

Project: IV Train Jose 250
 Location: Anaco - Anzoátegui State
 Contract: 1295
 Engineer: Daniel Serres
 Filename: 1295-01_OP2

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Option 2

Momentary Duty Summary Report

3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Momentary Duty					Device Capability		
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Asymm. kA rms	Asymm. kA Crest	Symm. kA rms	Asymm. kA rms	Asymm. kA Crest
Bus-1	13.800	Bus-1	Switchgear	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	52G1	5 cy Sym CB	33.590	18.9	1.560	52.395	87.715		77.000	130.000
	13.800	52 NC	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB2	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB40-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB74-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB20-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB10-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
Bus-2	13.800	Bus-2	Switchgear	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	52G2	5 cy Sym CB	33.590	18.9	1.560	52.395	87.715		77.000	130.000
	13.800	52 NC	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB13	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB54-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB73-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB53-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
	13.800	CB55-1	5 cy Sym CB	41.930	18.9	1.560	65.406	109.496		77.000	130.000
Bus-3	13.800	Bus-3	Switchgear	35.305	14.4	1.514	53.463	90.076		77.000	130.000
	13.800	52G3	5 cy Sym CB	26.971	14.4	1.514	40.842	68.813		77.000	130.000
	13.800	CB24	5 cy Sym CB	35.305	14.4	1.514	53.463	90.076		77.000	130.000
	13.800	CB7-1	5 cy Sym CB	35.305	14.4	1.514	53.463	90.076		67.000	113.100
MCC-480-01.	0.480	MCC-480-01.	Bus	46.868	11.1	1.462	68.526	116.273			
MCC-480-02.	0.480	MCC-480-02.	Bus	46.868	11.1	1.462	68.526	116.273			
MCC-480-03.	0.480	MCC-480-03.	Bus	46.868	11.1	1.462	68.526	116.273			
MCC-480-04.	0.480	MCC-480-04.	Bus	46.868	11.1	1.462	68.526	116.273			
MCC-480-05.	0.480	MCC-480-05.	Bus	44.646	11.1	1.462	65.262	110.740			
MCC-480-06.	0.480	MCC-480-06.	Bus	42.904	11.3	1.465	62.853	106.608			
MCC-480-07.	0.480	MCC-480-07.	Bus	44.646	11.1	1.462	65.262	110.740			
MCC-480-08.	0.480	MCC-480-08.	Bus	42.904	11.3	1.465	62.853	106.608			
MCC-480-09 A	0.480	MCC-480-09 A	Bus	43.606	10.7	1.453	63.352	107.625			
MCC-480-09 B	0.480	MCC-480-09 B	Bus	44.439	10.7	1.452	64.532	109.640			
MCC-480-10.	0.480	MCC-480-10.	Bus	43.606	10.7	1.453	63.352	107.625			
MCC-480-11 A	0.480	MCC-480-11 A	Bus	43.606	10.7	1.453	63.352	107.625			
MCC-480-11 B	0.480	MCC-480-11 B	Bus	44.439	10.7	1.452	64.532	109.640			

