Ethos Energy Wolf Hollow 2023 Freeze Protection Presentation

EthosEnergy

Winter Preparedness Plan

OCTOBER 26, 2023

EthosEnergy

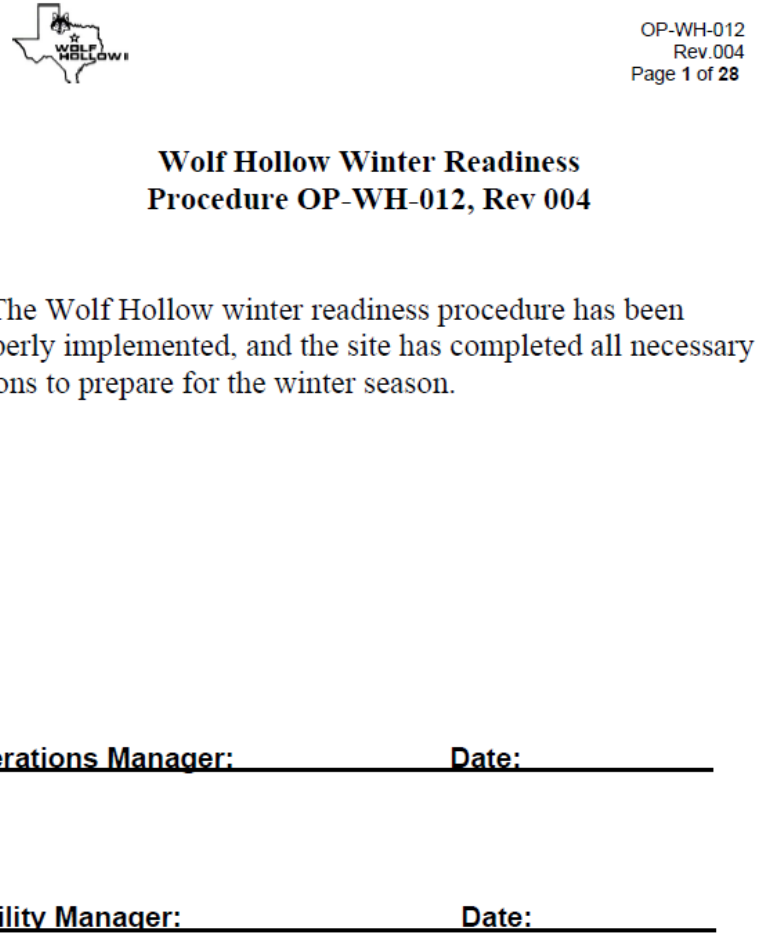
Agenda

1. Freeze Protection Procedure
2. Freeze Protection Installation Matrix
3. Freeze Protection Readiness PM
4. Critical Equipment Insulation PM
5. Thermal Insulation Audit
6. Chemical and Instrument Air Monitoring
7. Heat Trace
8. FP Rounds and Record Keeping
9. Extreme Weather
10. Monitoring PI Trends
11. Monthly Inspections
12. Inventory
13. Improvements
14. Training/Drills/Lessons Learned
15. Leadership during freezing conditions

Freeze Protection Procedure

Key elements of a robust freeze protection program:

1. Action plans based on temperature
2. Pre/Post Event Considerations
3. Readiness Review
4. Audits
5. Training
6. Lessons Learned
7. Continuous Improvement



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Wolf Hollow Winter Readiness
Procedure OP-WH-012, Rev 004

The Wolf Hollow winter readiness procedure has been properly implemented, and the site has completed all necessary actions to prepare for the winter season.

Operations Manager: _____ **Date:** _____

Facility Manager: _____ **Date:** _____

FP Installation Plan

Our installation plan includes, locations, pictures, and specific instructions for each shelter. There is also a section to initial for walk downs and verification.

Lube Oil Building GT1/2		**1. Light on deluge piping.** **2. Temp heat trace plugged in on deluge piping outside.** **3. Louvers covered** **GT1 ____** **GT2 ____**	Walked Down By: _____ Verified By: _____
Vacuum Pumps		**1. Hooch and lights** **2. Diesel Heater (placed so it can be easily filled)** **3. Light under each check valve**	Walked Down By: _____ Verified By: _____

CCW		**1. Place covers on HEX** **2. Hooch over pumps w/ string lights**	Walked Down By: _____ Verified By: _____
HRSG 1 Top		**Hooch/Light at each transmitter: Drum Level Transmitter not in penthouse.** **Wind Break at top of stairs to midway of drum.** **Hanging Scaffold for LP LCV south of CBT**	Walked Down By: _____ Verified By: _____
HRSG 2 Top		**Hooch/Light at each transmitter: Drum Level Transmitter not in penthouse.** **Wind Break at top of stairs to midway of drum.** **Hanging Scaffold for LP LCV south of CBT**	Walked Down By: _____ Verified By: _____

Freeze Protection Readiness

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Attachment 2

System Readiness Review

Station: _____ **Unit:** _____

Evaluator: _____ **System:** _____ **Date:** _____

For each unit system, complete the following checklist for potential items that may affect unit operation during the upcoming season. Negative effects on the unit operation to be assessed are:

- Could produce an unplanned shutdown (loss of generation) during operation (Example: Production Risk surveillances during Summer months, freezing risk in Winter, etc.)
- Could produce an unplanned de-rate (loss of generation) during operation (Example: same as above.)
- Could cause a situation when the risk of a unit shutdown or de-rate is increased. (Example: Planned maintenance of a condensate pump during July increases the risk of shutdown/de-rate should another Condensate pump fail)

If any items are listed in the affirmative, as potential for negatively affecting operation, note reference to the appropriate document, and initiate action to resolve the item prior Winter or Summer as appropriate.

Attach a list of the items in each category pertaining to the system.

Category	Describe (Attach list if necessary)	Type of Risk & Severity (Derate, Shutdown, / High, Medium, Low)	Condition addressed before start of season?	Expected status at start of season
System Changes since last season?				
Are there any OWAs affected by seasonal extremes for this system?			Yes /No	
Are there any TPAs affected by seasonal extremes for this system?			Yes /No	
Are there any SO affected by seasonal extremes for this system?			Yes /No	
Are there any Special Tests that have to be performed during this season?			Yes /No	
Are there any site specific seasonal readiness activities that have to be performed for this system?			Yes /No	
Are there any System Health deficiencies that could impact seasonal reliability?			Yes /No	

_____ Date_____
Evaluator

_____ Date_____
Operations Manager

Work Order Details

99580134: FREEZE PROTECTION READINESS INSPECTION

FREEZE PROTECTION READINESS PM

THE PURPOSE OF THIS PM IS TO MAINTAIN THE READINESS OF THE SITE THROUGHOUT THE FREEZE PROTECTION WINDOW OF DECEMBER 1ST - MARCH 31ST.

