fringes
Truck drivers:		
ZONE A:		
GROUP 1:.....	\$ 26.14	10.33
GROUP 2:.....	\$ 25.56	10.33
GROUP 3:.....	\$ 23.16	10.33
GROUP 4:.....	\$ 18.91	10.33
GROUP 5:.....	\$ 25.90	10.33

ZONE B (25-45 miles from center of listed cities*): Add \$.70 per hour to Zone A rates.

ZONE C (over 45 miles from centr of listed cities*): Add \$1.00 per hour to Zone A rates.

*Zone pay will be calculated from the city center of the following listed cities:

BELLINGHAM	CENTRALIA	RAYMOND	OLYMPIA
EVERETT	SHELTON	ANACORTES	BELLEVUE
SEATTLE	PORT ANGELES	MT. VERNON	KENT
TACOMA	PORT TOWNSEND	ABERDEEN	BREMERTON

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - "A-frame or Hydralift" trucks and Boom trucks or similar equipment when "A" frame or "Hydralift" and Boom truck or similar equipment is used; Buggymobile; Bulk Cement Tanker; Dumpsters and similar equipment, Tournorockers, Tournowagon, Tournotrailer, Cat DW series, Terra Cobra, Le Tourneau, Westinghouse, Athye Wagon, Euclid Two and Four-Wheeled power tractor with trailer and similar top-loaded equipment transporting material: Dump Trucks, side, end and bottom dump, including semi-trucks and trains or combinations thereof with 16 yards to 30 yards capacity: Over 30 yards \$.15 per hour additional for each 10 yard increment; Explosive Truck (field mix) and similar equipment; Hyster Operators (handling bulk loose aggregates); Lowbed and Heavy Duty Trailer; Road Oil Distributor Driver; Spreader, Flaherty Transit mix used exclusively in heavy construction; Water Wagon and Tank Truck-3,000 gallons and over capacity

GROUP 2 - Bulllifts, or similar equipment used in loading or unloading trucks, transporting materials on job site;

Dumpsters, and similar equipment, Tournorockers, Tournowagon, Turnotrailer, Cat. D.W. Series, Terra Cobra, Le Tourneau, Westinghouse, Athye wagon, Euclid two and four-wheeled power tractor with trailer and similar top-loaded equipment transporting material: Dump trucks, side, end and bottom dump, including semi-trucks and trains or combinations thereof with less than 16 yards capacity; Flatbed (Dual Rear Axle); Grease Truck, Fuel Truck, Greaser, Battery Service Man and/or Tire Service Man; Leverman and loader at bunkers and batch plants; Oil tank transport; Scissor truck; Slurry Truck; Sno-Go and similar equipment; Swampers; Straddler Carrier (Ross, Hyster) and similar equipment; Team Driver; Tractor (small, rubber-tired)(when used within Teamster jurisdiction); Vacuum truck; Water Wagon and Tank trucks-less than 3,000 gallons capacity; Winch Truck; Wrecker, Tow truck and similar equipment

GROUP 3 - Flatbed (single rear axle); Pickup Sweeper; Pickup Truck. (Adjust Group 3 upward by \$2.00 per hour for onsite work only)

GROUP 4 - Escort or Pilot Car

GROUP 5 - Mechanic

HAZMAT PROJECTS

Anyone working on a HAZMAT job, where HAZMAT certification is required, shall be compensated as a premium, in addition to the classification working in as follows:

LEVEL C: +\$.25 per hour - This level uses an air purifying respirator or additional protective clothing.

LEVEL B: +\$.50 per hour - Uses same respirator protection as Level A. Supplied air line is provided in conjunction with a chemical "splash suit."

LEVEL A: +\$.75 per hour - This level utilizes a fully-encapsulated suit with a self-contained breathing apparatus or a supplied air line.