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3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Momentary Duty					Device Capability		
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Asymm. kA rms	Asymm. kA Crest	Symm. kA rms	Asymm. kA rms	Asymm. kA Crest
MCC-480-12.	0.480	MCC-480-12.	Bus	44.439	10.7	1.452	64.532	109.640			
MCC-480-13 A	0.480	MCC-480-13 A	Bus	43.606	10.7	1.453	63.352	107.625			
MCC-480-13 B	0.480	MCC-480-13 B	Bus	44.439	10.7	1.452	64.532	109.640			
MCC-480-14.	0.480	MCC-480-14.	Bus	43.606	10.7	1.453	63.352	107.625			
MCC-480-15 A	0.480	MCC-480-15 A	Bus	43.606	10.7	1.453	63.352	107.625			
MCC-480-15 B	0.480	MCC-480-15 B	Bus	44.439	10.7	1.452	64.532	109.640			
MCC-480-16.	0.480	MCC-480-16.	Bus	44.439	10.7	1.452	64.532	109.640			
MCC-480-17 A	0.480	MCC-480-17 A	Bus	46.322	10.5	1.449	67.126	114.091			
MCC-480-17 B	0.480	MCC-480-17 B	Bus	46.814	10.5	1.449	67.819	115.275			
MCC-480-18 A	0.480	MCC-480-18 A	Bus	46.322	10.5	1.449	67.126	114.091			
MCC-480-18 B	0.480	MCC-480-18 B	Bus	46.814	10.5	1.449	67.819	115.275			
MCC-480-19 A	0.480	MCC-480-19 A	Bus	46.322	10.5	1.449	67.126	114.091			
MCC-480-19 B	0.480	MCC-480-19 B	Bus	46.814	10.5	1.449	67.819	115.275			
MCC-480-20 A	0.480	MCC-480-20 A	Bus	46.322	10.5	1.449	67.126	114.091			
MCC-480-20 B	0.480	MCC-480-20 B	Bus	46.814	10.5	1.449	67.819	115.275			
MCC-480-21.	0.480	MCC-480-21.	Bus	46.322	10.5	1.449	67.126	114.091			
MCC-480-22.	0.480	MCC-480-22.	Bus	46.814	10.5	1.449	67.819	115.275			
OFFSITES A	0.480	OFFSITES A	Switchgear	41.500	5.5	1.278	53.040	91.720	65.000	86.500	
OFFSITES B	0.480	OFFSITES B	Switchgear	41.500	5.5	1.278	53.040	91.720	65.000	86.500	
PDC-480-01-A	0.480	PDC-480-01-A	Bus	46.868	11.1	1.462	68.526	116.273			
PDC-480-01-B	0.480	PDC-480-01-B	Bus	46.868	11.1	1.462	68.526	116.273			
PDC-480-02-A	0.480	PDC-480-02-A	Bus	44.646	11.1	1.462	65.262	110.740			
PDC-480-02-B	0.480	PDC-480-02-B	Bus	42.904	11.3	1.465	62.853	106.608			
PDC-480-03-A	0.480	PDC-480-03-A	Bus	43.606	10.7	1.453	63.352	107.625			
PDC-480-03-B	0.480	PDC-480-03-B	Bus	44.439	10.7	1.452	64.532	109.640			
PDC-480-04-A	0.480	PDC-480-04-A	Bus	43.606	10.7	1.453	63.352	107.625			
PDC-480-04-B	0.480	PDC-480-04-B	Bus	44.439	10.7	1.452	64.532	109.640			
PDC-480-05A	0.480	PDC-480-05A	Bus	46.322	10.5	1.449	67.126	114.091			
PDC-480-05B	0.480	PDC-480-05B	Bus	46.814	10.5	1.449	67.819	115.275			
PDC-4160-01-A	4.160	PDC-4160-01-A	Switchgear	15.996	14.0	1.509	24.140	40.702		58.000	97.880
PDC-4160-01-B	4.160	PDC-4160-01-B	Switchgear	17.215	14.5	1.516	26.095	43.957		58.000	97.880
PDC-4160-02-A	4.160	PDC-4160-02-A	Switchgear	16.344	13.7	1.504	24.587	41.482		58.000	97.880
PDC-4160-02-B	4.160	PDC-4160-02-B	Switchgear	16.488	13.6	1.504	24.795	41.836		58.000	97.880
	4.160	CB61-1	5 cy Sym CB	16.488	13.6	1.504	24.795	41.836		32.000	54.000
PDC-4160-03-A	4.160	PDC-4160-03-A	Switchgear	17.660	14.9	1.520	26.843	45.190		58.000	97.880
PDC-4160-03-B	4.160	PDC-4160-03-B	Switchgear	17.702	14.8	1.520	26.904	45.295		58.000	97.880

