

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	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	52G1	5 cy Sym CB	25.247	21.2	1.577	39.817	66.493		77.000	130.000	
	13.800	52 NC	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB2	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB40-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB74-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB20-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB10-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
Bus-2	13.800	Bus-2	Switchgear	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	52G2	5 cy Sym CB	25.247	21.2	1.577	39.817	66.493		77.000	130.000	
	13.800	52 NC	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB13	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB54-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB73-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB53-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
	13.800	CB55-1	5 cy Sym CB	33.588	21.2	1.577	52.971	88.461		77.000	130.000	
Bus-3	13.800	Bus-3	Switchgear	19.388	20.6	1.573	30.501	50.964		77.000	130.000	
	13.800	52G3	5 cy Sym CB	11.047	20.6	1.573	17.379	29.039		77.000	130.000	
	13.800	CB24	5 cy Sym CB	19.388	20.6	1.573	30.501	50.964		77.000	130.000	
	13.800	CB7-1	5 cy Sym CB	19.388	20.6	1.573	30.501	50.964		67.000	113.100	
MCC-480-01.	0.480	MCC-480-01.	Bus	41.351	11.2	1.462	60.471	102.602				
MCC-480-02.	0.480	MCC-480-02.	Bus	41.783	11.4	1.466	61.265	103.896				
MCC-480-03.	0.480	MCC-480-03.	Bus	41.351	11.2	1.462	60.471	102.602				
MCC-480-04.	0.480	MCC-480-04.	Bus	41.783	11.4	1.466	61.265	103.896				
MCC-480-05.	0.480	MCC-480-05.	Bus	43.673	11.1	1.462	63.832	108.316				
MCC-480-06.	0.480	MCC-480-06.	Bus	42.208	11.3	1.465	61.821	104.861				
MCC-480-07.	0.480	MCC-480-07.	Bus	43.673	11.1	1.462	63.832	108.316				
MCC-480-08.	0.480	MCC-480-08.	Bus	42.208	11.3	1.465	61.821	104.861				
MCC-480-09 A	0.480	MCC-480-09 A	Bus	41.836	10.8	1.455	60.863	103.370				
MCC-480-09 B	0.480	MCC-480-09 B	Bus	44.314	10.5	1.450	64.242	109.181				
MCC-480-10.	0.480	MCC-480-10.	Bus	41.836	10.8	1.455	60.863	103.370				
MCC-480-11 A	0.480	MCC-480-11 A	Bus	41.836	10.8	1.455	60.863	103.370				
MCC-480-11 B	0.480	MCC-480-11 B	Bus	44.314	10.5	1.450	64.242	109.181				

