

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	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	52G1	5 cy Sym CB	25.554	21.1	1.577	40.288	67.285		77.000	130.000
	13.800	52 NC	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB2	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB40-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB74-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB20-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB10-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
Bus-2	13.800	Bus-2	Switchgear	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	52G2	5 cy Sym CB	25.554	21.1	1.577	40.288	67.285		77.000	130.000
	13.800	52 NC	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB13	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB54-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB73-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB53-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
	13.800	CB55-1	5 cy Sym CB	33.895	21.1	1.577	53.438	89.247		77.000	130.000
Bus-3	13.800	Bus-3	Switchgear	18.945	20.8	1.574	29.821	49.822		77.000	130.000
	13.800	52G3	5 cy Sym CB	10.604	20.8	1.574	16.692	27.887		77.000	130.000
	13.800	CB24	5 cy Sym CB	18.945	20.8	1.574	29.821	49.822		77.000	130.000
	13.800	CB7-1	5 cy Sym CB	18.945	20.8	1.574	29.821	49.822		67.000	113.100
MCC-480-01.	0.480	MCC-480-01.	Bus	43.787	11.1	1.462	64.002	108.603			
MCC-480-02.	0.480	MCC-480-02.	Bus	43.172	11.3	1.465	63.240	107.266			
MCC-480-03.	0.480	MCC-480-03.	Bus	43.787	11.1	1.462	64.002	108.603			
MCC-480-04.	0.480	MCC-480-04.	Bus	43.172	11.3	1.465	63.240	107.266			
MCC-480-05.	0.480	MCC-480-05.	Bus	46.162	11.1	1.461	67.437	114.444			
MCC-480-06.	0.480	MCC-480-06.	Bus	43.604	11.2	1.463	63.802	108.242			
MCC-480-07.	0.480	MCC-480-07.	Bus	46.162	11.1	1.461	67.437	114.444			
MCC-480-08.	0.480	MCC-480-08.	Bus	43.604	11.2	1.463	63.802	108.242			
MCC-480-09 A	0.480	MCC-480-09 A	Bus	42.243	10.7	1.453	61.386	104.280			
MCC-480-09 B	0.480	MCC-480-09 B	Bus	44.007	10.6	1.451	63.841	108.485			
MCC-480-10.	0.480	MCC-480-10.	Bus	42.243	10.7	1.453	61.386	104.280			
MCC-480-11 A	0.480	MCC-480-11 A	Bus	42.243	10.7	1.453	61.386	104.280			
MCC-480-11 B	0.480	MCC-480-11 B	Bus	44.007	10.6	1.451	63.841	108.485			

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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	44.007	10.6	1.451	63.841	108.485			
MCC-480-13 A	0.480	MCC-480-13 A	Bus	42.243	10.7	1.453	61.386	104.280			
MCC-480-13 B	0.480	MCC-480-13 B	Bus	44.007	10.6	1.451	63.841	108.485			
MCC-480-14.	0.480	MCC-480-14.	Bus	42.243	10.7	1.453	61.386	104.280			
MCC-480-15 A	0.480	MCC-480-15 A	Bus	42.243	10.7	1.453	61.386	104.280			
MCC-480-15 B	0.480	MCC-480-15 B	Bus	44.007	10.6	1.451	63.841	108.485			
MCC-480-16.	0.480	MCC-480-16.	Bus	44.007	10.6	1.451	63.841	108.485			
MCC-480-17 A	0.480	MCC-480-17 A	Bus	45.069	10.6	1.450	65.352	111.063			
MCC-480-17 B	0.480	MCC-480-17 B	Bus	46.416	10.4	1.448	67.199	114.234			
MCC-480-18 A	0.480	MCC-480-18 A	Bus	45.069	10.6	1.450	65.352	111.063			
MCC-480-18 B	0.480	MCC-480-18 B	Bus	46.416	10.4	1.448	67.199	114.234			
MCC-480-19 A	0.480	MCC-480-19 A	Bus	45.069	10.6	1.450	65.352	111.063			
MCC-480-19 B	0.480	MCC-480-19 B	Bus	46.416	10.4	1.448	67.199	114.234			
MCC-480-20 A	0.480	MCC-480-20 A	Bus	45.069	10.6	1.450	65.352	111.063			
MCC-480-20 B	0.480	MCC-480-20 B	Bus	46.416	10.4	1.448	67.199	114.234			
MCC-480-21.	0.480	MCC-480-21.	Bus	45.069	10.6	1.450	65.352	111.063			
MCC-480-22.	0.480	MCC-480-22.	Bus	46.416	10.4	1.448	67.199	114.234			
OFFSITES A	0.480	OFFSITES A	Switchgear	41.188	5.5	1.280	52.721	91.158	65.000	86.500	
OFFSITES B	0.480	OFFSITES B	Switchgear	41.188	5.5	1.280	52.721	91.158	65.000	86.500	
PDC-480-01-A	0.480	PDC-480-01-A	Bus	43.787	11.1	1.462	64.002	108.603			
PDC-480-01-B	0.480	PDC-480-01-B	Bus	43.172	11.3	1.465	63.240	107.266			
PDC-480-02-A	0.480	PDC-480-02-A	Bus	46.162	11.1	1.461	67.437	114.444			
PDC-480-02-B	0.480	PDC-480-02-B	Bus	43.604	11.2	1.463	63.802	108.242			
PDC-480-03-A	0.480	PDC-480-03-A	Bus	42.243	10.7	1.453	61.386	104.280			
PDC-480-03-B	0.480	PDC-480-03-B	Bus	44.007	10.6	1.451	63.841	108.485			
PDC-480-04-A	0.480	PDC-480-04-A	Bus	42.243	10.7	1.453	61.386	104.280			
PDC-480-04-B	0.480	PDC-480-04-B	Bus	44.007	10.6	1.451	63.841	108.485			
PDC-480-05A	0.480	PDC-480-05A	Bus	45.069	10.6	1.450	65.352	111.063			
PDC-480-05B	0.480	PDC-480-05B	Bus	46.416	10.4	1.448	67.199	114.234			
PDC-4160-01-A	4.160	PDC-4160-01-A	Switchgear	18.426	14.2	1.511	27.847	46.937		58.000	97.880
	4.160	CB39	5 cy Sym CB	18.426	14.2	1.511	27.847	46.937		58.000	97.000
PDC-4160-01-B	4.160	PDC-4160-01-B	Switchgear	18.426	14.2	1.511	27.847	46.937		58.000	97.880
	4.160	CB39	5 cy Sym CB	18.426	14.2	1.511	27.847	46.937		58.000	97.000
PDC-4160-02-A	4.160	PDC-4160-02-A	Switchgear	14.473	13.5	1.502	21.735	36.683		58.000	97.880
PDC-4160-02-B	4.160	PDC-4160-02-B	Switchgear	15.853	13.2	1.497	23.731	40.078		58.000	97.880
	4.160	CB61-1	5 cy Sym CB	15.853	13.2	1.497	23.731	40.078		32.000	54.000

