AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1007.A.b.

Degreaser

Completed Work Practice Checklist

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Date of Action: 1/31/18	**Location of Source : (TA/BLDG/Room) TA-55-PF4-319**

Monitoring Requirements(A1007.A[1]):	**Yes/No**	**Comments**
1. Does the operator monitor and record the amount of solvent added to the degreaser?	Yes	
Recordkeeping Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Are the actual emissions rate (pounds/month) of VOC and HAPS based on the quantity of solvent lost to evaporation calculated on a monthly basis?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) calculated for this source category and added to the facility-wide emissions rates in Table 106.B (Facility-wide Allowable Emissions)?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degreaser solvent content?	Yes	
4. Does the operator maintain work practice checklists?	Yes	
5. Does the operator maintain records in accordance with Section B109, General Recordkeeping Requirements?	Yes	
Operational Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Does the operator ensure the degreaser is closed with a tight fitting cover whenever not in use?	Yes	
2. Does the operator maintain a freeboard ratio of 0.75 or greater?	Yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and stored waste solvent and wipe rags are placed in closed containers?	Yes	
4. Does the operator ensure that flushing is performed only within the freeboard area only?	Yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 15 seconds or until dripping stops (whichever is longer)?	Yes	
6. Does the operator ensure that the solvent level does not exceed the fill line on the solvent level?	Yes	
7. Does the operator ensure that all spills are wiped up immediately?	Yes	
8. Does the operator ensure that there is no creation of observable splashing with agitation device?	N/A	An air or pump agitated solvent bath is not used.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Operational Requirements (A1007.A[1]) continued	Yes/No	Comments
9. Does the operator ensure that the degreaser is not exposed to drafts greater than 40 meters per minute (132 feet per minute)?	Yes	Glove box air flow rates based on system design descriptions average between 5 acfm (normal operating) up to 40 acfm maximum for a single glove box.
10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser?	Yes	

Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338.

Comments:

Form completed by:

Signature	Name (print)	Z number	Date
Arsenio Salazar	Arsenio Salazar	163479	1/31/18

The permit section or condition noted at the end of each requirement is from the following reference:

[1] Title V Operating Permit No: P100-R2

All required documentation must be kept for a minimum of 5 years from the date it was gathered or from the date of the operating permit issuance (February 27, 2015).

At the end of each assessment period this form must be filed as an official record.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Date of Action: 2/27/18	**Location of Source : (TA/BLDG/Room) TA-55-PF4-319**

Monitoring Requirements(A1007.A[1]):	**Yes/No**	**Comments**
1. Does the operator monitor and record the amount of solvent added to the degreaser?	Yes	
Recordkeeping Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Are the actual emissions rate (pounds/month) of VOC and HAPS based on the quantity of solvent lost to evaporation calculated on a monthly basis?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) calculated for this source category and added to the facility-wide emissions rates in Table 106.B (Facility-wide Allowable Emissions)?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degreaser solvent content?	Yes	
4. Does the operator maintain work practice checklists?	Yes	
5. Does the operator maintain records in accordance with Section B109, General Recordkeeping Requirements?	Yes	
Operational Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Does the operator ensure the degreaser is closed with a tight fitting cover whenever not in use?	Yes	
2. Does the operator maintain a freeboard ratio of 0.75 or greater?	Yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and stored waste solvent and wipe rags are placed in closed containers?	Yes	
4. Does the operator ensure that flushing is performed only within the freeboard area only?	Yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 15 seconds or until dripping stops (whichever is longer)?	Yes	
6. Does the operator ensure that the solvent level does not exceed the fill line on the solvent level?	Yes	
7. Does the operator ensure that all spills are wiped up immediately?	Yes	
8. Does the operator ensure that there is no creation of observable splashing with agitation device?	N/A	An air or pump agitated solvent bath is not used.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Operational Requirements (A1007.A[1]) continued	Yes/No	Comments
9. Does the operator ensure that the degreaser is not exposed to drafts greater than 40 meters per minute (132 feet per minute)?	Yes	Glove box air flow rates based on system design descriptions average between 5 acfm (normal operating) up to 40 acfm maximum for a single glove box.
10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser?	Yes	

Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338.

Comments:

Form completed by:

Signature	Name (print)	Z number	Date
[signature]	Arsenio Salazar	165429	2/27/18

The permit section or condition noted at the end of each requirement is from the following reference:

[1] Title V Operating Permit No: P100-R2

All required documentation must be kept for a minimum of 5 years from the date it was gathered or from the date of the operating permit issuance (February 27, 2015).