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Option 2

3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Momentary Duty					Device Capability		
ID	kV	ID	Type	Symm. kA rms	X/R Ratio	M.F.	Asymm. kA rms	Asymm. kA Crest	Symm. kA rms	Asymm. kA rms	Asymm. kA Crest
PDC-4160-03-B	4.160	CB81	5 cy Sym CB	17.702	14.8	1.520	26.904	45.295		32.000	54.000
SW-13800-01-A	13.800	SW-13800-01-A	Switchgear	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB82	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB84	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB93	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB94	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
SW-13800-01-B	13.800	SW-13800-01-B	Switchgear	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB82	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB83-2	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB91	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
	13.800	CB1-1	5 cy Sym CB	38.452	12.0	1.478	56.826	96.220		67.000	113.100
Tren A - BUS A	4.160	Tren A - BUS A	Switchgear	18.633	6.9	1.343	25.030	43.064		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.633	6.9	1.343	25.030	43.064		58.000	97.000
Tren A - BUS B	4.160	Tren A - BUS B	Switchgear	18.633	6.9	1.343	25.030	43.064		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.633	6.9	1.343	25.030	43.064		58.000	97.000
Tren B - BUS A	4.160	Tren B - BUS A	Switchgear	17.544	9.6	1.427	25.038	42.675		39.000	65.810
	4.160	CB76-1	5 cy Sym CB	17.544	9.6	1.427	25.038	42.675		77.000	130.000
	4.160	CB80-1	5 cy Sym CB	17.544	9.6	1.427	25.038	42.675		58.000	97.000
Tren B - BUS B	4.160	Tren B - BUS B	Switchgear	17.544	9.6	1.427	25.038	42.675		39.000	65.810
	4.160	CB80-1	5 cy Sym CB	17.544	9.6	1.427	25.038	42.675		58.000	97.000

Method: IEEE - X/R is calculated from separate R & X networks.

Protective device duty is calculated based on total fault current

* Indicates a device with momentary duty exceeding the device capability

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Interrupting Duty Summary Report

3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device			Interrupting Duty					Device Capability		
ID	kV	ID	Type	CPT (Cy)	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
Bus-1	13.800	52G1	5 cy Sym CB	3.0	31.120	19.6	1.000	31.120	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB2	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB40-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB74-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB20-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB10-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
Bus-2	13.800	52G2	5 cy Sym CB	3.0	31.120	19.6	1.000	31.120	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB13	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB54-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB73-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB53-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
		CB55-1	5 cy Sym CB	3.0	39.461	19.6	1.015	40.051	15.000		37.000	40.217
Bus-3	13.800	52G3	5 cy Sym CB	3.0	25.100	14.9	1.000	25.100	15.000		37.000	40.217
		CB24	5 cy Sym CB	3.0	33.436	14.9	1.000	33.436	15.000		37.000	40.217
		CB7-1	5 cy Sym CB	3.0	33.436	14.9	1.000	33.436	15.000		42.000	45.652
MCC-480-01.	0.480				46.868	11.1						
MCC-480-02.	0.480				46.868	11.1						
MCC-480-03.	0.480				46.868	11.1						
MCC-480-04.	0.480				46.868	11.1						
MCC-480-05.	0.480				44.646	11.1						
MCC-480-06.	0.480				42.904	11.3						
MCC-480-07.	0.480				44.646	11.1						
MCC-480-08.	0.480				42.904	11.3						
MCC-480-09 A	0.480				43.606	10.7						
MCC-480-09 B	0.480				44.439	10.7						
MCC-480-10.	0.480				43.606	10.7						
MCC-480-11 A	0.480				43.606	10.7						
MCC-480-11 B	0.480				44.439	10.7						

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3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device			Interrupting Duty				Device Capability			
ID	kV	ID	Type	CPT (Cy)	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
MCC-480-12.	0.480				44.439	10.7						
MCC-480-13 A	0.480				43.606	10.7						
MCC-480-13 B	0.480				44.439	10.7						
MCC-480-14.	0.480				43.606	10.7						
MCC-480-15 A	0.480				43.606	10.7						
MCC-480-15 B	0.480				44.439	10.7						
MCC-480-16.	0.480				44.439	10.7						
MCC-480-17 A	0.480				46.322	10.5						
MCC-480-17 B	0.480				46.814	10.5						
MCC-480-18 A	0.480				46.322	10.5						
MCC-480-18 B	0.480				46.814	10.5						
MCC-480-19 A	0.480				46.322	10.5						
MCC-480-19 B	0.480				46.814	10.5						
MCC-480-20 A	0.480				46.322	10.5						
MCC-480-20 B	0.480				46.814	10.5						
MCC-480-21.	0.480				46.322	10.5						
MCC-480-22.	0.480				46.814	10.5						
OFFSITES A	0.480	CB58-1	Molded Case		41.500	5.5	1.025	42.539	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.500	5.5	1.025	42.539	0.480	20.00	65.000	65.000
OFFSITES B	0.480	CB57-1	Molded Case		41.500	5.5	1.025	42.539	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.500	5.5	1.025	42.539	0.480	20.00	65.000	65.000
PDC-480-01-A	0.480				46.868	11.1						
PDC-480-01-B	0.480				46.868	11.1						
PDC-480-02-A	0.480				44.646	11.1						
PDC-480-02-B	0.480				42.904	11.3						
PDC-480-03-A	0.480				43.606	10.7						
PDC-480-03-B	0.480				44.439	10.7						
PDC-480-04-A	0.480				43.606	10.7						
PDC-480-04-B	0.480				44.439	10.7						
PDC-480-05A	0.480				46.322	10.5						
PDC-480-05B	0.480				46.814	10.5						
PDC-4160-01-A	4.160				14.762	13.9						
PDC-4160-01-B	4.160				15.572	14.5						
PDC-4160-02-A	4.160				14.680	13.9						

