EXTENSION TO NEYRIZ 66/20KVSUBSTATION

GUARANTEE TABLE FOR MEDIUM VOLTAGE SWITCHGEAR

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Rev.	**Purpose of Issue**	**Date**	**Prepared**	**Check**	**Approved**	**Authorized**

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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.

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3 MEDIUM VOLTAGE SWITCHGEAR

3.1 Switchgear cubicle

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacturer's type designation		
3	Indoor or outdoor installation		
4	Number of phases		
5	Number of busbars		
6	Rated voltage	KV(rms)	
7	Rated insulation level (at IEC condition)		
	a) Rated 1 min power frequency withstand voltage	KV(rms)	
	b) Rated lightning impulse withstand voltage	KV(rms)	
8	Rated normal current of busbar and feeder circuits	A (rms)	
9	Rated short - time withstand current (I_{th})	kA(rms)	
10	Rated duration of short circuit	Sec	
11	Rated peak withstand current	KA(rms)	
12	Pot head type and manufacturer		
13	Current transformer type and manufacturer		
14	Current transformer burden and accuracy		
15	Current transformer ratio		
16	Voltage transformer type and manufacturer		
17	Voltage transformer burden and accuracy		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
18	Voltage transformer ratio		
19	Ground switch type and manufacturer		
20	Ground switch, type of mechanism		
21	Ground switch, type of interlock		
22	Ground switch, number and type of auxiliary switch		
23	Ground switch, type of blade		
24	Type and rating fuses for voltage transformer circuits:		
	a) Primary H.V. fuses	A	
	b) Secondary L.V. fuses	A	
25	Degree of protection for the enclosure and partitions		
	a) For the enclosure		
	b) Between LV+HV compartment		
26	Cubicle weight	kg	
	a) In coming		
	b) Bus-section		
	c) Out going		
27	Cubicle shipping weight including circuit breaker		
28	Cubicle dimensions (L×W×H)	cmxcmxcm	
29	Earthquake protection (coefficient of g)		
30	Painting thickness of panels	micron	

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3.2 Circuit Breakers for Medium Voltage Switchgear

3.2.1 General

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacturer's type designation		
3	Applicable technical standards		

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3.2.2 Rated Values and Characteristics

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Indoor or outdoor installation		
2	Number of phases		
3	Number of poles		
4	Rated voltages	KV(rms)	
5	Rated frequency	Hz	
6	Rated insulation level:		
	a) Rated 1 min. power frequency withstand voltage	KV(rms)	
	b) Rated lightning impulse withstand voltage	KV(peak)	
7	Rated normal current (at IEC condition)	A(rms)	
8	Rated short - circuit breaking current	KA(rms)	
9	Rated duration of short circuit	S	
10	Rated line-charging breaking current	A(rms)	
11	Rated cable - charging breaking current	A(rms)	
12	Rated small - inductive breaking current	A(rms)	
13	First pole to clear factor		
14	Rated transient recovery voltage (TRV) for terminal faults	KV(rms)	
15	Rated characteristics for short-line faults	KA(rms)	
16	Rated short- circuit making current	KA(rms)	
17	Rated out-of phase breaking current	KA(rms)	
18	Rated operating sequence		
19	Rated time quantities:		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
	a) rated opening time	ms	
	b) Rated break time	ms	
	c) Rated closing time	ms	
	d) Rated make time	ms	
	e) Max. time interval between opening of first and last phase of three phase circuit - breaker	ms	
	f) Closing time from energization of close coil to latching of circuit breaker in fully closed position	ms	
20	Max. temperature rise under rated load condition	°C	
21	Max. peak value of switching over voltage when interrupting rated line charging current		
22	Voltage drop across terminals of a phase at normal current		
23	Breaking current (Asymmetrical)	A	

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3.2.3 Constructional features

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Type of circuit breakers (min. oil, Sf6 or vacuum)		
2	Mass of complete circuit breaker	kg	
3	Creepage to earth over insulation	mm	
4	Minimum clearances:		
	a) Between phases	mm	
	b) Between live parts to earth	mm	
5	Overall dimension of the installation	cmxcmxcm	

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3.2.4 Operating Mechanism of Circuit - Breaker and Associated Equipment

