SPECIFICATION

FOR

5 KV AND 15 KV POWER CABLE

FOR THE

GEORGIA POWER COMPANY

VOGTLE ELECTRIC GENERATING PLANT

BURKE COUNTY, GEORGIA

SPECIFICATION NO. X3AJ01

REVISION 7

DATE OF ISSUE JULY 30, 1986

PROJECT CLASS 12E

PAV - 4005
PAV - 4143

JOB 9510
BECHTEL WESTERN POWER CORPORATION
NORWALK, CALIFORNIA

Bechtel Western Power Corporation
ENGINEERS — CONSTRUCTORS
SAN FRANCISCO LOS ANGELES

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REV NO	DATE	REVISIONS
6	4-8-86	Incorporated SDDR #1470 & RRF 12-20. Updated Attachment EA to Rev 6 for environment inside the Containment.
5	5-9-85	Incorporated MSCN #1. Tech. Page 16
4	10-16-84	Deleted Edition Number of ICEA S-19-81, Tech. page 2
3	7-22-83	Revised Technical Revision Pages ii, 4 and 10, Attachment 1 Page 1-5,
		Added Attachments EA, EA-1 thru EA-3, EA-70 and EA-72, Updated
		Appendix EA to Rev. 3
2	4-28-81	Revised Pages ii,1, 15 and 16, added Kerite Attachment 1, Incorporated
		SDDR #156
1	8-22-80	General Revision of Technical Provisions
0	2-23-79	Issued for Bid

REV. NO	DATE	REVISIONS
1	7-30-86	SDDR #84 and 85 have been incorporated in Revision 1. This revision is issued to incorporate commitment made in RRF 12-15 response.

VOGTLE ELECTRIC GENERATING PLANT

5 KV and 15 KV POWER CABLE

BECHTEL POWER CORPORATION, AGENT
Los Angeles Power Division

for

GEORGIA POWER COMPANY

INSTRUCTIONS TO BIDDERS

for

ELECTRICAL EQUIPMENT AND/OR MATERIAL

General

1. The Contractor shall state any exceptions taken to the Instructions of Bidders and/or specifications in his Proposal. The Manufacturer and/or Supplier must obtain the Purchaser's approval in writing before such exceptions are binding upon the Purchaser.

2. The original and 7 copies of Bidders Proposal shall be submitted in exact conformance with the Proposal Form to the Procurement Department, Bechtel Power Corporation, Los Angeles Power Division, P. O. Box 60860, Terminal Annex, Los Angeles, California 90060, Attn: (Designee of Bid Request Cover Page) or delivered via messenger to Bechtel Power Corporation, Los Angeles Power Division, 12400 Imperial Highway, Norwalk, California not later than the date specified in the inquiry letter.

3. The Purchaser reserves the right to reject any or all bids, and to waive any informalities therein.

4. The term "Contractor" and the term "Manufacturer" are hereby defined as meaning the Contractor responsible for furnishing the equipment and work specified.

5. The term "Purchaser" is hereby defined as meaning the Georgia Power Company or its Engineers, inspectors, or other authorized representatives as named in the Proposal Form.

Accepted Proposal

6. The successful Bidder shall furnish 11 copies of a written Accepted Proposal for the performance of work included in the specifications. This Proposal will include the detail specifications of the equipment and/or material furnished.

Proposal Drawings and Description

7. Each Bidder shall submit with each proposal complete specifications, description of equipment, drawings and illustrations showing in detail the equipment or materials he proposes to furnish, and dimensions to show the clearances of his equipment. He shall submit a description of all major

equipment in sufficient detail to enable the Purchaser to check the relative merits of the various bids. It is extremely important that all proposals be complete in this respect and that any exceptions be clearly stated.

Contractor's Design Drawings

8. Upon award of the business confirmed by the Purchaser's commitment and/or Purchaser's order and in accordance with the specification Drawing and Data Requirements, the Manufacturer and/or Supplier shall prepare all necessary drawings for the manufacturer and installation of the equipment or materials supplied by him, including necessary details for the design of proper supporting structures, and showing all features and details including assembly drawings, parts lists, installation, operation and maintenance instructions, and other details for which the Purchaser must provide to secure the proper installation, operation and successful performance of the equipment.

9. The Contractor shall furnish Bechtel Power Corporation, in accordance with the Specification Drawing and Data Requirements, all complete and final approved drawings. The Contractor shall also submit preliminary sketches and notes on all unsettled details to the Purchaser for consideration and approval in ample time to enable the Contractor to comply with the specifications.

10. All Manufacturer's drawings shall be subject to the Purchaser's approval for general design, general dimensions and apparent suitability. The Purchaser's approval shall not relieve the Contractor of any responsibility for supplying material and equipment which meets the requirements of the specifications and which will operate satisfactorily under the specified conditions, nor will it relieve him from responsibility for detail dimensions.

Purchaser's Drawings Submitted With Specifications

11. Where the equipment and/or materials are to be installed in a new plant or in an existing plant where there are no building limitations, the Bidder shall offer a layout and arrangement which are conducive to best performance and lowest over-all installation cost. Where the equipment and/or materials are to be installed in existing plants or in restricted locations, the physical limitations will be described in Purchaser's Specifications and drawings will be included by Purchaser to show the general arrangement, dimensions, floor levels, etc., to which the Contractor must adhere as closely as possible.

Correspondence Pertaining to Design and Specifications

12. All questions or correspondence with reference to the inquiry and specifications, shall be referred to the Procurement Department, Bechtel Power Corporation, Los Angeles Power Division, P.O. Box 60860, Terminal Annex, Los Angeles, California 90060, Attn: (Designee on Bid Request Cover Page). All such correspondence shall be submitted in original and 7 copies.

Delivery

13. Delivery dates desired and acceptable are shown in the specifications. In the event the delivery dates as set out in the specifications cannot be met, the Bidder shall so state in his exceptions. The Bidder shall also state in his Proposal: (1) the submittal schedule for the required engineering drawings and data, (2) the date when manufacturing must be started to meet the specified jobsite delivery date, (3) the date when delivery will be made. It is of utmost importance that the Contractor maintain the specified delivery date. If any delays appear likely, it is the responsibility of the Contractor to immediately inform the Purchaser. The providing of such information shall in no way relieve the Contractor from compliance with the specified delivery date.

Labor Dispute Notification Provisions

14. In the event of any delay or threatened delay to the Contractor's performance of its Services because of any strike or labor dispute, the Contractor shall immediately notify Purchaser in writing of such an event. Such written notice shall include a description of the nature, cause, date of commencement, and expected duration of any such delay or threatened delay and shall indicate whether it is anticipated that the completion dates will be affected thereby.

Payments

15. All equipment and material shall be quoted and shipped on an F.O.B. destination basis and full payment will be made by Purchaser within 30 days following receipt of complete material and invoice. Invoices pertaining to partial shipments will not be honored.

16. It shall be understood and agreed that the completion of all payments for the work done and materials used, and the Purchaser's final acceptance, shall not relieve the Manufacturer and/or Supplier or its surety from its obligations and responsibilities under the terms of the agreement and in accordance with the attached specifications, or of making good any latent defects without additional cost to the Purchaser.

Tests and Inspection

17. The Purchaser may appoint inspectors to follow the progress of the work, the manner in which it is being done, materials in process of manufacture or at point of delivery, and with authority to reject defective materials at either source of supply or point of delivery at any time, or to suspend any work not being properly done, or not in accord with the plans and specification.

18. The Purchaser shall have the right to conduct source inspection and quality assurance program surveys and audits at the supplier plants. The Purchaser shall have free access to work, and to all parts of the Contractor's plant engaged in work on equipment and/or materials to be supplied the Purchaser, at all times while work on this Contract is being performed. The

Contractor shall afford the Purchaser free of cost all facilities for the convenience of the Purchaser in order that the Purchaser may be satisfied that all materials and workmanship are in accordance with the specifications. The same free access privileges to the Purchaser shall extend to all Contractors subtier Suppliers plants and facilities supplying material, fabrication, components, systems, or services, hereunder.

19. The Purchaser shall have the right, at any time within 180 days after the complete erection of the equipment, to make, at his own expense, such tests as he may deem proper or necessary to satisfy himself that the equipment meets the requirements of the specifications in every respect. The Contractor shall, if he so desires and at his own expense, have the right to have a witness present at such tests to see that the equipment is properly operated and to make such observations as he may desire. Should this test show that the equipment does not meet all the requirements of the specifications or guarantees, the Contractor shall, at his own expense, make such other tests as may be necessary to the fulfillment of the Contract.

20. In event of the equipment failing to meet the requirements of the specifications or guarantees in any respect, the Contractor shall within a reasonable time and at his own expense, make such alterations and or replacements as may be necessary in order that the equipment and its performance shall conform to the requirements of the specifications and guarantees; and the Contractor shall, at his own expense, make such additional tests as the Purchaser may require to show the effects of such alterations and replacements on the equipment and its performance.

Patents

21. The Contractor shall indemnify, save harmless, and defend the Purchaser with regard to all claims, suits, and proceedings against the Purchaser based on the contention, whether groundless or not, that any apparatus, or part thereof, furnished under the Contract (regardless of by whom designed, fabricated, or manufactured) constitutes an infringement of any patent. The Contractor shall pay all costs and expenses of investigation, defense, and settlement or judgment of any such claim, suit, or proceeding. In case the said apparatus, or any part thereof, is held in any suit to constitute infringement and the use of said apparatus or part is enjoined, the Contractor shall, at its own expense, either (1) procure for the Purchaser the right to continue using said apparatus or part, (2) replace same with non-infringing apparatus, or (3) modify same so that it becomes non-infringing. If the Contractor is unable to comply with any of the alternatives in the preceding sentence, then the Contractor may, upon terms and conditions satisfactory to the Purchaser, remove said apparatus and refund the purchase price and the transportation and installation costs thereof.

This provision shall take precedence over Paragraph 6 of any Purchase Order which Purchaser may issue hereafter, insofar as said Paragraph 6 relates to patents.

Taxes

22. All Federal, State or other governmental division taxes and contribution for unemployment compensation, or old age benefits, etc., now or hereafter effective shall be included in the prices quoted with the exception of the State of Georgia Sales or Use Tax which the Purchaser shall be responsible for, by authority granted by the State of Georgia Revenue Department, in accordance with the permit for operating under Rule 16 of the Rules and Regulations of Georgia Sales and Use Tax.

Alternates

23. Any alternates to the specifications which the Contractor desires to bid upon, shall be clearly indicated as such, and shall be set apart from the bid covering only the Purchaser's Specifications.

Proposal Form

24. Contractors shall submit their bids in exact conformance with the Proposal Form if such is contained in the specifications. Any alternates other than those called for in the specifications shall follow the completed Proposal Form.

Contractor's Supervisory and Service Personnel

25. The Contractor's erection supervisors, service men, startup men or any similar employees for whom the Purchaser will be invoiced on an hourly on per diem basis and/or for expenses must report to the Purchaser's Project Superintendent and Field Office Supervisor or their authorized representative before beginning any such services at the site. They must also report before leaving the jobsite due to a temporary suspension of their work, when returning to the jobsite after a temporary suspension of their work, and at the completion of their work.

26. The Purchaser must know of all Contractor's employees at the job site whose time and/or expenses are not included in the lump sum equipment price in order to verify invoices and time and expenses. Failure of the Contractor to comply with these requirements will be cause for rejection of any invoice for such time and/or expenses.

Domestic Materials

27. All materials and equipment to be furnished under this Inquiry shall be of domestic manufacture unless otherwise noted as an "Exception" in the Contractor's Proposal.

Price Adjustment

28. Bidder shall quote current prices in effect on the bid closing date. Whenever the current prices quoted are not firm, Bidder shall quote current prices which shall be subject to adjustment (upward or downward)

at time of shipment. The following information shall be included under the Price Adjustment section of the Proposal Form and shall be subject to the conditions stated in that section.

a. The indices to be used.

b. Starting date of adjustment.

c. Ending date of adjustment.
Definition of the final shipment should it affect the end date of adjustment.

1. For equipment shipments of 1 carload or less, the date of the bill of lading shall be used for the date of adjustment.

2. When equipment delivery involves several carload shipments, the Bidder shall define the end date of adjustment as the date of the bill of lading on a certain specified item of equipment.

d. When using an index averaging method for adjustment based on equipment fabrication dates, the Purchaser shall be advised as soon as possible when the actual starting and ending dates for fabrication become known.

e. The maximum limit of adjustment.

Warranty

29. The Contractor warrants to the Purchaser that the equipment described herein and to be furnished in connection with this purchase will be of the kind and quality described herein, free of defects in design, workmanship, and material, and shall conform to and perform in accordance with the characteristics and specifications referred to herein. The foregoing warranties shall be in lieu of all statutory warranties except for the warranty of title and against infringement.

30. Contractor shall promptly make all adjustments, repairs or replacements necessary, including direct rail or truck transportation charges, to remedy any failure or deficiency in the equipment furnished hereunder resulting from the defects in the design, workmanship or materials used in producing the equipment which shall appear within 12 months from the date the equipment and/or material is placed into service, or within 18 months from the date of shipment, whichever occurs first. The Purchaser shall assist in every manner in minimizing the expense of such repair work including removal from service and loading for shipment, any equipment and/or material which must be returned to the factory.

Where repaired or replacement parts or additional work are furnished, they shall be subject to the same warranties, the same conditions, and the same remedies provided for the original equipment; provided that the warranty period for repaired or replacement parts or for additional work shall be

for the same period as the original part or work extending from date of installation of repaired or replacement parts or from performance of the additional work.

31. The rights and liabilities imposed under these paragraphs under "Warranty" shall be in addition to the rights and liabilities imposed in other paragraphs and nothing stated herein shall be deemed to affect or alter the liability assumed by the Contractor under other paragraphs.

Liability of the Contractor

32. The Contractor shall defend, indemnify the save harmless the Purchaser, its representatives, agents, and employees from and against all demands, claims, suits or actions of any character, including costs of investigation and defense on account of death or injury to persons (including representatives, agents and employees of either of the parties) or damage to property (including property of either of the parties) resulting from any act of negligence of the Contractor or his agents or employees of either, whether or not constituting negligence, which act or omission occurs in the performance of any of the obligations imposed herein. The Contractor further agrees to defend, save harmless, and indemnify the Purchaser against any loss or expense as aforesaid resulting from any breach of the provisions of Paragraph 26 above.

33. In addition to the Contractor's express warranty of the equipment as set forth in the warranty clause applicable thereto, if any portion of the equipment shall prove to be damaged as a direct result of negligent technical direction of or assistance in installation, inspection, or instruction within 1 year from the date equipment is placed into service, the Contractor, when notified therof, shall correct such damage at its own expense, including the cost of any necessary labor by repairing or replacing the parts directly affected by such defective technical direction, or assistance, inspection, or instruction. The Contractor is liable and responsible for technical direction or assistance, of inspection, installation and instruction or for any claims of any kind arising out of or connection with technical direction or assistance, inspection and instruction whether in contract, tort (including negligence), or otherwise.

Assignment

34. The Purchase Order shall not be assigned by the Contractor by operation of law or otherwise without the prior written consent of the Purchaser. The Purchaser Order shall not be deemed an asset of the Contractor and at the option of the Purchaser, and upon 5 days notice, shall terminate in the event of any voluntary or involuntary receivership, bankruptcy, or insolvency proceedings affecting the Contractor.

Defaults

35. Time is of the essence. If the Contractor fails to perform any of its obligations hereunder, the Purchaser will be entitled to all remedies provided by law and without limitation to recover any replacement and repair

costs. If Contractor fails to give Purchaser adequate assurance of performance after written demand therof when reasonable grounds for insecurity arise, then Purchaser will be entitled to cancel the Purchase Order in whole or in part, without liability for any cancellation of other charges or for any of the Apparatus unshipped at the time of such cancellation. In the event of any such cancellation, Purchaser may procure the Work elsewhere similar to that which should have been shipped hereunder. The Contractor shall be liable for the difference between the cost of such procured work and the Purchase Order price together with all damages suffered by Purchaser. Purhcaser may withhold any money otherwise payable to Contractor and apply the same to the payment of any sums which Contractor may owe to Purchaser. Purchaser's failure to notify Contractor of a rejection of the Apparatus or to specify with particularly any defect in the Apparatus after rejection or acceptance thereof will not bar Purchaser from any remedies therefore which it may otherwise have.

Changes

36. No changes shall be made in this specification unless authorized in writing by the Purchaser. The Purchaser may, by written change order, make any changes, including additions or omissions in quantities ordered, or in the specification. If any such change affects the amount due or the time of performance hereunder, an equitable adjustment will be made. The Purchaser may at any time by written change order cancel the Purchase Order as to all or any portion of the Apparatus then not shipped, subject to an equitable adjustment between the parties as to the Apparatus then in progress, provided that no such adjustment shall be made in favor of the Contractor with respect to any of the Apparatus which is Contractor's standard stock. No such cancellation shall relieve the Purchaser or the Contractor of any of their obligations as to any of the Work furnished hereunder. Any claim for adjustment hereunder must be asserted by the Contractor in writing within 30 days from the date when the change or cancellation is ordered.

Signature

37. If the proposal is made by an individual, it shall be signed with his full name, and his address given. If it is made by a partnership, it shall be signed with the partnership name by a full partner, who shall also sign his full name and his address, and the names and addresses of all other partners shall be given. If it is made by a corporation, the name of the corporation shall be stated and the Corporate Seal affixed to the Proposal Bidding Sheet.

Scope of Work

38. The Bidder shall make his Proposal with the understanding that the specification and applicable drawings are intended to cover all of the work to be furnished and, unless expressly excluded, any and all labor and materials not indicated therein but which may be necessary to complete any part of the Work in a proper, substantial and workmanlike manner, are to be furnished by the Contractor without additional charge or cost to the Purchaser.

Proprietary Information

39. This invitation and all drawings, design, specifications and other data appended or related thereto are furnished only as information necessary to preparation of a proposal or to complete the Work and are the property of the Purchaser and shall not be used for any purposes other than the performance of this proposal or any resulting Purchase Order. The drawings and data submitted by the Bidder shall become the property of the Purchaser and will not be used for any other than the instant purpose.

Assembly and Shipping

40. The Apparatus shall be shipped in assembled units consistent with good shipping practice. When items must be disassembled for shipment they shall be matchmarked. All units and their containers shall be piece marked and show the Purchase Order and item number. Machined and other unpainted surfaces shall be fully protected from impact and weather damage with all holes and nozzles plugged or covered.

Method of Shipment

41. Delivery at the jobsite via rail and motor carrier is available. The Purchaser may specify the carriers and routing to be used providing the carrier(s) or routing specified does not increase Contractor's cost; however, Contractor shall not modify Purchaser's instructions in this respect without prior approval by the Purchaser. Contractor agrees to furnish Purchaser realistic estimates of net and gross weights, expected shipping points and shipping classifications.

Cooperation and other Manufacturers

42. The Contractor shall cooperate with other manufacturers furnishing associated equipment or equipment connecting directly thereto. The Contractor shall exchange with other manufacturers all necessary drawings, dimensions, templates, gauges and other information required to insure a combined installation that is most suitable in every respect within the intent of the specification, and to eliminate delays in manufacture or installation. The Contractor shall keep the Engineer informed of all such coordination by copy of his correspondence to other manufacturers.

Expediting

43. The Purchaser shall be allowed access to the Contractor's shops and those of the Contractor's suppliers to expedite the work. Contractor shall furnish Purchaser, at no additional cost, semi-monthly progress reports and scheduling information in sufficient detail to facilitate realistic evaluation of Contractor's performance. The reports and/or schedules must cover the complete status and progress of engineering, fabrication, submaterials and/or labor. Contractor shall furnish unpriced copies of purchase orders to Subsuppliers upon request.

