EXTENSION TO NEYRIZ 66/20KVSUBSTATION

GENERAL REQUIREMENTS

Z	Issued For Approval	1405/02/17	M. E.	M. A.	M. A.	M. E.
Rev.	**Purpose of Issue**	**Date**	**Prepared**	**Check**	**Approved**	**Authorized**

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

TABLE OF REVISED PAGES

SHEET	REVISION								SHEET	REVISION							
	Z	A	B	C	D	E	F	G		Z	A	B	C	D	E	F	G
1	×								41								
2	×								42								
3	×								43								
4	×								44								
5	×								45								
6	×								46								
7	×								47								
8	×								48								
9	×								49								
10	×								50								
11	×								51								
12	×								52								
13	×								53								
14									54								
15									55								
16									56								
17									57								
18									58								
19									59								
20									60								
21									61								
22									62								
23									63								
24									64								
25									65								
26									66								
27									67								
28									68								
29									69								
30									70								
31									71								
32									72								
33									73								
34									74								
35									75								
36									76								
37									77								
38									78								
39									79								
40									80								

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

TABLE OF CONTENTS

1 Introduction 4
1.1 Purpose 4
1.2 Definitions 4
2 Delivery 5
3 Accounts And Records 6
4 Standards 6
4.1 Trade Name Materials And Equipment And Alternatives 6
5 Environmental Requirements 7
6 Environmental Data 7
7 Protection 8
7.1 General 8
7.2 Surface Preparation for Protective Coating 9
7.3 Paint 9
7.4 Paint Application 9
8 Inspection 9
8.1 General 9
8.2 Testing of Materials 10
8.3 Construction Inspection 10
8.4 Defects 10
9 Quality Control Program 11
9.1 General 11
9.2 Program Requirements 12

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

1 INTRODUCTION

1.1 Purpose

This document has been prepared to specify and establish the minimum technical requirements for the design, supply, installation, and commissioning of the Extension to Neyriz 66/20 kV Substation.

1.2 Definitions

Within the context of this document, the following definitions will be applicable:

Project: Extension to Neyriz 66/20 kV Substation

Client: Petro Kavian Sanat Pars Co.

Owner: Fars Regional Electric Co.

Consultants: Aria Niroo Jam Co.

EPC Contractor: Any firm who is responsible for providing any service and material with respect to detailed engineering, procurement, construction of all items and material in accordance with the contract between the CLIENT and him.

Vendor/Supplier: The company, which has been selected to supply the equipment and material and products technical documentation mainly, related to the production of the ordered supply.

The word "shall" indicate a requirement. The word "should" indicate a recommendation.

Contractor shall be responsible for vendor goods.

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

2 DELIVERY

Material and equipment delivery shall only take place after approval of sources has been granted and inspection and performance of the followings:

(a)The contractor shall write, and submit to the Engineer for approval, a specification covering packing, shipping storage and markings used by manufacturers, suppliers and shippers.

(b)The contractor shall be responsible for proper and safe handling and storing up to the point of delivery at the site. Storing shall be done in a manner preventing losses. All parts shall be clearly marked to facilitate easy storing.

(c)The contractor shall properly group the smaller objects and equipment for indoor installation. Sensitive electronic equipment (e.g.: relay cubicles) shall be delivered at site with advance notice of such deliveries to the owner in order to store the said equipment in protected buildings. Indoor equipment with epoxy resin or equal insulation shall not be left under direct sunlight.

(d)Delivery of oil, fuel and other inflammable stuff shall be made in properly constructed tanks, with advance notice to owner for proper storing of the same.

(e)The contractor shall ensure that a sufficient number of vehicles are present at site to facilitate proper unloading of materials and equipment.

(f)Each substation shall be packed separately and marked distinctly and clearly, so that mix-up with other substation equipment is prevented.

(g)Crates and containers shall be provided to make handling and storing safe and secure.

Crates and containers shall be clearly marked with total weight, included items, contract number and port of destination.

(h)All supervision on erection, site testing and commissioning works shall be carried out according to manufacturer's manuals, specifications, or otherwise in a manner that will ensure correct operation of the completed works.

