

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	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	52G1	5 cy Sym CB	25.152	21.3	1.577	39.674	66.253		77.000	130.000
	13.800	52 NC	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB2	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB40-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB74-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB20-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB10-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
Bus-2	13.800	Bus-2	Switchgear	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	52G2	5 cy Sym CB	25.152	21.3	1.577	39.674	66.253		77.000	130.000
	13.800	52 NC	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB13	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB54-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB73-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB53-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
	13.800	CB55-1	5 cy Sym CB	33.493	21.3	1.577	52.831	88.223		77.000	130.000
Bus-3	13.800	Bus-3	Switchgear	19.526	20.5	1.572	30.703	51.307		77.000	130.000
	13.800	52G3	5 cy Sym CB	11.185	20.5	1.572	17.587	29.390		77.000	130.000
	13.800	CB24	5 cy Sym CB	19.526	20.5	1.572	30.703	51.307		77.000	130.000
	13.800	CB7-1	5 cy Sym CB	19.526	20.5	1.572	30.703	51.307		67.000	113.100
MCC-480-01.	0.480	MCC-480-01.	Bus	41.370	11.2	1.462	60.496	102.645			
MCC-480-02.	0.480	MCC-480-02.	Bus	41.777	11.4	1.466	61.258	103.883			
MCC-480-03.	0.480	MCC-480-03.	Bus	41.370	11.2	1.462	60.496	102.645			
MCC-480-04.	0.480	MCC-480-04.	Bus	41.777	11.4	1.466	61.258	103.883			
MCC-480-05.	0.480	MCC-480-05.	Bus	43.692	11.1	1.462	63.858	108.360			
MCC-480-06.	0.480	MCC-480-06.	Bus	42.203	11.3	1.465	61.813	104.848			
MCC-480-07.	0.480	MCC-480-07.	Bus	43.692	11.1	1.462	63.858	108.360			
MCC-480-08.	0.480	MCC-480-08.	Bus	42.203	11.3	1.465	61.813	104.848			
MCC-480-09 A	0.480	MCC-480-09 A	Bus	42.324	10.7	1.453	61.507	104.484			
MCC-480-09 B	0.480	MCC-480-09 B	Bus	43.983	10.6	1.451	63.803	108.421			
MCC-480-10.	0.480	MCC-480-10.	Bus	42.324	10.7	1.453	61.507	104.484			
MCC-480-11 A	0.480	MCC-480-11 A	Bus	42.324	10.7	1.453	61.507	104.484			
MCC-480-11 B	0.480	MCC-480-11 B	Bus	43.983	10.6	1.451	63.803	108.421			

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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	43.983	10.6	1.451	63.803	108.421			
MCC-480-13 A	0.480	MCC-480-13 A	Bus	42.324	10.7	1.453	61.507	104.484			
MCC-480-13 B	0.480	MCC-480-13 B	Bus	43.983	10.6	1.451	63.803	108.421			
MCC-480-14.	0.480	MCC-480-14.	Bus	42.324	10.7	1.453	61.507	104.484			
MCC-480-15 A	0.480	MCC-480-15 A	Bus	42.324	10.7	1.453	61.507	104.484			
MCC-480-15 B	0.480	MCC-480-15 B	Bus	43.983	10.6	1.451	63.803	108.421			
MCC-480-16.	0.480	MCC-480-16.	Bus	43.983	10.6	1.451	63.803	108.421			
MCC-480-17 A	0.480	MCC-480-17 A	Bus	45.144	10.6	1.450	65.461	111.248			
MCC-480-17 B	0.480	MCC-480-17 B	Bus	46.394	10.4	1.448	67.165	114.177			
MCC-480-18 A	0.480	MCC-480-18 A	Bus	45.144	10.6	1.450	65.461	111.248			
MCC-480-18 B	0.480	MCC-480-18 B	Bus	46.394	10.4	1.448	67.165	114.177			
MCC-480-19 A	0.480	MCC-480-19 A	Bus	45.144	10.6	1.450	65.461	111.248			
MCC-480-19 B	0.480	MCC-480-19 B	Bus	46.394	10.4	1.448	67.165	114.177			
MCC-480-20 A	0.480	MCC-480-20 A	Bus	45.144	10.6	1.450	65.461	111.248			
MCC-480-20 B	0.480	MCC-480-20 B	Bus	46.394	10.4	1.448	67.165	114.177			
MCC-480-21.	0.480	MCC-480-21.	Bus	45.144	10.6	1.450	65.461	111.248			
MCC-480-22.	0.480	MCC-480-22.	Bus	46.394	10.4	1.448	67.165	114.177			
OFFSITES A	0.480	OFFSITES A	Switchgear	41.168	5.5	1.280	52.701	91.122	65.000	86.500	
OFFSITES B	0.480	OFFSITES B	Switchgear	41.168	5.5	1.280	52.701	91.122	65.000	86.500	
PDC-480-01-A	0.480	PDC-480-01-A	Bus	41.370	11.2	1.462	60.496	102.645			
PDC-480-01-B	0.480	PDC-480-01-B	Bus	41.777	11.4	1.466	61.258	103.883			
PDC-480-02-A	0.480	PDC-480-02-A	Bus	43.692	11.1	1.462	63.858	108.360			
PDC-480-02-B	0.480	PDC-480-02-B	Bus	42.203	11.3	1.465	61.813	104.848			
PDC-480-03-A	0.480	PDC-480-03-A	Bus	42.324	10.7	1.453	61.507	104.484			
PDC-480-03-B	0.480	PDC-480-03-B	Bus	43.983	10.6	1.451	63.803	108.421			
PDC-480-04-A	0.480	PDC-480-04-A	Bus	42.324	10.7	1.453	61.507	104.484			
PDC-480-04-B	0.480	PDC-480-04-B	Bus	43.983	10.6	1.451	63.803	108.421			
PDC-480-05A	0.480	PDC-480-05A	Bus	45.144	10.6	1.450	65.461	111.248			
PDC-480-05B	0.480	PDC-480-05B	Bus	46.394	10.4	1.448	67.165	114.177			
PDC-4160-01-A	4.160	PDC-4160-01-A	Switchgear	14.708	13.7	1.505	22.134	37.341		58.000	97.880
PDC-4160-01-B	4.160	PDC-4160-01-B	Switchgear	16.118	14.2	1.512	24.362	41.062		58.000	97.880
PDC-4160-02-A	4.160	PDC-4160-02-A	Switchgear	14.575	13.5	1.502	21.895	36.951		58.000	97.880
PDC-4160-02-B	4.160	PDC-4160-02-B	Switchgear	15.819	13.1	1.497	23.674	39.985		58.000	97.880
	4.160	CB61-1	5 cy Sym CB	15.819	13.1	1.497	23.674	39.985		32.000	54.000
PDC-4160-03-A	4.160	PDC-4160-03-A	Switchgear	15.855	14.8	1.519	24.090	40.559		58.000	97.880
PDC-4160-03-B	4.160	PDC-4160-03-B	Switchgear	17.024	14.4	1.514	25.777	43.431		58.000	97.880