Right to use Apparatus Requiring Corrections

44. If, after the Apparatus has been installed, it is discovered that it or any part thereof may require correction, the Purchaser shall nevertheless have the right to use such Apparatus until such time as it is convenient that such Apparatus be removed from service for correction.

Quality Assurance and Quality Control

45. The Bidder and Contractor shall verify conformance to quality requirements by furnishing documentation that is identified in the specification, and in Part C, Drawing and Data Requirements, of the Proposal Form.

When nuclear safety class items are involved the same requirements will apply and, in addition, the Bidder and Contractor will be required to have written procedures that comprise his quality program. The written procedures shall conform to the Nuclear Regulatory Commission Regulation 10 CFR 50, Appendix B as defined in ANSI N45.2-1971 Quality Assurance Program Requirements for Nuclear Plants. Specific criteria of ANSI N45.2 to which the Bidder and Contractor must furnish procedures are identified in the Quality Program Requirements section of Part C of the Proposal Form.

The Purchaser shall have free access to the work and to all parts of the Contractor's plant engaged in work on equipment and/or materials to be supplied the Purchaser, at all times while work on this Contract is being performed. The Contractor shall afford the Purchaser free of cost, all facilities for the convenience of the Purchaser in order that the Purchaser may be satisfied that the Quality Program and all materials and workmanship are in accordance with the specifications. The same free access privileges provided to the Purchaser shall also extend to all Contractors subtier suppliers plants and facilities supplying material, fabrication, components, systems or services hereunder.

The Purchaser shall have the right to conduct surveys and audits of the suppliers Quality Program of all functional groups that have an effect on quality. Audits may be conducted by one individual or by a team of auditors, and will take place when deemed necessary by the Purchaser. The same survey and audit privileges shall extend to all subtier Contractor's plants and facilities.

Bidder's Knowledge

46. The Apparatus will be used in and become a part of a nuclear-electric generating station. Bidder shall be knowledgeable of conditions that may arise during the design, construction, startup and operation of a nuclear-electric generation station, and shall make his Propsoal consistent with such conditions.

Correspondence

47. Subsequent to notification of award, the successful Bidder shall forward all correspondence, in original and 7 copies, relating to price, terms or schedule to Georgia Power Company, c/o Bechtel Power Corporation, Procurement Department, Los Angeles Power Division, P.O. Box 60860, Terminal Annex, Los Angeles, California 90060, Attention: (Designee on Bid Request Cover Page).

Correspondence relating to engineering shall be forwarded in original and 7 copies, to Bechtel Power Corporation, Los Angeles Power Division, Attention: J. D. Duffin, Project Engineer, at the address shown above.

The Purchaser reserves the right to designate additional persons and locations to which copies of all correspondence relating to the Work shall be forwarded by the Contractor.

Insurance

48. Insurance to be provided by Purchaser. Purchaser shall maintain, at its own espense for itself, each Contractor and each Subcontractor, the following forms of insurance in the amounts specified. This insurance will apply to the operations of and for each Contractor and Subcontractor (unless expressly excluded by name or class) at the project site only (and not at any other place). The insurance will terminate upon completion of the work except that Completed Operations Liability Insurance will continue for a period of 3 years from the acceptance of the total job by the owner.

a. Insurance coverage for the legal liability of the Contractor, and his Subcontractors, for claims for personal injuries to the Contractor's or his Subcontractor's employees engaged in this work and for death resulting therefrom under the Georgia Workmen's Compensation Act.

b. Insurance coverage for the legal liability (including contractual) of the Contractor, and his Subcontractors who may be engaged in this work, for claims or damages for personal injuries or for death resulting therefrom arising out of the work to be performed by the Contractor or his Subcontractors, to persons other than employees of the Contractor or Subcontractors engaged in the work in an amount of $10,000,000 for any one occurrence.

c. Insurance coverage for the legal liability (including contractual) of the Contractor, and his Subcontractors who may be engaged in this work, to pay claims for damages to property belonging to other than such Contractor, or his Subcontractors, in the amount of $10,000,000 for any one occurrence.

d. Insurance coverage for physical loss or damage to Contractor's equipment on the jobsite for the following amounts:

Actual cash value of equipment at time of loss.

e. The Purchaser will obtain direct damage (All Risk Builder Risk) insurance and cause the Contractor and his Subcontractors who may be engaged in the work, to be named as an insured. As evidence of this insurance, and prior to the beginning of any work the Purchaser shall submit to the Contractor a certificate providing the above coverage and which verifies that the said policies have been properly endorsed to meet the above requirements.

The Contractor represents and warrants that no cost of insurance, indemnifications, waivers or reserves for contingencies is or will be included in any bid for costs or will otherwise be changeable to the Purchaser, except as to automobile liability insurance to be provided by Contractor.

49. Insurance to be provided by Contractor. Prior to the commencement of any work, the Contractor and his Subcontractors shall procure and thereafter maintain during the life of the contract, Automobile Liability Insurance for not less than the following limits:

Bodily Injury	$250,000 Each Person
	$500,000 Each Person
Property Damage	$250,000 Each Accident

The insurance will apply to all owned, non-owned or hired automobiles to be used by the Contractor or Subcontractor in the performance of work on his job.

Each Contractor or Subcontractor shall furnish a certificate of this insurance which shall contain a provision for 10 days prior notice of cancellation or material change to Georgia Power Company, which notice shall be in a form provided by or suitable to Georgia Power Company.

Any insurance not described herein which the Contractors or Subcontractors desire for their own protection shall be their own responsibility and at their sole expense.

Drawing and Data Submittals

50. It is of utmost importance that the Contractor commence preparation of the required engineering drawings and data immediately upon notification of award and that he prosecute the Work in a manner that will insure submittal of this technical data on or before the dates established by the Purchaser.

Specification or Bill of Material

51. The Invitation to Bid, General Provisions (where applicable), Instructions to Bidders, Specific Conditions, Technical Provisions, Appendices, Proposal Form and any supplements, drawings, sketches and Data Sheets attached thereto, or referenced therein, and any addenda thereto comprise the complete Specification or Bill of Material and the resulting Purchase Order or Contract shall incorporate and be based on these documents.

Location

52. The Alvin W. Vogtle Nuclear Plant site is located in Burke County, Georgia approximately 34 miles South East of Augusta, Georgia on River Road approximately 5 miles N.E. of State Highway 23.

Transportation Facilities

53. The Alvin W. Vogtle Nuclear Plant will be served by rail freight with a siding at Greens Cut, Georgia and by motor freight by those carriers authorized to serve this area.

Delay in Manufacture or Delivery

54. The Manufacturer shall not be liable for damages resulting from delays in delivery or failure to manufacture or deliver where such delays or failure result from (1) acts of God, acts of the Purchaser, acts of civil or military authority, priorities, fires, strikes, floods, epidemic, war, riot, (due to causes beyond its reasonable control) to obtain materials necessary for the manufacture of the equipment herein described.

55. However, in the event of any occurrence which the Manufacturer considers may cause a delay in the manufacture or delivery of the equipment herein described and which will extend the delivery date(s), the Purchaser shall be so notified in writing promptly. If such delay will extend the delivery date so as to make it impossible for the Purchaser to comply with the requirements or orders of a regulatory commission having jurisdiction or if such delay will cause Purchaser to default on a Contract or obligation for service to its customers or to the public with respect to which it has a duty to serve, the Manufacturer shall consult with the Purchaser to determine if and by what means another delivery date could be established whereby the Purchaser could utilize such equipment without violating such orders of such regulatory commissions or defaulting on such Contracts or other service obligations.

Subcontracts

56. The Manufacturer shall not award any portion of this work to any Subcontractor nor employ any Subcontractor to assist in the performance of the work without first obtaining the written approval of the Purchaser.

57. In the event the Manufacturer obtains the Purchaser's approval to sublet any part of the work, then the Manufacturer agrees to bind the Subcontractor to the terms of these Instruction to Bidders and General Conditions and the specifications and other documents comprising a part of the Contract between the Manufacturer and the Purchaser as far as applicable to the Subcontractor's work. The Manufacturer shall be as fully responsible to the Purchaser for the acts and omissions of his Subcontractors and of the persons either directly or indirectly employed by his Subcontractors as he is for the acts of the persons directly employed by himself. The Manufacturer shall in any event remain subject to all the terms, conditions and obligations of the Contract and the execution of a Subcontract shall not relieve him therefrom.

Cancellation

58. With respect to the successful Bidder for the equipment covered by this Inquiry, it shall be understood and agreed that the Purchaser will retain the right to cancel the order at any time up to the time at which the Contractor must order materials and begin manufacture of the equipment specified. In the event of cancellation, the Purchaser will pay for the actual engineering expenses incurred by the Manufacturer, plus a nominal sum for overhead. The Bidder's Proposal shall clearly state the latest date that the equipment can be cancelled by the Purchaser without incurring any expenses other than those stated above. The Bidder shall also clearly outline the basis for determining any engineering and overhead expenses that might be chargeable to the Purchaser by reason of this provision. The Bidder shall understand in connection with the cancellation provision that it shall not in any way interfere with the normal preparation of drawings and commencement of engineering which shall begin immediately upon award of this business and shall proceed at a rate that will not delay the Contractor in supplying the Purchaser with drawings and complete engineering information.

Deferment

59. With respect to the successful Bidder for the equipment covered by this Inquiry, it shall be understood and agreed that the Purchaser will retain the right to defer shipment, provided the Contractor is notified of such deferment 1 year prior to scheduled shipment. In the event of deferment up to but not beyond 1 year after scheduled shipment, the Bidder shall state what effect if any, such deferment will have on any of the prices and/or pricing provisions contained in the base proposal. All other terms and conditions shall remain unchanged unless modified by mutual agreement. In the event of deferment beyond 1 year after scheduled shipment, the order shall be cancelled unless mutually satisfactory terms and conditions can be agreed upon.

Qualification of Bidders

60. The equipment offered in response to this Inquiry shall be of highest quality in materials and workmanship and shall be capable (from demonstrated experience) of full compliance with the specification requirements as related to capacity, performance and design adequacy. In order to receive full and equal consideration each Bidder must be able to show that he has manufactured and placed in satisfactory and regular operating service equipment similar in design and equivalent in size, capacity, general design, etc., to that covered by this Inquiry. A list of installation similar to the equipment bid upon shall accompany each bid.

TECHNICAL PROVISIONS

FOR

5 KV AND 15 KV POWER CABLE

FOR THE

GEORGIA POWER COMPANY

VOGTLE ELECTRIC GENERATING PLANT

BURKE COUNTY, GEORGIA

SPECIFICATION NO. X3AJ01

REVISION 1

AUGUST 22, 1980

PROJECT CLASS 12E

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ATTACHMENTS

APPENDICES

1.0 SCOPE

1.1 WORK INCLUDED

This specification covers the design, manufacture, inspection, testing, and delivery of 5 kV and 15 kV Power Cable on a "Contingent Purchase Order" basis. The quantities shown in the Proposal Form represent estimated requirements and may be subject to change (increase/decrease) according to actual job requirements. Upon receipt of "Release to Ship" order, Contractor is to ship the quantities requested. The order is to stay open until January 1985.

NOTE: Cable manufactured by Kerite Company shall be in accordance with this specification as modified by Attachment 1.

1.2 WORK NOT INCLUDED

The following items are not included:

1. Receiving, unloading, handling, and storage of cables at the jobsite.

2. Installation and connections of cable at the jobsite.

3. Field Testing, unless specified.

2.0 QUALITY STANDARDS

2.1 GENERAL

A. All work shall be in accordance with the applicable portions of the latest issue of all Codes, Standards, Specification, etc., referenced within this Appendix and other implementing documents.

B. Latest issue is defined as the issue (including latest published addenda or supplements in force on the date of award (either verbal or by Purchase Order) of the' order. Adoption of any subsequent issues shall be subject to Purchaser s approval prior to implementation.

2.2 REFERENCED CODES AND STANDARDS

ANSI N45.2 - 1971	Quality Assurance Program Requirements for Nuclear Power Plants
ANSI N45.2.2 - 1972	Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants
ASTM B 33	Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes
ASTM B 8	Specification for Concentric.Lay.Stranded Copper Conductors, Hard, Medium-Hard or Soft
ASTM B 189	Specification for Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes

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IEEE 323	IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations
IEEE 383	IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations
4 IPCEA S-19-81	Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
IPCEA S-68-516	Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
AEIC 6	Specification for Ethylene Propylene Rubber Insulated, Shielded Power Cables, Rated 5 through 65 kV
NEMA WC-21	Non-returnable Reels

B. If a Bidder has any reason for deviating from any of the specified Codes and Standards, he shall state in his Proposal the exact nature of the change and his reason. Omission of any Codes and Standards does not relieve the Manufacturer of his responsibility to follow all applicable Codes and Standards.

2.3 ABBREVIATIONS

The abbreviations listed below shall have the following definitions where used:

AEIC - Association of Edison Illuminating Companies

ANSI - American National Standards Institute

ASTM - American Society for Testing and Materials

AWG - American Wire Gauge

IEEE - Institute of Electrical and Electronic Engineers

IPCEA - Insulated Power Cable Engineers Association

NEMA - National Electrical Manufacturers Association

3.0 CHARACTERISTICS

3.1 PHYSICAL

A. Armored cable shall be suitable for indoor installation in cable tray, or cable racks. Non-armored cable shall be suitable for indoor or outdoor installation in underground duct bank, and conduit. Outdoors, the cable may be exposed to sunlight, rain, dust, etc.

B. All cables shall be designed for an installed life expectancy of 40 years at the specified service and environmental conditions.

C. All cable is intended for use at conductor temperatures not exceeding 90 C. Continuous conductor temperatures of 90 C shall not prevent the cable from successfully performing its intended function.

3.2 SERVICE CONDITIONS

1. 5 kV Power Cable (Class 1E)

a.	System:	4160 volt, 3-phase, 60-hertz, resistance grounded neutral
b.	Insulation Level:	8,000 volt (133 percent level)
c.	Maximum Conductor Temperature:	90 C - continuous
		130 C - emergency
		250 C - short circuit

2. 15 kV Power Cable (Class 1E)

a.	System:	13,800 volt, 3-phase, 60-hertz, resistance-grounded neutral
b.	Insulation Level:	15,000 volt (133 percent level)
c.	Maximum Conductor Temperature:	90 C - continuous
		130 C - emergency
		250 C - short-circuit

3.3 ENVIRONMENTAL CONDITIONS

The cable shall be capable of normal operation during or after exposure to any of the following conditions. The cable will be subjected to outdoor ambient temperatures and dust during construction and startup at which time it may be in service.

3.3.1 Altitude of Jobsite

220 feet above mean sea level.

1

3.3.2 Temperature

The atmospheric temperatures at the jobsite are as follows:

1. Maximum Summer Temperature: 98 F dry bulb (82 F wet bulb).

2. Minimum Winter Temperature: 17 F dry bulb.

3.3.3 Humidity

The relative humidity ranges from 45 to 100 percent, the average being 72 percent.

3.3.4 Containment Service Conditions

The 15 kV cables shall be suitable for use in the containment building under the following normal conditions:

1. Continuous operation in a 120 F ambient temperature at 50 percent relative humidity.

2. Forty year integrated radiation dosage of 5.0×10^5 rads.

3. A containment pressure regulated between 13.2 psia and 17.7 psia.

NOTE: Deleted

3.3.5 LOCA Conditions

All cables shall, at any time during their 40 year expected lifetime, be able to withstand (maintain electrical integrity during and after) the conditions of a Loss-of-coolant accident (LOCA) inside the containment. (See Environmental Designator IB of Attachments EA). 3

4.0 DESIGN AND CONSTRUCTION

4.1 DESIGN REQUIREMENTS

4.1.1 General

Neither asbestos material nor PVC shall be used in the cable construction. The following general features shall apply. No alternate cable construction will be accepted. Cables with 3.0 inches or larger O.D. shall be designed for bending radius to a minimum of eight times the cable O.D. There shall be no splices of completed cable assemblies.

4.1.1.1 15 kV, 3/c Armored Cable (Class 1E)

The 15 kV armored cable (for use in cable tray) shall have each individual conductor provided with an extruded semiconducting strand screen over the conductor, Ethylene Propylene Rubber (EPR) insulation, extruded

semiconducting screen over the insulation, copper shielding tape and flame-retardant Hypalon (chlorosulfonated polyethylene) jacket. The individual insulated and jacketed conductors shall be cabled with flame and moisture-resistant, non-wicking fillers into a round core with flame-resistant binder tape and armor interlocked galvanized steel overall cover.

4.1.1.2 15 kV, 3/c Non-Armored Cable (Class 1E) 1

The 15 kV non-armored cable (for use in underground duct and conduit) shall have each individual conductor provided with an extruded semiconducting strand screen over the conductor, EPR insulation, extruded semiconducting screen over the insulation, copper shielding tape and flame-retardant Hypalon jacket. The individual insulated and jacketed conductors shall be cabled with flame and moisture-resistant non-wicking fillers into a round core with flame-resistant binder tape, and Hypalon overall jacket.

4.1.1.3 5 kV, 3/c Armored Cable (Class 1E)

The 5 kV armored cable (for use in cable tray) shall be of the same general construction as the 15 kV armored cable, except without insulation screen and shield.

4.1.1.4 5 kV, 3/c Non-Armored Cable (Class 1E)

The 5 kV non-armored cable (for use in underground duct and conduit) shall be of the same general construction as the 15 kV non-armored cable.

4.1.2 Conductors

1. Conductors shall be soft or annealed tin-coated copper in accordance with ASTM B 33 or lead alloy coated in accordance with ASTM B 189. 1

2. Conductor stranding shall be Class B in accordance with ASTM B 8.

4.1.3 Conductor Screening (or Shield)

Conductor screening shall be an extruded semiconducting thermosetting EPR compound material compatible with the insulation and the conductor and in accordance with Section 2.4 of IPCEA S-19-81. Conductor screen thickness shall be not less than 20 mils. The outer surface of the conductor screen shall be cylindrical and shall be firmly bonded to the overlying insulation. The conductor screen shall be free stripping from the conductor. 1

4.1.4 Insulation

A. The insulation shall be rated 8 kV for 5 kV cable, and 15 kV for 15 kV cable, and shall be made of heat, moisture, radiation, and ozone resistant EPR compound.

B. Color of insulation material shall be in contrast with the color of the extruded semiconductive insulation screen.

C. Insulation thickness are as specified in Table 1. The minimum thickness at any point shall not be less than 90 percent of the specified average.

TABLE 1

Rated Circuit Voltage Phase to Phase Volts	System Voltage Level	Conductor Size AWG or MCM	Average Insulation Thickness Mils	AC Test Voltage kV	DC Test Voltage kV
2001-5000	4160	6 to 1000	140	22	55
		above 1000	175	27	70
8001-15,000	13,800	2 to 1000	220	33	80
		above 1000	260	38	100

TABLE 2

15,000 VOLT CABLE

Conductor Size (AWG - MCM)	Minimum Average Insulation Thickness, mils	Test Voltage, kV ac	Test Voltage, kV dc	Corona Extinction Level, kV (Ungrounded System)
3/0-500	220	33	80	21.6

4.1.5 Insulation Screen

A. The cable insulation screen shall be an extruded thermosetting semiconductive compound in accordance with AEIC No. 6. The insulation screen shall be intimate with the insulation, and shall meet the stripping test requirements of Section D.3 of AEIC No. 6.

B. The following legend: "Semiconducting - Remove when splicing or terminating," shall be printed in ink at close regular interval (maximum of 24 inches) on the extruded insulation screen.

4.1.6 Insulation Shield

When specified, the insulation shield shall be applied over the insulation screen in accordance with Section 4.1.1.2 of IPCEA S-19-81, except that the tinned copper tape shall be at least 5 mils thick with a minimum overlap of 12.5 percent." 1

4.1.7 Cabling and Fillers

All cables shall be of round construction. The conductors of all multiconductor cables shall be cabled, and where necessary the interstices filled, to provide a firm circular cross-section. The fillers shall be of a material compatible with the other components of the cable. They shall be nonwicking, noncombustible, not sticky, nonhygroscopic, and shall not adhere to the individual conductors or the separator or binder tape. Precured fillers are preferred. A tape separator or binder shall be applied between the individual cabled conductors and the common overall jacket or armor. The tape shall not affect color-coding of the conductors.