THE FOLLOWING INSPECTIONS ARE TO BE PERFORMED:
1. FREEZE PROTECTION INSTALLATION MATRIX -(2) Tabs
2. OBRIEN BOX INSPECTION - (3) Tabs
3. STORAGE INVENTORY CHECKLIST
4. SUPPLY INVENTORY CHECKLIST

THE REFERENCED INSPECTIONS ARE ATTACHED. PERFORM AND SUBMIT YOUR COMPLETED INSPECTIONS TO THE FOLLOWING:
REX.LAMEW@ETHOSENERGY.COM
SAMUEL.WARD@ETHOSENERGY.COM
ROBERT.JOHNSON@ETHOSENERGY.COM
ISAIASHERNANDEZ@ETHOSENERGY.COM
JAMES.BILLINGTON@ETHOSENERGY.COM

Asset:
Location: WHX Unit WHX
CI:

Sched Start:		**Site:**	WHS	**Job Plan:**	
Sched Finish:		**Priority:**		**Supervisor:**	
Target Start:	3/28/23	**Work Type:**	PM	**Lead:**	
Target Finish:	3/28/23	**Status:**	COMP	**Vendor:**	
Actual Start:	4/26/23	**Parent:**		**Owner:**	
Actual Finish:	5/3/23	**Failure Class:**		**Owner Group:**	
Report Date:	3/21/23	**Problem Code:**		**Service:**	
Reported By:	MAXADMIN			**Service Group:**	
		GL Account:		**Classification:**	

We use system readiness reviews to prepare for winter, and we have a monthly pm to keep us prepared during freeze protection months. Some of the activities we perform monthly are walking down the installation plan, checking inventory, and inspecting transmitter boxes for proper insulation/heat trace/heater operation.

Critical Equipment

Making your list and checking it twice! Wolf Hollow personnel developed a good critical equipment list over the years. In 2021 we reached out to an independent third party to perform a review of our single points of failure, and to help us identify and mitigate freeze protection issues.

Circuit Breaker	Equipment ID #	Instrument	Critical Component	Instrument Details	Reference Drawings/Notes	Heat Trace Type	Design Amperage	Insulation inspection on sensing line (signature)	Transmitter cabinet inspection, is the heater and thermometer functioning? (signature)	Wind break installation (if required)	Additional heater (if required)
CB-1	561-LSH-50001	SCB/FLT/SEP DRN TK FLOAT LVL SW		2166-HT-306	561-302-001					NO	NO
"	561-LG-50104	FG SCB/FLT/SEP DRAIN TNK	YES	2166-HT-306	561-LG-50104					NO	NO
"	449-FIT-90001	AUX BOILER STM FLOW	YES	2166-HT-473	449-302-002					NO	NO
"	541-FIT-50032	AUX BLR DEA FLOW	YES	2166-HT-346	514-302-001					NO	NO
"	Aux Blr LG/LS/LG	Aux Blr Pump to Aux Blr Deaerator	YES	2166-HT-549-553						YES	YES
"	449-FIT-50039	AUX BOILER FEEDWATER FLOW	YES	2166-HT-474						YES	YES
CB-4	516-TNK-50005/6	PHOSPHATE (2100) DILUTION TANK	YES	2166-HT-241						ENCLOSURE	NO
"	516-SKD-50002	OXYGEN SCAVENGER SKID		2166-HT-539						ENCLOSURE	NO
"	516-SKD-50005	LP BOILERS PHOSPHATES SKID	YES	2166-HT-548						ENCLOSURE	NO
"	210-PT-12027	HRSG2 RECIR PUMP 1	YES	2166-HT-930						ENCLOSURE	NO
"	210-PDT-12009	HRSG2 RECIR PUMP 1	YES	2166-HT-930						ENCLOSURE	NO
"	210-PT-12012	HRSG2 RECIR PUMP 2	YES	2166-HT-931						ENCLOSURE	NO
"	210-PDT-12047	HRSG2 RECIR PUMP 2	YES	2166-HT-931						ENCLOSURE	NO
"	449-SKD-50003	AUX BOILER SAMPLE BOOSTER SKID		2166-HT-503						ENCLOSURE	NO
"	447-PDIT-12054	GT CLG STM IN FLTR	YES	2166-HT-381	447-302-002					NO	NO
"	447-PDT-12034	GT CLG STM COMB	YES	2166-HT-384	WOLF-1-DW-300-302-002					INSULATION REPAIR	NO
"	447-PDT-12035	GT2 IP CLG STM DP	YES	2166-HT-384	WOLF-1-DW-300-302-002					INSULATION REPAIR	NO
"	447-PDT-12036	GT2 IP CLG STM DP	YES	2166-HT-384	WOLF-1-DW-300-302-002					INSULATION REPAIR	NO
CB-11	449-PIT-50029	HP BU STM IN PRESS	YES	2166-HT-440	449-302-001					NO	NO
CB-19	516-SKD-50004	IP BOILERS PHOSPHATES SKID	YES	2166-HT-542	WOLF-1-DW-516-302-001					YES	NO
"	516-SKD-50005	LP BOILERS PHOSPHATES SKID	YES	2166-HT-547	WOLF-1-DW-516-302-005					YES	NO
"	516-SKD-50004	IP BOILERS PHOSPHATES SKID	YES	2166-HT-540	WOLF-1-DW-516-302-005					YES	NO
CB-20	516-SKD-50006	AUXILIARY BOILER CHEMICAL SKID	YES	2166-HT-537	WOLF-1-DW-516-302-005					YES	NO
"	516-SKD-50001	NEUTRALIZING AMINE SKID	YES	2166-HT-538	WOLF-1-DW-516-302-005					YES	NO
"	516-SKD-50003	HP BOILERS PHOSPHATES SKID	YES	2166-HT-541	WOLF-1-DW-516-302-005					YES	NO
"	516-SKD-50003	HP BOILERS PHOSPHATES SKID	YES	2166-HT-543	WOLF-1-DW-516-302-005					YES	NO
"	210-PDT-12004	?									