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MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Date of Action: 3/30/18	**Location of Source : (TA/BLDG/Room) TA-55-PF4-319**

Monitoring Requirements(A1007.A[1]):	**Yes/No**	**Comments**
1. Does the operator monitor and record the amount of solvent added to the degreaser?	Yes	
Recordkeeping Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Are the actual emissions rate (pounds/month) of VOC and HAPS based on the quantity of solvent lost to evaporation calculated on a monthly basis?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) calculated for this source category and added to the facility-wide emissions rates in Table 106.B (Facility-wide Allowable Emissions)?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degreaser solvent content?	yes	
4. Does the operator maintain work practice checklists?	yes	
5. Does the operator maintain records in accordance with Section B109, General Recordkeeping Requirements?	yes	
Operational Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Does the operator ensure the degreaser is closed with a tight fitting cover whenever not in use?	yes	
2. Does the operator maintain a freeboard ratio of 0.75 or greater?	yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and stored waste solvent and wipe rags are placed in closed containers?	yes	
4. Does the operator ensure that flushing is performed only within the freeboard area only?	yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 15 seconds or until dripping stops (whichever is longer)?	yes	
6. Does the operator ensure that the solvent level does not exceed the fill line on the solvent level?	yes	
7. Does the operator ensure that all spills are wiped up immediately?	yes	
8. Does the operator ensure that there is no creation of observable splashing with agitation device?	N/A	An air or pump agitated solvent bath is not used.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Operational Requirements (A1007.A[1]) continued	Yes/No	Comments
9. Does the operator ensure that the degreaser is not exposed to drafts greater than 40 meters per minute (132 feet per minute)?	Yes	Glove box air flow rates based on system design descriptions average between 5 acfm (normal operating) up to 40 acfm maximum for a single glove box.
10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser?	Yes	

Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338.

Comments:

Form completed by:

Signature	Name (print)	Z number	Date
[signature]	Arsenio Salazar	163479	3/30/17

The permit section or condition noted at the end of each requirement is from the following reference:

[1] Title V Operating Permit No: P100-R2

All required documentation must be kept for a minimum of 5 years from the date it was gathered or from the date of the operating permit issuance (February 27, 2015).

At the end of each assessment period this form must be filed as an official record.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Date of Action: 4/30/18	**Location of Source : (TA/BLDG/Room) TA-55-PF4-319**

Monitoring Requirements(A1007.A[1]):	**Yes/No**	**Comments**
1. Does the operator monitor and record the amount of solvent added to the degreaser?	Yes	
Recordkeeping Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Are the actual emissions rate (pounds/month) of VOC and HAPS based on the quantity of solvent lost to evaporation calculated on a monthly basis?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) calculated for this source category and added to the facility-wide emissions rates in Table 106.B (Facility-wide Allowable Emissions)?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degreaser solvent content?	Yes	
4. Does the operator maintain work practice checklists?	Yes	
5. Does the operator maintain records in accordance with Section B109, General Recordkeeping Requirements?	Yes	
Operational Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Does the operator ensure the degreaser is closed with a tight fitting cover whenever not in use?	Yes	
2. Does the operator maintain a freeboard ratio of 0.75 or greater?	Yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and stored waste solvent and wipe rags are placed in closed containers?	Yes	
4. Does the operator ensure that flushing is performed only within the freeboard area only?	Yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 15 seconds or until dripping stops (whichever is longer)?	Yes	
6. Does the operator ensure that the solvent level does not exceed the fill line on the solvent level?	Yes	
7. Does the operator ensure that all spills are wiped up immediately?	Yes	
8. Does the operator ensure that there is no creation of observable splashing with agitation device?	N/A	An air or pump agitated solvent bath is not used.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Operational Requirements (A1007.A[1]) continued	Yes/No	Comments
9. Does the operator ensure that the degreaser is not exposed to drafts greater than 40 meters per minute (132 feet per minute)?	YES	Glove box air flow rates based on system design descriptions average between 5 acfm (normal operating) up to 40 acfm maximum for a single glove box.
10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser?	YES	

Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338.