4.1.8 Binder Tape

Cables shall have a binder tape helically applied with a minimum 10 percent overlap and a minimum thickness of 10 mils (0.010 inch). The binder tape shall be flame-retardant and compatible with both the individual components of the cable and the overall coverings.

4.1.9 Cable Jacket

A. When specified, cable jacket shall be heavy duty, flame-retardant, moisture-, oil-, radiation-, and ozone-resistant Hypalon meeting the required tests specified in Paragraph 5.3 and IPCEA S-19-81, Section 6.4.

B. Jacket shall not be coated with or contain any lubricating or molding compounds that will interfere with the coloring of cable jacket.

C. Jacket thicknesses over the individual insulated conductor and the overall jacket for multiple conductor cable shall be as specified in Table 4-6 IPCEA S-68-516. The minimum thicknesses at any point shall not be less than 80 percent of the specified average. 1

4.1.10 Metal Armor

When interlocked armor is specified, it shall be galvanized steel as specified in IPCEA S-68-516,, Section 4.5.7.

4.2 MATERIALS AND PROCESSES

4.2.1 Materials

All materials used in fabrication shall be new and meet the requirements of this specification, and shall be subject to the approval of the Purchaser. All materials, supplies, and articles not fabricated or manufactured by the Contractor shall be the products of recognized reputable manufacturers who shall be required to maintain a quality program and supply documentary evidence of quality compliance with the requirements of this specification.

4.2.2 Defective Material

A. If after the cable has been installed, it is discovered that it or any part thereof requires correction, the Purchaser will immediately notify the Contractor and shall have the right to use such cable until such time as it is convenient to the Purchaser that such cable be removed from service for correction.

B. If it is determined that defective cable was not damaged during shipping or installation, but the defect(s) occurred in the manufacturing process, the cost of repairing and/or replacing such cable shall be borne by the manufacturer.

4.3 IDENTIFICATION AND MARKING

4.3.1 Identification of Manufacturer

The cable individual and overall jacket shall have a durable lifetime identification which shows the manufacturer's name, year of manufacture, cable type, voltage class, number and size of conductors, cable code (see proposal for cable codes), and a unique serial number indicating the production run or batch of insulation and jacket compounds to provide traceability. Marker tape placed within the cable under the armor is acceptable for armored cables. 6

4.3.2 Cable Length Indications

Sequential length markings are required for each cable reel. Beginning with the lowest number at the end adjacent to the reel center, lengths shall be marked at 1-foot to 3-foot intervals. Beginning and ending length markings shall be noted on the reel tag. 6

4.3.3 Phase Identification

Multiconductor power cables shall have each phase conductor identified by color-coding using Method 1 of IPCEA S-19-81.

4.3.4 Coloring of Cables

The Contractor shall recommend paint and paint manufacturer, including complete identification and adequate instructions for field application. The paint shall be compatible with the cable components and shall be indicated in Paragraph 12.3.c. 1

4.4 WORKMANSHIP

The details of workmanship shall be of the highest quality consistent with intentions of this specification.

5.0 INSPECTION AND TEST

5.1 GENERAL

5.1.1 Witnessing

The Engineer shall have the right to be present at the Contractor's factory for tests on the cable to determine the fulfillment of performance guarantees. The Engineer shall be notified at least 5 working days in advance of the date of inspection or testing which it is to make or witness. Presence of the Engineer to witness tests will not be required except on request of the Engineer. Certified copies of all performance test reports shall be furnished to the Engineer.

5.1.2 Field Tests

If performance tests are to be made in the field, they shall be made at times and under conditions to be mutually agreed upon by the Purchaser and the Contractor.

5.2 INSPECTION

5.2.1 General

After award but prior to the beginning of manufacture, fabrication or installation of materials, systems, or components, witness and hold points shall be established by the Purchaser to observe the performance of manufacturing processes, inspections, or tests to verify compliance with requirements of this specification and applicable Codes or Standards. Purchaser's Supplier Quality Representative (SQR) shall designate to the Contractor those witness and hold points in which he or the Purchaser will participate.

1. Witness points are defined as critical steps in manufacturing and testing whereby the Contractor is obligated to advise the SQR 3 to 5 working days in advance of the operation so that it may be witnessed by SQR, but the Contractor may proceed with the work past the witness point if the SQR is not available at the appointed time.

2. Hold points are defined as critical steps in manufacturing and testing whereby the Contractor is obligated to advise the SQR 3 to 5 working days in advance of the operation so that it may be witnessed by the SQR and the Contractor may not proceed with the work past the hold point except by written agreement from the Purchaser.

5.3 TESTS

A. All standard factory tests called for by the Codes and Standards listed in Paragraph 2.0 shall be performed as they apply. These tests shall include, but not be limited to, physical and aging test, high voltage dielectric test (ac and dc), conductor resistance measurements, insulation resistance measurements, partial discharge, and moisture absorption tests. In addition, the completed cables shall pass the IEEE 383 Vertical Tray Flame Tests, and individual conductors from multiconductor cable assemblies shall pass the Section 6.19.6 Flame Test of IPCEA S-19-81. All cables shall be Class-1E and shall be qualified in accordance with IEEE 383, including furnished or recommended field splices, and furnished or recommended connections (terminations) for operation under LOCA, post-LOCA and Main-Steam-Line-Break (MSLB) as per Environment Designator IB of Attachments EA, and Appendix EA Qualification Requirements, Rev. 3. Prototype copies of qualification tests using equal or higher values of qualification tests shall be furnished with the proposal for review by the Purchaser. 3

B. The following tests shall be performed on all cable types.

5.3.1 Conductor Test

Before application of any covering, the cable conductor shall be tested in accordance with Section 6.3 of IPCEA S-19-81 and ASTM B 33 as applicable.

5.3.2 Insulation Tests

Cable insulation material called for in this specification shall meet the following requirements:

1. Physical Requirements Before Aging

   a. Tensile strength, minimum, psi: 700

   b. Elongation at rupture, minimum, percent: 250

2. Physical Requirements After Aging

   a. After Air Oven Test (168 hours at 121 ±1 C)

      1. Tensile strength, minimum, percent of unaged value: 75

      2. Elongation, minimum, percent of unaged value: 75

b. After Air Pressure Heat Test (42 hours at 80 psi, 127 C)

1. Tensile strength, minimum, percent of unaged value: 85

2. Elongation, minimum, percent of unaged value: 75

3. Ozone Resistance Test

Ozone concentration 0.025 to 0.030 percent by volume for 3 hours: No cracks resulting in insulation.

4. Accelerated Water Absorption

a. Electrical Method (immersed at 75 C, tested at an average stress of 80 volts per mil, 60 Hz)

1. Dielectric Constant SIC (specific inductive capacitance) after 24 hours immersion, maximum, 4.0.

2. Increase in SIC, 1 to 14 days, maximum percent, 3.5.

3. Increase in SIC, 7 to 14 days, maximum percent, 1.5.

4. Stability Factor after 14 days, maximum, 1.0.

b. Gravimetric Method (Immersed for 168 hours at 70 C)

After 7 days immersion in water at 70 C, maximum mg/sq. inch: 8 | 1

5. Long Term Water Stability

Electrical Method EM 60 except water shall be maintained at 90 C

Dielectric Constant, SIC at 80V/Mil	
After 2 weeks immersion, max.	3.0
After 26 weeks immersion, max.	3.1
Power Factor % at 80V/Mil	
After 2 weeks immersion, max.	1.5
After 26 weeks immersion, max.	1.5
Stability Factor (SF)=80-40V/Mil, power factors	
After 2 weeks immersion, max.	0.2
after 26 weeks immersion, max.	0.2

1

5.3.3 Jacketing Material Tests

Jacketing material called for in this specification shall be tested in accordance with IPCEA S-19-81, Section 6.4, and shall meet the following requirements:

1. Physical Requirements Before Aging

a. Tensile strength, minimum: 1800 psi

b. Elongation at rupture, minimum: 300 percent

c. Tensile stress at 200 percent elongation minimum: 500 psi

d. Set, maximum, percent: 30

2. Physical Requirements After Aging

a. After Air Oven Test at 121 ±1 C for 168 hours:

1. Tensile strength, minimum percent of unaged value: 85

2. Elongation at rupture, minimum, percent of unaged value: 50

b. After Oil Immersion Test at 121 ±1 C for 18 hours:

1. Tensile strength, percent of initial value, minimum: 60

2. Elongation at rupture, percent of initial value, minimum: 60

3. Electrical Requirement

Specific Surface Resistivity, Minimum Megohms - 200,000

5.3.4 Tests on Individual Conductors

Results of the following tests shall be provided for specimens of each type of multiple insulated and jacketed conductor removed from the multiconductor cable assembly.

5.3.4.1 Electrical Tests

Each individual insulated and jacketed conductor intended for multiconductor assembly, after a minimum of 6 hours immersion in water shall meet the following tests:

1. High Voltage ac Test

Each conductor while still immersed shall be subjected to a high voltage 60 cycle test for 5 minutes at voltage values specified in Tables 1 and 2.

2. Insulation Resistance Test

Following the 5 minute ac voltage test and while still immersed in water, each conductor shall show an insulation resistance, corrected to 15.6 C (60 F), of not less than the value of R calculated from the following formula:

$$R = K \log_{10} \frac{D}{d}$$

where:

a. R = insulation resistance in megohms per 1000 ft.

b. K = 50,000. (Minimum) 1

c. D = diameter over insulation.

d. d = diameter under insulation.

3. High Voltage dc Test

Immediately after the Insulation Resistance Test and while still immersed in water, each conductor shall withstand without failure a 15 minute high voltage dc test at values specified in Tables 1 and 2.

5.3.4.2 Flame Test

Individual conductors intended for multiconductor cable assembly shall be capable of passing the Section 6.19.6 Flame Test of IPCEA S-19-81.

5.3.5 Tests of Finished Cable

5.3.5.1 Qualification Tests

The following prototype tests shall be performed.

5.3.5.1.1 Aging and Radiation Exposure

A. Specimen preparation - Form suitable lengths of insulated conductor into test coils so that the effective section of each coil under test will not be less than 10 feet.

B. Aging - Subject the coils to circulating air oven aging at a temperature and time developed by plotting data using the Arrhenius technique or other method of proven validity to simulate installed life.

C. Radiation Exposure-Total - Expose oven-aged specimens to gamma radiation such as Cobalt 60 to a dosage of 5.0×10^5 rads at a rate not greater than 1.0×10^6 rads per hour.

D. After the radiation exposure, the specimens should be straightened and recoiled around a mandrel with a diameter of approximately 20 times the insulated conductor diameter and immersed in tap water at room temperature. While still immersed, these specimens shall pass a voltage withstand test for 5 minutes at a potential of 80V/mil ac or 240V/mil dc.

5.3.5.1.2 Flame Test

5.3.5.1.2.1 Vertical Tray Flame Test

Prototype samples of cable identical in design, materials, and manufacture to the cables specified in this specification, shall pass the flame tests described below.

1. The requirements of IEEE 383 shall apply with the cable sample heat aged at 150 C for 168 hours prior to flame test. The cable shall be subjected to a Ribbon Gas Burner Test in accordance with IEEE 383, Section 2.5. An alternate flame source is not acceptable.

2. In addition to the above flame test, the Contractor shall provide a prototype Flame Test Report using a 210,000 BTU gas burner flame source, if available. Data on the 70,000 BTU test is required.

5.3.5.1.2.2 Criteria

A. The flame shall be extinguished after 20 minutes, and the following data shall be recorded:

1. Time for specimen to ignite following initial application of the flame.

2. Length of time specimen continues to burn following removal of the flame and whether there is flame propagation.

3. Maximum length of charred cable (insulation and/or jacket).

1 B. Cables that propagate flame are considered to have failed the test.

5.3.5.1.2.3 Test Specimens

Sizes recommended for type tests, but not necessarily limited thereto.

Type	Test	Size
5 kV and 15 kV, 3/c Power Cable, Armored and Non-armored.	Vertical Tray Flame Test	No. 250 MCM and No. 3/0 AWG

5.3.5.2 Electrical Tests

Perform electrical tests, high voltage ac, insulation resistance and high voltage dc tests similar to Paragraph 5.3.4.1.

5.3.5.3 Production Tests

Prior to shipping the manufacturer shall perform the following tests on each reel and shall include certified copies of the test results with the shipment.

5.3.5.3.1 Moisture Content Test (Production Test)

Cables shall be free of water. Evidence of water shall be cause for rejection of the cable. Certification that the cables provided do not have any water shall be provided.

5.3.5.3.2 Conductor Continuity

Each length of finished cable shall be tested for conductor continuity.

5.3.5.3.3 Cold Bend Test

The completed cable shall comply with a cold bend requirement of minus 25 C for Hypalon jacketed cable when tested in accordance with the procedure indicated in IPCEA Standard S-19-81, Paragraph 6.19.3.

5.3.5.4 Corona Level

Each length of completed cable shall be tested for Partial discharge and shall comply with AEIC No. 6-75 maximum apparent discharge in picocoulombs specified in Table F1.

5.4 INDEPENDENT TESTING ORGANIZATIONS

The Contractor shall state whether or not there would be any objection to the factory tests being witnessed by inspectors from an independent engineering organization or testing laboratory, should these services be retained by the Purchaser.

5.5 TEST REPORTS

Two transparencies and one print of Certified Test Data on all of the above tests shall be supplied to the Purchaser. The test reports shall also contain verification that the cable will pass the flame test specified. Certified Test Reports showing that the cable satisfies the intent of this specification shall be submitted by the Contractor, fully certified and signed by the Engineer of tests. Documentation according to IEEE 383 shall be included. 2

6.0 PREPARATION FOR DELIVERY

6.1 EQUIPMENT LEVEL

The cable covered by this specification is Level D in accordance with ANSI N45.2.2.

6.2 PACKAGING

The applicable packaging requirements of ANSI N45.2.2 shall apply in addition to the following:

A. The cable shall be placed on standard NEMA non-returnable reels in lengths as specified in the attached proposal. Reels shall be of substantial construction to withstand multiple handling in transit and during ordinary storage and handling operations. They shall have drums with diameters at least 12 times the outside diameter of the cable shipped thereon, and the cable reel flange shall extend 3 inches beyond the last wrap of cable. The Contractor shall be responsible for any damage to the cable and/or the reels during transit resulting from improper packing, sealing, or blocking. Care shall be exercised to insure that no nails or foreign objects extend through the covering or lagging which might puncture or penetrate the cable.

B. 1. Cable reels shall be shipped upright on reel flanges unless the reels are 18 inches or less in diameter and weigh 50 pounds or less. Cable reels shall be shipped to a maximum of 10,000 pounds and 84 inch diameter reel. Reels will not be off-loaded by Purchaser unless these requirement are met.

2. Where individual circuit lengths will require reel sizes and/or weights in excess of 84 inches and/or 10,000 pounds; as a result of owner's circuit length requirements, cable reels in this case may be shipped on suitable sized reels with prior GPC engineering approval.

C. All cable ends shall be taped or otherwise sealed to prevent the entrance of moisture.

6.2.1 Cleaning

6 Cleaning prior to packaging shall insure a minimum of site-cleaning. Any dirt, oil residue, or other contamination (except the manufacturing process dusting powder) shall be removed. The Contractor shall eliminate all material that is defective according to this specification.

6.2.2 Cable Reel Marking

Each cable reel shall have an embossed metal tag securely attached, bearing the purchase order number, item number, cable code, reel number, length of cable, size of conductor, number of conductors, cable voltage rating, gross weight, tag number, if a tag number is included in the requisition, purchase order, and destination. Each side of each cable reel shall be marked as follows: STAND REEL ON RIM ONLY. DO NOT LAY ON SIDE.

6.2.3 Cable Lengths

Each cable reel shall have only one cable length per reel with a tolerance of -0 percent to +10 percent for each cable reel. Cable reels have a minimum length specified in the Specification Proposal section for each cable type and size. The Contractor awarded the order shall submit a detailed list of cable lengths per reel for acceptance by the Purchaser.

6.3 SHIPPING

The applicable shipping requirements of ANSI N45.2.2 shall apply.

6.3.1 Reordering

The cable delivered shall be supplied in continuous reel lengths as approved by the Purchaser. However, in his quotation, the Contractor may state the minimum quantities that he will accept for release. This information will be assessed during the bid evaluation.

ATTACHMENT 1

REQUIREMENTS FOR KERITE CABLE

(This Attachment is only to be used by the Kerite Company, all other manufacturers must abide by the design requirements of Specification X3AJ01 without reference to this Attachment.)

The design requirements of Specification X3AJ01 are to be modified as shown herein. Only those paragraphs specifically addressed in this Attachment are to be considered as modified, all requirements of Specification X3AJ01 not specifically addressed in this Attachment remain unchanged and applicable to the cable manufactured by the Kerite Company. 2

The following paragraphs are revised:

2.2; 3.1.A; 4.1.1; 4.1.1.2; 4.1.1.4; 4.1.3; 4.1.4; Table 1; 4.1.5; 4.1.6; 4.1.7; 4.3.1; 4.3.2; 4.3.3; 5.3; 5.3.1; 5.3.2; 5.3.3; 5.3.4; 5.3.4.1; 5.3.4.2; 5.3.5.1.2.1; 5.3.5.1.2.2; 5.3.5.1.2.3; 5.3.5.2; 5.3.5.3.1; 5.3.5.3.3; 5.3.5.4; 5.5.

The following paragraphs are to be deleted in entirety:

4.1.1.1; 4.1.1.3; Table 2; 4.1.8; 4.1.9; 4.1.10; 5.3.5.1.

2.2 REFERENCED CODES AND STANDARDS

AEIC CS6-79	Specification for Ethylene-Propylene-Rubber Insulated, Shielded Power Cables, Rated 5 through 65 kV
ANSI N45.2 - 1971	Quality Assurance Program Requirements for Nuclear Power Plants
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IEEE 383	IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations
MANUFACTURER	Manufacturer's standard production tests and certified prototype tests and/or certification by suppliers to the manufacturer
MANUFACTURER	Kerite Proprietary Document Alvin W. Vogtle Nuclear Plant, Bechtel, Qualification Documentation for Kerite 5kV HTK-SPS and 15kV HTK-DPS Shielded Power cables, Draft 1, 11/21/79. (Note, Draft 2 to be submitted upon completion of Environmental testing
NEMA WC-21	Non-returnable reels

If a Bidder has any reason for deviating from any of the specified Codes and Standards, he shall state in his Proposal the exact nature of the change and his reason.

3.1 PHYSICAL

A. Non-armored cable shall be suitable for indoor or outdoor installation in underground duct bank, and conduit. Outdoors, the cable may be exposed to sunlight, rain, dust, etc.

4.1.1 General

Neither asbestos material nor PVC shall be used in the cable construction. The following general features shall apply. No alternate cable construction will be accepted. Cables shall be designed for bending radius to a minimum of twelve times the cable O.D. There shall be no splicing of completed cable assemblies.

4.1.1.2 15 kV, 3/C Non-Armored Cable

The 15 kV non-armored cable (for use in underground duct and conduit) shall have each individual conductor provided with an extruded energy suppression layer, Ethylene Propylene Rubber (EPR) or Kerite HT insulation, an extruded energy suppression layer applied over the insulation, a helically applied metal tape and a flame-retardant Hypalon (chlorosulfonated polyethylene) or Kerite FR jacket. The individual conductors shall be cabled together to form a triplexed construction. 2

4.1.1.4 5 kV, 3/C Non-Armored Cable

The 5 kV non-armored cable (for use in underground duct and conduit) shall have each individual conductor provided with an extruded energy suppression layer, EPR or Kerite HT insulation, a helically applied metal tape and a flame-retardant Hypalon (chlorosulfonated polyethylene) or Kerite FR jacket. The individual conductors shall be cabled together to form a triplexed construction.