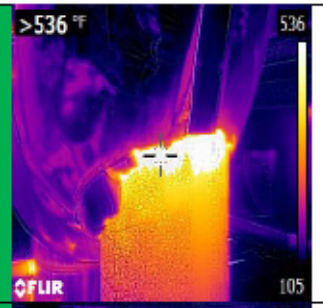
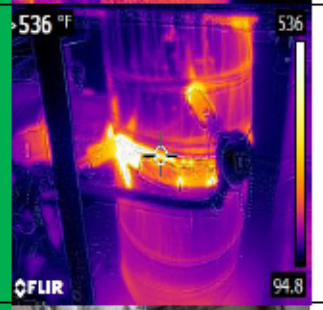
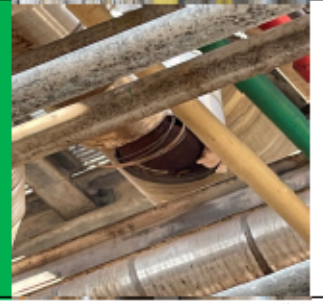
Tag #	Component List (Description)	Maximo Description (Vlookup)	Maximo Location (Vlookup)	Commodity	Detail	Asset #	Tier 1 Freeze List	Tier 2 Freeze List	Tier 3 Freeze List	Recommendations

EthosEnergy

Single Point of Failure Review Wolf Hollow

June 2021

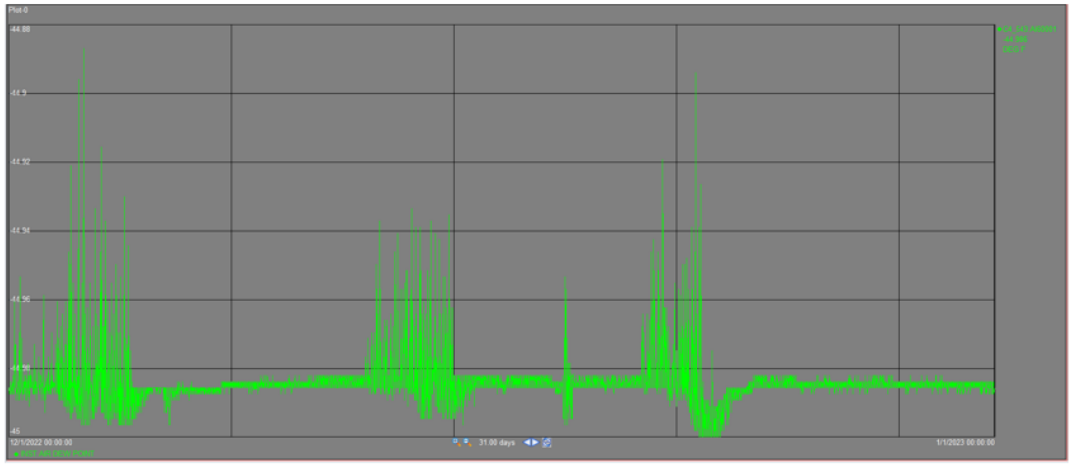
Insulation Inspections

HRSG2		Complete	H2 north side ground HP Steam need to insulate leg. 500 degrees
HRSG2		Complete	H2 RH Steam line Drain Pot needs insulation
HRSG2		Complete	H2 North side exhaust needs insulation repair and blanket repair.
HRSG2		Complete	H2 northside mezanine looking up needs insulation repair

Chemicals and Instrument Air

Instrument Air Dew point

1. Instrument Air Dew point is monitored/maintained in the following ways:
    a. Continuously monitored in PI
    b. Checked on freeze protection rounds
    c. Checked daily on Webview rounds
    d. Priority 1 alarm associated with a dew point less than -25F
    e. Automatic blowdowns on receiver tank and throughout the plant
    f. Compressors and air dryer are on a Platinum PM package with Ingersoll Rand