Comments:

Form completed by:

Signature	Name (print)	Z number	Date
[signature]	Arsenio Salazar	163479	4/30/18

The permit section or condition noted at the end of each requirement is from the following reference:

[1] Title V Operating Permit No: P100-R2

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At the end of each assessment period this form must be filed as an official record.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Date of Action: 5/29/18	**Location of Source : (TA/BLDG/Room) TA-55-PF4-319**

Monitoring Requirements(A1007.A[1]):	**Yes/No**	**Comments**
1. Does the operator monitor and record the amount of solvent added to the degreaser?	Yes	
Recordkeeping Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Are the actual emissions rate (pounds/month) of VOC and HAPS based on the quantity of solvent lost to evaporation calculated on a monthly basis?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) calculated for this source category and added to the facility-wide emissions rates in Table 106.B (Facility-wide Allowable Emissions)?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degreaser solvent content?	Yes	
4. Does the operator maintain work practice checklists?	Yes	
5. Does the operator maintain records in accordance with Section B109, General Recordkeeping Requirements?	Yes	
Operational Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Does the operator ensure the degreaser is closed with a tight fitting cover whenever not in use?	Yes	
2. Does the operator maintain a freeboard ratio of 0.75 or greater?	Yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and stored waste solvent and wipe rags are placed in closed containers?	Yes	
4. Does the operator ensure that flushing is performed only within the freeboard area only?	Yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 15 seconds or until dripping stops (whichever is longer)?	Yes	
6. Does the operator ensure that the solvent level does not exceed the fill line on the solvent level?	Yes	
7. Does the operator ensure that all spills are wiped up immediately?	Yes	
8. Does the operator ensure that there is no creation of observable splashing with agitation device?	N/A	An air or pump agitated solvent bath is not used.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Operational Requirements (A1007.A[1]) continued	Yes/No	Comments
9. Does the operator ensure that the degreaser is not exposed to drafts greater than 40 meters per minute (132 feet per minute)?	Yes	Glove box air flow rates based on system design descriptions average between 5 acfm (normal operating) up to 40 acfm maximum for a single glove box.
10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser?	Yes	

Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338.

Comments:

Form completed by:

Signature	Name (print)	Z number	Date
Arsenio Salazar	Arsenio Salazar	163479	5/29/18

The permit section or condition noted at the end of each requirement is from the following reference:

[1] Title V Operating Permit No: P100-R2

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MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Date of Action: 6/26/18	Location of Source : (TA/BLDG/Room) TA-55-PF4-319

Monitoring Requirements(A1007.A[1]):	Yes/No	Comments
1. Does the operator monitor and record the amount of solvent added to the degreaser?	Yes	
Recordkeeping Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Are the actual emissions rate (pounds/month) of VOC and HAPS based on the quantity of solvent lost to evaporation calculated on a monthly basis?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) calculated for this source category and added to the facility-wide emissions rates in Table 106.B (Facility-wide Allowable Emissions)?	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degreaser solvent content?	Yes	
4. Does the operator maintain work practice checklists?	Yes	
5. Does the operator maintain records in accordance with Section B109, General Recordkeeping Requirements?	Yes	
Operational Requirements (A1007.A[1])	**Yes/No**	**Comments**
1. Does the operator ensure the degreaser is closed with a tight fitting cover whenever not in use?	Yes	
2. Does the operator maintain a freeboard ratio of 0.75 or greater?	Yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and stored waste solvent and wipe rags are placed in closed containers?	Yes	
4. Does the operator ensure that flushing is performed only within the freeboard area only?	Yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 15 seconds or until dripping stops (whichever is longer)?	Yes	
6. Does the operator ensure that the solvent level does not exceed the fill line on the solvent level?	Yes	
7. Does the operator ensure that all spills are wiped up immediately?	Yes	
8. Does the operator ensure that there is no creation of observable splashing with agitation device?	N/A	An air or pump agitated solvent bath is not used.

MONTHLY WORK PRACTICE CHECK LIST
TA-55-DG-1 DEGREASER

R 04/20/2015

Operational Requirements (A1007.A[1]) continued	Yes/No	Comments
9. Does the operator ensure that the degreaser is not exposed to drafts greater than 40 meters per minute (132 feet per minute)?	Yes	Glove box air flow rates based on system design descriptions average between 5 acfm (normal operating) up to 40 acfm maximum for a single glove box.
10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser?	Yes	

Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338.

Comments:

Form completed by:

Signature	Name (print)	Z number	Date
	Arsenio Salazar	163479	6/26/18

The permit section or condition noted at the end of each requirement is from the following reference:

[1] Title V Operating Permit No: P100-R2

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AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1104.A.

Internal Combustion

TA-33-G-1-P Daily Operating Logs

Daily TA-33-G-1-P Cummins/ONAN/DFHD 1000 kW Generator Hour Log

This generator has the following air quality permit requirements:

This generator engine is authorized to operate **no more than eight (8) hours per day**.

This unit can **operate only between the hours of 7:00 AM and 5:00 PM**

The permittee shall monitor the time(s) of operation each day.

The permittee shall monitor and keep records of the time(s) of operation each day, and the daily, monthly, and the monthly rolling 12-month total hours of operation of the genset (LANL ENV-CP will maintain this)

Date	Time of operation		Hour Meter Reading		Hours of operation	Purpose	Operator/User Name
	Start Time	End Time	Start Reading	End Reading			
3/16/2017	14:03	14:45	694.3	694.7	0.4	Maintenance	Paul Sanchez
4/27/2018			694.7	695.7	1	Maintenance	RM, PT
5/4/2018			695.7	696.1	0.4	Maintenance	RV, JP

Version June 2018 | Air Quality Permit P100-R2M1 & P100-R2M2, Section A1104

Asked operators to note time of operation.

Contact: Paul Sanchez, 505-231-4342

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1104.B.

Internal Combustion

Permitted Generator Hours

YEAR 2018

Permitted Generators

Permit ID	Location	ID #	Engine Make	Engine Model	Engine Serial #	gen kWe	engine kWm	Reading 2nd half of previous year		First Half: 6 Month Reading Date	First Half: Reading	First Half: Hours Run	Second Half: 12 Month Reading Date	Second Half: Reading	Second Half: Hours Run	* Total Run Hours
TA-33-G-1P	33-Port	G-0053	Cummins	QST30-G5	37199764	1000	281.25	Dec-17	694.7	Jun-18	696.1	1.4			0.0	1.4
TA-33-G-2	33-209	G-0008	Kohler/Yanmar	4TNE84T	52993	20	25	Dec-17	468.9	Jun-18	469.0	0.1			0.0	0.1
TA-33-G-3	33-280	G-0010	Kohler/Yanmar	4TNE84T	52992	20	25	Dec-17	233.9	Jun-18	233.9	0.0			0.0	0.0
TA-33-G-4	33-151	G-0007	Caterpillar	3306	8JJ00615	225	281.25	Dec-17	3766.0	Jun-18	3770.0	4.0			0.0	4.0
RLUOB-GEN-1	55-585	G-0058	Cummins	KTA50G9	25314401	1500	1656.1	Dec-17	221.9	Jun-18	221.9	0.0			0.0	0.0
RLUOB-GEN-2	55-584	G-0059	Cummins	KTA50G9	25314399	1500	1656.1	Dec-17	172.7	Jun-18	215.7	43.0			0.0	43.0
RLUOB-GEN-3	55-583	G-0060	Cummins	KTA50G9	33165566	1500	1656.1	Dec-17	159.4	Jun-18	172.9	13.5			0.0	13.5
TA-48-GEN-1	TA-48-1	G-0067	Cummins	QSB7-G3 NR3	73176927	150	186					0.0			0.0	0.0
TA-55-GEN-1	TA-55-PF10	G-0065	Isuzu	BZ-4LE2T	4LE2-298868	30	40.2	Dec-17	15.0	Jun-18	15.0	0.0			0.0	0.0
TA-55-GEN-2	TA-55-PF11	G-0066	Isuzu	BZ-4LE2T	4LE2-299432	30	40.2	Dec-17	14.0	Jun-18	14.0	0.0			0.0	0.0
TA-55-GEN-3	TA-55-371	G-0064	Caterpillar	C32	SYCO5263	900	1335	Dec-17	91.7	Jun-18	98.6	6.9			0.0	6.9

Note: TA-33-G-1 has been removed and no longer on site. TA-48-GEN-1 has not started up as of June 2018

The TA-33 225 kW & two 20 kW generators have limits of 500 hrs/yr.

RLUOB-GENs, TA-48 GEN, TA-55-GENs are subject to NSPS IIII regulation; nonemergency operation limited to 100 hrs/yr

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1106.A.

Internal Combustion

Method 9 Opacity Reports

Opacity measurements were not required or conducted during this monitoring period.

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1107.A.

Internal Combustion

Operating Records for RLUOB Generators

Cummins Generator — Cummins Serial # 1060976810 Gen A — Model DFLE 5754172

Authorized Worker	Date	Start Time	End Time	Run Time	Run Time Accumulative	Reason/Notes
Michael Dominguez	8/22/16	1405	1530	1.5	209.7	Monthly PM
Michael Dominguez	9-20-16	1300	1530	2.5	212.8	Monthly PM
Michael Dominguez	10/13/16	0900	1100	2.0	214.8	Monthly PM
Michael Dominguez	11-3-16	1400	1530	1.5	216.3	Monthly PM
Michael Dominguez	12-7-16	0950	1302	1.8	218.1	Monthly PM
Michael Dominguez	6-13-17	0800	0830	0.7	218.8	Gen OS hours used are for TS/Repair
Michael Dominguez	7-6-17	0945	1100	1.3	220.1	Monthly PM
Michael Dominguez	9/14/17	0930	1130	1.8	221.9	Monthly PM / Trouble Shooting

Cummins Generator — Cummins Serial # 1060976811 Gen B — Model DFLE 5754172

Authorized Worker	Date	Start Time	End Time	Run Time	Run Time Accumulative	Reason/Notes
Michael Dominguez	9.20.16	8:15	1120	3.4	160.2	Monthly PM
Michael Dominguez	10/13/16	12:50	1520	2.5	162.7	Monthly PM
Michael Dominguez	11.3.16	8:30	11:00	2.3	165.0	Monthly PM
Michael Dominguez	12.7.16	1005	1315	2.0	167.0	Monthly PM
Michael Dominguez	2.7.17	1200	1300	0.7	167.7	Monthly PM
Michael Dominguez	6.13.17	08:30	0849	0.1	167.8	Gen 05 hours used for TS/Repair
Michael Dominguez	7.6.17	—	—	0	167.8	Monthly PM
Michael Dominguez	9/14/17	0930	1400	3.7	171.0	Monthly PM
Michael Dominguez	10/26/17	1005	1415	1.7	172.7	Monthly PM
Michael Dominguez	11/7/17	0935	1330	1.9	174.6	Monthly PM
Michael Dominguez	12/5/17	1015	1400	2.1	176.7	Monthly PM
Michael	01/21/17	0930	1130	1.8	178.5	Annual Gen B PM
Michael	02/8/18	0945	1400	4.2	182.7	Monthly PM
Michael	3/8/18	1000	1345	3.2	185.9	Monthly PM
Michael	4/4/18	1100	2000	24.2	210.1	Monthly PM / Testing ATS-F
Michael	5/2/18	8:40	1300	3.3	213.4	Monthly PM
Michael Dominguez	6/4/18	0945	1330	2.3	215.7	Monthly PM

Cummins Generator	Cummins Serial # 1060976812 Gen C				Model DFLE 5754172	
Authorized Worker	Date	Start Time	End Time	Run Time	Run Time Accumulative	Reason/Notes
FRED SEYBERT	11-19-15	0900	1500	1.6	132.3	MONTHLY PM
FRED SEYBERT	12-17-15	0845	1513	1.6	133.9	MONTHLY PM
FRED SEYBERT	12-29-15	0814	0838	6.4	134.3	VOLTAGE GLITCH
FRED SEYBERT	~~1-27-16~~ 1-28-16	0845	1530	1.7	136.0	MONTHLY PM
FRED SEYBERT	1-15-16	0951	1016	0.4	136.4	1YR/5YR PM
FRED SEYBERT	2-18-16	0850	1330	1.5	137.9	MONTHLY PM
FRED SEYBERT	3-2-16	0915	1515	1.5	139.4	MONTHLY LOAD TEST
FRED SEYBERT	3-28-16	1130	1215	0.4	139.8	MONTHLY ATS TEST
Michael Dommyer	4-28-16	935	1047	1.6	141.4	Monthly PM
Michael Dommyer	5-5-16	9:30	11:00	1.6	143.0	Monthly PM
Michael Dommyer	6-28-16	9:35	10:35	0.5	145.5	Monthly PM
Michael Dommyer	7-7-16	9:48	11:00	1.7	146.9	Monthly PM
A. Jaramillo	8/9/16	2000	2010	.2	147.1	Power Prob
Michael Dommyer	8/22/16	1400	1500	0.9	148.0	Monthly PM
Michael D	9-20-16	1300	1530	3.2	151.2	Monthly PM
Michael Dommyer	10-13-16	12:50	15:20	2.2	153.4	Monthly PM
Michael Dommyer	11-3-16	8:20	11:00	1.7	155.3	Monthly PM
Michael Dommyer	12-7-16	1035	1345	1.6	156.9	Monthly PM
Michael Dommyer	2-7-17	12:00	13:00	0.4	157.3	Monthly PM
Michael Dommyer	6-13-17	1000	1200	1.8	159.1	Gen OS hours used for TS/Repair
Michael Dommyer	7-6-17	—	—	0	159.1	Monthly PM
Michael Dommyer	9/14/17	9:30	10:00	0.3	159.4	Monthly PM
Michael Dommyer	10/26/17	10:00	1500	1.7	161.1	Monthly PM
M D	10/26/17					Gen C placed out of Service
M D	2/8/18	0900	1150	1.5	162.6	Monthly PM
Michael D	3/8/18	0950	1230	1.6	164.2	Monthly PM
Michael Dommyer	4/4/18	11:30	2000	5.5	169.7	Monthly PM / Testing ATS - F
Michael Dommyer	5/2/18	8:40	12:00	1.4	171.1	Monthly PM
M D	6/4/18	09:45	1300	1.8	172.9	Monthly PM