4.1.3 Conductor Screening (or Shield)

Conductor energy suppression layer shall be an extruded material designed to relieve stress and suppress energy at the inner insulation interface. It shall be compatible with the insulation and the conductor. The conductor energy suppression layer nominal thickness shall be 18 mils. The outer surface of the conductor energy suppression layer shall be cylindrical and smooth. The conductor energy suppression layer shall be free stripping from the conductor.

4.1.4 Insulation

A. The insulation shall be rated 8 kV for 5 kV cable and 15 kV for 15 kV cable. It shall be ozone resistant EPR or Kerite HT compound to achieve the best possible balance of electrical and physical properties including heat, moisture, radiation and ozone resistance. The insulation shall also be resistant to the effects of partial discharge.

B. Color of the insulation system shall be in contrast with the color of the extruded insulation energy suppression layer.

C. Insulation system thickness (including energy suppression layer) are as specified in Table 1. The minimum thickness of any component at any point shall not be less than 90 percent of the specified average.

TABLE 1

Rated Circuit Voltage Phase to Phase Volts	System Voltage Level	Conductor Size AWG or MCM	Minimum Average Insulation System Thickness (mils)	AC Test Voltage kV	DC Test Voltage kV
2001 - 5000	4,160	250 - 500	138	26	52
8001 - 15,000	13,800	3/0 - 500	223	35	70

2

4.1.5 Insulation Energy Suppression Layer

When specified, an insulation energy suppression layer shall be applied. The insulation energy suppression layer shall be an extruded material designed to relieve stress and suppress energy at the interface with the insulation. It shall be compatible with the insulation. The surfaces of the insulation energy suppression layer shall be cylindrical and smooth and shall be printed "Do Not Strip" at maximum intervals of 24 inches.

4.1.6 Insulation Shield

When specified, the insulation shield shall be applied over the insulation or insulation energy suppression layer. The insulation shield shall consist of a tinned copper or zinc tape with a minimum overlap of 12.5 percent, helically applied over the insulation screen.

4.1.7 Cable Jacket

A. The cable jacket shall be heavy duty, flame-retardant, moisture, oil, radiation and ozone resistant Hypalon or Kerite FR meeting the required tests to achieve the best possible balance of physical and fire resistant properties.

B. Jacket shall not be coated with or contain any lubricating or molding compounds that will interfere with the coloring of cable jacket.

C. Jacket thickness over the individu insulated conductors shall meet or exceed the specifications of Table 4 ICEA S-68-516. The minimum thickness at any point shall not be less than 80 percent of the specified minimum average.

4.3.1 Identification of Manufacturer

The cable individual jackets shall have a durable lifetime identification which shows the manufacturer's name, year of manufacture, cable type, voltage class, number and size of conductors, cable code (see proposal for cable codes), and a unique serial number indicating the production run or batch of insulation and jacket compounds to provide traceability.

4.3.2 Cable Length Indications

A. Sequential length markings are required for each cable reel. Beginning with the lowest number at the end adjacent to the reel center, lengths shall be marked at 2-foot intervals. Beginning and ending length markings shall be noted on the reel tag.

B. Completed cables shall not contain any splices, repairs, or rework that are not qualified to this specification and Appendix EA, Rev. 3. 3

4.3.3 Phase Identification

Multiconductor power cables shall have each phase conductor identified by color-coding using Method 3 of ICEA S-19-81.

5.3 TESTS

A. Standard factory production or prototype qualification tests as described by the Codes and Standards listed in Paragraph 2.0 shall be performed as described below. These tests shall include, but not be limited to, physical and aging test, high voltage dielectric test (ac and dc), conductor resistance measurements, insulation resistance measurements, and moisture absorption data. In addition, the completed cables shall be capable of passing the IEEE 383 Vertical Tray Flame Tests and individual conductors from multiconductor cable assemblies shall be capable of passing the Section 6.19.6 Flame Test of ICEA S-19-81. All cables shall be Class 1E and shall be qualified in accordance with IEEE 383, including furnished or recommended field splices, for operation under LOCA, post-LOCA, and Main Steam Line Break (MSLB) as per Environment Designator IB of Attachments EA, and Appendix EA Qualification Requirements, Rev. 3. Documentation of prototype qualification tests using mutually agreeable test levels shall be furnished to the Purchaser. 3

B. The following production and prototype qualification tests shall be performed.

5.3.1 Conductor Test (Prototype)

The cable conductor shall be tested in accordance with Section 6.3 of ICEA S-19-81 and ASTM B 33 as applicable. Certification of Compliance by the manufacturer's supplier shall be furnished.

5.3.2 Insulation Tests (Prototype)

Cable insulation material called for in this specification shall meet the requirements as delineated by Kerite Material Data Sheet, HTK (N-98) Insulation, 10/24/79, Kerite EM 178B, Determining Temperature Ratings of HTK Insulated Cables and Pre-Aging Requirements to Simulate 40-Year Service Aged Conditions, 12/1/77, and EM 223, Determining Temperature Ratings of High Temperature Kerite Insulated Cables for Operation in Wet and Alternate Wet/Dry Locations, 5/4/77, contained in Kerite Proprietary Document referenced in Section 2.2.

5.3.3 Jacketing Material Tests (Prototype)

Jacketing material called for in this specification shall meet the requirements as delineated by Kerite Material Data Sheet, Kerite FR (HC-711) Jacket, 12/1/77, and Kerite EM 178A, Determining Temperature Ratings of FR Insulated, FR or HTNS Jacketed Cables, and Pre-Aging Requirements to Simulate 40-Year Service Aged Conditions, 5/1/79, contained in Kerite Proprietary Document referenced in Section 2.2.

5.3.4 Tests on Individual Conductors

Individual conductors comprising a triplexed assembly shall meet the following electrical and flame test requirements.

5.3.4.1 Electrical Tests (Production)

Each individual insulated conductor intended for multiconductor triplexed assembly shall meet the following tests:

1. High Voltage DC Test

   After a minimum of 16 hours immersion in water and while still immersed, each conductor shall withstand without failure a 5-minute high voltage dc test at values specified in Table 1.

2. High Voltage AC Test

   After a minimum of 24 hours immersion in water and while still immersed, each conductor shall be subjected to a high voltage 60 cycle test for 5 minutes at voltage values specified in Table 1.

3. Insulation Resistance Test

Following the 5-minute ac voltage test and while still immersed in water, each conductor shall show an insulation resistance, corrected to 15.6 C (60 F), of not less than the value of R calculated from the following formula:

$$R = K \log_{10} \frac{D}{d}$$

where:

a. R = insulation resistance in megohms per 1000 ft.

b. K = 20,000 (Minimum)

c. D = diameter over insulation

d. d = diameter under insulation

5.3.4.2 Flame Test (Prototype)

Individual conductors intended for multiconductor triplexed cable assembly shall be capable of passing the Section 6.19.6 Flame Test of ICEA S-19-81.

5.3.5.1.2.1 Vertical Tray Flame Test (Prototype) 2

Prototype samples of cable identical in design, materials, and manufacture to the cables specified in this specification, shall pass the flame tests described as follows:

The requirements of IEEE 383 shall apply with one cable sample heat aged at 143 C for 168 hours prior to flame test and one cable tested in an unaged condition. The cable shall be subjected to a Ribbon Gas Burner Test in accordance with IEEE 383, Section 2.5. An alternate flame source is not acceptable.

5.3.5.1.2.2 Criteria

A. The flame shall be extinguished after 20 minutes, and the following data shall be recorded:

1. Time for specimen to ignite following initial application of the flame.

2. Length of time specimen continues to burn following removal of the flame and whether there is flame propagation.

3. Maximum length of charred cable (insulation and/or jacket).

B. Cables that propagate flame to the top of the tray are considered to have failed the test.

5.3.5.1.2.3 Test Specimens

Sizes recommended for prototype tests, but not necessarily limited thereto.

Type	Test	Size
5 kV and 15 kV, 3/C Power Cable, Non-armored.	Vertical Tray Flame Test	No. 4/0 AWG and/or 500 mcm

5.3.5.2 Electrical Tests (Production)

Perform electrical tests, high voltage ac, insulation resistance and high voltage dc tests as delineated in Paragraph 5.3.4.1.

5.3.5.3.1 Moisture Content Test (Production)

Each reel of finished cable shall be visually inspected to ensure the absence of moisture in accordance with Kerite Factory Instruction No. 174, Cable Inspection for Water or Moisture, 10/30/75, contained in Kerite Proprietary Document referenced in Section 2.2. The presence of moisture shall constitute a rejection. 2

5.3.5.3.3.3 Cold Bend Test (Prototype)

The completed cable shall comply with the low temperature flex criterion of Kerite Material Data Sheet - Kerite FR (HC-711) Jacket, 12/1/77, contained in Kerite Proprietary Document referenced in Section 2.2.

5.3.5.4 Corona (Prototype)

Corona immunity shall be demonstrated by Qualification Test Documentation U-Bend Plate Test on HTK Insulation, 3/12/78, contained in Kerite Proprietary Document referenced in Section 2.2.

5.5 TEST REPORTS

Certified Test Data on all production tests and Certified Prototype Qualification Documentation shall be supplied to the Purchaser. All prototype test documents certifying that the cable satisfies the intent of this specification shall be signed by an Engineer familiar with and skilled in the particular area and an executive officer of the Contractor. Certified production test reports shall bear the signature of the individual responsible for the Quality Assurance function.

TABLE 2
ENVIRONMENTAL CONDITIONS
(Sheet 1 of 84)

ENVIR. DESIGNATOR	UNIT	NORMAL			ABNORMAL TEST(1)		DBA/POST-DBA(2)			RELATIVE HUMIDITY MAX	
		TEMP °F	PRESS	INT. DOSE-RADS	TEMP - °F MAX/MIN	PRESS	TEMP °F	PRESS	INT. DOSE-RADS	NORMAL %	DBA %
1. SPRAYED VAPOR REGION(4)											
IB-R-301H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-302H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-101H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-102H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-103H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-104H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-105H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-106H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-111H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A01H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
2. UNSPRAYED VAPOR REGION(4)											
IB-R-107H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-108H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-110H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-115H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A02H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A03H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A04H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A05H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100

H = Harsh environment

Note: If any one of the following condition exists, the room is classified as in harsh environment.

1. Temperature increases due to the pipe break.
2. T.I.D > 1×10^4 rad

CONTAINMENT BUILDING(3)
(Sheet 1 of 3)

TABLE 2
ENVIRONMENTAL CONDITIONS
(Sheet 2 of 84)

ENVIR. DESIGNATOR	UNIT	NORMAL			ABNORMAL TEST(1)		DBA/POST-DBA(2)			RELATIVE HUMIDITY MAX	
		TEMP °F	PRESS	INT. DOSE-RADS	TEMP - °F MAX/MIN	PRESS	TEMP °F	PRESS	INT. DOSE-RADS	NORMAL %	DBA %
IB-R-A06H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A07H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A08H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-A09H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-B03H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-B12H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-B10H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-B13H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-B14H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
IB-R-B15H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 9	Fig. 11	2×10^8	50	100
3. SUMP REGION(4)											
*IA-R-B01H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B02H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B04H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B05H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B06H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B07H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B08H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B09H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B11H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-B16H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-C03H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100
*IA-R-C10H	1/COM	120	17.7-13.2 psia	2×10^6	120/60	60 psig	Fig. 10	Fig. 11	2×10^8	50	100

*If equipment is located above flood level, Figure 9 shall be used for temperature (Flood level is 181'2")
H = Harsh environment

CONTAINMENT BUILDING(3)
(Sheet 2 of 3)

TABLE 2
ENVIRONMENTAL CONDITIONS
(Sheet 3 of 84)

NOTES

1. The containment test pressure is 60 psig.

2. Includes normal doses.

3. Chemicals - spray solution, boric acid (2000 ppm Boron) plus sufficient sodium hydroxide solution (30-35 wt% NaOH) to achieve the desired pH.

4. Spray Exposure

The containment building consists of three general regions, these regions are defined as:

- Sprayed Vapor Region - That area above the operating deck that would be exposed to the direct effects of the spray system.
- Unsprayed Vapor Region - That area of containment that is below the operating deck and above the containment flood level that may be exposed to the indirect effects of the spray system.
- Sump Region - That area of containment that would be flooded post-accident.
- Sprayed and unsprayed vapor region pH - Time = 0 - 100 mins - 10.5. Time = 100 mins - 24 hrs - 8.5
- Sump region pH - Time = 0 mins - 24 hrs - 8.5.

CONTAINMENT BUILDING(3)
(Sheet 3 of 3)

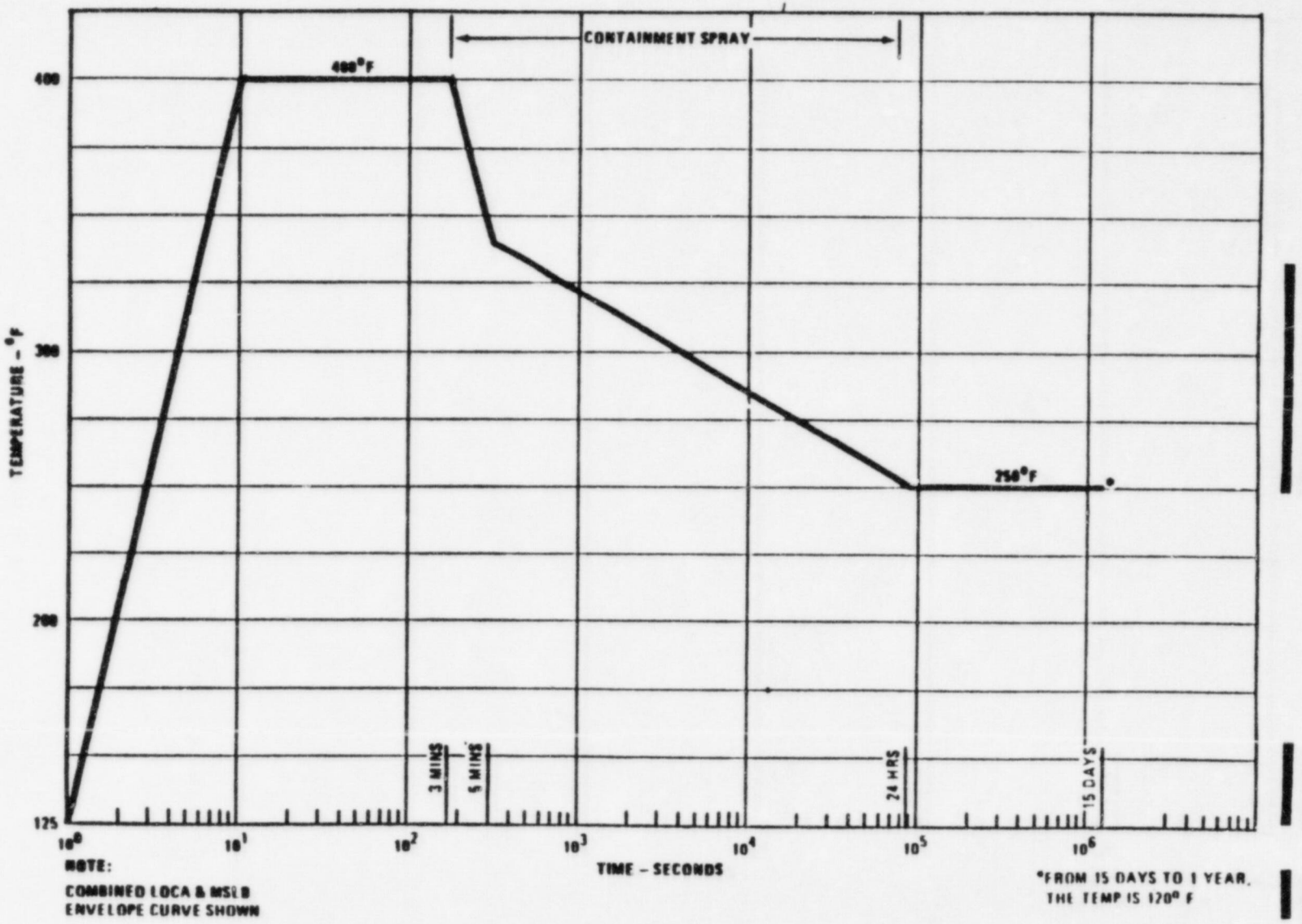

FIGURE 9 - TEMPERATURE CONDITIONS FOR ENVIRONMENTAL QUALIFICATION INSIDE CONTAINMENT (VAPOR REGION)

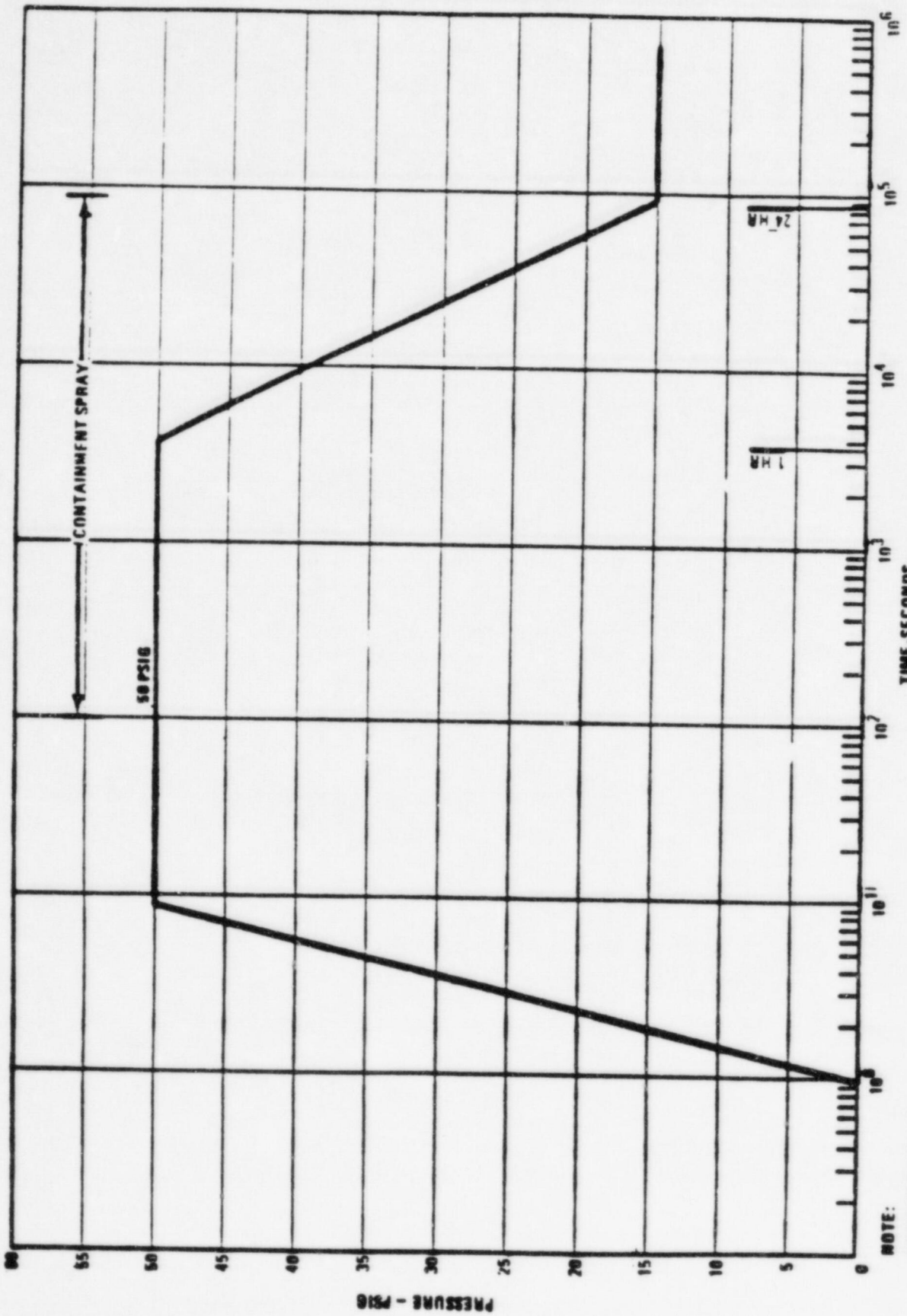

FIGURE 11 - PRESSURE CONDITIONS FOR EQUIPMENT QUALIFICATION INSIDE CONTAINMENT

APPENDIX EA

QUALIFICATION REQUIREMENTS

FOR

SAFETY-RELATED EQUIPMENT, DEVICES, AND INSTRUMENTATION

FOR THE

ALVIN W. VOGTLE NUCLEAR PLANT

BURKE COUNTY, GEORGIA

REVISION 3

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APPENDIX EA

QUALIFICATION REQUIREMENTS

FOR

SAFETY-RELATED EQUIPMENT, DEVICES, AND INSTRUMENTATION

1.0 SCOPE

1.1 GENERAL

A. This Appendix identifies qualification methods and requirements for Safety-Related Equipment (Mechanical Equipment, and Class IE Equipment) hereinafter called Equipment, using the guidance given in IEEE Standard 323-1974 to verify that Equipment can perform the specified safety functions when subjected to normal, abnormal and design basis event environmental conditions and can adequately perform this function before, during, and after the specified event. This document also provides the general requirements for development of qualification plan(s), procedure(s) and report(s). Compliance with the general requirements of developing qualification plans/procedures/reports and the utilization of the specific procedure shall be in accordance with this document. The availability of information will be taken into account during such reviews.