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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
PDC-4160-03-B	4.160	CB81	5 cy Sym CB	17.024	14.4	1.514	25.777	43.431		32.000	54.000
SW-13800-01-A	13.800	SW-13800-01-A	Switchgear	17.284	12.3	1.484	25.645	43.389		67.000	113.100
	13.800	CB84	5 cy Sym CB	17.284	12.3	1.484	25.645	43.389		67.000	113.100
	13.800	CB93	5 cy Sym CB	17.284	12.3	1.484	25.645	43.389		67.000	113.100
	13.800	CB94	5 cy Sym CB	17.284	12.3	1.484	25.645	43.389		67.000	113.100
SW-13800-01-B	13.800	SW-13800-01-B	Switchgear	26.880	10.0	1.437	38.635	65.766		67.000	113.100
	13.800	CB83-2	5 cy Sym CB	26.880	10.0	1.437	38.635	65.766		67.000	113.100
	13.800	CB91	5 cy Sym CB	26.880	10.0	1.437	38.635	65.766		67.000	113.100
	13.800	CB1-1	5 cy Sym CB	26.880	10.0	1.437	38.635	65.766		67.000	113.100
Tren A - BUS A	4.160	Tren A - BUS A	Switchgear	18.163	7.1	1.350	24.516	42.153		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.163	7.1	1.350	24.516	42.153		58.000	97.000
Tren A - BUS B	4.160	Tren A - BUS B	Switchgear	18.163	7.1	1.350	24.516	42.153		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.163	7.1	1.350	24.516	42.153		58.000	97.000
Tren B - BUS A	4.160	Tren B - BUS A	Switchgear	17.064	9.8	1.432	24.440	41.629		39.000	65.810
	4.160	CB76-1	5 cy Sym CB	17.064	9.8	1.432	24.440	41.629		77.000	130.000
	4.160	CB80-1	5 cy Sym CB	17.064	9.8	1.432	24.440	41.629		58.000	97.000
Tren B - BUS B	4.160	Tren B - BUS B	Switchgear	17.064	9.8	1.432	24.440	41.629		39.000	65.810
	4.160	CB80-1	5 cy Sym CB	17.064	9.8	1.432	24.440	41.629		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	23.326	21.9	1.000	23.326	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB2	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB40-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB74-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB20-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB10-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
Bus-2	13.800	52G2	5 cy Sym CB	3.0	23.326	21.9	1.000	23.326	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB13	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB54-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB73-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB53-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
		CB55-1	5 cy Sym CB	3.0	31.667	21.9	1.031	32.649	15.000		37.000	40.217
Bus-3	13.800	52G3	5 cy Sym CB	3.0	10.004	21.1	1.000	10.004	15.000		37.000	40.217
		CB24	5 cy Sym CB	3.0	18.345	21.1	1.029	18.877	15.000		37.000	40.217
		CB7-1	5 cy Sym CB	3.0	18.345	21.1	1.029	18.877	15.000		42.000	45.652
MCC-480-01.	0.480				41.370	11.2						
MCC-480-02.	0.480				41.777	11.4						
MCC-480-03.	0.480				41.370	11.2						
MCC-480-04.	0.480				41.777	11.4						
MCC-480-05.	0.480				43.692	11.1						
MCC-480-06.	0.480				42.203	11.3						
MCC-480-07.	0.480				43.692	11.1						
MCC-480-08.	0.480				42.203	11.3						
MCC-480-09 A	0.480				42.324	10.7						
MCC-480-09 B	0.480				43.983	10.6						
MCC-480-10.	0.480				42.324	10.7						
MCC-480-11 A	0.480				42.324	10.7						
MCC-480-11 B	0.480				43.983	10.6						