(i)Erection Marks

Before leaving the contractor's works, all apparatus and fittings shall be painted or stamped at least in two places with distinguishing number and/or letter, corresponding to the distinguishing number and /or letter appearing on an approved drawing and material list.

The erection marks on galvanized material shall be stamped before galvanizing and shall be clearly legible after galvanizing.

All markings shall be legible and weatherproof. Where tags are used, they shall be durable, securely attached and duplicated.

(j)The documents outlined in submittals Document shall be delivered by the contractor during the execution of the works in a manner and time-table best suited for the orderly and timely progress of the works. The details shall be worked out during the contract negotiations.

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

3 ACCOUNTS AND RECORDS

The contractor will keep accounts and records in such form and detail as shall be satisfactory to the employer and furnish employer or his authorized representative(s) with all such information about accounts as he or they may require.

4 STANDARDS

The latest editions of all standards and codes mentioned in this specification shall govern, unless the year of publications is given. Standards and codes of other origin may be substituted provided that:

(a) The technical requirements given in the respective descriptions of work of this specification are met.

(b) In the event of conflict, the standards and codes of this specification shall govern.

(c) One copy in English of the standards and codes substituted shall preferably accompany the tender information, but shall in

any case be provided to the Engineer not more than 14 days after the contract award.

The following is a list of the agencies whose standards and codes are used in this document:

1- Standards of the American national standards institute (ANSI)
2- Standards of the American society for testing and materials (ASTM)
3- Standards of the insulated power cable engineer's association (IPCEA)
4- Standards of the American institute of steel construction (AISC)
5- Standards of the National electrical manufacturers association (NEMA)
6- Standards of the British standards institute (BS)
7- Steel structures painting council (SSPC)
8- American welding society (AWS)
9- American standards association (ASA)
10- Institute of electrical and electronic engineers (IEEE)
11- International electrotechnical commission (IEC)
12- Institute of standards and industrial research of Iran (ISIRI)
13- Deutsche industry norm (DIN)
14- British electricity boards standards (BEBS)

4.1 Trade Name Materials and Equipment and Alternatives

Certain materials and equipment to be incorporated in the work maybe designated on the contract drawings or in the specification by a trade name or the name of a manufacturer and his catalogue information. Upon the contractor's written request, and subject to the following requirements, the Engineer will approve the use of alternative materials or equipment, if he is satisfied that the alternative is of equal quality to the item specified and of the required characteristics for the purpose intended. Such approval will be given in writing.

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

The burden of proof as to the comparative quality and suitability of alternative materials and equipment shall be upon the contractor. He shall furnish with his request to use an alternative, six(6) copies of complete data thereon, including descriptions and performance data showing at equality to the item specified. Thereafter he shall furnish

such other pertinent information as may be requested by the Engineer. The contractor's request and accompanying data

Shall be submitted in sufficient time to permit approval action without delaying the work. If such request is disapproved, the contractor shall not ask or be permitted to use the same alternative materials or equipment in modified form.

The contractor shall bear the total cost of all necessary modifications to the works arising as a result of substituted materials or equipment.

No. payment over and above the prices in the schedule of prices will be made to the contractor because of his use of substituted materials or equipment.

5 ENVIRONMENTAL REQUIREMENTS

Materials susceptible to deterioration from climatic conditions or subject to the formation of fungus or any other form of parasitic life shall preferably be eliminated but if used must be permanently protected. Where such materials cannot be eliminated or permanently protected, the contractor shall apply a suitable surface treatment to protect the equipment for a minimum period of 24 months. The contractor shall state the period of protection and specify treatment procedures and the recommended intervals between pretreatment.

Untreated organic materials, such as contain, paper, or wood shall not be used. Operating coils of relays and meters shall be impregnated with a fungus inhibiting varnish, marking strips and nameplates shall be of plastic laminate or anodized aluminum. Paper labels shall not be used.

Doors of panels shall be close fitting and ventilating openings shall be suitably screened to prevent entrance of insects, rodents and dust.

All cable entrances to equipment shall be tightly sealed with gland plates.

Prior to shipment, surfaces of wiring and all other parts susceptible in any way to moisture absorption or fungus attack shall receive treatment with fungicidal varnish.