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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	44.314	10.5	1.450	64.242	109.181			
MCC-480-13 A	0.480	MCC-480-13 A	Bus	49.788	10.0	1.439	71.625	121.901			
MCC-480-13 B	0.480	MCC-480-13 B	Bus	49.788	10.0	1.439	71.625	121.901			
MCC-480-14.	0.480	MCC-480-14.	Bus	49.788	10.0	1.439	71.625	121.901			
MCC-480-15 A	0.480	MCC-480-15 A	Bus	49.788	10.0	1.439	71.625	121.901			
MCC-480-15 B	0.480	MCC-480-15 B	Bus	49.788	10.0	1.439	71.625	121.901			
MCC-480-16.	0.480	MCC-480-16.	Bus	49.788	10.0	1.439	71.625	121.901			
MCC-480-17 A	0.480	MCC-480-17 A	Bus	45.126	10.6	1.450	65.438	111.208			
MCC-480-17 B	0.480	MCC-480-17 B	Bus	46.399	10.4	1.448	67.172	114.190			
MCC-480-18 A	0.480	MCC-480-18 A	Bus	45.126	10.6	1.450	65.438	111.208			
MCC-480-18 B	0.480	MCC-480-18 B	Bus	46.399	10.4	1.448	67.172	114.190			
MCC-480-19 A	0.480	MCC-480-19 A	Bus	45.126	10.6	1.450	65.438	111.208			
MCC-480-19 B	0.480	MCC-480-19 B	Bus	46.399	10.4	1.448	67.172	114.190			
MCC-480-20 A	0.480	MCC-480-20 A	Bus	45.126	10.6	1.450	65.438	111.208			
MCC-480-20 B	0.480	MCC-480-20 B	Bus	46.399	10.4	1.448	67.172	114.190			
MCC-480-21.	0.480	MCC-480-21.	Bus	45.126	10.6	1.450	65.438	111.208			
MCC-480-22.	0.480	MCC-480-22.	Bus	46.399	10.4	1.448	67.172	114.190			
OFFSITES A	0.480	OFFSITES A	Switchgear	41.173	5.5	1.280	52.705	91.131	65.000	86.500	
OFFSITES B	0.480	OFFSITES B	Switchgear	41.173	5.5	1.280	52.705	91.131	65.000	86.500	
PDC-480-01-A	0.480	PDC-480-01-A	Bus	41.351	11.2	1.462	60.471	102.602			
PDC-480-01-B	0.480	PDC-480-01-B	Bus	41.783	11.4	1.466	61.265	103.896			
PDC-480-02-A	0.480	PDC-480-02-A	Bus	43.673	11.1	1.462	63.832	108.316			
PDC-480-02-B	0.480	PDC-480-02-B	Bus	42.208	11.3	1.465	61.821	104.861			
PDC-480-03-A	0.480	PDC-480-03-A	Bus	41.836	10.8	1.455	60.863	103.370			
PDC-480-03-B	0.480	PDC-480-03-B	Bus	44.314	10.5	1.450	64.242	109.181			
PDC-480-04-A	0.480	PDC-480-04-A	Bus	49.788	10.0	1.439	71.625	121.901			
PDC-480-04-B	0.480	PDC-480-04-B	Bus	49.788	10.0	1.439	71.625	121.901			
PDC-480-05A	0.480	PDC-480-05A	Bus	45.126	10.6	1.450	65.438	111.208			
PDC-480-05B	0.480	PDC-480-05B	Bus	46.399	10.4	1.448	67.172	114.190			
PDC-4160-01-A	4.160	PDC-4160-01-A	Switchgear	14.683	13.7	1.505	22.100	37.282		58.000	97.880
PDC-4160-01-B	4.160	PDC-4160-01-B	Switchgear	16.126	14.2	1.512	24.375	41.083		58.000	97.880
PDC-4160-02-A	4.160	PDC-4160-02-A	Switchgear	13.974	13.8	1.507	21.054	35.510		58.000	97.880
PDC-4160-02-B	4.160	PDC-4160-02-B	Switchgear	16.300	12.9	1.494	24.347	41.137		58.000	97.880
	4.160	CB61-1	5 cy Sym CB	16.300	12.9	1.494	24.347	41.137		32.000	54.000
PDC-4160-03-A	4.160	PDC-4160-03-A	Switchgear	15.830	14.8	1.520	24.054	40.498		58.000	97.880
PDC-4160-03-B	4.160	PDC-4160-03-B	Switchgear	17.032	14.4	1.514	25.789	43.452		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	17.032	14.4	1.514	25.789	43.452		32.000	54.000
SW-13800-01-A	13.800	SW-13800-01-A	Switchgear	17.140	12.4	1.485	25.446	43.047		67.000	113.100
	13.800	CB84	5 cy Sym CB	17.140	12.4	1.485	25.446	43.047		67.000	113.100
	13.800	CB93	5 cy Sym CB	17.140	12.4	1.485	25.446	43.047		67.000	113.100
	13.800	CB94	5 cy Sym CB	17.140	12.4	1.485	25.446	43.047		67.000	113.100
SW-13800-01-B	13.800	SW-13800-01-B	Switchgear	26.982	10.0	1.437	38.777	66.008		67.000	113.100
	13.800	CB83-2	5 cy Sym CB	26.982	10.0	1.437	38.777	66.008		67.000	113.100
	13.800	CB91	5 cy Sym CB	26.982	10.0	1.437	38.777	66.008		67.000	113.100
	13.800	CB1-1	5 cy Sym CB	26.982	10.0	1.437	38.777	66.008		67.000	113.100
Tren A - BUS A	4.160	Tren A - BUS A	Switchgear	18.169	7.1	1.350	24.523	42.165		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.169	7.1	1.350	24.523	42.165		58.000	97.000
Tren A - BUS B	4.160	Tren A - BUS B	Switchgear	18.169	7.1	1.350	24.523	42.165		39.000	65.810
	4.160	CB4-1	5 cy Sym CB	18.169	7.1	1.350	24.523	42.165		58.000	97.000
Tren B - BUS A	4.160	Tren B - BUS A	Switchgear	17.070	9.8	1.432	24.448	41.643		39.000	65.810
	4.160	CB76-1	5 cy Sym CB	17.070	9.8	1.432	24.448	41.643		77.000	130.000
	4.160	CB80-1	5 cy Sym CB	17.070	9.8	1.432	24.448	41.643		58.000	97.000
Tren B - BUS B	4.160	Tren B - BUS B	Switchgear	17.070	9.8	1.432	24.448	41.643		39.000	65.810
	4.160	CB80-1	5 cy Sym CB	17.070	9.8	1.432	24.448	41.643		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	23.354	21.9	1.000	23.354	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB2	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB40-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB74-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB20-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB10-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
Bus-2	13.800	52G2	5 cy Sym CB	3.0	23.354	21.9	1.000	23.354	15.000		37.000	40.217
		52 NC	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB13	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB54-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB73-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB53-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
		CB55-1	5 cy Sym CB	3.0	31.694	21.9	1.031	32.675	15.000		37.000	40.217
Bus-3	13.800	52G3	5 cy Sym CB	3.0	9.973	21.1	1.000	9.973	15.000		37.000	40.217
		CB24	5 cy Sym CB	3.0	18.313	21.1	1.029	18.847	15.000		37.000	40.217
		CB7-1	5 cy Sym CB	3.0	18.313	21.1	1.029	18.847	15.000		42.000	45.652
MCC-480-01.	0.480				41.351	11.2						
MCC-480-02.	0.480				41.783	11.4						
MCC-480-03.	0.480				41.351	11.2						
MCC-480-04.	0.480				41.783	11.4						
MCC-480-05.	0.480				43.673	11.1						
MCC-480-06.	0.480				42.208	11.3						
MCC-480-07.	0.480				43.673	11.1						
MCC-480-08.	0.480				42.208	11.3						
MCC-480-09 A	0.480				41.836	10.8						
MCC-480-09 B	0.480				44.314	10.5						
MCC-480-10.	0.480				41.836	10.8						
MCC-480-11 A	0.480				41.836	10.8						
MCC-480-11 B	0.480				44.314	10.5						