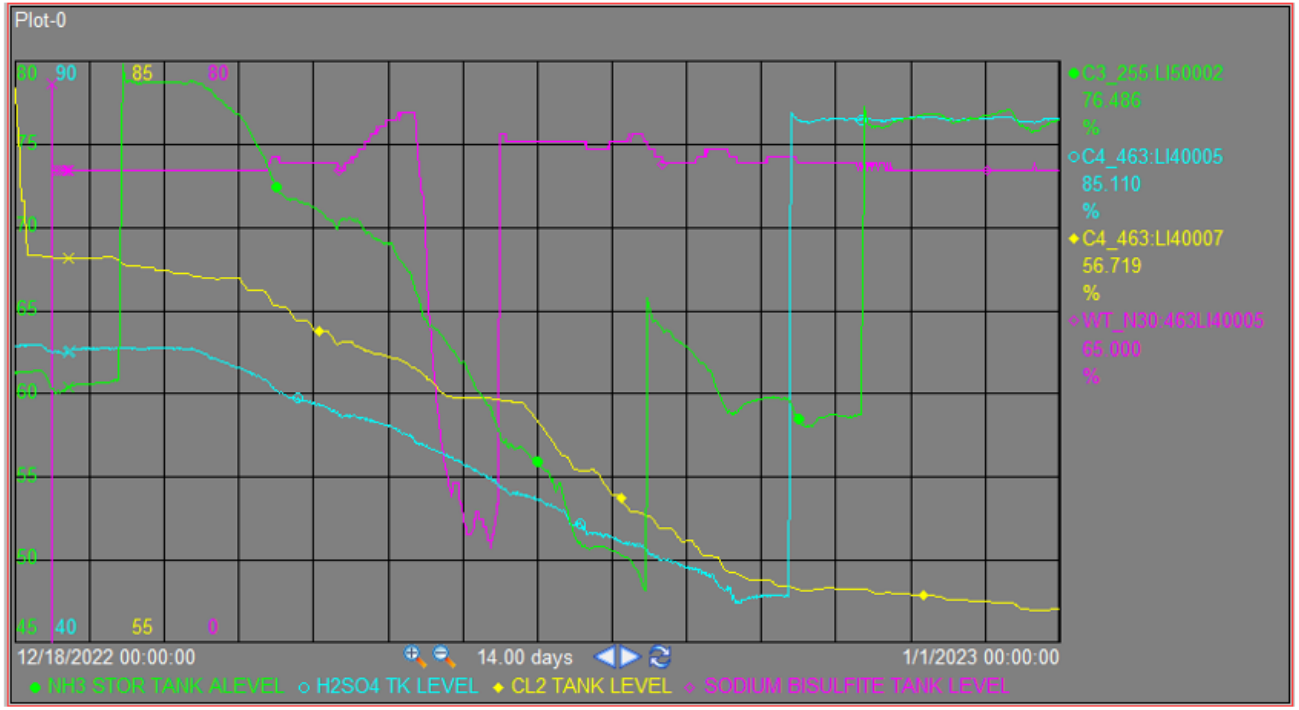


12/27/2022 19:13:31	-99	Smith, Chance
12/27/2022 09:12:38	-98	Darter, Billy
12/26/2022 18:06:51	-94	Zuniga, Jonathan
12/26/2022 10:43:27	-96	Darter, Billy
12/25/2022 19:18:21	-97	Razo, German
12/25/2022 13:10:27	-96	Smith, Chance

Chemical Monitoring

Wolf Hollow monitors chemical in the following ways:

1. Continuously monitored in PI
2. Critical chemicals are also monitored by our vendor (Skyhawk) via telemetry
3. Weekly bulk chemical inventory – performed every Monday
4. Priority 1 alarms set for low levels



Heat Trace

WHS performs monthly and annual heat trace inspections. Two changes made this year were to add the extreme weather temperature to the round, and to label the critical breakers in the panels.

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Attachment 12

Every 2 hours < 32 Degrees F

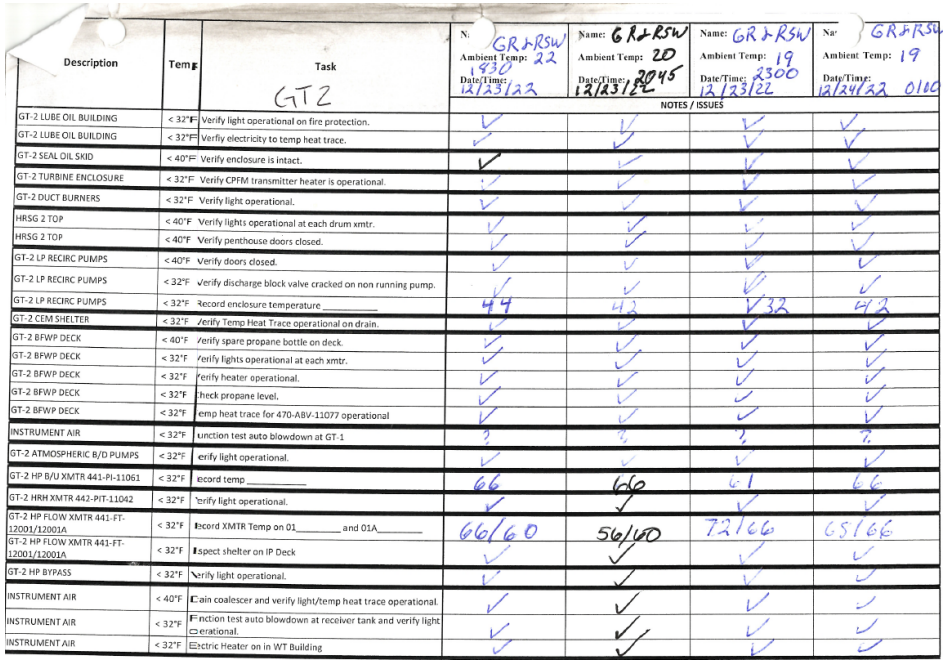
Every 1 hours < 25 Degrees F

	Wolf Hollow Generating Station Freeze Protection Check Sheet		OP-WH-012 Rev 004
Name:		Date:	
1.- CONDITIONS OF FREEZE PROTECTION PANELS			List Breaker # of Tripped Items along with Circuit ISO. #
	NORMAL	Time	
HTFP - 1	YES / NO		
HTFP - 2	YES / NO		
HTFP - 3	YES / NO		
HTFP - 4	YES / NO		

Freeze Protection Rounds

On the left you can see a completed round sheet, and on the right an updated round sheet where we spell out the expectations based on temperature.

Recordkeeping is an essential part of any freeze protection program. Someone should be designated on each shift to collect documentation. I do this to ensure that we are tracking the documents in the field, and for document control on anything that may need to be printed.



Description	Temp	Task: GT2	Name: GR+RSW Ambient Temp: 22 Date/Time: 1930 12/23/22	Name: GR+RSW Ambient Temp: 20 Date/Time: 2045 12/23/22	Name: GR+RSW Ambient Temp: 19 Date/Time: 2300 12/23/22	Name: GR+RSW Ambient Temp: 19 Date/Time: 12/24/22 0100
			NOTES / ISSUES			
GT-2 LUBE OIL BUILDING	< 32°F	Verify light operational on fire protection.	✓	✓	✓	✓
GT-2 LUBE OIL BUILDING	< 32°F	Verify electricity to temp heat trace.	✓	✓	✓	✓
GT-2 SEAL OIL SKID	< 40°F	Verify enclosure is intact.	✓	✓	✓	✓
GT-2 TURBINE ENCLOSURE	< 32°F	Verify CPFM transmitter heater is operational.	✓	✓	✓	✓
GT-2 DUCT BURNERS	< 32°F	Verify light operational.	✓	✓	✓	✓
HRSG 2 TOP	< 40°F	Verify lights operational at each drum xmtr.	✓	✓	✓	✓
HRSG 2 TOP	< 40°F	Verify penthouse doors closed.	✓	✓	✓	✓
GT-2 LP RECIRC PUMPS	< 40°F	Verify doors closed.	✓	✓	✓	✓
GT-2 LP RECIRC PUMPS	< 32°F	Verify discharge block valve cracked on non running pump.	✓	✓	✓	✓
GT-2 LP RECIRC PUMPS	< 32°F	Record enclosure temperature _____	44	42	32	42
GT-2 CEM SHELTER	< 32°F	Verify Temp Heat Trace operational on drain.	✓	✓	✓	✓
GT-2 BFWP DECK	< 40°F	Verify spare propane bottle on deck.	✓	✓	✓	✓
GT-2 BFWP DECK	< 32°F	Verify lights operational at each xmtr.	✓	✓	✓	✓
GT-2 BFWP DECK	< 32°F	Verify heater operational.	✓	✓	✓	✓
GT-2 BFWP DECK	< 32°F	Check propane level.	✓	✓	✓	✓
GT-2 BFWP DECK	< 32°F	Temp heat trace for 470-ABV-11077 operational	✓	✓	✓	✓
INSTRUMENT AIR	< 32°F	Function test auto blowdown at GT-1	?	?	?	?
GT-2 ATMOSPHERIC B/D PUMPS	< 32°F	Verify light operational.	✓	✓	✓	✓
GT-2 HP B/U XMTR 441-PI-11061	< 32°F	Record temp _____	66	66	61	66
GT-2 HRH XMTR 442-PIT-11042	< 32°F	Verify light operational.	✓	✓	✓	✓
GT-2 HP FLOW XMTR 441-FT-12001/12001A	< 32°F	Record XMTR Temp on 01_____ and 01A_____	66/60	56/60	72/66	65/66
GT-2 HP FLOW XMTR 441-FT-12001/12001A	< 32°F	Inspect shelter on IP Deck	✓	✓	✓	✓
GT-2 HP BYPASS	< 32°F	Verify light operational.	✓	✓	✓	✓
INSTRUMENT AIR	< 40°F	Drain coalescer and verify light/temp heat trace operational.	✓	✓	✓	✓
INSTRUMENT AIR	< 32°F	Function test auto blowdown at receiver tank and verify light operational.	✓	✓	✓	✓
INSTRUMENT AIR	< 32°F	Electric Heater on in WT Building	✓	✓	✓	✓

