

Application No. 18-04-____
Exhibit PAC/1002
Witness: Brett S. Allsup

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

PACIFICORP

Exhibit Accompanying Direct Testimony of
Brett S. Allsup
Risk Templates for Top 10 Risks

April 2018

Risk Event:	Substation Transformer Failure	Risk Plot Key:	A
Reasonable Worst Case:	Substation transformer fails, releasing all oil in the transformer, resulting in a prolonged outage to all customers that requires the transformer to be replaced.		
Controls:	<ul style="list-style-type: none"> • Preventive maintenance monitoring of the condition of transformers. • Install and maintain spill prevention devices. • Purchase spare transformers. 		
Risk Scoring			
Frequency Score	Impact Scores		
5	Safety	4	
	Environmental	4	
	Compliance	4	
Frequency Factor	Reliability	5	
1	Trust	5	
	Financial	4	
Total Risk Score:	192.35		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Develop emergency generator deployment contract with service suppliers. • Increase number of mobile substations to minimize outage times. • Add redundant transformers at stations. 		

Risk Event:	Substation Circuit Breaker Failure	Risk Plot Key:	B
Reasonable Worst Case:	Substation circuit breaker failure causes damage to other substation equipment, resulting in prolonged outage.		
Controls:	<ul style="list-style-type: none"> • Use preventive maintenance activities to monitor the condition of circuit breakers. • Increase ratio of spare to in-service circuit breakers. 		
Risk Scoring			
Frequency Score	Impact Scores		
6	Safety	4	
	Environmental	4	
	Compliance	4	
Frequency Factor	Reliability	4	
3	Trust	5	
	Financial	4	
Total Risk Score:	158.50		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Increase number of mobile substations to minimize outage times. • Develop emergency generator deployment contract with service suppliers. 		

Risk Event:	Substation Transformer Bushing Failure	Risk Plot Key:	C
Reasonable Worst Case:	Substation transformer bushing failure destroys the transformer, resulting in a prolonged outage to all customers.		
Controls:	<ul style="list-style-type: none"> • Preventive maintenance monitoring of the condition of transformer and bushings. • Install and maintain spill prevention devices. 		
Risk Scoring			
Frequency Score	Impact Scores		
5	Safety	3	
	Environmental	4	
	Compliance	3	
Frequency Factor	Reliability	5	
0.50	Trust	4	
	Financial	4	
Total Risk Score:	144.10		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Develop emergency generator deployment contract with service suppliers. • Implement a bushing testing/replacement program. • Increase number of mobile substations to minimize outage times. • Add redundant transformers at substations. 		

Risk Event:	Substation Circuit Breaker Oil/SF6 Gas Leak	Risk Plot Key:	D
Reasonable Worst Case:	Substation circuit breaker oil/SF6 gas release results in the destruction of the circuit breaker, further resulting in a prolonged outage to all customers and an off-site release of oil or SF6 gas.		
Controls:	<ul style="list-style-type: none"> • Preventive maintenance monitoring of the condition of transformer. • Install and maintain spill prevention devices. 		
Risk Scoring			
Frequency Score	Impact Scores		
4	Safety	3	
	Environmental	4	
	Compliance	3	
Frequency Factor	Reliability	5	
0.33	Trust	4	
	Financial	4	
Total Risk Score:	130.20		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Develop emergency generator deployment contract with service suppliers. • Increase number of mobile substations to minimize outage times. • Add redundant transformers at substations. 		

Risk Event:	Transformer Radiator Failure	Risk Plot Key:	E
Reasonable Worst Case:	Substation transformer radiator failure results in oil release that also damages the transformer, resulting in a prolonged outage to all customers and an off-site release of oil.		
Controls:	<ul style="list-style-type: none"> • Preventive maintenance monitoring of the condition of transformer. • Install and maintain spill prevention devices. 		
Risk Scoring			
Frequency Score	Impact Scores		
4	Safety	2	
	Environmental	5	
	Compliance	4	
Frequency Factor	Reliability	5	
0.22	Trust	4	
	Financial	4	
Total Risk Score:	123.40		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Develop emergency generator deployment contract with service suppliers. • Increase number of mobile substations to minimize outage times. • Add redundant transformers at substations. 		

Risk Event:	Relay Failure or Mis-operation	Risk Plot Key:	F
Reasonable Worst Case:	Relay fail or mis-operate, resulting in prolonged outages to all customers.		
Controls:	<ul style="list-style-type: none"> • Current spare relay inventory. • Leverage donor relays from impacted substation or other substations. 		
Leverage donor relays .			
Frequency Score	Impact Scores		
3	Safety	3	
	Environmental	2	
	Compliance	4	
Frequency Factor	Reliability	5	
0.10	Trust	5	
	Financial	4	
Total Risk Score:	103.40		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Develop emergency generator deployment contract with service suppliers. • Increase spare relay inventory. 		

Risk Event:	Distribution Underground Conductor Failure	Risk Plot Key:	G
Reasonable Worst Case:	Public contact with underground wire resulting in multiple, permanent or serious injuries.		
Controls:	<ul style="list-style-type: none"> • Conduct current construction, maintenance and repairs per governing/company standards. 		
Risk Scoring			
Frequency Score	Impact Scores		
5	Safety	4	
	Environmental	2	
	Compliance	3	
Frequency Factor	Reliability	4	
0.86	Trust	5	
	Financial	3	
Total Risk Score:	100.30		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Provide a program to test and identify underground conductor needing repair or replacement. • Increase the number of underground conductor replacement projects. • Initiate program to repair underground conductor. 		

Risk Event:	Distribution Overhead Pole Failure	Risk Plot Key:	H
Reasonable Worst Case:	Excessive pole failures due to weather/fire resulting in 50% of customers losing power and an extended outage.		
Controls:	<ul style="list-style-type: none"> • Perform current pole inspection program. • Perform current intrusive pole inspection program • Perform current maintenance programs • Maintain existing mutual assistance agreements for line crews from other utilities • Maintain existing emergency support contracts for contractor line crews 		
Risk Scoring			
Frequency Score	Impact Scores		
3	Safety	4	
	Environmental	5	
	Compliance	5	
Frequency Factor	Reliability	3	
0.0733	Trust	5	
	Financial	4	
Total Risk Score:	75.86		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Make necessary adjustments to pole inspection and maintenance programs. 		

Risk Event:	Distribution Overhead Conductor Failure	Risk Plot Key:	I
Reasonable Worst Case:	Sustained outages resulting in significant degradation in reliability and quality of service delivered, triggering widespread customer dissatisfaction, and increased regulatory and political scrutiny.		
Controls:	<ul style="list-style-type: none"> • Perform current vegetation management program. • Perform current inspection and maintenance programs • Conduct current construction, maintenance and repairs per governing standards • Maintain existing circuits with reclosing capable switches/breakers • Maintain existing mutual assistance agreements for line crews from other utilities • Maintain existing emergency support contracts for contractor line crews • Execute approved capital improvement projects 		
Risk Scoring			
Frequency Score	Impact Scores		
4	Safety	4	
	Environmental	3	
	Compliance	4	
Frequency Factor	Reliability	4	
0.2347	Trust	4	
	Financial	3	
Total Risk Score:	57.60		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Make necessary adjustments to pole inspection and maintenance programs. • Make necessary adjustments to the current vegetation management program. 		

Risk Event:	Distribution Overhead Pole Mounted Equipment Failure - Aging Infrastructure	Risk Plot Key:	J
Reasonable Worst Case:	Frequent outages due to aging infrastructure resulting in 50% of customers losing power and an extended outage.		
Controls:	<ul style="list-style-type: none"> • Perform current inspection and maintenance programs. • Conduct current construction, maintenance and repairs per governing standards • Maintain existing circuits with reclosing capable switches/breakers • Maintain existing mutual assistance agreements for line crews from other utilities • Maintain existing emergency support contracts for contractor line crews • Execute approved capital improvement projects 		
Risk Scoring			
Frequency Score	Impact Scores		
6	Safety	2	
	Environmental	3	
	Compliance	3	
Frequency Factor	Reliability	3	
1.81	Trust	4	
	Financial	3	
Total Risk Score:	39.84		
Additional Mitigations Considered:	<ul style="list-style-type: none"> • Make necessary adjustments to pole inspection and maintenance programs. • Increase the number of overhead equipment replacement projects. 		