B. It further requires the Contractor to describe his qualification program and from it to demonstrate, by appropriate tests and/or analyses with adequate justification, a period of qualified life (41 years) for the Equipment and its components offered. If a qualified life of 41 years for the Equipment item or component has not been demonstrated, the Contractor shall state the methods by which he will qualify the Equipment.

C. Equipment varies considerably in size and complexity. This Appendix, therefore, addresses the major Equipment categories and specifies acceptable programs for these categories.

D. Quality assurance program requirements which apply to the Purchaser's Specification shall also apply to this Appendix.

E. Where there are conflicts between the IEEE Standards, U.S. NRC Regulatory Guide(s) and this Appendix the conflict shall be resolved by the Purchaser.

1.2 INTENT

A. This Appendix defines environmental qualification acceptance criteria for equipment that must conform to IEEE Standard 323 as supplemented by U.S. NRC Regulatory Guide 1.89. Seismic qualification requirements are stated in Seismic Appendix "QG".

B. For electrical, control and instrumentation equipment strict compliance to IEEE Standard 323-1974 and it's daughter standards is mandatory. For mechanical equipment the principles and criteria used in IEEE Standard 323-1974 are mandatory. 3

1.3 RESPONSIBILITIES

A. The Purchaser is responsible for defining the environmental conditions and for specifying appropriate performance or functional requirements for Equipment to be supplied.

B. Environmental and operational qualification of Equipment shall be in accordance with the procedures and methods of this Appendix and shall be the responsibility of the Contractor.

C. If an ongoing qualification program is proposed, the Contractor shall state specifically his involvement and limits of liability for such a program in his Proposal.

D. In some cases Equipment may be provided by others for inclusion in or attached to the Contractor's equipment. When such Equipment is provided, the Contractor shall have the full responsibility for providing the qualifications to the Purchaser, including qualification for any interface(s) associated with the Equipment, the interfaces will be described by the Purchaser.

E. The Contractor is responsible for providing technical assistance to the Purchaser as required to defend and justify the methods used to all parties required in order that an Operating License be issued for the VNP. Technical support after the issurance of an operating license will be negotiated between the Purchaser and the Contractor.

2.0 CODES AND STANDARDS

2.1 GENERAL

A. The Purchaser's Specification to which this document is attached contains a list of referenced Codes and/or Standards. All work activities and documentation shall conform to applicable portions of the latest issue of all Codes and Standards in force at the date of award of the Purchase Order. Adoption of any subsequent issues shall be subject to Purchaser's approval prior to implementation.

B. Equipment shall meet the requirements of the Codes and/or Standards listed as applicable and as supplemented by the U.S. NRC Regulatory Guides. Those Codes and Standards not supplemented by a Regulatory Guide shall satisfy NRC Regulatory Guide No. 1.89, dated November 1974, titled "Qualification of Class IE Equipment for Nuclear Plants," that implements and modifies certain portions of the referenced standards.

C. The Contractor shall provide to the Purchaser a listing of Codes, Standards, and Specifications (identifying the effective issue by date)

which govern the work performed within the scope of this document. Codes and Standards referenced within this Appendix include, but are not limited to, the following:

ANSI N 45.2 - 1971	Quality Assurance Program Requirements for Nuclear Power Plants
IEEE Standard 1	General Principles for Temperature Limits in the Rating of Electric Equipment
IEEE Standard 98	Guide for the Preparation of Test Procedures for the Thermal Evaluation and Establishment of Temperature Indices of Solid Electrical Insulating Materials
IEEE Standard 99	Guide for the Preparation of Test Procedures for the Thermal Evaluation of Insulation Systems for Electrical Equipment
IEEE Standard 101	Guide for the Statistical Analysis of Thermal Life Test Data
IEEE Standard 317	IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations
IEEE Standard 323	IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations
IEEE Standard 334	IEEE Standard for Type Tests of Continuous Duty Class IE Motors for Nuclear Power Generating Stations
IEEE Standard 344	IEEE Recommended Practices for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations
IEEE Standard 380	Definitions of Terms Used in IEEE Nuclear Power Generating Station Standards
IEEE Standard 381	IEEE Standard Criteria for Type Tests of Class IE Modules Used in Nuclear Power Generating Stations
IEEE Standard 382	IEEE Trial Use Guide for Type Test of Class IE Electric Valve Operators for Nuclear Power Generating Stations
IEEE Standard 383	IEEE Standard for Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations

IEEE Standard 420	IEEE Trial-Use Guide for Class IE Control Switchboards for Nuclear Powered Generating Stations
IEEE Standard 535	IEEE Standard for Qualifying Class IE Lead Storage Batteries for Nuclear Power Generating Stations
IEEE Standard 650	IEEE Standard for Qualification of Class IE Battery Chargers and Solid State Inverters for Nuclear Power Generating Stations
ASME BOILER AND PRESSURE VESSEL CODE, SECTION III	

3

3.0 PRINCIPLES OF QUALIFICATION

3.1 GENERAL

A. Equipment qualified by methods acceptable under this Appendix must have its design (safety-related) functions demonstrated while subjected to normal, abnormal (includes ASME Boiler and Pressure Vessel Code upset and emergency conditions) and Design Basis Event (DBE) environmental conditions. Satisfactory performance of design functions is required before, during, and after a DBE.

B. The nuclear plant in which the Equipment will be used has a design life of 41 years, therefore, the qualified life goal of the Equipment is 41 years or more. Any exceptions shall be identified and clearly described in the Proposal, and the Contractor shall define the method of qualification proposed for reaching the qualified life.

C. When the Contractor's standard qualification requirements are more stringent than all postulated circumstances specified for the Equipment, and the Contractor has documented evidence of performance consistent with the requirements of Section 8 of IEEE Standard 323-1974, he may submit this evidence in lieu of the additional testing requirement specified in this Appendix.

D. "Qualified Life" is defined as the operating period deduced from historical performance data and/or actual test data, including the effects of aging, after which the Equipment can satisfactorily withstand the Design Basis Event and Post-Design Basis Event operation. The tests are delineated by Items 5, 6, and 7 of the sequence given in Paragraph 6.3.2 of IEEE 323-1974. Extrapolation from previous test data must be supported by appropriate evidence to justify the technique used.

E. If the limiting factor in the qualified life is deterioration under normal operating conditions of items such as insulation, gaskets, diaphragms, motor brushes, etc., which are replaceable at maintenance intervals, the Contractor shall state the optimum length of such intervals, based on actual environmental test data. A list of the components which may have to be replaced in this time period shall be provided.

F. With all of the following qualification methods, the end result must be documentation that demonstrates the equipment's adequacy to perform its required safety-related function. This documentation must be in a form that allows verification by competent personnel, other than the qualifiers, and should contain as a minimum the performance requirements, the method used, the results, and the justification as outlined in Section 8 of IEEE Standard 323-1974.

G. To satisfy the requirements of this Appendix, a qualified life of definable period shall be demonstrated, using one or more of the qualification methods described in Sections 3.2, 3.3, 3.4, 3.5, and 3.6 of this Appendix.

H. The qualification of safety-related equipment shall include documentation that adequate margin as recommended by Section 6.3.1.5 of IEEE Standard 323-1974 has been applied. The following indicates some typical methods of demonstrating margin:

1. Increasing the levels of testing.

2. Increasing the number of test cycles.

3. Increasing test duration.

4. Increasing the number of stress reversals in analysis.

5. Increasing or decreasing (e.g., line voltage for some plant conditions. The voltage at the equipment terminals may be as low as 75 percent of nominal) service conditions to provide more severe conditions.

6. Various combinations of 1 thru 5 above.

I. Manual logging of data shall not be allowed, unless justified by the Contractor. The Purchaser may specifically waive this requirement on a case-by-case basis after review of the Contractor's test plan. 3

3.2 TYPE TESTS, AGING AND MARGIN

3.2.1 Type Tests

A. Type testing of actual Equipment per IEEE Standard 323-1974, Paragraph 6.3, is the method preferred to demonstrate the ability of the Equipment to perform its required safety-related function for a definable period. The type test shall include, as a minimum, thermal and mechanical aging, and exposure to extremes of environmental conditions, seismic and vibration effects. Type testing shall be done with samples of the production line equipment and simulated service conditions, in accordance

with the sequence indicated in IEEE Standard 323-1974 to the VNP specified service conditions, including margin, and shall take into account normal, abnormal plant operation , Design Basis Events,(DBE) and Post DBE operations.

B. Type Testing shall include adequate service condition margins as recommended by Section 6.3.1.5 of IEEE Standard 323-1974 over the most severe specified (by Purchaser) service conditions. There is no requirement to test a large number of samples (to support probability analyses). Margins must allow for manufacturing tolerances and normal variations in manufacture, plus an additional margin. The information presented in Attachment EA (Environmental Conditions) does not include any margin. Therefore, margin shall be identified by the Contractor and included in his test program. Any Standard(s) and/or Codes which include operational cycling as a life consideration shall be considered not to include margin. 3 3

C. The Contractor shall prepare and submit to the Purchaser a test procedure, compatible with the equipment specification, to describe the required tests and provide an auditable link between the specification and the test results in accordance with Paragraph 6.3.1.1 of IEEE Standard 323-1974.

D. Equipment shall be mounted and connected in a manner, and in a position that simulates or duplicates the actual installation. A description of the mounting and external connections shall be provided by the Purchaser. Any deviation from the actual installation and/or connection shall be justified. Equipment that can be installed in more than one position shall be tested in all installation positions that the Purchaser specifies, unless justification is provided that such positioning will not affect the equipment performance. If such justification is not provided, qualification will be acceptable only for the installation that was tested. Throughout the tests, the venting path of all pneumatic devices shall represent the actual installed configuration (vents with exhaust within the test chamber).

E. In any testing program, particular attention shall be given to the sequence of tests performed. Synergistic effects shall be considered in any testing program. The most severe sequence shall be determined (subject to Purchaser review) by using the guidance of Section 6 of IEEE Standard 323-1974. Generally Section 6, Paragraph 6.3.2 of IEEE Standard 323-1974 is considered the most severe sequence of type testing and should be performed in the following sequence, unless another sequence would be more severe for the specific equipment. The Contractor shall provide complete justification that the sequence used is the most severe for the item being tested.

1. Inspection to confirm that there are no shipping or handling damages and that the equipment conforms to the Purchaser's Specification, and also to determine the basic dimensions.

2. Operation under normal service and environmental conditions through the entire operating range and record base line data.

3. Operation through the extremes of all performance and electrical characteristics (excluding DBE and post-DBE conditions) and record data to confirm that those requirements have been satisfied.

4. Aging, either natural or accelerated, to put the equipment in the expected end-of-qualified life condition; radiation may be included in this step or in Step "6" below.

5. Vibration to both seismic (per Seismic Appendix "QG") and plant mechanical service levels. Recording of data to confirm that the functional requirements have been satisfied before, during, and after the vibratory event.

6. Operation through the extremes of performance and electrical characteristics over the entire operating range while exposed to simulated DBE events. Record data to prove that functions which must be performed during such conditions are performed.

7. Operation through the extremes of all performance and electrical characteristics over the entire operating range while exposed to post-DBE conditions immediately following the DBE conditions and record data to prove that functions that must be performed during such conditions are performed.

8. For equipment that is not exposed to DBE environmental conditions, the simulated environmental conditions used shall represent the extreme environmental conditions that each equipment may be exposed to at the actual installed location. 3

9. Disassemble and inspect to determine the condition and status of the equipment and record the findings.

F. Tests shall be monitored, using suitable equipment that detects changes in the variables and that was calibrated to traceable and auditable standards traceable to the National Bureau of Standards in accordance with Paragraph 6.3.1.4 of IEEE Standard 323-1974.

G. Before, during, and after the type test, safety-related control or indicating functions shall be recorded. The equipment shall be operated over its specified range while varying the powering media (e.g., air, electric) through its extremes or the Contractor shall justify the operational range.

H. Contractor's program shall identify all critical components and materials that are subject to aging or wear. Critical components and materials, for the purpose of this Appendix, are components and materials whose

degradation could cause equipment to fail to perform its required safety-related function. Identify and establish life cycles for these components and materials.

I. All electrical, mechanical, and hydraulic/pneumatic components shall perform their safety-related functions throughout the test, with no error exceeding the required tolerance values. If this requirement cannot be satisfied the Contractor shall advise the extent to which performance is degraded during, and subsequent to, any portion of the test. Accessory components shall be tested as assembled to the basic equipment, or justification shall be provided for acceptance of separate test results.

J. Contractor shall justify and document any exceptions to any of the tests, by reason of such factors as size, aging, radiation tolerance limits, and effects on performance. Fail-safe justification shall not be acceptable.

K. The qualification requirements listed in this Appendix describe the service and environmental conditions at the equipment location. It is recognized that the qualification test facility may be limited in some way. The extent of any such limitations shall be described clearly in the proposal in a section titled "Qualification Facility Limitations". The Contractor shall propose alternate methods to compensate for such limitations.

L. The Contractor shall provide documentation of any off-normal conditions, abnormal events and any departure from procedural requirements that occur during any portion of the qualification program. This documentation shall include justification which describes how the validity of the program was not violated. The Purchaser reserves the right to declare the program unacceptable if the justification is not adequate.

M. The Contractor shall use the same production line test sample in all portions of the sequence described in Section 3.2.1.E of this Appendix.

3.2.2 Aging

A. The objective of aging is to put the equipment in a condition equivalent to end-of-qualified-life before performing the functional tests under design basis event and post-design basis event environments. It is acknowledged that the state-of-the-art regarding aging for some equipment is more advanced than others. It is expected that known technology will be utilized in any aging program by the Contractor. Optionally, and especially where the state-of-the-art is limiting, aging as part of the qualification program may be addressed by analysis, or combined qualification as detailed in Section 5.3, and 5.4 of IEEE 323-1974.

B. As an example, a typical aging procedure designed to put equipment into an advanced or end-of-life age prior to design basis event testing could include, as appropriate, the following:

1. Operational (functional) cycling (electrical/mechanical) at service loads.

2. Power Source (high and low voltage or air pressure) cycling.

3. Extreme ambient temperature and humidity increase and cycling.

4. Ionizing radiation exposure.

5. Ozone concentration.

Other methods may be considered when provided with full justification in the test plan.

C. In order to be useful, an aging procedure description should include an auditable analysis that defines the time compression factor. The aging procedures are applied for a specific time. Providing that the equipment passes the subsequent design basis event tests, the aging time multiplied by the time compression factor would be the equipment qualified life. "The qualified life shall be based upon the known limits of extrapolation of the time dependent environmental effects if an accelerated aging test was used to determine the mathematical model" (Ref. IEEE 323-1974, Paragraph 6.5.4).

D. The post-DBE conditions including the time factor will be specified by the Purchaser.

E. Further clarification of aging as it is applied to major equipment categories is addressed in Section 5 of this Appendix.

3.3 PREVIOUSLY QUALIFIED EQUIPMENT

The Contractor's basis for justifying equipment qualification for a qualified life period, number of operations, number of hours, or other time of operation, shall include the following information, particularly when reference is made to previously qualified equipment.

A. Identify the conditions upon which the qualified life is based, but not limited to the following: maintenance procedures and intervals, replacement of component items and intervals, and operational requirements (running time, number of operations, load cycles, etc.), under normal operation, elapsed time may not in itself be the critical element of equipment degradation.

B. Manufacturers who have previously qualified equipment of the same design as that to be supplied for this purchase may submit copies of the previous qualification including a statement of applicability to the Purchaser's Specification in lieu of requalifying the equipment. The previous qualification must have used procedures consistent with the requirements of this Appendix and must have subjected the Equipment to environmental

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conditions which exceed those required by the Purchaser's Specification. In cases where differences in the equipment design, service, and/or environmental conditions exist between the previous qualification and Purchaser's Specification, extrapolation of results from the previous qualification is required. The Contractor shall submit an analysis justifying the extrapolation, and the tests used as the basis. Such an analysis shall, as a minimum, identify the differences, describe the method of extrapolation, and justify the qualification.

C. Where equipment of a similar design has been previously qualified, the Contractor may submit previous qualification data in lieu of requalifying the equipment. The previous qualification must have used procedures consistant with the requirements of the Purchaser's Specification. Differences in the equipment design, service, and environmental conditions that exist between the previous qualification and the Purchaser's Specification shall be addressed and extrapolation of results of the previous qualification shall be justified.

3.4 ON-GOING QUALIFICATION

A. The Contractor shall state the extent of his responsibility and participation in any on-going qualification program, including but not limited to the following in accordance with Paragraph 6.6 of IEEE Standard 323-1974.

1. Furnish original qualification report for review to assure compliance with the requirements of the Purchaser's Specification.

2. Furnish for review a test procedure, specification, and objectives including specific features to be demonstrated by the tests.

3. Furnish specialized test equipment, tools, and technical services, if the program is to be carried out at the jobsite.

4. Provide technical services for interpretation of test results and preparation of preliminary, intermediate and summary reports of conclusion and recommendations.

5. Where a qualification program is underway for like equipment and for service conditions the same as or more severe than the specified service conditions of this project, such program may be proposed in lieu of a new program.

6. State the optimum intervals for replacement of equipment components that limit the qualified life under normal operating conditions, i.e., bearings, diaphragms, gaskets, contacts, springs, etc. These intervals shall be based on test data or analyses. If an analyses is used it shall be justified.

B. When the qualified life of the equipment is less than 41 years, the Contractor shall propose a detailed maintenance program, replacement criteria, and a test procedure to requalify the Equipment, including it's seismic qualifications.

C. Modification to the Equipment shall be in accord with Paragraph 6.8 of IEEE Standard 323-1974.

3.5 ANALYSIS

A. Qualification by analysis must include justification of the methods, theories, and assumptions used. In general, equipment is too complex to be qualified by analysis alone, although it may be effective in the extrapolation of test data and determination of the effects of minor design changes to equipment that was previously tested.