Each cabinet or cubicle, indoor or outdoor, containing electrical equipment shall be provided with a manually and thermostatically controlled heater to combat moisture condensation and with a light fixture. The heaters shall be located such that there is effective ventilation and local overheating is avoided. All instruments shall be adequately tropicalized.

6 ENVIRONMENTAL DATA

The following table indicates the environmental data to be considered for the design of equipment for the substation of this contract.

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

ITEM	DESCRIPTION	UNIT	ENVIRONMENTAL CONDITIONS
1	*Altitude above sea'level*	*m*	*1600*
2	*Isochronic level (thunder storm)*	*day / year*	*10*
3	*Relative humidity (Max. / Min.)*	*%*	*95/50*
4	*Ambient temperature*		
5	*Absolute maximum*	*Deg.Cen.*	*+50*
6	*Absolute minimum*	*Deg.Cen.*	*-30*
7	*Maximum annual average*	*Deg.Cen.*	*+40*
8	*Ice loading (radial thickness on conductor)*		*20 mm*
9	*Max. mean wind velocity:*		
9-a	*For 10 m above ground level*	*km/hr*	*108*
9-b	*Wind velocity under ice loading conditions*	*m/sec*	*25*
10	*Earthquake acceleration (max./mean)*	*m/s^2*	*0.35g*
11	*Pollution level*		*Very Heavy*
12	*Creepage distance*	*mm/KV(rms)*	*31*
13	*Solar radiation*		*Strong*

7 PROTECTION

7.1 General

The minimum surface protection shall be one coat of red lead iron oxide primer in accordance with SSPC paints 6-64T applied to produce dry film thickness of not less than 40 microns.

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

7.2 Surface Preparation for Protective Coating

All surfaces shall be cleaned in accordance with the steel structure painting council specification SSPCSP3-63 power wire brush. All grease and oil deposits shall be removed by wiping with a clean cloth dipped in universal solvent. All surfaces to be painted shall be clean free from moisture at the time of painting.

7.3 Paint

Materials which are not specified by brand or make shall be top quality products, of manufacturer approved by Engineer.

7.4 Paint Application

Materials shall be applied in accordance with manufacturer's written recommendations.

Paint coating shall be uniform and free from defects. Primers and pre - treatment shall be applied as soon as practicable after surface has been cleaned.

Damage to primer coat shall be repaired before succeeding coats are applied and the succeeding coats shall be applied as soon as practicable in accordance with manufacturer's written recommendations.

Printing equipment shall be kept clean using paint manufacturer recommended thinner or other compatible thinner.

Conventional spray painting equipment shall be provided with adequate filters to remove condensate and lubricating oil from the air stream.

For multicoat application, the individual coats shall be tinted such as to give distinct and easily visible color difference between coats to facilitate inspection.

Area adjacent to field welds shall be left unpainted for a distance of five (5) centimeters and shall be protected for shipment by application of one coat of rust preventative compound.

8 INSPECTION

8.1 General

The owner will have representative for inspecting all shop and assembly work associated with the work. The contractor shall furnish the Engineer a list of suppliers and the materials or equipment to be furnished by them for use in the works within sixty (60) days of the effective date of contract. The list shall be furnished in sufficient time to permit inspection and testing of materials and equipment. All mill or shop orders shall quote the pertinent requirements. If so requested by the Engineer, the contractor shall furnish triplicate copies of designated mill and shop orders.

No materials or equipment shall be shipped until all mill and shop tests, analyses, and inspections are completed, and results of tests or analyses are accepted.

All inspections and tests will be performed in such a manner as not to unduly delay the work. The Engineer reserves the right to charge to the contractor any additional cost of inspection and testing

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

when materials and equipment are not ready at the time such inspection and testing is requested by the contractor or when reinspection or retesting is necessitated by rejection.