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1 – June 30, 2018

Attachment A1107.B. Generators – Operating records

TA-48-Gen-1 has not been installed.

See Attachment A1104.B. for TA-55-GEN-1, TA-55-GEN-2 and TA-55-GEN-3 records.

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1207.A.

Data Disintegrator

Operating Logs

2018 TA-52 Data Disintegrator (EQPT 89)

Month	Data Entry Boxes[c] Shredded	Month	Data Entry Boxes[c] Shredded
January	656	July	
February	734	August	
March	650	September	
April	776	October	
May	870	November	
June	1561	December	
6 mo. Total:	5,247	6 mo. Total:	0

Annual Boxes: [g]	5,247

Reviewed By / Date: V. Carretti 7/03/2018

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1207.B.

Data Disintegrator

Maintenance Performed

LANL Data Disintegrator - Maintenance Records

January - June 2018

TA/BLDG	Work Order	Task	Job Type	Task Title	Task Status	Actual Start Date	Completion Date
52/0011	00589389	1	CM	520011 Replace Bag Filters at Shaker/baghouse unit	CLOSED	3/5/2018	5/17/2018
52/0011	00604872	1	PM	520011 6M Cyclone Separator/Shaker Lube Inspection	CLOSED	4/4/2018	5/10/2018

*Starting in 2016 all Maintenance documentation is being done electronically via iPads. Copy of Work Order and Screen Shot of documented completion is attached.

July - December 2018

TA/BLDG	Work Order	Task	Job Type	Task Title	Task Status	Actual Start Date	Completion Date

*Starting in 2016 all Maintenance documentation is being done electronically via iPads. Copy of Work Order and Screen Shot of documented completion is attached.

Facility: F07 **Unit:** 5200 **Proj:**
Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT
W/O Type: CO W/O Group: 3J ROMER Task Priority: 3
Planner : 090467 ROMERO A J
W/O Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FAC
Written To: (WO) GF 52-0011 MULTI-CRAFTS-DESTRUCTION
Task Dspln: M Due Date: 08/03/2017

D-B Determination: NON-COVERED D-B Date: 11/28/17
Tracking Number: 18-442
Hazard: MODERATE IWD Reqmt: TASK SPECIFC

Los Alamos NATIONAL LABORATORY EST. 1943

Work Order Task

00589389 01

MASTER

Date: 01/26/2018
Page: 1

Work Order Task Written To

Facility : F07 **Unit :** 520011 **Op Sys :**
Room : **Area :** **Sys/Cls:**
Equipment : **Component:**
Location : TA 52, BLDG 0011
Job Type : CO
Tag 1 : Tag 2 :
Work Item : Ops Review Reqd: N

Authorization

Start Permission :
Complete Notice :
Start Date: 11/28/17
Complete Date: 1/5/18

NOTE:

*** Refer to attached Form 2101 - Non-Tenant Activity Form - or Form 2102- Tenant Activity Form - for a description of site specific training or escort and access requirements.**

Work Order Task Instructions

CREW NO. SUPERVISOR NO:su092185 KENNY CHAVEZ CELL: 231-1635
IWD REQUIRED TM 094821 8/7/17
.Contact Information
Primary MC Joe Allen Romero 667-3662; 699-6852; 664-1513 TA-3-142-7
Backup MC Tony Rodriguez 665-5285; 670-6584; 664-4059 ta3-142-7
Ops Manager Bill Schleft 667-8941; 699-5790; 664-3536
.
M/L:4
.
TEXT DESCRIPTION
.
.