Description	Temp	Round is to be completed every: 2 Hours if < 32°F 1 Hours if < 25°F	Name: Ambient Temp: Date/Time:	Name: Ambient Temp: Date/Time:	Name: Ambient Temp: Date/Time:	Name: Ambient Temp: Date/Time:
			NOTES / ISSUES			
GT-2 LUBE OIL BUILDING	< 32°F	Verify light operational on fire protection.				
GT-2 LUBE OIL BUILDING	< 32°F	Verify electricity to temp heat trace.				
GT-2 SEAL OIL SKID	< 40°F	Verify enclosure is intact.				
GT-2 TURBINE ENCLOSURE	< 32°F	Verify CPFM transmitter heater is operational.				
GT-2 DUCT BURNERS	< 32°F	Verify light operational.				
HRSG 2 TOP	< 40°F	Verify lights operational at each drum xmtr.				
HRSG 2 TOP	< 40°F	Verify penthouse doors closed.				
GT-2 LP RECIRC PUMPS	< 40°F	Verify doors closed.				
GT-2 LP RECIRC PUMPS	< 32°F	Verify discharge block valve cracked on non running pump.				
GT-2 LP RECIRC PUMPS	< 32°F	Record enclosure temperature _____				
GT-2 CEM SHELTER	< 32°F	Verify Temp Heat Trace operational on drain.				
GT-2 BFWP DECK	< 40°F	Verify spare propane bottle on deck.				

Round is to be completed every: 2 Hours if < 32°F 1 Hours if < 25°F

LOCATION	Name: Ambient Temp: Date/Time:	Name: Ambient Temp: Date/Time:	Name: Ambient Temp: Date/Time:	Name: Ambient Temp: Date/Time:
Auxiliary Boiler X 2 (Diesel)				
Auxiliary Boiler FG valve (Diesel)				
GT-2 Boiler FW Pump Deck (Propane)				
HRSG-2 Drains (Diesel)				
Jet pack Heater				
GT-1 Boiler FW Pump Deck (Propane)				
HRSG-1 Drains (Diesel)				
Potable Water Building				
Water Treatment Building (Electric)				

Extreme Weather Prep

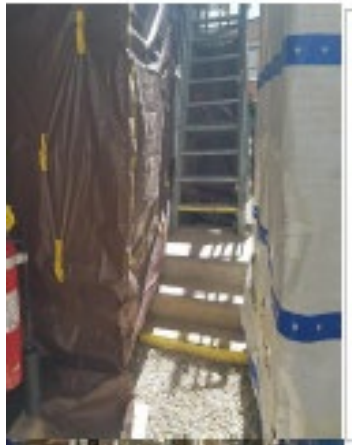
Attachment 13
Extreme Weather Preparations

Manpower:

- 1 ICE tech dedicated to watching PI for frozen transmitters
- 1 Person dedicated to fueling heaters
- 2 ICE tech per shift
- 2 Mechanic per shift
- 6 Scaffold/insulators per shift
- 1 Welder per shift
- 6 Operators per shift
- 1 Manager per shift

Supplies:

- 50 sheets of 4x8 2" foam insulation or Equivalent Plastic
- 30 diesel heaters
- 20 propane bottles
- 12 propane heaters
- 500 gallons of extra diesel
- 250 gallon propane tank onsite



Extreme Severe Weather conditions:

1. Windbreak from stairs near Ammonia skid along to LP Recir Pump house

Walked Down By: _____

Verified By: _____

Extreme Severe Weather conditions:

1. Windbreak from BFP to include transmitters near Atmos. BD Tank
   a) IP FW 210-PT-12019
   b) LP SH 210-PT-12007
   c) LP HDR 446-PIT-12048