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Type of operating mechanism (spring, hydraulic, etc.)		
2	Rated supply pressure	N/m^2	
3	Quantity of free gas for operation		
4	Power supply for operating mechanism and control voltage		
5	Current and power for operating	A,W	
6	Operating times (of operating devices)	ms	
7	Trip coil current and number of trip coil	A/No	
8	Trip coil rated max. /min. voltage	V	
9	Closing coil current	A	
10	Closing coil rates max./min. voltage	V	
11	Special inter locking requirements		
12	Type and number of auxiliary contracts		
13	Power supply for auxiliaries		
14	Number of operating cycle permissible before inspection and maintenance of contacts and other essential parts:		
	a) At 50% rated current		
	b) At rated current		
	c) At 50% short circuit current		
	d) At rated short circuit current		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
15	Type of main contacts		
16	Type of arcing contacts		
17	Type of arc control device		
18	Details of spring charging motor (if provided)		
19	Type of motor		
20	Power consumption	W	
21	Rated voltage	V	
22	Speed at rated output	R.P.M.	
23	Class of insulation		
24	Time required by motor to charge the spring completely	S	
25	Motor full load current	A	
26	Maximum starting current	A	
27	Rating of protection fuses	A	
28	Type of starter and rating		

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3.3 Current Transformers

3.3.1 Incoming Cubicles (N.A)

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacturer's type designation		
3	Rated secondary current	A	
4	Rated primary current for different taps (multi ratio)		
	a) Core 1		
	b) Core 2		
	c) Core 3		
5	Burden and accuracy class (specify the values for relevant parameters in each class e.g. ALF for class P. Vk. Ie. & Rct for class X. etc.)		
	a) Core 1		
	b) Core 2		
	c) Core 3		
6	Type of CT (oil immersed. dry....)		
7	Class of CT (outdoor, indoor)		
8	Rated transformation ratio		
9	Rated short time thermal current / 3 sec	kA(rms)	
10	Rated short time dynamic current	kA(peak)	
11	Rated frequency	Hz	
12	Pollution level	mm/kV	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
13	Type of primary winding (single trun or muti turn)		
14	Insulation level (at IEC service conditions)		
14.1	Nominal service voltage	kV(rms)	
14.2	Rated voltage (max)	kV(rms)	
14.3	Rated lightning impulse withstand voltage	kV(peak)	
14.4	Rated one minute power frequency withstand voltage	kV(rms)	
15	Rated continuous thermal current (% of rated primary current)		
16	Time permitted with open circuited secondary	sec	
17	Voltage of secondary winding terminals with normal primary load current. Secondary open circuit	V	
18	Design altitude above sea level	m	
19	Temperature rise at rated burden above following ambient temperature		
	a) 40	°C	
	b) 45	°C	
	c) 50	°C	
	d) 55	°C	
20	Type of protective device		

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3.3.2 Outgoing Cubicles

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacutrer's type designation		
3	Rated secondary current	A	
4	Rated primary current for different taps (multi ratio)		
	a) Core 1		
	b) Core 2		
5	Burden and accuracy calss (specify the values for relevant parameters in each class e.g. ALF for calss P. Vk. Ie. & Rct for calss X. etc.)		
	a) Core 1		
	b) Core 2		
6	Type of CT (oil immersed. dry....)		
7	Class of CT (outdoor, indoor)		
8	Rated transformation ratio		
9	Rated short time thermal current / 3 sec	kA(rms)	
10	Rated short time dynamic current	kA(peak)	
11	Rated frequency	Hz	
12	Pollution level	mm/kV	
13	Type of primary winding (single turn or multi turn)		
14	Insulation level (at IEC service conditions)		
14.1	Nominal service voltage	kV(rms)	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
14.2	Rated voltage (max)	kV(rms)	
14.3	Rated lightning impulse withstand voltage	kV(peak)	
14.3	Rated one minute power frequency withstand voltage	kV(rms)	
15	Rated continuous thermal current (% of rated primary current)		
16	Time permitted with open circuited secondary	sec	
17	Voltage of secondary winding terminals with normal primary load current. Secondary open circuit	V	
18	Design altitude above sea level	m	
19	Temperature rise at rated burden above following ambient temperature		
	a) 40	°C	
	b) 45	°C	
	c) 50	°C	
	d) 55	°C	
20	Type of protective device		
21	Overall dimensions (H × W × L)	mm^3	
22	Total weight of a single phase CT	kg	
23	Material of conducting parts:		
	a) Primary windings		
	b) Secondary windings		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
24	Type of terminal connectors		
25	power frequency withstand voltage on each secondary windings		
26	Max. partial discharge at 1.1 rated voltage	PC	

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3.3.3 Bus - Section Cubicles (N.A)