Facility: F07 Unit: 520011 Proj:
Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT
W/O Type: CO W/O Group: 3J ROMER Task Priority: 3
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Los Alamos NATIONAL LABORATORY EST. 1943

Work Order Task

00589389 01

MASTER

Date: 01/26/2018
Page: 2

.
.
.
.
.
CALIBRATED TOOL REQUIRED ( ) YES ( ) NO
FILE NO:
EXPIRATION DATE:
DATE CHECKED OUT:
.
NOTE: ASSIGNED CRAFTS SHALL FOLLOW ALL APPLICABLE STATE, FEDERAL AND LANL CODES AND STANDARDS.
.
.
ORIGINATOR: JOE ROMERO TELEPHONE#: 7-3662
CONFIGURATION MANAGEMENT REVIEW REQUIRED] [ ] YES [X] NO
.
.
CHECK CRAFTS REQUIRED:

[ ] CUSTODIAL	[ ] ELECTRICIANS	[ ] LABORERS
[ ] TEAMSTERS	[ ] OPERATING ENGINEERS	[ ] PAINTERS
[ ] FITTERS	[ ] CEMENT MASONS	[XX] CARPENTERS
[ ] ROOFERS	[XX] IRON WORKERS	[ ] INSULATORS
[XX] SHEETMETAL	[XX] MECHANICS	[ ] ENGINEERING

[ ] OTHER (SPECIFY) :
.
AUTHORIZED FUNDING LEVEL:
.
FUNDING APPROVED BY:
Z# DATE:
.
LOG-IN REQUIRED: [X] YES [ ] NO LOG-OUT REQUIRED: [X] YES [ ] NO
LOCATION OF LOG-IN: TA-3-142
Weekly Schedule or Plan of the Day

Facility: F07 Unit: 52001) Proj:
Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT
W/O Type: CO W/O Group: 3J ROMER Task Priority: 3
Planner : 090467 ROMERO A J
W/O Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FAC
Written To: (WO) GF 52-0011 MULTI-CRAFTS-DESTRUCTION
Task Dspln: M Due Date: 08/03/2017

D-B Determination: NON-COVERED D-B Date: 11/28/17
Tracking Number: 18-442
Hazard: MODERATE IWD Reqmt: TASK SPECIFC

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Work Order Task

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MASTER

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.
CHECK-IN REQUIRED: [X] YES [ ] NO CHECK-OUT REQUIRED: [X] YES [ ] NO
LOCATION OF CHECK-IN/CHECK-OUT:
.
PLANT ENGINEERING REVIEW:
PE REVIEW REQUIRED [ ] YES [X] NO
PE INSPECTION APPROVAL [ ] YES [X] NO
.
All debris/trash created by this work will be removed prior to completion of job or work day.
.
REQUESTING THE MECHANICS TO REPLACE MULTIPLE
Mechanics replace bag filters at the shaker/bag house unit. This will include carpenters to install scaffolding also requesting Sheet metal to remove outer panels to get access to this bag filters. Iron workers to fabricate a shaker arm once unit is disassembled.
POC: JOHNNY D. MAES 665-7752

QC Requirements/Comments

Rework Reason/Cause

(Y/N)

CDSG CUSTOMER DESIGN
IMCW IMPROPER CONSTRUCTION/WORKMANSHIP
IMDN IMPROPER DESIGN
PDMS PARTS/MATERIAL DID NOT MEET SPECIFICATIONS
WR WARRANTY REWORK/REPAIR

Date: Hours: Crew: Shift:
Comments:

Facility: F07 Unit: 520011 Proj:
Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT
W/O Type: CO W/O Group: 3J ROMER Task Priority: 3
Planner : 090467 ROMERO A J
W/O Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FAC
Written To: (WO) GF 52-0011 MULTI-CRAFTS-DESTRUCTION
Task Dspln: M Due Date: 08/03/2017

D-B Determination: NON-COVERED D-B Date: 11/28/17
Tracking Number: 18-442
Hazard: MODERATE IWD Reqmt: TASK SPECIFC

Los Alamos NATIONAL LABORATORY EST. 1943

Work Order Task

00589389 01

MASTER

Date: 01/26/2018
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Rework/Approval

Deficiency Tag No.: Loc: Tag Removed:
ReWork Job : N Comments:

Trouble Found/Work Performed

Continued on Additional Sheets? : ____

Work Delay Reason

					(Y/N)
A ACCESS	Date:	Hours:	Crew:	Shift:	
EQPT EQUIPMENT	Date:	Hours:	Crew:	Shift:	
IWD IWD WORKABILITY	Date:	Hours:	Crew:	Shift:	
MAT MATERIAL	Date:	Hours:	Crew:	Shift:	
OPS OPERATIONS	Date:	Hours:	Crew:	Shift:	
RCT RCT AVAILABILTY	Date:	Hours:	Crew:	Shift:	
SP SAFETY PAUSE	Date:	Hours:	Crew:	Shift:	
TEL TOOLS/EQUIP/LIFTS	Date:	Hours:	Crew:	Shift:	
W WEATHER	Date:	Hours:	Crew:	Shift:	