8.2 Testing of Materials

Materials incorporated or to be incorporated in the works shall be tested during the progress of the work as requested by the Engineer. All tests performed by the contractor shall be witnessed by the Engineer unless the requirement therefore is waived in writing, or unless certified test result are required to be submitted to the Engineer. The contractor shall give the Engineer reasonable advance notice of all such tests. The Engineer or his authorized representative may perform additional tests of materials tested by the contractor, and the contractor shall furnish samples for his purpose as requested

Whenever a specification or test method of the ANSI, NEMA, IEEE, IEC, BS, ASTM, AWS, or other authority is made applicable to materials, the contractor shall test the materials in accordance therewith, shall submit to the Engineer certified copies of test results, and shall not use such

materials until test results have been approved by the Engineer. The requirement for test results may be waived in writing by the Engineer. Wherever reference is made in the drawings or specification to one of the above specifications of test methods, and the number or other identification of the specification or test method, representing the year of its adoption or latest revision is omitted, the reference shall be to the specification or test method in effect on the date of the invitation to tenders.

8.3 Construction Inspection

The contractor shall provide and maintain an inspection system acceptable to the Engineer covering the works under this contract. Records of all inspection work by the contractor shall be kept complete and available to the Engineer during the performance of this contract including the warranty period.

All of the works shall be subject to inspection and approval by the Engineer for conformity with the drawings and specification. The Engineer shall have access to, and may inspect the works at all times and places at the site of the works, and shall have access to and may inspect materials and equipment to be incorporated in the works at all times at the place of production or manufacture, in such parts of the producing or manufacturing plant as are concerned therewith, and at the shipping point, as well as at storage yards and the site of the works.

The Engineer will designate for the contractor the materials and equipment to be inspected at the place of production or manufacture. The contractor shall give the Engineer thirty (30) days advance written notice of the start of manufacture or production of materials and equipment so designated, and the contractor's contracts for such materials and equipment shall include a notice to the supplier or subcontractor of the inspection requirements of this article.

8.4 Defects

If so ordered in writing by the Engineer, the contractor shall remove, tear out, or disassemble, in whole or in part, any completed portion of the works to permit its inspection. If such portion of the works is found to be defective or unauthorized, the contractor shall bear the costs of removal, tearing out, or disassembly, and the provisions of this article shall apply. If such portion of the works is found to meet specification requirements, it shall be replaced, reassembled, or otherwise restored by

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

the contractor to its original condition and its removal, tearing out, or disassembly and replacement, reassembly, or restoration will be considered extra work.

Neither the inspection nor lack of inspection of any portion of the works nor the presence or absence of the Engineer during performance of any of the works shall waive any of the requirements of the drawings and specification or relieve the contractor of any of his obligations thereunder , and defective work, materials and equipment may be rejected not withstanding their prior inspection or lack of inspection by the Engineer, and not withstanding their conformance with the drawings and specification at the time of any prior inspection.

Any work, material, or equipment not conforming with the requirements of the drawings and specification will be considered defective, and except as otherwise provided below, will be rejected by the Engineer, whether in place or not.

Upon rejection, the contractor shall correct defective work, materials, or equipment, or shall remove and replace them with work, materials or equipment conforming with the requirements of the drawings and specification, as ordered by the Engineer. Corrected material and equipment shall be used in the work only upon the written approval of the Engineer.

Any work done beyond the lines and grades shown on the drawings or established by the Engineer, or any extra work done without written authority will be considered unauthorized and will not be paid for.

Such work shall be removed, or removed and replaced with authorized work, or otherwise corrected as ordered by the Engineer.

The contractor shall remove, tear out, or disassemble any portion of the works when necessary to give access to defects in the works or unauthorized work, and shall replace, reassemble or otherwise restore it to its original condition following correction, replacement, or removal of the defective or unauthorized portion of the works. If so ordered in writing by the Engineer, the contractor shall remove, tear out, or disassemble any portion of the work of other contractors, when necessary for the above purpose, and shall replace, reassemble, or otherwise restore it to its original condition, all at the expense of the contractor.

If the contractor fails to comply promptly with any order of the Engineer given under this article, the owner may cause the defective work, materials, or equipment or unauthorized work covered by the order to be corrected, and any amount thereof may be deducted from any money due or that may become due to him under the contract. If shipment to the contractor of any item or part is required, the costs of such shipment shall be borne by the contractor.

Any decision of the Engineer under this article shall be final and conclusive.