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacutrer's type designation		
3	Rated secondary current	A	
4	Rated primary current for different taps (multi ratio)		
	a) Core 1		
	b) Core 2		
5	Burden and accuracy calss (specify the values for relevant parameters in each class e.g. ALF for calss P. Vk. Ie. & Rct for calss X. etc.)		
	a) Core 1		
	b) Core 2		
6	Type of CT (oil immersed. dry....)		
7	Class of CT (outdoor, indoor)		
8	Rated transformation ratio		
9	Rated short time thermal current / 3 sec	kA(rms)	
10	Rated short time dynamic current	kA(peak)	
11	Rated frequency	Hz	
12	Pollution level	mm/kV	
13	Type of primary winding (single turn or multi turn)		
14	Insulation level (at IEC service conditions)		
14.1	Nominal service voltage	kV(rms)	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
14.2	Rated voltage (max)	kV(rms)	
14.3	Rated lightning impulse withstand voltage	kV(peak)	
14.3	Rated one minute power frequency withstand voltage	kV(rms)	
15	Rated continuous thermal current (% of rated primary current)		
16	Time permitted with open circuited secondary	sec	
17	Voltage of secondary winding terminals with normal primary load current. Secondary open circuit	V	
18	Design altitude above sea level	m	
19	Temperature rise at rated burden above following ambient temperature		
	a) 40	°C	
	b) 45	°C	
	c) 50	°C	
	d) 55	°C	
20	Type of protective device		
21	Overall dimensions (H × W × L)	mm^3	
22	Total weight of a single phase CT	kg	
23	Material of conducting parts:		
	a) Primary windings		
	b) Secondary windings		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
24	Type of terminal connectors		
25	power frequency withstand voltage on each secondary windings		
26	Max. partial discharge at 1.1 rated voltage	PC	

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3.4 Potential transformers

3.4.1 Incoming Cubicles (N.A)

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacturer's type designation		
3	Rated primary voltage		
4	Rated secondary voltage		
5	Rated burden of winding	VA	
6	Rated frequency	Hz	
7	Highest system voltage	kV(rms)	
8	Rated voltage factor: a) Continuous b) 30 sec.		
9	Insulation level (at IEC condition		
9.1	Rated lightning impulse withstand voltage	KV(peak)	
9.2	Rated one minute power frequency withstand voltage	kV(rms)	
10	Power frequency withstand voltage between secondary's and secondary to earth	KV(rms)	
11	Rated transformation ratio		
12	Number of secondary winding		
13	Accuracy class for each winding		
14	Continuous thermal of each secondary winding alone	VA	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
15	Total continuous thermal burden of secondary windings	VA	
16	permissible secondary short circuit time with rated voltage maintained on primary terminals	sec	
17	Short circuit impedance		
18	Temperature rise at rated burden above ambient temperature: a) 40 b) 45 c) 50 d) 55	 °C °C °C °C	
19	Designed for Min. to Max. ambient temperature	°C	
20	Designed altitude above sea level	m	
21	Method of suppressing Ferro resonance phenomena		
22	Overall dimensions (H × W × L)	mm^3	
23	Total weight of a single phase CT	kg	
24	Material of conducting parts		
25	Max. partial discharge at 1.1 rated voltage	PC	

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3.4.2 Busbar Cubicles (N.A)

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacturer's type designation		
3	Rated primary voltage		
4	Rated secondary voltage		
5	Rated burden of winding	VA	
6	Rated frequency	Hz	
7	Highest system voltage	kV(rms)	
8	Rated voltage factor: a) Continuous b) 30 sec.		
9	Insulation level (at IEC condition		
9.1	Rated lightning impulse withstand voltage	KV(peak)	
9.2	Rated one minute power frequency withstand voltage	kV(rms)	
10	Power frequency withstand voltage between secondary's and secondary to earth	KV(rms)	
11	Rated transformation ratio		
12	Number of secondary winding		
13	Accuracy class for each winding		
14	Continuous thermal of each secondary winding alone	VA	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
15	Total continuous thermal burden of secondary windings	VA	
16	permissible secondary short circuit time with rated voltage maintained on primary terminals	sec	
17	Short circuit impedance		
18	Temperature rise at rated burden above ambient temperature: a) 40 b) 45 c) 50 d) 55	 °C °C °C °C	
19	Designed for Min. to Max. ambient temperature	°C	
20	Designed altitude above sea level	m	
21	Method of suppressing Ferro resonance phenomena		
22	Overall dimensions (H × W × L)	mm^3	
23	Total weight of a single phase CT	kg	
24	Material of conducting parts		
25	Max. partial discharge at 1.1 rated voltage	PC	

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