TEAM0760-002 06/01/2003

ADAMS, ASOTIN, BENTON, CHELAN, COLUMBIA, DOUGLAS, FERRY, FRANKLIN, GARFIELD, GRANT KITTITAS, LINCOLN, OKANOGAN, PEND OREILLE, SPOKANE, STEVENS, WALLA WALLA, AND WHITMAN COUNTIES

Rates Fringes

Truck drivers: (ANYONE WORKING ON HAZMAT JOBS SEE FOOTNOTE A BELOW)

ZONE 1: (INCLUDES ALL OF YAKIMA COUNTY)

GROUP 1.....	\$ 17.93	9.00
GROUP 2.....	\$ 20.20	9.00
GROUP 3.....	\$ 20.70	9.00
GROUP 4.....	\$ 21.03	9.00

GROUP 5.....	\$ 21.14	9.00
GROUP 6.....	\$ 21.31	9.00
GROUP 7.....	\$ 21.84	9.00
GROUP 8.....	\$ 22.17	9.00

Zone Differential (Add to Zone 1 rate: Zone 2 - \$2.00)

BASE POINTS: Spokane, Moses Lake, Pasco, Lewiston

Zone 1: 0-45 radius miles from the main post office.

Zone 2: 45 radius miles and over from the main post office

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Escort Driver or Pilot Car; Employee Haul; Power Boat Hauling Employees or Material

GROUP 2: Fish Truck; Flat Bed Truck; Fork Lift (3000 lbs. and under); Leverperson (loading trucks at bunkers); Trailer Mounted Hydro Seeder and Mulcher; Seeder & Mulcher; Stationary Fuel Operator; Tractor (small, rubber-tired, pulling trailer or similar equipment)

GROUP 3: Auto Crane (2000 lbs. capacity); Buggy Mobile & Similar; Bulk Cement Tanks & Spreader; Dumptor (6 yds. & under); Flat Bed Truck with Hydraulic System; Fork Lift (3001-16,000 lbs.); Fuel Truck Driver, Steamcleaner & Washer; Power Operated Sweeper; Rubber-tired Tunnel Jumbo; Scissors Truck; Slurry Truck Driver; Straddle Carrier (Ross, Hyster, & similar); Tireperson; Transit Mixers & Truck Hauling Concrete (3 yd. to & including 6 yds.); Trucks, side, end, bottom & articulated end dump (3 yards to and including 6 yds.); Warehouseperson (to include shipping & receiving); Wrecker & Tow Truck

GROUP 4: A-Frame; Burner, Cutter, & Welder; Service Greaser; Trucks, side, end, bottom & articulated end dump (over 6 yards to and including 12 yds.); Truck Mounted Hydro Seeder; Warehouseperson; Water Tank truck (0-8,000 gallons)

GROUP 5: Dumptor (over 6 yds.); Lowboy (50 tons & under); Self-loading Roll Off; Semi-Truck & Trailer; Tractor with Steer Trailer; Transit Mixers and Trucks Hauling Concrete (over 6 yds. to and including 10 yds.); Trucks, side, end, bottom and end dump (over 12 yds. to & including 20 yds.); Truck-Mounted Crane (with load bearing surface either mounted or pulled, up to 14 ton); Vacuum Truck (super sucker, guzzler, etc.)

GROUP 6: Flaherty Spreader Box Driver; Flowboys; Fork Lift (over 16,000 lbs.); Dumps (Semi-end); Mechanic (Field); Semi-end Dumps; Transfer Truck & Trailer; Transit Mixers & Trucks Hauling Concrete (over 10 yds. to & including 20 yds.); Trucks, side, end, bottom and articulated end dump (over 20 yds. to & including 40 yds.); Truck and Pup; Tournarocker, DWs & similar with 2 or more 4 wheel-power tractor with trailer, gallonage or yardage scale, whichever is greater

Water Tank Truck (8,001- 14,000 gallons)

GROUP 7: Oil Distributor Driver; Stringer Truck (cable operated trailer); Transit Mixers & Trucks Hauling Concrete (over 20 yds.); Truck, side, end, bottom end dump (over 40 yds. to & including 100 yds.); Truck Mounted Crane (with load bearing surface either mounted or pulled (16 through 25 tons));

GROUP 8: Prime Movers and Stinger Truck; Trucks, side, end, bottom and articulated end dump (over 100 yds.); Helicopter Pilot Hauling Employees or Materials

Footnote A - Anyone working on a HAZMAT job, where HAZMAT certification is required, shall be compensated as a premium, in addition to the classification working in as follows:

LEVEL C-D: - \$.50 PER HOUR (This is the lowest level of protection. This level may use an air purifying respirator or additional protective clothing.

LEVEL A-B: - \$1.00 PER HOUR (Uses supplied air in conjunction with a chemical splash suit or fully encapsulated suit with a self-contained breathing apparatus.

NOTE:

Trucks Pulling Equipment Trailers: shall receive \$.15/hour over applicable truck rate

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION