Cold Weather Critical Component Monitoring Strategy

Andrew Valencia, PE Senior Vice President of Generation





Agenda

- Review LCRA's cold weather preparation and after-action process
- Discuss LCRA's Monitoring Strategy
- Discuss LCRA Data Evolution

LCRA Cold Weather Preparation Process

Site Procedures

- Written procedure and checklists for each site
 - Required supply inventories and equipment checks
 - Location, type of temporary measures
- Plant directors affirm execution of site procedures
 - By early November
 - Documentation for all checks performed
- Senior manager tours each site to verify preparations
- Also follow site procedures and checklists for actions while temperatures below freezing

Preparation Meeting – Early November

- Includes staff from generation, plant management, qualified scheduling entity operations, meteorology
- Discuss:
 - Expected weather patterns
 - Expected real-time market conditions
 - Preparation status
 - Questions, concerns, needed resources
- Document action items

- Strategy is dependent on severity of event, Levels 1 4
- Additional equipment surveillance by operations personnel
- Additional staffing brought in to help with further surveillance
- Battle stations staffing
- Generation Emergency Command Center

- Battle Stations staffing involves every employee in Generation
- Every employee is assigned a task and a location
- Put in place for a Level 3 event or sooner depending on the situation

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16	Scott Blair FRG FRG	FRG		FRO	FRG I	FRG F	RG FRG	G FRO	FRC FRG	FRG FRG	FRG/H	O FR	G FRGFF	G FR	G FRG	но	FRG / HO	FRG		AL	FRG	FRG	FRG AL	A	L AL	AL	FRG	AL	FRG I	RG			FRG I	RG	AL A	L AL	. AL	LPP	LPP 7	AL /	AL A	L
13	Lee Kusy FPP FPF	P FPP		FPI	P FPP	FPP F	PP AL	AL	FPF FPP	FPP FPF	FPP	FP	P FPP FF	P FP	P FPP	FPP	FPP	FPP		FPP	FPP	FPP	FPP FPP	00	00 00	C FPF	P FPP	FPP	FPP I	PP			FPP I	FPP F	PP FP	P FP	P OOC	FPP	FPP F	PP F	PP FP	Ρ
14	Alfred Fuentes GOC GOC	GOO		GOO	GOC	GOC G	GOC GO	<mark>с</mark> но	GOIGOO	GOC GO	c <mark>GOC</mark>	GC	A A	GO	C GOC	GOC	FRG / GO	GOC		AL	AL	AL	AL AL	н	о но	GO	c GOO	GOC	AL A	L			GOC 0	OC H	O HC	э нс	он с	GOC	SOC G	OC G	oc GC	C
15	Chris Alford LPP LPP	LPP		LPF	LPP	LPP		P LPP	LPP LPP	LPP LPF	LPP	LP	PLPPLP	PLP	P LPP	LPP	LPP	LPP		LPP	LPP	LPP	LPP LPP	LF	P 00	C LPF	LPP	LPP	LPP	PP			LPP	LPP	.PP LP	P LP	P LPP	LPP	LPP L	.PP U	PP LP	Ρ
12	Scott Ivins LPP LPP	LPP		LPF	LPP	LPP	LPP WP	PLPF	LPP LPP	LPP LPP	LPP	LP	P LPP LP	P LP	P LPP	LPP	LPP/HO	LPP		LPP	LPP	LPP	LPP LPP	00	DO LPP	LPF	LPP	LPP	LPP A	L			LPP	LPP L	.PP LP	P LP	P LPP	LPP	LPP U	.PP U	PP LP	Ρ
	Hannah Flores							_														_											_	_		LPI	P LPP					_
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	Steve Bailey FPP FPF	P FPP		FPF	P FPP	FPP F	FPP FPF	P FPF	FPF FPP	FPP FPF	FPP	FP	P FPPFF	P FP	P FPP	HO	FPP	FPP		FPP	FPP	FPP	FPP FPP	FP	P 00	C FPF	FPP	FPP	FPP I	PP	_		FPP I	FPP F	PP FP	P FP	P FPP	FPP	FPP F	PP F	PP FP	P
10	Antoni Bruno FPP FPF	P FPP	FPP FP	PP FP	P FPP	FPP F	FPP HO	FPF	FPF FPP	FPP FPF	FPP	AL	AL A	AL	но	FPP	SL	FPP		FPP	FPP	FPP	FPP FPP	00	00000	O FPF	P FPP	FPP	AL A	L			FPP I	FPP F	PP FP	P HC	он с	FPP	FPP F	PP F	PP FP	P