2. Windbreak near HP Backup PCV to include transmitters:
   a) HP BU PT 441-PT-11011
   b) HP STM PT 441-PT-11038

Walked Down By: _____

Verified By: _____

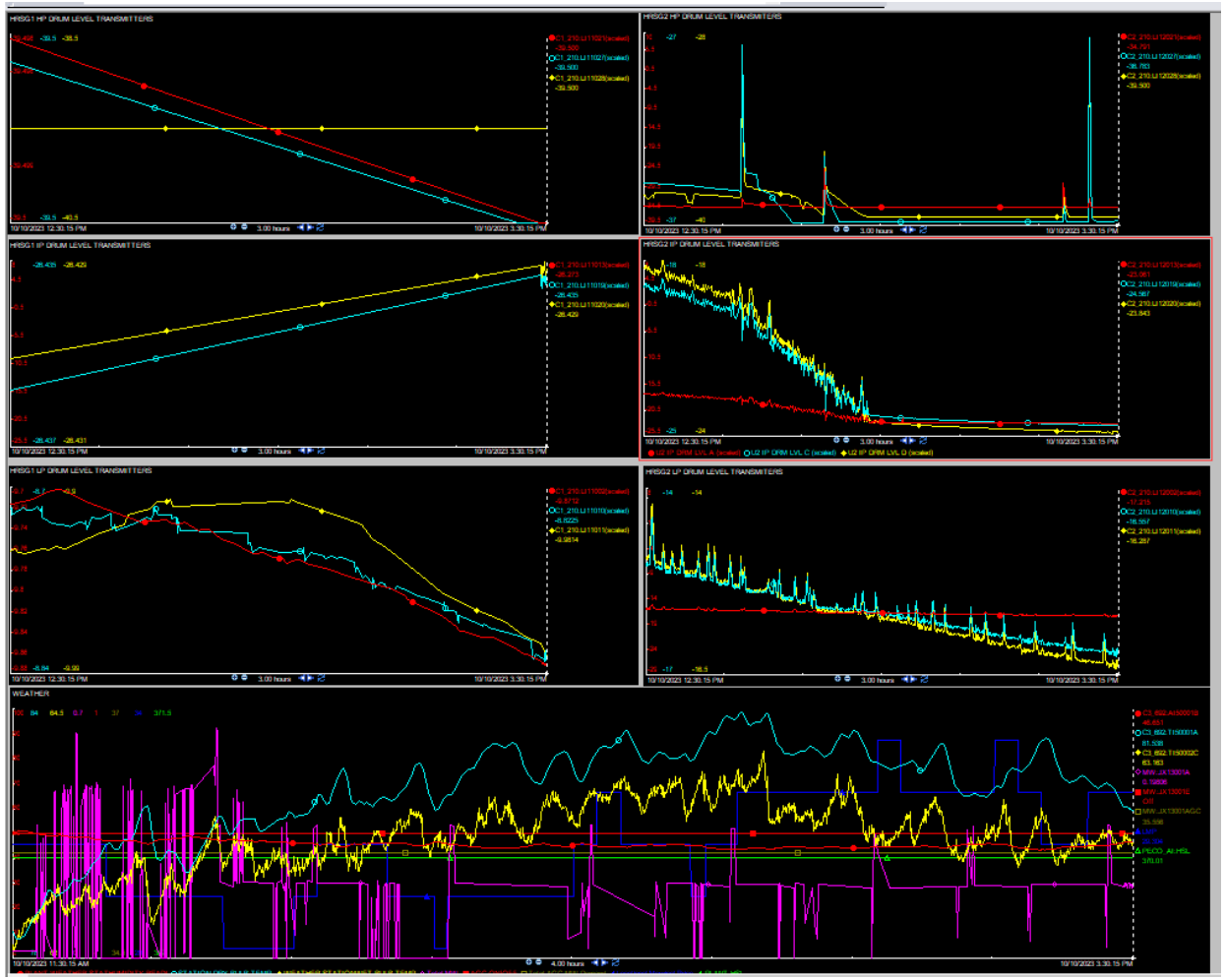
Extreme Severe Weather conditions:

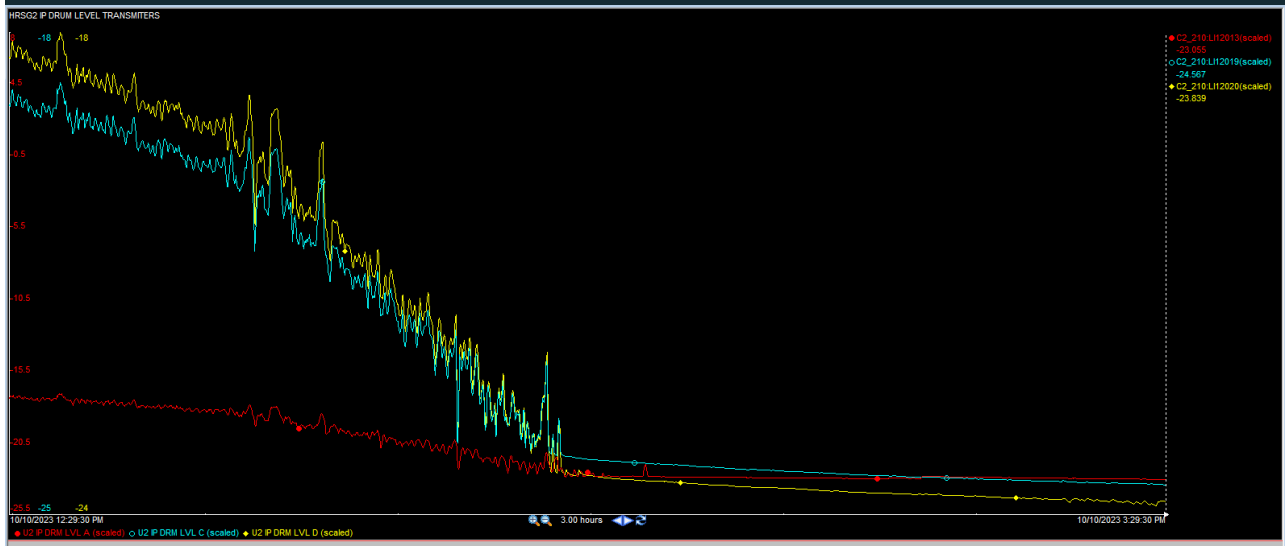
1. Hooch around transmitterr to include:
   a) RAW WTR CT 512-FIT-60002
   b) RAW WTR-Clarif 512-FIT-60003
2. Verify lights operational
3. Verify temp heat trace plugged in on Clarifier sensing line.
4. Verify cordless propane heater ready for use

Walked Down By: _____

Verified By: _____

Monitoring PI Freeze Protection Trends





Monthly Inspections

O'Brien Box Inspections

	Stm Trb Ground Level / South Side					
Tag	**Instrument Type**	**Description**	**Thermometer**	**Heat Trace**	**Insulation**	**Heater**
514-FIT-30017	DP Xmttr	Cond Cyc M/U Flow				
470-FIT-30011	DP Xmttr	Condene Flow				
470-PIT-30006	Press Xmttr	Condene Hdr Press				

	Stm Trb Ground Level / West Side					
Tag	**Instrument Type**	**Description**	**Thermometer**	**Heat Trace**	**Insulation**	**Heater**
461-PDIT-30020	DP Xmttr	Main Cond CW Dp				

	Stm Trb Ground Level / Under Turbine					
Tag	**Instrument Type**	**Description**	**Thermometer**	**Heat Trace**	**Insulation**	**Heater**
442-PIT-30048	Press Xmttr	IP Steam Pressure	N/A			
442-PIT-30014	Press Xmttr	CRH Steam Disch Press				
C1MAA03CP101	Press Xmttr	HP Inlet Steam Press	N/A			
442-PS-30028	Press Switch	HP Exh Stm Press - 1	N/A			
442-PS-30029	Press Switch	HP Exh Stm Press - 2	N/A			
442-PS-30030	Press Switch	HP Exh Stm Press - 3	N/A			

Monthly Amp Reading at the heat trace panels.