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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-A	4.160	PDC-4160-03-A	Switchgear	15.749	14.8	1.519	23.925	40.283		58.000	97.880
PDC-4160-03-B	4.160	PDC-4160-03-B	Switchgear	17.058	14.4	1.514	25.834	43.525		58.000	97.880
	4.160	CB81	5 cy Sym CB	17.058	14.4	1.514	25.834	43.525		32.000	54.000
SW-13800-01-A	13.800	SW-13800-01-A	Switchgear	16.682	12.3	1.483	24.733	41.852		67.000	113.100
	13.800	CB84	5 cy Sym CB	16.682	12.3	1.483	24.733	41.852		67.000	113.100
	13.800	CB93	5 cy Sym CB	16.682	12.3	1.483	24.733	41.852		67.000	113.100
SW-13800-01-B	13.800	SW-13800-01-B	Switchgear	27.314	10.0	1.439	39.294	66.877		67.000	113.100
	13.800	CB83-2	5 cy Sym CB	27.314	10.0	1.439	39.294	66.877		67.000	113.100
	13.800	CB91	5 cy Sym CB	27.314	10.0	1.439	39.294	66.877		67.000	113.100
	13.800	CB1-1	5 cy Sym CB	27.314	10.0	1.439	39.294	66.877		67.000	113.100
Tren A - BUS A	4.160	Tren A - BUS A	Switchgear	18.190	7.1	1.349	24.546	42.205		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.190	7.1	1.349	24.546	42.205		58.000	97.000
Tren A - BUS B	4.160	Tren A - BUS B	Switchgear	18.190	7.1	1.349	24.546	42.205		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.190	7.1	1.349	24.546	42.205		58.000	97.000
Tren B - BUS A	4.160	Tren B - BUS A	Switchgear	17.091	9.8	1.432	24.475	41.689		39.000	65.810
	4.160	CB76-1	5 cy Sym CB	17.091	9.8	1.432	24.475	41.689		77.000	130.000
	4.160	CB80-1	5 cy Sym CB	17.091	9.8	1.432	24.475	41.689		58.000	97.000
Tren B - BUS B	4.160	Tren B - BUS B	Switchgear	17.091	9.8	1.432	24.475	41.689		39.000	65.810
	4.160	CB80-1	5 cy Sym CB	17.091	9.8	1.432	24.475	41.689		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	23.517	21.8	1.000	23.517	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB2	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB40-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB74-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB20-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB10-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
Bus-2	13.800	52G2	5 cy Sym CB	3.0	23.517	21.8	1.000	23.517	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB13	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB54-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB73-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB53-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
		CB55-1	5 cy Sym CB	3.0	31.858	21.8	1.031	32.840	15.000		37.000	40.217
Bus-3	13.800	52G3	5 cy Sym CB	3.0	9.764	21.2	1.000	9.764	15.000		37.000	40.217
		CB24	5 cy Sym CB	3.0	18.105	21.2	1.029	18.637	15.000		37.000	40.217
		CB7-1	5 cy Sym CB	3.0	18.105	21.2	1.029	18.637	15.000		42.000	45.652
MCC-480-01.	0.480				43.787	11.1						
MCC-480-02.	0.480				43.172	11.3						
MCC-480-03.	0.480				43.787	11.1						
MCC-480-04.	0.480				43.172	11.3						
MCC-480-05.	0.480				46.162	11.1						
MCC-480-06.	0.480				43.604	11.2						
MCC-480-07.	0.480				46.162	11.1						
MCC-480-08.	0.480				43.604	11.2						
MCC-480-09 A	0.480				42.243	10.7						
MCC-480-09 B	0.480				44.007	10.6						
MCC-480-10.	0.480				42.243	10.7						
MCC-480-11 A	0.480				42.243	10.7						
MCC-480-11 B	0.480				44.007	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				44.007	10.6						
MCC-480-13 A	0.480				42.243	10.7						
MCC-480-13 B	0.480				44.007	10.6						
MCC-480-14.	0.480				42.243	10.7						
MCC-480-15 A	0.480				42.243	10.7						
MCC-480-15 B	0.480				44.007	10.6						
MCC-480-16.	0.480				44.007	10.6						
MCC-480-17 A	0.480				45.069	10.6						
MCC-480-17 B	0.480				46.416	10.4						
MCC-480-18 A	0.480				45.069	10.6						
MCC-480-18 B	0.480				46.416	10.4						
MCC-480-19 A	0.480				45.069	10.6						
MCC-480-19 B	0.480				46.416	10.4						
MCC-480-20 A	0.480				45.069	10.6						
MCC-480-20 B	0.480				46.416	10.4						
MCC-480-21.	0.480				45.069	10.6						
MCC-480-22.	0.480				46.416	10.4						
OFFSITES A	0.480	CB58-1	Molded Case		41.188	5.5	1.027	42.283	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.188	5.5	1.027	42.283	0.480	20.00	65.000	65.000
OFFSITES B	0.480	CB57-1	Molded Case		41.188	5.5	1.027	42.283	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.188	5.5	1.027	42.283	0.480	20.00	65.000	65.000
PDC-480-01-A	0.480				43.787	11.1						
PDC-480-01-B	0.480				43.172	11.3						
PDC-480-02-A	0.480				46.162	11.1						
PDC-480-02-B	0.480				43.604	11.2						
PDC-480-03-A	0.480				42.243	10.7						
PDC-480-03-B	0.480				44.007	10.6						
PDC-480-04-A	0.480				42.243	10.7						
PDC-480-04-B	0.480				44.007	10.6						
PDC-480-05A	0.480				45.069	10.6						
PDC-480-05B	0.480				46.416	10.4						
PDC-4160-01-A	4.160	CB39	5 cy Sym CB	3.0	15.603	14.0	1.000	15.603	4.760		29.000	33.183
PDC-4160-01-B	4.160	CB39	5 cy Sym CB	3.0	15.603	14.0	1.000	15.603	4.760		29.000	33.183
PDC-4160-02-A	4.160				12.832	13.7						