B. Qualification by analysis must consist of mathematical or logical proof based on actual test data, that the Equipment meets or exceeds its specified performance when subjected to normal, abnormal, and Design Basis Event environmental conditions, in accordance with Paragraph 6.5 of IEEE Standard 323-1974.

3.6 OPERATING EXPERIENCE

Where equipment has been in service for a period of time in more severe conditions, the Contractor may qualify the equipment covered by the Purchaser's Specification for a like period of time provided the equipment in service is seismically and environmentally qualified by testing, or analysis (when pertinent) after aging. Acceptance of this method of qualification is dependant upon the Contractor submitting in detail all of the items listed below to the Purchaser. If he does not provide complete and detailed data the information will be considered as not having been submitted. Documentation shall be provided to verify the operating experience as follows:

1. Identification of plant(s) in which the equipment has been in service.

2. Date installed and length of time the equipment has been in service.

3. Comparison and identification of differences in design, specified service conditions and environmental conditions between the equipment in service and the proposed equipment, and an analysis to justify any extrapolation involved due to minor differences.

4. Identification and history of failures of the equipment in service (random failure, wear out, etc.), and the cost and time associated with returning the equipment to service.

5. Preventive maintenance program. Identification of the preventive maintenance program followed for the equipment in service (together with recommended changes) and that will provide assurance that the qualified life of the proposed equipment will equal or exceed the life of the reference equipment, and the cost of the program.

6. Seismic Test Reports on the equipment that has been in service.

4.0 EQUIPMENT ENVIRONMENT AND PERFORMANCE

4.1 GENERAL

A. Environmental Designators (Attachment EA) identify the normal, abnormal, and Design Basis Event environmental conditions that can be expected in the various plant locations where safety-related equipment will be installed. 3

B. The location (as indicated by the appropriate Environmental Designator) of each item of equipment will be identified by the Purchaser in the Specification. Equipment performance through the normal, abnormal, Design Basis Events, and Post-Design Basis Events shall be in accordance with the Purchaser's Specification. 3

C. Devices for service inside or outside the containment shall be tested under environmental conditions that are at least as severe as those identified by the applicable Environmental Designator.

4.2 PERFORMANCE

A. Before, during, and after the testing, all required safety-related functions shall be operated under the most severe operating conditions and also over the entire range and recorded. Throughout the DBE conditions the supply and venting lines of all pneumatic equipment shall be routed in a manner which represents the actual plant installation (vents with exhaust within the test chamber).

B. Acceptance requires that malfunctions as discussed in Subparagraphs 4.2.C, below, as applicable, shall not occur. Whenever any of these criteria are not met, specific deviation data shall be formally submitted to the Purchaser for comment.

C. All equipment and devices must perform their safety-related function before, during, and after the DBE with no error greater than the required tolerance. This shall include but not be limited to consideration of:

1. Loss of performance characteristics, e.g. ability to change state, maintain pressure boundary, modulate or control.

2. Spurious, erroneous, or inaccurate outputs.

3. Moisture leakage into sealed enclosures.

4. Equipment failure in the safe direction (fail-safe) shall not be used for justification or acceptance.

5. Voltage drop at the equipment terminals(s) to 75 percent of nominal.

D. Sufficient instrumentation shall be provided to monitor any variation in performance to assure that it does not exceed the requirements as indicated in the Purchaser's Specification. The instrumentation used shall be calibrated using standards which are traceable to the National Bureau of Standards. These records shall be supplied at no additional costs and shall be available (for audit) by the Purchaser, and shall demonstrate that the sensitivity, accuracy and repeatability of the instrumentation is suitable for the application.

5.0 ACCEPTABLE PROGRAMS BY CATEGORY

5.1 GENERAL

Any of the following categories may be used in combination with any other category, if the equipment contains material(s), component(s) or equipment that are applicable to other category(ies).

5.2 WIRE AND CABLE

Wire and cable shall be qualified for the environment specified in the Purchaser's specification. Contractor's program shall include type testing in accordance with the direction given in IEEE Standard 383-1974. NRC Regulatory Guide 1.131, dated August 1977, and the requirements of Section 3 of this Appendix. Aging shall be in accordance with Section 1.3.5.2 of IEEE Standard 383-1974. 3

5.3 MOTORS

Each motor shall be qualified for the environment specified in the Purchaser's Specification. The Contractor's program shall include type testing in accordance with the direction given in IEEE Standard 334-1974 and the requirements of Section 3 of this Appendix. Aging shall be in accordance with Section 9 of IEEE Standard 334-1974.

5.4 BATTERIES

Batteries shall be qualified for the environment specified in the Purchaser's Specification. Contractor's program shall include type testing in accordance with the directions given in IEEE Standard 535 and the requirements of this Appendix. Aging shall be in accordance with the requirements of IEEE Standard 535.

5.5 CHARGERS, INVERTERS, AND REGULATORS

Chargers, inverters and regulators shall be qualified for the environment specified in the Purchaser's Specification. Contractor's program shall include type testing in accordance with the direction given in IEEE Standard 650 and the requirements of the Appendix. Aging shall be in accordance with the requirements of IEEE Standard 650.

5.6 SWITCHGEAR, LOAD CENTERS AND MOTOR CONTROL CENTERS

A. Equipment shall be qualified for the environment specified in the Specification.

B. Type tests to establish qualified life shall meet the requirements of Section 3 of this Appendix.

C. The effects of aging (thermal, mechanical, and radiation) shall be established and documented by a combination of test and analysis or by actual aging of the Equipment.

D. The program shall establish a qualified life for the specified conditions. Qualified life in years may be approached through a maximum number of operations. When the established period of qualified life is less than 41 years, the program shall identify those components which are subject to aging and wear and shall provide a schedule and criteria (on-going maintenance) to replace those components in order to re-establish the equipment qualified life. Should testing be required to identify the degree of component deterioration, the test program's pass-fail criteria and the replacement criteria shall be supplied by the Contractor at no extra cost.

E. Protective and Auxiliary Relays which are a part of this equipment shall be qualified for the environment specified in the Purchaser's Specification and any increases due to the effects of its inclusion into the equipment, and tested in accordance with IEEE Standard 323-1974.

5.7 ELECTRIC PENETRATION ASSEMBLIES

Electric Penetration Assemblies shall be qualified for the environment specified in the Purchaser's Specification. Contractor's program shall include type testing in accordance with the directions given in of Section 6 of IEEE Standard 317-1976, U.S. NRC Regulatory Guide 1.63, Revision 2, dated July 1978 and the requirements of this Appendix.

5.8 ELECTRIC VALVE ACTUATORS

Electric valve actuators shall be qualified for the environment specified by the Environmental Designator on the Valve Data Sheet attached to the Purchaser's Specification. Contractor's program shall include type testing in accordance with the direction given in Section 4 of IEEE

Standard 382-1972 and the requirements of this Appendix. The procedure for aging simulation shall be in accordance with Part II of IEEE Standard 382-1972 with the exception of the 500 operating cycles. The number of required operating cycles shall be in accordance with the requirements in the Purchaser's Specification.

5.9 CONTROL SYSTEMS AND ACTIVE MECHANICAL EQUIPMENT

A. Type testing in accordance with the requirements of Section 3.2 of this Appendix is the preferred method of demonstrating qualification. Qualification by analysis, or by combination of methods, may be accepted by the Purchaser after review of the Proposal.

B. The following Equipment is included for this type of qualification:

1. Instruments - Such items as pressure switches, process transmitters, and display (readout) instruments.

2. Miscellaneous Devices - Items not covered above, such as switches, relays, solenoid valves, and limit switches.

3. Valve Appurtenances.

4. Motor-Operated Valves.

5. Pumps.

6. Fans.

7. Air Conditioning Units.

8. All other safety-related Equipment - Items not covered above.

5.9.1 Unique Equipment Qualification (or combination of different types of qualification methods)

5.9.1.1 Panel or Rack Assemblies

A. It is not necessary to environmentally qualify the panel or rack structures since they are constructed of suitable metals and are suitably coated to prevent corrosion. Only seismic qualification of the panel or rack structure is necessary. However, devices mounted in or on the panel or rack assembly shall be environmentally qualified in accordance with Subparagraph 5.9.A.

B. This type of equipment is unique because they are assemblies of many components mounted on a framework or structure. For this reason, a building block approach may be acceptable. Thus, individual devices or assemblies may be qualified separately and included in the system. Such individual qualification shall be justified in detail, with particular attention to interfaces and consequences to adjacent or related equipment in case of failure. The total system analysis shall include the effects of the components on each

other and on the structure. Non-Class IE devices shall not cause the failure of any Class IE equipment mounted in the same rack or panel per IEEE Standard 420-1973, and U.S. NRC Regulatory Guide 1.29, Revision 3, dated September 1978.

5.9.1.2 Valve Bodies and Actuators

A. Qualification of the valve bodies (metallic parts only), are covered by other standards. The "soft" parts of the valve assemblies - e.g., packing, diaphragms, elastomers, degrade with age. Therefore, the "soft" parts shall be environmentally qualified to determine an overall "Qualified Life" for each valve assembly. Previous qualification may be used to satisfy this requirement, provided it is in accordance with the requirements of this Appendix.

B. For this type of equipment, the building block approach may be acceptable. The valve assembly is composed of individual devices or subassemblies that may be qualified separately and included in the system. Such individual qualification shall be justified in detail, with particular attention to interfaces and consequences to adjacent or related devices or subassemblies in case of failure. The total system analysis shall include the effects of the individual devices or subassemblies on each other and on the total performance of the valve assembly. At least one representative test sample of each valve type (non-metallic portion of the body, actuator, and appurtenances) shall be type tested in accordance with Subparagraph 5.9.A, including aging to its Qualified Life. This is necessary to determine the validity of the assumptions made in the analysis.

C. Electric valve actuators shall be qualified for the environment specified in the Purchaser's Specification. The Contractor's program shall include type testing in accordance with the requirements of Section 4 of IEEE Standard 382-1972 and the requirements of this Appendix. The procedure for aging simulation shall be in accordance with Section 5.8 of this Appendix.

5.10 MODULES

Modules shall be qualified for the environment specified in the Purchaser's specification. Contractor's program shall include type testing in accordance with the direction given in IEEE Standard 381-1977, and the requirements of Section 3 of this Appendix. Aging shall be in accordance with Section 3.2.2 of this Appendix. 3

5.11 PLANT VIBRATION

Plant vibration effects shall be addressed in the qualification of equipment as follows:

1. For floor or wall mounted equipment, subject them to a minimum of five (5) OBE's prior to the application of SSE (as required by Appendix QG).

2. For pipe or line-mounted equipment, the vibration aging shall be a sinusoidal motion of 0.75g or such reduced acceleration necessary at low frequencies to not exceed 0.025 inches double amplitude with the frequency sweeping from 5 Hz to 200 Hz to 5 Hz at a rate of 1 octaves per minute or equivalent, justifiable on a case by case basis. Ninety minutes of vibration shall be applied along each orthogonal axis. 3

6.0 DOCUMENTATION

6.1 PROPOSAL STATEMENT - QUALIFICATION PLAN

A. The Bidder shall provide a Plan with his Proposal which describes how the equipment to be furnished complies with the requirements of this Appendix and the Purchaser's Specification. Exceptions, where taken, shall be listed with a justification for each. The justification shall include the methods of qualification delineating the steps to establish and maintain qualification. This will be considered in evaluating the proposal.

B. This Plan shall address at least the following items:

1. A description of the methods utilized that establish conformance with this Appendix.

2. Documentation of qualified life.

3. Identification of organizations which will perform any portion of the tests and/or analyses and the organizations capabilities (including any test facilities).

4. A description of any analytical methods used in extrapolations and the testing used as a basis.

5. Information identified in Section 6.3.C.9 of this Appendix.

6. Where an ongoing qualification program is proposed, the Bidder shall specify any anticipated participation by the Owner and state specifically his involvement and limit of liability for such a program. This will be considered in the evaluation of the proposals.

7. The Bidder shall identify all equipment interfaces in his plan.

8. Purchaser will evaluate qualification programs for conformance to this Appendix.

9. Where published standard equipment generic qualification certifies that the equipment is suitable for environmental and service conditions at least as severe as those called for by this Appendix and the Purchaser's Specification, Bidder shall submit test and/or analytical data on which his qualifications are based.

C. If previous qualifications are used, the applicability of the previous qualifications to the requirements of this Appendix and the Purchaser's Specification shall be justified.

D. The plan shall have a title page and revision page with the information specified on Figure 1 and Figure 2 respectively. 3

6.2 AFTER PURCHASE ORDER AWARD - QUALIFICATION PROCEDURE

A. After purchase order award, the Contractor shall submit his procedure for Purchaser's review. Failure to receive a Status 1 or 2 for test procedures shall not be considered justification for increased costs or delay in delivery. Sufficient detail shall be included to demonstrate adequacy of the selected method and that the requirements of this Appendix have been satisfied including acceptance criteria. Qualified life shall be established by the Contractor's qualification program, if the equipment has not been previously qualified to the objectives of this Appendix.

B. Contractors that have not previously supplied the information required by Paragraph 6.1 above as a part of the original Proposal shall submit the information as a part of his initial response to Paragraph 6.2.

C. The procedure shall have a title page and revision page with the information specified on Figure 1 and Figure 2 respectively. 3

6.3 ENGINEERING DOCUMENTATION - QUALIFICATION REPORT

A. Qualification documentation of safety-related equipment shall be auditable. The procedure for qualifying equipment and the documentation submitted in the equipment qualification report shall be presented (by the Contractor to the Purchaser) in a readily understandable and traceable manner.

B. The Contractor shall submit his qualification procedure, and test and/or analyses results, in a report for Purchaser's review. Sufficient detail shall be given to demonstrate adequacy of the selected method, and that the requirements of this Appendix have been satisfied.

C. A qualification package for each type of equipment to be supplied shall be submitted to the Purchaser prior to shipment, and it shall demonstrate that the requirements of this Appendix have been satisfied. As applicable, the documentation shall consist of, but not be limited to:

1. Purchase Order Number.

2. A listing of all Equipment (by manufacturer(s) and model numbers including any components, i.e., relays, switches, or modules), supplied by the Contractor on the purchase order, and the method(s) of qualification selected and including justification that the

test sequence is the most severe for the Equipment. The information shall be presented as listed in Paragraphs 8.3, 8.4, 8.5, and 8.6 of IEEE Standard 323-1974, depending upon the qualification method used.

3. The detailed data shall be supplied but not limited to the following:

   a. Illustrations (photographs, drawings, etc.,), and a description of the equipment to be tested including equipment performance specifications.

   b. Test or operational facility identification and its capabilities and limitations.

   c. Test set-up, instrumentation, calibration records and traceability of its standards to the National Bureau of Standards.

   d. Plan and objectives, including identification of safety-related functional requirements to be demonstrated.

   e. Previously reviewed and accepted procedures, test, and/or analyses, inspection results.

   f. Test data to include copies of all raw data such as computer tapes, charts, any written records, etc.

   g. Statement of qualified life.

   h. Summary, conclusions, and recommendations.

   i. A description of all computer programs used shall be provided, together with the program capabilities, its name and source and the verification document. Computer output shall be treated the same as any other part of the design calculations submitted for review. At least the lead sheet of the output shall be signed and/or stamped by the responsible Engineer. All the pages of the output shall be numbered. All output quantities shall be labeled and all the quantities shall be identified by the units individually. All computer output shall contain an input data print-out. Computer output shall be treated as a part of the overall analytical calculation and shall be identified in the index.

4. Supporting data and references, including data on operating experience as specified in Section 3.6 and 6.3.C.8 of this Appendix.

5. Analysis data, including (and the test data used as a basis) that used for extrapolation to devices other than those tested.

6. Description of any analytical method used, and analysis data including all extrapolations.

7. Identification of specified tolerances for critical components and materials subject to aging or wear.

8. Verification of operating experience, as follows:

   a. Identification of plant in which the equipment has been in service.

   b. In-service data and length of time the equipment has been in service.

   c. Identification of differences in design requirements and the actual service conditions including seismic between the equipment in service and the proposed equipment and an analysis to justify any extrapolation involved due to these differences.

   d. Identification and history of failures of the equipment in service.

   e. Identification of the preventive maintenance program followed for the equipment in service and a recommended preventative maintenance program that will provide assurance that the qualified life of the proposed equipment will equal or exceed the life of the reference equipment.

9. Contractor's recommended program (if required) to maintain qualification by replacing critical components identified in Contractor's qualification program.

10. Contractor's recommended program (if required) to requalify equipment to establish a further period of qualified life and the Contractor's participation in the program, his liability, and the anticipated Owner participation.

11. Contractor's statement that each item of Equipment to be shipped contains (Manufacturers Catalog or Type Number, materials, etc., etc., etc.) the same type and make as that which was qualified and reviewed by the Purchaser.

D. Report summary sheet listing the page(s) on which each of the above listed items may be found.

E. Contractor's Environmental Qualification Report shall include as a minimum a certification that the equipment satisfies or exceeds the requirements of this Appendix and the Specification. The report shall have a title page and revision page with the information specified on Figure 1, and Figure 2 respectively, including the Certificate of Compliance as specified by Figure 1.

3

ENVIRONMENTAL QUALIFICATION *
(Identification of Equipment)

FOR THE

GEORGIA POWER COMPANY
ALVIN W. VOGTLE NUCLEAR POWER PLANTS 1 & 2
BURKE COUNTY, GEORGIA
TO
PURCHASE ORDER NO. _____
SPECIFICATION NO. _____
REVISION _____ DATE _____
PROJECT QUALITY CLASS _____

** I hereby certify that the (name of equipment) for the Alvin W. Vogtle Nuclear Generating Station has been designed, manufactured, and qualified in full accordance with the requirements of Purchaser Order No. _____ and is qualified to withstand without loss of the required function due to the environmental conditions specified provided in the Purchaser's Specification. The calculations and/or test has been supervised, witnessed, and reviewed by me.

Signature _____ Date _____

Registered P.E. Number _____, County of _____,

State of _____.

P.E. Stamp

Prepared by (Signed Signature, _____ Date _____)
(Typed Name, Title, Date)

Approved by (Signed Signature, _____ Date _____)
(Typed Name, Title, Date)

(Contractor's Name, Address, etc.)

*Either Plan, Procedure or Report
**Required only on the Report.

FIGURE 1

3

REVISION RECORD*

Specification No. _____ 3

Rev. ____

Page ____ of ____

REV.	PAGE	PARAGRAPH	DESCRIPTION	APPROVAL/DATE

A. Each page shall indicate at the top the latest revision number to that page. The change made to the page shall be identified by a vertical line in the margin with the revision number included next to the line.

B. Each page after the title page shall be numbered consecutively. The last sheet of the document shall be identified as the final page. If a page(s) is added in a revision, the added pages will be identified by using the preceding page number and a suffix from A to Z. The added pages should be identified on the revision page.

C. *Pages where Revision 0 apply are not included.

FIGURE 2 3

PROPOSAL

FOR

5 KV AND 15 KV POWER CABLE

FOR THE

GEORGIA POWER COMPANY

VOGTLE ELECTRIC GENERATING PLANT

BURKE COUNTY, GEORGIA

SPECIFICATION NO. X3AJ01

REVISION 0

FEBRUARY 23, 1979

PROJECT CLASS 12E

FROM

NAME OF BIDDER _____

fc/em
1 OCT 78

PROPOSAL FORM

FOR

5 KV AND 15 KV POWER CABLE

FOR THE

GEORGIA POWER COMPANY

VOGTLE ELECTRIC GENERATING PLANT

BURKE COUNTY, GEORGIA

SPECIFICATION NO. X3AJ01

FEBRUARY 23, 1979

1.0 SPECIAL INSTRUCTIONS FOR COMPLETING PROPOSAL FORM

In order for Bidder's Proposal to be considered it must be submitted on the attached form and in accordance with the following instructions:

1. Where a specific response is requested of the Bidder, the Bidder shall include such response in the space provided or shall type in "See Attached," "None," "Included Above," or like words to indicate that he has read and understands the requirement. Bidder's Proposal will not be considered responsive unless completed in this manner.