Work Order Details

99579680: MONTHLY CRITICAL BREAKER PM

Critical Breaker PM Covers Items Listed Below:

- 614-BKR-11001 GT1 SF6 GMCB
- 614-BKR-12001 GT2 SF6 GMCB
- 614-BKR-30001 STG SF6 GMCB
- 666-BKR-17001 East Line SF6 Switchyard CB
- 666-BKR-17002 West Line SF6 Switchyard CB

We added an SF6 chart that correlates the acceptable pressure with a temperature chart.

1. INSPECT BUSHINGS FOR CRACKS, CHIPS, DEBRIS, CONTAMINATION, EVIDENCE OF FLASHOVER, AND BROKEN STRANDS OR BIRD CAGING IN THE LEADS.
2. INSPECT CONDITION AND TIGHTNESS OF GROUND CABLE
3. INSPECT CONDITION OF CONCRETE PAD OR FOUNDATION.
4. INSPECT CONTROL CABINET FOR EVIDENCE OF RODENT DAMAGE, DISCOLORED WIRING, ALARM CONDITIONS, SWITCHES THAT HAVE BEEN PULLED OR TAGGED, AND HEATER FUNCTION (CABINET HEATER HAS A FIXED THERMOSTAT THAT ONLY COMES ON AT 40° OR BELOW.)
5. VERIFY SF6 GAS PRESSURE IS WITHIN MANUFACTURERS RECOMMENDATION USING FIG 2/5 CHART WHICH CAN BE FOUND UNDER THE ATTACHMENTS TAB.

IF POSSIBLE CORRECT ANY MINOR ISSUES WITH "TOOL POUCH" MAINTENANCE AND DOCUMENT.

IF MORE INVOLVED CORRECTIVE ACTIONS ARE NEEDED CREATE A CORRECTIVE WORK ORDER AGAINST THE SPECIFIC EQUIPMENT ID AND RECORD THAT WORK ORDER NUMBER AND DEFICIENCY IDENTIFIED IN THE COMMENTS OF THIS PM WORK ORDER.

PREVIOUS MONTH'S AMP READINGS				CURRENT MONTH'S AMP READINGS			
A-PHASE AMPS	B-PHASE AMPS	C-PHASE AMPS	NEUTRAL AMPS	A-PHASE AMPS	B-PHASE AMPS	C-PHASE AMPS	NEUTRAL AMPS
72	107	83		80	107	100	
BKR#	**AMPS**	**BKR#**	**AMPS**	**BKR#**	**AMPS**	**BKR#**	**AMPS**
1	1.1	2	4	1	1.1	2	4.6
3	30.2	4	12.9	3	28.3	4	12.3
5	13.8	6	0	5	13.9	6	0

Inventory

Attachment 9

Pre-Freeze Protection Storage Inventory List

Item Description and Type	Storage Location	Qty Req	Qty OH
Box of Polyethylene Insulation (Pipe insulation - 5/8" X 3/8" X 6'	FP Conex	1 Box	
Ceramic heaters	FP Conex	10	
GFCI Adapters/ 3-way 120V Splitters	FP Conex	40	
100' Extension Cord	FP Conex	20	
50' Extension Cord	FP Conex	20	
25' Extension Cord	FP Conex	20	

Attachment 10

Post-Freeze Protection Storage Inventory List

Item Description and Type	Storage Location	Qty Req	Qty OH
Box of Polyethylene Insulation (Pipe insulation - 5/8" X 3/8" X 6'	FP Conex	1 Box	
Ceramic heaters	FP Conex	5	
GFCI Adapters/ 3-way 120V Splitters	FP Conex	5	
100' Extension Cord	FP Conex	5	
50' Extension Cord	FP Conex	5	
25' Extension Cord	FP Conex	5	

Attachment 11

Freeze Protection Supply Inventory Checklist

Description	Storage Location	Qty Required	Qty On Hand
Bulk Diesel	Oil Storage	1000 Gals	
Bulk Gasoline	Oil Storage	250 Gals	
Insulated Gloves XL	Warehouse	12 Pair	
Insulated Gloves L	Warehouse	12 Pair	
Insulated Gloves M	Warehouse	12 Pair	
Shoe Cleats for ice	Warehouse	24 Sets	
Hardhat liners	Warehouse	35 Each	
Ear Muffs	Warehouse	10 Each	
Squincher Powder Packs	Warehouse	250 Pks	
Bottled Water	Training Center	1 Pallet	
Gatorade	Training Center	1 Pallet	
Coffee	Admin Bldg.	6 Cases	
Coffee Filters	Admin Bldg.	2 Pks	

WHS purchased a large jet heater, and installed electricity on top of the HRSG's.

Thermal Transmitter Blankets

Transformer Installation

Continuous Improvement

One major improvement for us is moving from blue tarps to shrink wrap. The tarps were not durable, and were often found ripped from the wind. The heavy FR plastic worked, but it also has some challenges. Utilizing the shrink wrap with zipper access doors, has been a big improvement for WHS with wind resistance, durability, and keeping the heat in the enclosure.

Previous Issue

WHS swapped the main gas valve from instrument air to Natural Gas.

Training, drills, turnover, and lessons learned.

HOLIDAY FREEZE EVENT AFTER ACTION

December 22-25, 2022

EthosEnergy

Wolf Hollow Freeze Protection Training

OP-WH-012
Rev.004
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Attachment 7

Winter Readiness Drill

Date/Time:	Participants:
Conditions:	
Realtime Temp:	Forecasted Temp:
Wind Chill:	Expected Hours in Freeze Protection:

1. Did the participants readily know where the freeze protection binder was located?
2. Have they review the procedure and signed off for the current year?
3. Did they know the temperature that activated freeze protection rounds performance?