9 QUALITY CONTROL PROGRAM

9.1 General

The contractor shall provide and maintain quality control programs as specified below, for the manufacture of equipment, to ensure compliance with quality standards of the specification. Within thirty (30) days of the signature date of contract the contractor shall furnish to the Engineer four (4)

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

copies of his complete quality control and procedures manual, and description of the organization to be used on this contract.

Throughout the period of the contract until shipment from points of manufacture, the Engineer or other authorized representatives of the owner will monitor the contractor's methods, procedures, and processes in all phases of the work for compliance with the quality control program, provisions. Before beginning the work, the contractor shall designate to the owner and Engineer in writing one employee or member of this organization who shall have authority to act in all matters relative to the quality control provisions of the contract. Failure of the contractor to maintain the quality control program throughout all phases of the work will be considered a failure of the work to conform to the specification.

9.2 Program Requirements

The quality control program shall provide for at least the following controls:

(i)Design All drawings and production information shall clearly set forth the standards of quality such as materials to be used, required machining finishes, welding procedures, and coatings to be applied. An effective system shall ensure rapid dissemination of specification and drawing changes throughout the manufacturing organization and provide for immediate removal of obsolete information from use. All the latest applicable drawings and changes shall be available at the time and place of inspection. A list of all drawings shall be maintained showing the status of each, including submittal, dates, reviews and revisions.

(ii)Purchased Material Control: Effective quality control shall be exercised over all outside purchased materials to ensure that the materials meet specification requirements. This control shall consist of either inspection at source of manufacturing, verification of certified data furnished by the supplier or inspection upon receipt. Records of purchased material inspection shall be maintained and be available for inspection by the Engineer or other authorized representatives of the owner.

(iii)Tools and Gages: Precision tools, gages and measuring instruments necessary to verify material conformance to specification shall be available before beginning production. Adequate physical control and safeguarding of tools and gages shall be provided to prevent their misuse and damage when not in use. A schedule shall be established and maintained for periodically checking and calibrating all precision tools and gages against master standards. This procedure shall include the maintenance of records to verify the checking of precision tools and gages as scheduled. Master standards used for checking shall be periodically certified for accuracy against standards traceable to an international bureau of standards and evidence of certification shall be made available upon request. New and reconditioned precision tools and gages shall be calibrated before being released for use.

(iv)Manufacturing Control The contractor's inspection organization shall be independent of the line production staff, shall report directly to top management, and shall be vested with controlling authority. Before beginning production, the quality control program shall provide for determination of those points throughout the manufacturing process where inspection or tests are required to ensure adequate control of quality, and accordingly establish and maintain such in-process inspection operations as are necessary. Inspectors shall be provided with instructions clearly detailing what characteristics to inspect, what standards of acceptance to use and what action to take

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.

as a result of inspecting finding. The inspection status of material shall be identified at all times by markings on the material tags or other suitable means. Evidence of performance of special

processes shall also be indicated in a like manner. Final inspection and testing shall be sufficient to ensure compliance of the finished product with the specifications. Adequate records shall be maintained of all inspections and tests. These records shall substantiate that the required inspections and tests have

been performed as specified in the written instructions, and indicate the discrepancies and reasons for such discrepancies. These records shall be available and maintained as stated above.

When specifications require that manufacturing operations or processes require certification by codes or certification of operators and equipment according to the said codes, the program shall provide that such certification are obtained before production is stated. Evidence of such certifications shall be maintained and be available for inspection by the Engineer or other authorized representatives of the owner.

(v)Unsatisfactory Materials Inspection procedures shall include adequate measures for positive segregation of unsatisfactory incoming, in-process and finished material from acceptable material and to ensure its removal from the manufacturing cycle. Such measures shall consist separation from acceptable material, there shall be an established procedure for analysis and review of questionable material by a higher authority to determine its disposition.

(vi)Handling and packing The program shall provide for and maintain throughout the manufacturing cycle such measures as

are necessary to protect incoming, in-process and finishing material from damage. These measures shall include protective packing or wrapping maintaining special environment, special handling and storage instructions and other specific methods of protection as required.

We reserve all right in this document and in the information contained therein. Reproduction, use or disclosure to third parties without express authority is strictly forbidden © COPYRIGHT ANJ Co.