2. The types and quantities of "Drawing and Data Requirements," along with the submittal schedule, is included in Part C of this form. Each Bidder shall include all necessary costs of Drawing and Data Requirements in his Proposal and shall indicate his promised delivery in the appropriate space on the "Submittal Schedule to Engineering Office," Paragraph 14.

3. Under Paragraph 9, "Deviations," it is imperative that Bidder include any deviations and/or exception to the Instructions to Bidders, Technical Provisions or Design Specification, and Proposal Form included in the Bid Request.

2.0 GENERAL

Proposal is hereby made to furnish all labor, materials, tools, and equipment, and to perform all operations and incidentals necessary to furnish, detail, fabricate, and deliver for unloading by others, all equipment, and accessories in accordance with this Specification X3AJ01, Dated February 23, 1979. It is understood that payment in accordance with the prices set forth shall constitute complete payment for the work specified.

PART A. PRICE AND SCHEDULE DATA

3.0 PRICES

A. Bidder shall quote current prices in effect on the bid closing date (see Price Adjustment below). Prices quoted shall exclude Georgia State Sales/Use Tax.

B. In bidding the equipment covered by this specification, Bidder herewith submits current prices f.o.b. destination, as follows:

Unit 1

5 kV and 15 kV Power Cable $_____

Unit 2

5 kV and 15 kV Power Cable $_____

C. Freight included in above prices Unit 1 $_____ Unit 2 $_____

Rate Basis

Truck_____

Rail_____

Other (specify)_____

D. Proposals must be firm for acceptance within 90 calendar days from the stated bid due date or until notification of award is made verbally or by receipt of a Purchase Order, whichever occurs first. Bidder hereby agrees that his Proposal is firm for _____calendar days from the stated bid due date.

E. The Bidder shall provide information for the services of a field Engineer as follows:

1. Number of man-days included at no cost_____.
2. Number of days (estimated) a field Engineer is recommended _____/Unit.
3. $_____ /hour for an 8-hour day.
4. $_____ /hour for overtime rate.
5. $_____ /hour for Saturday, Sunday and holiday.
6. $_____ /hour _____. (Other)
7. Travel expenses, lodging, meals, etc. $_____.

3.1 TERMS OF PAYMENT

_____

_____

_____

5 KV AND 15 KV POWER CABLE

ALVIN W. VOGTLE NUCLEAR PLANT - UNIT 1

Item No.	Cable Code	Type of Cable	Total Quantity (In Feet)	Delivered Price Per 1,000 Feet	*Length Per Reel (In Feet)	Initial Delivery (In Feet)
		5 kV, Multiconductor, Armor Interlocked				
1001	53K	3/c, 250 MCM, Non-Shielded	3[illegible],000		1,000	18,000
1002	53M	3/c, 500 MCM, Non-Shielded	21,000		1,000	11,000
		5 kV, Multiconductor, Non-Armored				
1003	63K	3/c, 250 MCM, Shielded	20,000		1,000	10,000
1004	63M	3/c, 500 MCM, Shielded	5,000		1,000	0

*Bidder to state maximum and minumum reel lengths available and minimum order release lengths at the stated unit prices

5 KV AND 15 KV POWER CABLE

ALVIN W. VOGTLE NUCLEAR PLANT - UNIT 1

Item No.	Cable Code	Type of Cable	Total Quantity (In Feet)	Delivered Price Per 1,000 Feet	*Length Per Reel (In Feet)	Initial Delivery (In Feet)
		15 kV, Multiconductor, Armor Interlocked				
1005	13I	3/c, 3/0 AWG, Shielded	4,000		1,000	4,000
1006	13M	3/c, 350 MCM, Shielded	5,000		1,000	5,000
		15 kV, Multiconductor, Non-Armored				
1007	23I	3/c, 3/0 AWG, Shielded	1,000		1,000	1,000
1008	23M	3/c, 500 MCM, Shielded	3,000		1,000	3,000

5 KV AND 15 KV POWER CABLE

ALVIN W. VOGTLE NUCLEAR PLANT - UNIT 2

Item No.	Cable Code	Type of Cable	Total Quantity (In Feet)	Delivered Price Per 1,000 Feet	*Length Per Reel (In Feet)	Initial Delivery (In Feet)
		5 kV, Multiconductor, Armor Interlocked				
2001	53K	3/c, 250 MCM, Non-Shielded	30,000		1,000	6,000
2002	53M	3/c, 500 MCM, Non-Shielded	18,000		1,000	4,000
		5 kV, Multiconductor, Non-Armored				
2003	63K	3/c, 250 MCM, Shielded	20,000		1,000	5,000
2004	63M	3/c, 500 MCM, Shielded	1,000		1,000	1,000

* Bidder to state maximum and minimum reel lengths available and minimum order release length at the stated unit prices.

5 KV AND 15 KV POWER CABLE

ALVIN W. VOGTLE NUCLEAR PLANT - UNIT 2

Item No.	Cable Code	Type of Cable	Total Quantity (In Feet)	Delivered Price Per 1,000 Feet	*Length Per Reel (In Feet)	Initial Delivery (In Feet)
		15 kV, Multiconductor, Armor Interlocked				
2005	13I	3/c, 3/0 AWG, Shielded	4,000		1,000	4,000
2006	13M	3/c, 350 MCM, Shielded	4,000		1,000	4,000
		15 kV, Multiconductor, Non-Armored				
2007	23I	3/c, 3/0 AWG, Shielded	1,000		1,000	1,000
2008	23M	3/c, 500 MCM, Shielded	2,000		1,000	2,000

4.0 PRICE ADJUSTMENT

Whenever the current prices quoted above are not firm, Bidder shall quote current prices which shall be subject to adjustment (upward or downward) at time of shipment in accordance with a recognized industry index. Bidder shall clearly indicate below the industry index on which his bid is based and/or shall state the maximum percentage the current prices quoted may be adjusted for the delivery dates specified.

(Note: The "maximum" adjustment quoted will be a serious consideration in the evaluation of all proposals submitted in response hereto. Price adjustments, if any, shall be substantiated and invoiced separately.)

4.1 INDICES TO BE USED (Provide Base Date Index Value on which Bid is based for each of the following:)

LABOR: _____

MATERIAL: _____

OTHER: (Freight) _____

4.2 PERCENT BREAKDOWN FOR LABOR/MATERIALS

_____

_____

4.3 STARTING DATE OF ADJUSTMENT

_____

_____

4.4 ENDING DATE OF ADJUSTMENT

_____

_____

4.5 LIMITS OF ADJUSTMENT

_____

_____

_____

4.6 METHOD OF CALCULATING ADJUSTMENT

_____

_____

_____

5.0 CANCELLATION AND/OR DEFERMENT

A. The latest date for cancelling this contract without incurring charges other than engineering and overhead is

1. Unit 1 _____

2. Unit 2 _____

B. Cancellation charges beyond those dates specified above will be calculated as follows:

1. Unit 1 _____

_____

2. Unit 2 _____

_____

C. In the event of deferment up to 12 months as covered in the specifications, the price adjustment will be

_____

_____

_____

6.0 AUTHORIZED REPRESENTATIVES

The Bidder shall designate below a representative authorized to make binding and enforceable decisions and assume financial responsibility on behalf of the Bidder in all matters relating to the administration and performance of any resultant purchase order. Such matters include, but are not limited to backcharges, freight claims, insurance claims, change orders and extra work orders. The Bidder's representative to be contacted regarding any resultant purchase order is:

Name: _____ Title: _____

Business Address: _____ Home Address: _____

_____ _____

Business Phone: _____ Home Phone: _____

7.0 GEORGIA REPRESENTATIVES

If the Bidder's Proposal has been prepared by a representative or an agent of the Bidder other than the representative or agent normally servicing the Georgia Power Company, Bidder shall designate below the proper Georgia representative or agent through which the purchase order may be placed. It is understood that all provisions of Bidder's Proposal shall be binding on such designated representative or agent.

Company Name: _____

Contact: _____

Address: _____

_____

Telephone: _____

8.0 CODE AUTHORIZATIONS

Bidder shall list all Code Authorizations for which he is certified. Copies of Certificates of Authorization shall be attached to Bidder's Proposal.

_____

_____

_____

9.0 DEVIATIONS

The following is a list of all deviations from, and additions, supplements, and exceptions to, Instructions to Bidders, Technical Provisions or Design Specification, and Proposal Form on which this bid is based. There are no others. The Bidder affirms that any provisions in the bid, inconsistent with provisions in the specification which are not here expressly described or referred to, will be construed as though such inconsistent provisions do not exist.

9.1 INSTRUCTIONS TO BIDDERS

_____

_____

_____

_____

9.2 TECHNICAL PROVISIONS OR DESIGN SPECIFICATIONS

9.3 PROPOSAL FORM

10.0 DELIVERY SCHEDULE

The Bidder shall, with due regard to jobsite delivery dates required by the Purchaser and indicated herein, furnish the following delivery information on the specified items.

10.1 DRAWING AND DATA REQUIREMENTS

Bidder to provide delivery information under column titled VENDOR PROMISED DELIVERY included on attached Submittal Schedule to Engineering Office, Paragraph 14. It shall be understood that delivery promises shall be based on earliest notification of award, including verbal awards. It shall be understood and agreed that failure to furnish "Drawing and Data Requirements" as promised, for causes within Bidder's control, shall be considered a breach of Contract, and the Purchaser shall be entitled to the remedies shown under the paragraph titled "Defaults" contained in the Instructions to Bidders included in this specification.

10.2 MANUFACTURING

The Bidder shall state below the date(s) by which manufacturing must be started to meet the required delivery shown below.

Item	Start Manufacturing

10.3 INITIAL JOBSITE DELIVERY DATE

Required by Purchaser	Promised by Bidder
November 1, 1979	

10.4 DELIVERY ACCEPTANCE

Delivery dates earlier than 30 calendar days prior to required dates are subject to Purchaser approval before shipment is made.

10.5 POINT OF SHIPMENT _____, _____.

10.6 PLACE OF MANUFACTURE _____, _____.

10.7 COMMERCIAL OPERATION

For purposes of the warranty provisions required in the Instructions to Bidders, the "date the equipment and/or material is placed into service" shall be considered the date of COMMERCIAL OPERATION as follows:

UNIT	DATE
Unit 1	November 1, 1984
Unit 2	November 1, 1985

11.0 RETURN OF SURPLUS MATERIAL (Where Applicable)

Bidder shall state the conditions under which materials ordered in excess of job requirements may be returned for credit.

_____

_____

_____

PART B. ENGINEERING DATA

12.0 5 KV AND 15 KV POWER CABLE

12.1 TECHNICAL INFORMATION

A. Each Bidder shall complete and submit the Data Sheets provided in this section in accordance with Section 14.0 Submittal Schedule to Engineering Office Electrical/Mechanical.

B. Each Bidder shall list the brand names and manufacturers of at least three (s) pulling compound lubricants compatible with the proposed cable.

1. _____

_____

2. _____

_____

3. _____

_____

C. Each Bidder shall list recommended brand names and manufacturers of splicing and terminating tape with maximum shelf life compatible with cable.

_____

_____

_____

_____

_____

D. Each Bidder shall list recommended brand names and manufacturers of heat-shrinkable splice kits qualified for use in nuclear power plant using the proposed Contractor's cable.

_____

_____

_____

_____

_____

12.2 INSULATION DATA SHEET 5 KV AND 15 KV POWER CABLE

A. Bidder's Name _____

B. This data is applicable to the individual conductor insulation (innermost layer) of multiconductor cable.

1. Chemical Name _____

2. IPCEA Designation _____

3. Bidder's Trade Name _____

4. Density _____ grams/cubic centimeter

5. Physical requirements before aging

Tensile Strength _____ psi

Elongation at rupture _____ percent

K constant (IPCEA S-19-81, Section 6.23) _____

SIC _____

P.F. _____

6. Physical requirements after aging

a. Results of Air Oven Test

Tensile strength, percent of unaged value _____ percent

Elongation at rupture, percent of unaged value _____ percent

b. Results of Air Pressure Heat Test

Tensile strength, percent of unaged value _____ percent

Elongation at rupture, percent of unaged value _____ percent

7. Results of Ozone Resistance Test (Indicate pass or fail)

_____

8. Accelerated Water Absorption Test

a. Electrical Method

SIC after 24 hours _____

Increase in SIC (1 to 14 days) _____ percent

Increase in SIC (7 to 14 days) _____ percent

Stability factor (14 days) _____ percent

Power factor after 24 hours _____

b. Gravimetric Method

After 7 days at 70 C _____ milligrams per inch^2

12.3 JACKETING MATERIAL DATA SHEET 5 KV AND 15 KV POWER CABLE

A. Bidder's Name _____

B. This data is applicable to jacketing material used on individual conductors or the overall jacket on multiconductor cables.

1. Chemical Name _____

2. Bidder's Trade Name _____

3. Density _____ grams/cubic centimeter

4. Physical requirements before aging

Tensile strength _____ psi

Elongation at rupture _____ percent

Tensile stress at 200 percent elongation _____ psi

Set _____ percent

5. Physical requirements after aging

a. Results of Air Oven Test

Tensile strength, percent of unaged value _____ percent

Elongation at rupture, percent of unaged value _____ percent

b. Results of Oil Immersion Test

Tensile strength, percent of unaged value _____ percent

Elongation at rupture, percent of unaged value _____ percent

12.4 PROTOTYPE CABLE DATA SHEET FOR 5 KV AND 15 KV

A. Bidder's Name _____

B. The following data shall be provided for prototypes of the finished cable.

1. Results of Aging and Radiation Exposure Test

Indicate pass or fail _____

2. Results of IEEE 383 Flame Test

Time for specimen to ignite _____ seconds

Did cotton batting ignite? _____

Time specimen continued to burn after burner was extinguished _____ seconds

Did flame propagate? _____

Maximum length of burned cable _____ inches

3. Results of IPCEA S-19-81 Vertical Flame Test

Indicate pass or fail _____

4. Results of Electrical Test

Indicate pass or fail _____

5. Provide a complete description, itemized by cable codes, of each cable listed in the purchase order. The description shall include construction details, generic chemical names of the jacket and insulation materials, and thickness.

12.5 PROTOTYPE CABLE DATA SHEET FOR 5 KV POWER CABLE

A. Bidder's Name _____

B. Complete the following table for each type of cable listed in Pages 3 and 5 of the proposal.

Cable Code	Design Overall Diameter (Mils)	Weight per 1000 feet (Lb)	Minimum Bending Radius (1)	Maximum Pulling Tension (Lb)	Maximum Pulling Side Pressure (2)

(1) Multiple of diameter.
(2) Multiple of cable diameter and bend radius.

12.6 PROTOTYPE CABLE DATA SHEET FOR 15 KV POWER CABLE

A. Bidder's Name _____

B. Complete the following table for each type of cable conductor listed in Pages 4 and 6 of the proposal.

Cable Code	Design Overall Diameter (Mils)	Weight per 1000 feet (Lb)	Minimum Bending Radius (1)	Maximum Pulling Tension (Lb)	Maximum Pulling Side Pressure (2)

(1) Multiple of diameter.
(2) Multiple of cable diameter and bend radius.

PART C. DRAWING AND DATA REQUIREMENTS

13.0 GENERAL

A. The Bidder/Contractor herewith provides his submittal schedule for drawings and data. Purchaser's requirements and those of regulating government agencies for type, quantity, and quality of submittals are to be provided in accordance with the submittal schedules and as defined in Items B through I in this paragraph.

B. Drawings or data shall be submitted for each unit(s) as separate drawing(s), indicating on the drawing for which unit it is applicable. Drawings or data shall be submitted as one full-size black-on-white vellum. Submittals may be rolled but shall not be folded. The black-on-white vellum must be of a quality that is acceptable for microfilming by the Purchaser. Drawings and data 18 x 24 inches or smaller shall be capable of being microfilmed at a 14.5X reduction factor. Drawings and data larger than 18 x 24 inches, but not exceeding 36 x 48 inches, shall be capable of being microfilmed at a 29.0X reduction factor. Any drawings or data submitted that are not acceptable for microfilming will be rejected or, at the Purchaser's option and Contractor's expense, upgraded by either drafting or other techniques to permit microfilming.

C. The Purchaser may consider the Contractor's reasonable request for restriction of proprietary information; however, it may become necessary to make disclosure to the following: NRC; Department of Health, Education, and Welfare; bonafide interveners; and/or other regulating governmental agencies.

D. Drawings or data submitted by the Contractor will be processed by the Engineer within 30 calendar days after receipt, and returned in any one of the following forms: blackline vellum, blueline, or 35-mm microfilm aperture card, as mutually agreed between the Purchaser and the Contractor, with the status of the drawing or data marked as follows:

STATUS 1. WORK MAY PROCEED.

STATUS 2. REVISE AND RESUBMIT, WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.

STATUS 3. REVISE AND RESUBMIT, WORK MAY NOT PROCEED.

STATUS 4. INFORMATION ONLY.

Contractor shall incorporate changes, as required by comments on the drawing and resubmit corrected drawings for review, within 30 calendar days. Contractor shall not change Status 1 drawings without notifying the Purchaser and resubmitting the drawing.

E. Assignment of a Status 1 to the drawings by the Purchaser shall not relieve the Contractor of any part of his obligation to meet all of the requirements of the specification and other Contract documents, or of his responsibility for the correctness of such drawings, and the adequacy and suitability of materials and equipment represented thereon for the intended function.

F. Fabrication prior to the Purchaser's assigned Status 1 or 2 shall be at the Contractor's risk.

G. Drawings submitted after Contract award shall show the Purchaser's equipment number, purchase order number, specification number, and equipment title.

H. Drawings and data are to be accompanied by a letter of transmittal, and shall be forwarded as follows:

1. Drawings and data, with the original and one copy of the transmittal letter, are to be sent to:

   Bechtel Power Corporation
   Los Angeles Power Division
   P.O. Box 60860 Terminal Annex
   Los Angeles, California 90060
   Attention: Drawing and Data Control (Building 46B)
   Alvin W. Vogtle Nuclear Power Plant

2. One copy of the transmittal letter is to be sent to the above address to the attention of:

   J. D. Duffin, Project Engineer

3. Copies of Instructions (Erection, Installation, Operation, and Maintenance) and Complete Parts Lists are to be sent to: Bechtel Power Corporation, Los Angeles Power Division at address listed in Paragraph H.1. above.

I. Bidder shall supply with his Proposal, one copy each of the information as indicated required by Paragraph 14.0, Data Description Items 1, 2, and 3, to establish current qualification for work covered by this bid request. Failure of Bidder to submit required information will be considered nonresponsive and may be cause for rejection of Bidder's Proposal.