Tracking issues and communicating them across the shifts is key during freezing events.

Wolf Hollow 2/1/2023 Freeze Protection Turnover (Nightshift)

OurPractices

Wrapping transmitters in thermal blankets.

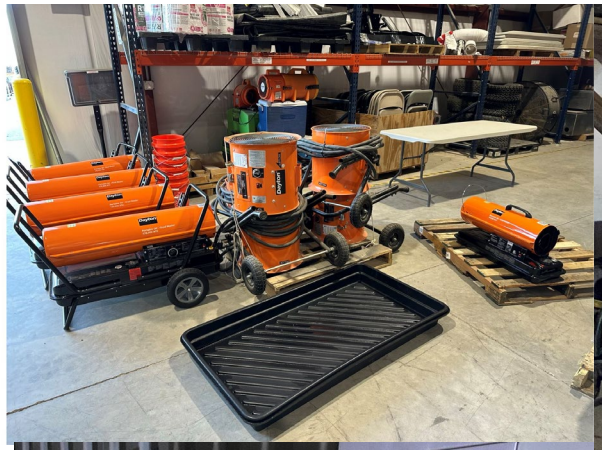
Building tall wind breaks.

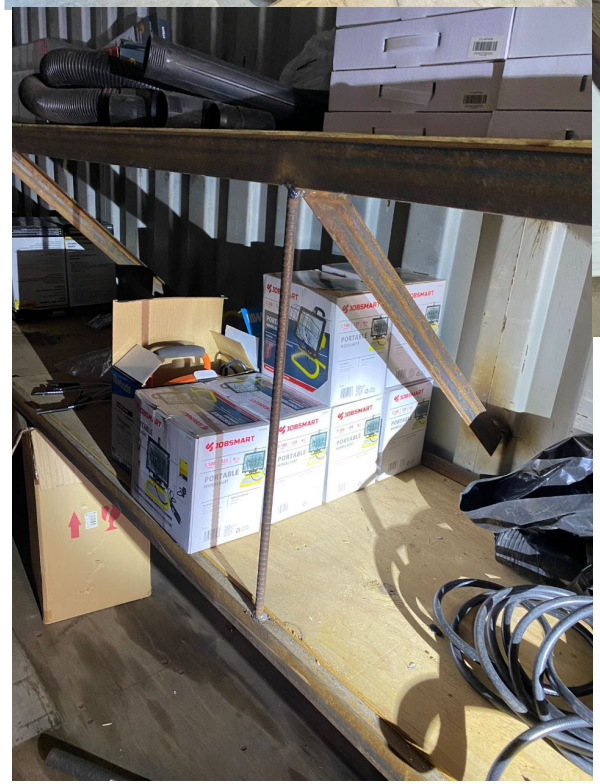
Using shrink wrap and zippers for enclosures. We also found that labeling the enclosures was helpful for the contractors.

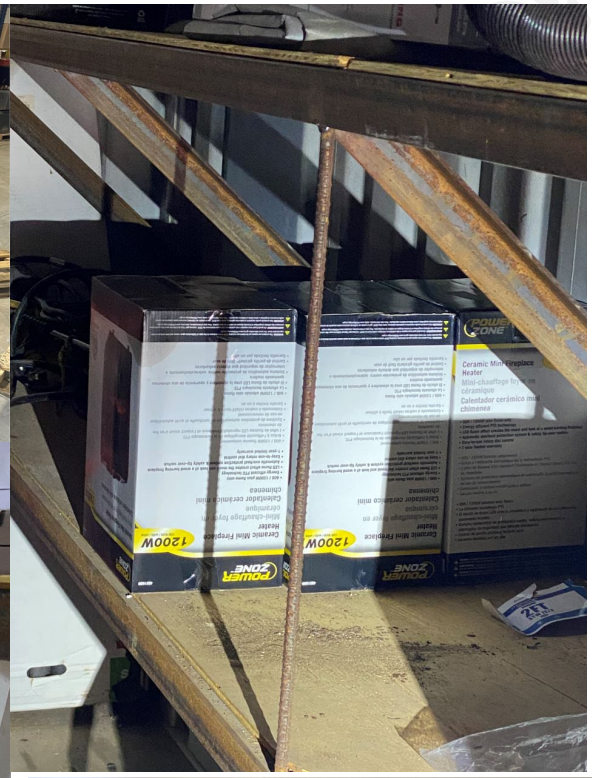
Adding a local thermometer and heat source to the enclosures.

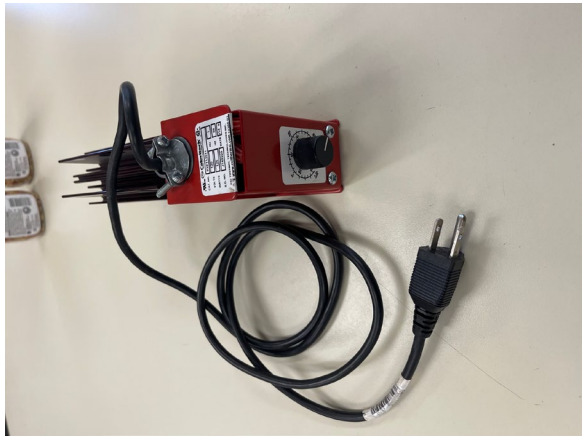
Supplies

It is important to keep some additional supplies on hand. Extra lights, heaters, and plastic are always good to have. We also have a standard 110v plug on some Obrien box heaters, so if one fails in the field it can easily be mitigated with a extension cord and spare heater.









Coordinate
Communicate
Cooperate

Leadership

No one enjoys the cold. In fact, many elite training programs use cold exposure to harden trainees and create mental toughness. Your team may not be comprised of Navy Seals, but they still have to perform during extremely cold weather. Take this into consideration when laying out the freeze protection plan. Ask yourself how long they will be out on a round, can that duration be shortened, can we add another person or piece of equipment to improve response time, etc… Safety should be baked into every decision you make around freeze protection.

During every freezing event there will be challenges. It is important that you establish a plan, remain supportive, and encourage the group. Listen to your team during lessons learned meetings, and make improvements wherever possible. If something cannot be improved, then communicate that. Never leave any room for doubt or uncertainty.

Always be grateful for your team, and the sacrifices they make to keep your plant reliable.

Are you ready?

EthosEnergy