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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				44.314	10.5						
MCC-480-13 A	0.480				49.788	10.0						
MCC-480-13 B	0.480				49.788	10.0						
MCC-480-14.	0.480				49.788	10.0						
MCC-480-15 A	0.480				49.788	10.0						
MCC-480-15 B	0.480				49.788	10.0						
MCC-480-16.	0.480				49.788	10.0						
MCC-480-17 A	0.480				45.126	10.6						
MCC-480-17 B	0.480				46.399	10.4						
MCC-480-18 A	0.480				45.126	10.6						
MCC-480-18 B	0.480				46.399	10.4						
MCC-480-19 A	0.480				45.126	10.6						
MCC-480-19 B	0.480				46.399	10.4						
MCC-480-20 A	0.480				45.126	10.6						
MCC-480-20 B	0.480				46.399	10.4						
MCC-480-21.	0.480				45.126	10.6						
MCC-480-22.	0.480				46.399	10.4						
OFFSITES A	0.480	CB58-1	Molded Case		41.173	5.5	1.027	42.270	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.173	5.5	1.027	42.270	0.480	20.00	65.000	65.000
OFFSITES B	0.480	CB57-1	Molded Case		41.173	5.5	1.027	42.270	0.480	20.00	65.000	65.000
		CB56-1	Molded Case		41.173	5.5	1.027	42.270	0.480	20.00	65.000	65.000
PDC-480-01-A	0.480				41.351	11.2						
PDC-480-01-B	0.480				41.783	11.4						
PDC-480-02-A	0.480				43.673	11.1						
PDC-480-02-B	0.480				42.208	11.3						
PDC-480-03-A	0.480				41.836	10.8						
PDC-480-03-B	0.480				44.314	10.5						
PDC-480-04-A	0.480				49.788	10.0						
PDC-480-04-B	0.480				49.788	10.0						
PDC-480-05A	0.480				45.126	10.6						
PDC-480-05B	0.480				46.399	10.4						
PDC-4160-01-A	4.160				13.113	13.7						
PDC-4160-01-B	4.160				14.738	14.0						
PDC-4160-02-A	4.160				12.759	13.8						

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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	14.225	13.2	1.000	14.225	4.760		20.000	22.885
PDC-4160-03-A	4.160				13.855	14.5						
PDC-4160-03-B	4.160	CB81	5 cy Sym CB	3.0	15.054	14.1	1.000	15.054	4.760		20.000	22.885
SW-13800-01-A	13.800	CB84	5 cy Sym CB	3.0	16.049	12.3	1.000	16.049	15.000		42.000	45.652
		CB93	5 cy Sym CB	3.0	16.049	12.3	1.000	16.049	15.000		42.000	45.652
		CB94	5 cy Sym CB	3.0	16.049	12.3	1.000	16.049	15.000		42.000	45.652
SW-13800-01-B	13.800	CB83-2	5 cy Sym CB	3.0	25.329	10.0	1.000	25.329	15.000		42.000	45.652
		CB91	5 cy Sym CB	3.0	25.329	10.0	1.000	25.329	15.000		42.000	45.652
		CB1-1	5 cy Sym CB	3.0	25.329	10.0	1.000	25.329	15.000		42.000	45.652
Tren A - BUS A	4.160	CB4-1	5 cy Sym CB	3.0	16.664	6.9	1.000	16.664	4.760		29.000	33.183
Tren A - BUS B	4.160	CB4-1	5 cy Sym CB	3.0	16.664	6.9	1.000	16.664	4.760		29.000	33.183
Tren B - BUS A	4.160	CB76-1	5 cy Sym CB	3.0	16.268	10.0	1.000	16.268	15.000		37.000	48.000
		CB80-1	5 cy Sym CB	3.0	16.268	10.0	1.000	16.268	4.760		29.000	33.183
Tren B - BUS B	4.160	CB80-1	5 cy Sym CB	3.0	16.268	10.0	1.000	16.268	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	33.027	35.39	11.687
Bus-2	13.800	52G2	5 cy Sym CB	33.027	35.39	11.687
Bus-3	13.800	52G3	5 cy Sym CB	14.104	34.89	4.921

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