14.0 SUBMITTAL SCHEDULE TO ENGINEERING OFFICE (1 of 4)
ELECTRICAL/MECHANICAL

INDICATE BY [X] DATA ITEMS REQUIRED

VENDOR SHALL COMPLETE "VENDOR PROMISED DELIVERY" COLUMN TO INDICATE HIS PROPOSAL FOR DELIVERY OF DRAWINGS AND DATA REQUIRED BY BECHTEL. ALL SUCH DATA SHALL CONFORM TO REQUIREMENTS DEFINED IN BODY OF SPECIFICATION

CHK REQD	DATA DESCRIPTION	SPEC PARA NO.	DATA CODE	BECHTEL REQUIREMENTS						VENDOR PROMISED DELIVERY	
				WITH EACH PROPOSAL		AFTER AWARD		SUBMITTAL DAYS AFTER AWARD			
				QTY	TYPE *	QTY	TYPE *	APPD FOR LAYOUT	CERTFD FOR CONSTR	APPD FOR LAYOUT	CERTFD FOR CONSTR
[X]	1. Supplier Questionnaire	13.0.I	160	1	D	-	-				
[ ]	2. ASME Certificate(s) of Authorization										
[X]	3. Experience List	13.0.I	43	1	D	-	-				
[ ]	4. Outline Dimensions (With Motors)										
[ ]	5. Foundation Dimensions										-
[ ]	6. General Arrangement										
[ ]	7. Erection Drawings										
[ ]	8. Detail Drawings with Parts List and Cross-Reference to Erection Drawings										
[ ]	9. Internal Arrangement Detail										
[X]	10. Published Descriptive Bulletins of Equipment		52	1	C	-	-				
[ ]	11. One-Line Diagrams										
[ ]	12. Wiring Diagrams										
[ ]	13. Elementary Diagrams										
[ ]	14. Logic Diagrams										
[ ]	15. Control Circuit Diagrams										
[ ]	16. Terminal Connection Diagrams										
[ ]	17. Schematic Piping and Instrument Diagram (Flow Sheet)										

* TYPE OF SUBMITTAL
A = BLUELINE OR BLACKLINE PRINT
B = BLACK-ON-WHITE VELLUM AND ONE SEPIA
C = BOUND BOOKS
D = UNBOUND PAGES

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fc/em 1 OCT 78

ALVIN W. VOGTLE NUCLEAR PLANT
DRAWING AND DATA REQUIREMENTS

14.0 SUBMITTAL SCHEDULE TO ENGINEERING OFFICE (2 of 4)
ELECTRICAL/MECHANICAL

INDICATE BY [X] DATA ITEMS REQUIRED

VENDOR SHALL COMPLETE "VENDOR PROMISED DELIVERY" COLUMN TO INDICATE HIS PROPOSAL FOR DELIVERY OF DRAWINGS AND DATA REQUIRED BY BECHTEL. ALL SUCH DATA SHALL CONFORM TO REQUIREMENTS DEFINED IN BODY OF SPECIFICATION

CHK REQD	DATA DESCRIPTION	SPEC PARA NO.	DATA CODE	BECHTEL REQUIREMENTS						VENDOR PROMISED DELIVERY	
				WITH EACH PROPOSAL		AFTER AWARD		SUBMITTAL DAYS AFTER AWARD			
				QTY	TYPE *	QTY	TYPE *	APPD FOR LAYOUT	CERTFD FOR CONSTR	APPD FOR LAYOUT	CERTFD FOR CONSTR
☐	18. Instrument Board Arrangement Drawings										
☐	19. Instrument Installation Details										
☐	20. Shop Details										
☐	21. Electric Motor Data									-	
[X]	22. Specifications		47	1	C	-	-				
[X]	23. Supplier Quality Verification Documentation List-Summary (SQVDL-S)	16.0	160	1	D	-	-				
[X]	24. Electrical Tests	5.3	173	1	C	-	-				
[X]	25. Manufacturer's Compound Mix Number, Formula Number or Receipt Number Established and Documented for the Proposed Cable and Related to Prototype Sample Test with Similar Documented Formula Number		47	1	C	-	-				
[X]	26a. Site Storage Instruction Including Requirements for Handling, Short and Long Term Storage		47	1	C	-	-				
	b. Splicing and Terminating Instructions Certified for Use with Splice Kits and Termination Kits		47	1	C	-	-				

* TYPE OF SUBMITTAL

A = BLUELINE OR BLACKLINE PRINT
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C = BOUND BOOKS
D = UNBOUND PAGES

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14.0 SUBMITTAL SCHEDULE TO ENGINEERING OFFICE (3 of 4)
ELECTRICAL/MECHANICAL

INDICATE BY [X] DATA ITEMS REQUIRED

CHECK REQD	DATA DESCRIPTION	SUBMITTAL REQUIREMENTS	
		QUANTITY AND SCHEDULE	TYPE
☐	27. Drawing Lists		
	Preliminary	1 copy 30 days after award	B
	Updates	1 copy within 15 days after requested	B
	Complete	1 copy at time of shipment	B
☐	28. Code Certificates - ASME, _____ (Manufacturer's Data Report)	1 original at time equipment is shipped	D
☐	29. Design Calculations	1 copy within 15 days after completion	B
☐	30. Stress Reports (Certified) (ASME III, NCA 3352)	5 certified copies within 15 days after completion	C/D
☐	31. Seismic Calculations	1 copy within 15 days after completion	B
☐	32. Instructions (Erection, Installation, Operation, and Maintenance) and Complete Parts Lists	13 copies as soon as completed (Refer to Paragraph 13, GENERAL, item H for delivery requirements)	C
☐	33. List of Special Tools	1 copy 30 days before shipment	B
☐	34. List of Subvendors (Final)	1 copy 30 days after award	B
☐	35. Welding Procedures	1 copy 30 days before use	B
☐	36. Weld Repair Reports	1 copy within 15 days after repairs are completed	B
☐	37. List of Vendor-Recommended Spare Parts, Including Prices	1 copy with proposal	B
☐	38. Special Process Procedures	1 copy 30 days before use/ fabrication	B
[X]	39. Quality Program		
	A. Plan or Manual (Uncontrolled Copy)	A. 1 copy with proposal	C/D
	B. Manual (Controlled Copy)	B. 1 copy 30 days after award for approval, 4 additional copies 30 days after approved by Bechtel QAE/PE	C/D

TYPE OF SUBMITTAL
A = BLUELINE OR BLACKLINE PRINT
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C = BOUND BOOKS
D = UNBOUND PAGES

PP-2564(8810) 2/73

ALVIN W. VOGTLE NUCLEAR PLANT
DRAWING AND DATA REQUIREMENTS

14.0 SUBMITTAL SCHEDULE TO ENGINEERING OFFICE (4 of 4)
ELECTRICAL/MECHANICAL

INDICATE BY [X] DATA ITEMS REQUIRED

CHECK REQD	DATA DESCRIPTION	SUBMITTAL REQUIREMENTS	
		QUANTITY AND SCHEDULE	TYPE
☐	40. Conformed Equipment Data Sheets	1 copy 21 days after notification by Purchaser	B
☐	41. Non-destructive Examination Procedures	1 copy 30 days before tests	B
☐	42. Heat-Treating Procedures	1 copy 30 days before use	B
☒	43. Supplier Deviation Disposition Requests (For approval)	1 copy within 15 days after occurrence	B
	(After work has been done and accepted)	1 copy at time equipment is shipped	D
☒	44. List of Codes and Standards (Including applicable revision and date of document to be used)	1 copy with proposal 1 updated copy 30 days after award	D
☒	45. Cable BTU Content per Linear Foot of Each Type of Cable Proposed, Assuming Complete Combustion	1 copy 15 days after Occurrence	C
☒	46. Qualification Procedure (EA)	1 copy with proposal	C
☒	47. Qualification Report (EA)	1 copy within 15 days after completion	C

TYPE OF SUBMITTAL

A = BLUELINE OR BLACKLINE PRINT
B = BLACK-ON-WHITE VELLUM AND ONE SEPIA
C = BOUND BOOKS
D = UNBOUND PAGES

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15.0 QUALITY VERIFICATION DOCUMENTS

A. The Contractor shall provide, and deliver to the jobsite, quality verification documents (such as test reports, radiographs, chemical analysis, etc.) as defined throughout the specification.

B. The cover page of each such quality verification document shall include, as a minimum:

1. Document title.
2. Contractor's or subcontractor's name.
3. Manufacturer's name.
4. Project name.
5. Name of item.
6. Serial or batch number of item.
7. Reference to appropriate part of specification that identifies need for documentation.

Documents of a like kind may be bound together using one cover page.

C. At award, Bechtel will furnish the Contractor with blank Supplier Quality Verification Documentation List-Summary (SQVDL-S) forms. The Contractor will list on these forms a summary of the quality verification documents he will deliver to the jobsite in accordance with the specification requirements. Within 30 days after award, the Contractor will submit completed, certified SQVDL-S forms to Bechtel. Bechtel will review the completed SQVDL-S forms and return approved copies to the Contractor. The approved forms will be the official checklist for the Purchaser's Supplier Quality Representative (SQR) review of the documentation, or for the receiving inspector's review where there is no source inspection.

D. At the start of fabrication, Bechtel will furnish the Contractor with blank Supplier Quality Verification Documentation List-Detailed (SQVDL-D) forms on which the Contractor will list and specifically identify each individual quality verification document including Bechtel-accepted nonconformance reports (see Paragraph 15.0.G4) to be delivered to the jobsite. The Contractor shall certify on the SQVDL-D that each document applies, as required, to the appropriate procurement item. The Purchaser's source SQR then will verify the acceptability of each document, and will indicate his approval by signing the SQVDL-D, adjacent to the Contractor's certification.

E. Following fabrication, the Contractor shall certify on the SQVDL-D that all documents listed on the form apply to and meet the requirements of the specification. The Purchaser's source SQR then will ensure that each document listed on the SQVDL-D is in the package for jobsite delivery. The SQR's acceptance signature on the form confirms that the Contractor has met the quality verification requirements. The SQR cannot release the equipment or material for shipment until the documents have been sent, or are attached to the related item as part of the packaging. The corresponding, completed SQVDL-S and SQVDL-D forms shall accompany the shipment, with the SQVDL-D serving as the transmittal for the documents. The SQR shall attach a copy of the SQVDL-D to his Quality Surveillance Report. When the procurement is for more than one item or batch, and when these are to be delivered at different times, the applicable verification documents and forms shall accompany each delivery.

F. When the Purchaser does not have a SQR, the Contractor shall prepare and certify the SQVDL-D and deliver it to the jobsite with the equipment or material and related verification documents. The Purchaser shall review the delivered documents at the jobsite and return an approved copy of the form to the Contractor.

G. Approved Supplier's Deviation Disposition Request (SDDR) reports are quality verification documents and will be processed as follows:

1. Quality verification documents include SDDR reports that have had the Contractor's recommended "repair" or "use as is" disposition approved by the Purchaser's Engineer.

2. The SDDR report form used by any Contractor must be approved by Bechtel prior to use by the Contractor. The existing Bechtel Form LAO 0790 may be used by the Contractor in lieu of the Contractor's form. At the start of fabrication, Bechtel will furnish the Contractor with blank SDDR Forms.

3. Within 15 days after the occurrence of a nonconformance, the Contractor shall submit to Bechtel a SDDR report requesting disposition approval. Bechtel will review the report and accept, reject, or reject with instructions to the Contractor to resubmit. All accepted SDDR's will be signed by the Contractor to verify that the accepted disposition was correctly accomplished. The SQR's acceptance signature on the form confirms that the Contractor has correctly accomplished the accepted disposition.

4. All accepted SDDR's become documentation generated in support of the quality verification requirements of this procurement and shall be listed on the SQVDL-D. (See Paragraph 15.0.D.) At the time equipment is shipped, one copy of the SDDR will be included in the document package to be delivered to the jobsite.

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SUPPLIER QUALITY VERIFICATION DOCUMENTATION LIST – SUMMARY

(SQVDL-S)

EQUIPMENT NAME _____

EQUIPMENT TAG NO. _____

EQUIPMENT SERIAL NO. _____

SUPPLIER NAME _____

INSTRUCTIONS ON BACK SIDE

BECHTEL JOB NO. _____

SPEC/PO NO. _____

PACKING LIST NO. _____

CATEGORY _____

QUALITY VERIFICATION DOCUMENT SUMMARY		SPECIFICATION REFERENCE		SUPPLIER CERTIFICATION BY:	
DESCRIPTION OF REQUIRED DOCUMENTS	CHANGE OR SERIAL NO	SECTION	PARAGRAPH NO	SIGNATURE	DATE

THIS SUMMARY SHALL BE ATTACHED TO THE COMPLETED DETAILED SQVDL-D AT THE TIME THE CONTRACTOR CERTIFIES THE DETAILED LIST, AND SHALL SERVE AS A QUALITY VERIFICATION CHECKLIST FOR JOBSITE DELIVERY.

THE PURCHASER HAS REVIEWED THIS SUMMARY AND AGREES THAT THE DETAILED DOCUMENTATION TO SUPPORT THIS SUMMARY MEETS THE QUALITY VERIFICATION REQUIREMENTS OF THE SPECIFICATION

EGS _____ DATE _____

QAE _____ DATE _____

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INSTRUCTIONS FOR PREPARING
SUPPLIER QUALITY VERIFICATION DOCUMENTATION LIST-SUMMARY
(SQVDL-S)

The supplier should complete the entries at top of the form and fill in summary and reference columns as described below. Entries in the summary column may be categorized, such as "Welder Qualification Certificates." If a category contains several different types of documentation, such as Inspection Reports, specific types should be listed under the category.

DESCRIPTION OF REQUIRED DOCUMENTS	Enter title, description or category of documents.
CHANGE OR SERIAL NO.	Enter change or serial number only if supplier has other documents with the same title that do not apply to this procurement.
SECTION; PARAGRAPH NO.	Enter section of specification and paragraph number in that section that the listed documents and/or categories are intended to support.

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SUPPLIER QUALITY VERIFICATION DOCUMENTATION LIST – DETAILED
(SQVDL-D)

PAGE _____ OF _____

EQUIPMENT NAME _____

EQUIPMENT TAG NO. _____

EQUIPMENT SERIAL NO. _____

SUPPLIER NAME _____

INSTRUCTIONS ON BACK SIDE

BECHTEL JOB NO. _____

SPEC/PO NO. _____

PACKING LIST NO. _____

CATEGORY _____

DRAWING OR DOCUMENTS	CHANGE OR SERIAL	SPECIFICATION SECTION	PARA NO.	CERTIFIED BY		PURCHASER'S INSPECTOR	
				SIGNATURE	DATE	INITIAL	DATE

SUPPLIER CERTIFICATION

WE CERTIFY THAT THE DOCUMENTS LISTED ON THIS FORM MEET THE QUALITY VERIFICATION REQUIREMENTS OF THE SPECIFICATION, AND FURTHER, THAT EACH DOCUMENT LISTED APPLIES SPECIFICALLY TO THE PROCUREMENT IDENTIFIED ON THIS FORM.

SUPPLIER REP _____ DATE _____

TITLE _____

PURCHASER'S INSPECTOR ACCEPTANCE

WHEN SHOP INSPECTION IS NOT REQUIRED, REVIEW WILL BE MADE AT THE JOBSITE AS PART OF RECEIVING INSPECTION.

ACCEPTED BY _____ DATE _____

TITLE _____

INSTRUCTIONS FOR PREPARING SUPPLIER QUALITY VERIFICATION DOCUMENTATION LIST-DETAILED (SQVDL-D)

The supplier should list all documentation generated in support of the quality verification requirements of this procurement, including Bechtel-accepted nonconformance reports and as shown on the Supplier Quality Verification Documentation List-Summary (SQVDL-S) form for jobsite delivery. Use a separate page for each category of documentation even though a single entry may be all that is required. The heading of the form is self-explanatory and all available data should be entered. Enter data on the remainder of the form as shown below.

CATEGORY

Enter the category of the documentation that will be listed on the form, such as, "Inspection Reports".

DRAWING

Enter the titles of the drawings and quality verification documents to be delivered to the jobsite.

CHANGE OR SERIAL NUMBER

Enter the change or serial number of the drawing or document.

SPECIFICATION SECTION; PARA NUMBER

Enter the section of the specification and the paragraph number in that section that the listed document is intended to support.

CERTIFIED BY

The contractor representative signs opposite each entry, after verifying that the specific document listed applies directly to the equipment shown on the form.

PURCHASER'S INSPECTION

Purchaser's inspector must review and sign each document listed. After review he initials the form opposite the contractor's certification.

NOTE

When a source inspector is not assigned, this column remains blank.

SUPPLIER CERTIFICATION

Contractor representative signs form, after reviewing complete list and is satisfied that all documentation required is listed.

INSPECTOR ACCEPTANCE

Purchaser's inspector signs form, after reviewing it to ensure that each has been certified by the contractor and reviewed by Purchaser's inspection, and that all documentation listed is packaged for delivery to the jobsite.

NOTE

This space will be blank when there is no source inspector. Receiving inspection shall review the form and documents and when satisfied, sign the INSPECTOR ACCEPTANCE line, and forward a copy to the contractor.

16.0 QUALITY PROGRAM REQUIREMENTS

16.1 PROPOSAL QUALITY PROGRAM REQUIREMENTS

A. A written description of the quality program plan to be implemented that conforms to the requirements, identified in Paragraph 16.3, Quality Program Requirements, of this Appendix must be submitted with the proposal.

B. If an effective quality program manual is being implemented and meets the requirements, identified in Paragraph 16.3, it may be submitted in lieu of a quality program plan.

16.2 QUALITY PROGRAM REQUIREMENTS AFTER AWARD

Within 30 days after award of the Contract a documented quality program, including procedures for the Contract of quality related activities, shall be submitted for the review and acceptance by the Purchaser.

16.3 QUALITY PROGRAM REQUIREMENTS

The quality program submitted must comply with criteria appearing in ANSI N45.2-1971, "Quality Assurance Program Requirements for Nuclear Power Plants." The attached list of subjects required to be included in the quality program is numbered and titled on "Quality Program Requirements" to correspond with the applicable sections in ANSI N45.2-1971. An "X" in the block preceding each number and title indicates that the section requires coverage in the program plan; a "-" (dash) in the block signifies no requirement. The extent to which the individual sections and elements apply is established by the nature and scope of work of this specification.

16.4 QUALITY PROGRAM CROSS INDEX

It is required that a cross-index table or listing of the quality program manual procedures be provided with each manual to identify the criteria of ANSI N45.2-1971 which each of the individual procedures addresses.

16.5 QUALITY PROGRAM DOCUMENTS

Documents, records, correspondence, etc, are considered valid only if stamped, initialed, signed or otherwise authenticated and dated by authorized personnel. Initials and stamps shall be traceable to the individual. Printed names and printed initials are unacceptable. In addition, all quality assurance documents and documents submitted for quality assurance review, shall be validated by using black ink. On materials where the use of black ink is impractical (mylar and vellum) standard drafting methods may be used for validation.

QUALITY PROGRAM REQUIREMENTS

ANSI N 45.2-71

REQ'D	SECT	TITLE
[X]	2	Quality Assurance Program
[X]	3	Organization
[X]	4	Design Control
[X]	5	Procurement Document Control
[X]	6	Instructions, Procedures and Drawings
[X]	7	Document Control
[X]	8	Control of Purchased Material, Equipment, and Services
[X]	9	Identification and Control of Material, Parts, and Components
[X]	10	Control of Special Processes
[X]	11	Inspection
[X]	12	Test Control
[X]	13	Control of Measuring and Test Equipment
[X]	14	Handling, Storage, and Shipping
[X]	15	Inspection, Test and Operating Status
[X]	16	Nonconforming Items*
[X]	17	Corrective Action
[X]	18	Quality Assurance Records
[X]	19	Audits

*NOTE: Procedures for the control of nonconforming items shall include provisions for the approval by the Purchaser's engineer of "repair" or "use as is" dispositions made for materials, parts, or components that do not conform to drawings, specifications, or other purchase documents. Submittals by the supplier shall include the recommended disposition and technical justification.

OTHER QUALITY PROGRAM REQUIREMENTS

17.0 REPORTING OF DEFECTS AND NONCOMPLIANCE

The work to be performed in accordance with this specification is subject to regulation 10 CFR Part 21.

18.0 REPRESENTATION AND EXECUTION OF CONTRACT

The undersigned hereby declares, as Bidder, that the only persons or parties interested in this proposal as principals are those named herein; that this bid is made without any connection with any other person or party making a bid for the same purpose; that this bid is in all respects fair and without collusion or fraud; and that he agrees that if his bid, as submitted on this Proposal Form be accepted, he will perform the work and complete same within the time specified therein; and that he will accept in full payment therefore the prices quoted in this Proposal Form.

Date: _____ Bidder: _____

Bidder's Address: _____

_____ By: _____

Title: _____

ATTACHMENT 2

SPECIFICATION X3AJ02