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3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Interrupting Duty				Device Capability				
ID	kV	ID	Type	CPT (Cy)	Symm. kA rms	X/R Ratio	M.F.	Adj. Sym. kA rms	kV	Test PF	Rated Int.	Adjusted Int.
PDC-4160-02-B	4.160	CB61-1	5 cy Sym CB	3.0	14.778	13.8	1.000	14.778	4.760		20.000	22.885
PDC-4160-03-A	4.160				15.701	14.6						
PDC-4160-03-B	4.160	CB81	5 cy Sym CB	3.0	15.725	14.6	1.000	15.725	4.760		20.000	22.885
SW-13800-01-A	13.800	CB82	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
		CB84	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
		CB93	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
		CB94	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
SW-13800-01-B	13.800	CB82	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
		CB83-2	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
		CB91	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
		CB1-1	5 cy Sym CB	3.0	35.737	12.0	1.000	35.737	15.000		42.000	45.652
Tren A - BUS A	4.160	CB4-1	5 cy Sym CB	3.0	17.136	6.7	1.000	17.136	4.760		29.000	33.183
Tren A - BUS B	4.160	CB4-1	5 cy Sym CB	3.0	17.136	6.7	1.000	17.136	4.760		29.000	33.183
Tren B - BUS A	4.160	CB76-1	5 cy Sym CB	3.0	16.753	9.7	1.000	16.753	15.000		37.000	48.000
		CB80-1	5 cy Sym CB	3.0	16.753	9.7	1.000	16.753	4.760		29.000	33.183
Tren B - BUS B	4.160	CB80-1	5 cy Sym CB	3.0	16.753	9.7	1.000	16.753	4.760		29.000	33.183

Method: IEEE - X/R is calculated from separate R & X networks.

HV CB interrupting capability is adjusted based on bus nominal voltage

Short-Circuit multiplying factor for LV Molded Case and Insulated Case Circuit Breakers is calculated based on asymmetrical current.

Generator protective device duty is calculated based on maximum through fault current. Other protective device duty is calculated based on total fault current.

* Indicates a device with interrupting duty exceeding the device capability

Interrupting Duty Summary Report
Generator Circuit-Breaker

3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Peak Symmetrical kA	@ CB Parting Time	
ID	kV	ID	Type		Degree of Asymm.(%)	DC Fault Current (kA)
Bus-1	13.800	52G1	5 cy Sym CB	44.010	29.42	12.946
Bus-2	13.800	52G2	5 cy Sym CB	44.010	29.42	12.946

Project: IV Train Jose 250
Location: Anaco - Anzoátegui State
Contract: 1295
Engineer: Daniel Serres
Filename: 1295-01_OP2

ETAP
5.0.3C

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SN: YANES&ASOC
Revision: Base
Config.: SALTRX-07

Option 2

Interrupting Duty Summary Report
Generator Circuit-Breaker

3-Phase Fault Currents: (Prefault Voltage = 100 % of the Bus Nominal Voltage)

Bus		Device		Peak Symmetrical kA	@ CB Parting Time	
ID	kV	ID	Type		Degree of Asymm.(%)	DC Fault Current (kA)
Bus-3	13.800	52G3	5 cy Sym CB	35.496	20.72	7.353