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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				43.983	10.6						
MCC-480-13 A	0.480				42.324	10.7						
MCC-480-13 B	0.480				43.983	10.6						
MCC-480-14.	0.480				42.324	10.7						
MCC-480-15 A	0.480				42.324	10.7						
MCC-480-15 B	0.480				43.983	10.6						
MCC-480-16.	0.480				43.983	10.6						
MCC-480-17 A	0.480				45.144	10.6						
MCC-480-17 B	0.480				46.394	10.4						
MCC-480-18 A	0.480				45.144	10.6						
MCC-480-18 B	0.480				46.394	10.4						
MCC-480-19 A	0.480				45.144	10.6						
MCC-480-19 B	0.480				46.394	10.4						
MCC-480-20 A	0.480				45.144	10.6						
MCC-480-20 B	0.480				46.394	10.4						
MCC-480-21.	0.480				45.144	10.6						
MCC-480-22.	0.480				46.394	10.4						
OFFSITES A	0.480	CB58-1	Molded Case		41.168	5.5	1.027	42.267	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.168	5.5	1.027	42.267	0.480	20.00	65.000	65.000
OFFSITES B	0.480	CB57-1	Molded Case		41.168	5.5	1.027	42.267	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.168	5.5	1.027	42.267	0.480	20.00	65.000	65.000
PDC-480-01-A	0.480				41.370	11.2						
PDC-480-01-B	0.480				41.777	11.4						
PDC-480-02-A	0.480				43.692	11.1						
PDC-480-02-B	0.480				42.203	11.3						
PDC-480-03-A	0.480				42.324	10.7						
PDC-480-03-B	0.480				43.983	10.6						
PDC-480-04-A	0.480				42.324	10.7						
PDC-480-04-B	0.480				43.983	10.6						
PDC-480-05A	0.480				45.144	10.6						
PDC-480-05B	0.480				46.394	10.4						
PDC-4160-01-A	4.160				13.119	13.7						
PDC-4160-01-B	4.160				14.736	14.0						
PDC-4160-02-A	4.160				12.876	13.7						

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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.
PDC-4160-02-B	4.160	CB61-1	5 cy Sym CB	3.0	14.114	13.3	1.000	14.114	4.760		20.000	22.885
PDC-4160-03-A	4.160				13.860	14.5						
PDC-4160-03-B	4.160	CB81	5 cy Sym CB	3.0	15.052	14.1	1.000	15.052	4.760		20.000	22.885
SW-13800-01-A	13.800	CB84	5 cy Sym CB	3.0	16.081	12.3	1.000	16.081	15.000		42.000	45.652
		CB93	5 cy Sym CB	3.0	16.081	12.3	1.000	16.081	15.000		42.000	45.652
		CB94	5 cy Sym CB	3.0	16.081	12.3	1.000	16.081	15.000		42.000	45.652
SW-13800-01-B	13.800	CB83-2	5 cy Sym CB	3.0	25.300	10.0	1.000	25.300	15.000		42.000	45.652
		CB91	5 cy Sym CB	3.0	25.300	10.0	1.000	25.300	15.000		42.000	45.652
		CB1-1	5 cy Sym CB	3.0	25.300	10.0	1.000	25.300	15.000		42.000	45.652
Tren A - BUS A	4.160	CB4-1	5 cy Sym CB	3.0	16.662	6.9	1.000	16.662	4.760		29.000	33.183
Tren A - BUS B	4.160	CB4-1	5 cy Sym CB	3.0	16.662	6.9	1.000	16.662	4.760		29.000	33.183
Tren B - BUS A	4.160	CB76-1	5 cy Sym CB	3.0	16.266	10.0	1.000	16.266	15.000		37.000	48.000
		CB80-1	5 cy Sym CB	3.0	16.266	10.0	1.000	16.266	4.760		29.000	33.183
Tren B - BUS B	4.160	CB80-1	5 cy Sym CB	3.0	16.266	10.0	1.000	16.266	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	32.988	35.40	11.679
Bus-2	13.800	52G2	5 cy Sym CB	32.988	35.40	11.679
Bus-3	13.800	52G3	5 cy Sym CB	14.148	34.86	4.931

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