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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	14.132	13.3	1.000	14.132	4.760		20.000	22.885
PDC-4160-03-A	4.160				13.815	14.5						
PDC-4160-03-B	4.160	CB81	5 cy Sym CB	3.0	15.069	14.1	1.000	15.069	4.760		20.000	22.885
SW-13800-01-A	13.800	CB84	5 cy Sym CB	3.0	15.836	12.2	1.000	15.836	15.000		42.000	45.652
		CB93	5 cy Sym CB	3.0	15.836	12.2	1.000	15.836	15.000		42.000	45.652
SW-13800-01-B	13.800	CB83-2	5 cy Sym CB	3.0	25.501	10.0	1.000	25.501	15.000		42.000	45.652
		CB91	5 cy Sym CB	3.0	25.501	10.0	1.000	25.501	15.000		42.000	45.652
		CB1-1	5 cy Sym CB	3.0	25.501	10.0	1.000	25.501	15.000		42.000	45.652
Tren A - BUS A	4.160	CB4-1	5 cy Sym CB	3.0	16.676	6.9	1.000	16.676	4.760		29.000	33.183
Tren A - BUS B	4.160	CB4-1	5 cy Sym CB	3.0	16.676	6.9	1.000	16.676	4.760		29.000	33.183
Tren B - BUS A	4.160	CB76-1	5 cy Sym CB	3.0	16.281	10.0	1.000	16.281	15.000		37.000	48.000
		CB80-1	5 cy Sym CB	3.0	16.281	10.0	1.000	16.281	4.760		29.000	33.183
Tren B - BUS B	4.160	CB80-1	5 cy Sym CB	3.0	16.281	10.0	1.000	16.281	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	33.258	35.34	11.755
Bus-2	13.800	52G2	5 cy Sym CB	33.258	35.34	11.755
Bus-3	13.800	52G3	5 cy Sym CB	13.809	34.95	4.827

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