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21	Blanton Ray FRG HO	AL	_	FRG	FRG F	RG FI	RG AL	AL	ноно	FRG FRG	но	AL	A A	но	LPP	но	AL	AL	AL AI	. HO	FRG	но	но но	FF	IG HO	FRG	FRG	FRG	FRG F	RG		L	FRG F	RG H	O AL	HC) HO	FRG F	RG FF	RG FP	G A	2
23	Donna Lee HO HO	LPP	-	LPP	LPP L	.PP LI	PP HO	но	ноно	FRG FPP	LPP	HC	рно	LPP	LPP	SL	LPP	LPP		FRG	FRG	PP/H	SL SL	SL	SL	но	но	НО	HO F	0			HO F	IO H	D HC) HC) HO	HO I	10	SL /	IL A	-
24	David Wilson HO HO	GOO		GOO	GOCIO	SOCG	SOC HO	но	но вос	GOC Hyd	ir HO	но		GO	C GOC	BUC	НО	но		GOC	GOC	Wirt	но но	0	осно	GO	cleoc	GOC	GOC A	LA	L AL	AL	GOC	SOC H	O HO	> 00	00000	GOC	JOC G	OC G	DCIGC	JC
25	James Buie HO HO	GOO		GOO	GOCIO	SOCIG	SOC HO	но	HO LPP	McR FPP	но	LP	P A	LPI	PHO	но	LPP	но		НО	но	но	HO SL/AL	0	осно	GO	cleoc	GOC	GOC	oc		ľ	GOC	SOC H	о но)	_		-	_	_	_
26	Robert Champagne HO HO	но	AL A	LAL	AL A	AL A	AL AL		AL AL	AL AL	AL	AL	AL A	AL	AL	AL	AL	AL		. GOC	HLB	HLB	HLB/GOC/	10 FF	р но	GO	cleoc	GOC	GOCIO	oc		ŀ	GOCIO	SOC H	о но	HO) но	GOCIO	SOC G	OCIG	DCIGC	IC .
27	Steven Jarvis FPP FPP	FPP	-	FPP	FPP F	FPP F	PP HO	но	HO FPP	FPP FPP	AL	FP	PAA	FPF	FPP	LPP	FRG	но		FPP	FPP	FPP	FPP FPP	н	о но	FPP	FPP	FPP	FPP F	PP		Ļ	FPP F	PP H	O HO) HO) HO	FPP F	PP FF	PP FP	PA	4
32	Vincent Kwong HO HO	AL	-	GOO	GOCI	SOCG	SOC AL		ноно	GOCIGO	СНО	GC		GO	GOC	GOC	но	AL		GOC	GOC	HLB	GOCIGOC	0	DCFPP	GO	CIGOC	GOC	GOCA	L		ŀ	GOCIE	A DOG	L HO) 00	ОНО	GOCIO	JOCG	00 4	L A	-
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	Lorenzo de la Rosa						FPP	EPE	EPE EPP	FPP FPP	FPP				FPP	FPP	FPP	FPP		FPP	FPP	SL	FPP	-			FPP	FPP	FPP F	PP	-		-	F	PP	-		FPP	F	:pp	-	
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- Plant, QSE and meteorology staff hold daily calls to discuss:
 - Plant status and known risk
 - Market/ERCOT status
 - Weather issues severity, duration, timing
 - Offline units
 - Fuel supply needs
- Depending on severity of event, hold additional calls with managers on duty, risk staff
- For Level 4 event, may activate Generation Emergency
 Command Center

Generation Emergency Center - L215



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- Prior to 2016 plant data resided at the site
- In 2016, LCRA set up a Fleetwide Enterprise Historian (EdNA/PODS)
- Data from each site was viewable from any network computer
- LCRA was data-rich

- We have over 55k points in our historian
- In 2019, we began evaluating a Data Analytics solution
- HanPHI for HanAra was selected and implemented in Dec 2019
- Installed on 100+ PCs, including in our control rooms

- Plant models were built and tuned using a year's worth of data
- Near real-time data flows from historian to HanPHI and is compared to predicted values
- Deviations are graded and alarmed if they meet definable criteria

PODS Overview Screen



HanPHI Fleet Dashboard



HanPHI Plant Index Screen



HanPHI Success Tree



LP1 Intermediate Pressure Drum Pressure Sensing Line Freeze

Very good agreement between the black (model predicted value) and the green (actual tag value).