Comments:

Facility: F07 **Unit:** 5200 **Proj:**
Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT
W/O Type: CO W/O Group: 3J ROMER Task Priority: 3
Planner : 090467 ROMERO A J
W/O Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FAC
Written To: (WO) GF 52-0011 MULTI-CRAFTS-DESTRUCTION
Task Dspln: M Due Date: 08/03/2017

D-B Determination: NON-COVERED D-B Date: 11/28/17
Tracking Number: 18-442
Hazard: MODERATE IWD Reqmt: TASK SPECIFC

Los Alamos NATIONAL LABORATORY EST. 1943

Work Order Task

00589389 01

MASTER

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Major Failure/Action Taken

Major Failure :
Deficiency Tag Loc:
Deficiency Tag No.:
Action Taken :
Removed (Y/N):
Limited Cond Operation:

Work Completion Signatures

Name	Function/Dept.	Date
Eric Fernandez	Mech Fab 7	4-2-18

Comments:
(rework?)

***** E N D O F R E P O R T *****

Cost Center: 8K040A Activity : 640CL000 User Def:
Percentage : 100.000 Acct No : WL2300 00000000

AP-WORK-002 Attachment 15

FORM 2100-WC

Los Alamos National Laboratory			Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)
Revision #: 0			**Activity/Task Title: TA-52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT**
Work Document #: (WO # / Task) 589389-01			**Planner/Preparer (Name/Z#/Date)** Ralph Dominguez, 100538 01-09-18
TA: 52	**Building:** 0011	**Room:**	**Additional Location Description:**

1. Scope of Work

Mechanics replace bag filters at the shaker/bag house unit. This will include carpenters to install scaffolding also requesting Sheet metal to remove outer panels to get access to this bag filters. Iron workers to fabricate a shaker arm once unit is disassembled. POC: JOHNNY D. MAES 665-7752

Hazard Analysis (HA) Team: Ralph Dominguez, Eric Fernandez and Daniel Calanche Date: 01-09-18

2. Precautions and Limitations

2.1. If steps cannot be completed as described, or if unforeseen situations occur, **PAUSE WORK**, stabilize the situation, contact your supervisor, and await further instructions before proceeding.

2.2. When operating a circuit breaker, stand to one side of panel, use one hand to operate the handle of the circuit breaker and keep the head turned away from the panel.

3. Prerequisites/Initial Conditions

Entry Conditions:

3.1. Notify OMC Thomas Hallock 695-5761 **prior** to starting work in building.

3.2. The following permits, forms, and documents are required to complete this work:

- LO/TO
- Scaffolding Inspection form

3.3. Establish barricade flagging and robust barriers (this will be field directed during Pre-Job Briefing) to clearly define work execution area.

3.4. Follow lock out/ tag out procedures in accordance with Lock Out/Tag Out for control of electrical energy sources for personnel safety (red lock procedures).

3.5. LO/TO devices shall be applied in accordance with requirements of P101-3 "Lock Out/Tag Out for Hazardous Energy Control"

4. Special Training/Medical Requirements

4.1. The following trainings are required for the General Hazard Section:

- Basic Craft Worker PPE #10968
- LO/TO Authorized worker TP #127
- Non Energized/Non-Electrical - Training Plan # 2909
- Scaffold User TP # 3949
- Fall Protection, LANL TP # 9257

5. Special Tools/Equipment

5.1. The following basic PPE is required:

- Safety Shoes
- Safety glasses with side shields.
- Work Gloves
- Bump cap ,or Hard hat
- Reflective vest

Wear Tyvex, goggles, paper dust masks while working on paper schreder. R.D.J. 3/20/18 [signature] 117208 3/26/18

AP-WORK-002 Attachment 15

FORM 2100-WC

Los Alamos National Laboratory — Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)			
Revision #: 0			**Activity/Task Title: TA-52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT**
Work Document #: (WO # / Task) **589389-01**			**Planner/Preparer (Name/Z#/Date)** Ralph Dominguez, 100538 01-09-18
TA: 52	**Building:** 0011	**Room:**	**Additional Location Description:**

6. Work Instructions

Carpenter Crafts:

6.1. **ERECT** scaffolding under direction of scaffold competent person. ☑

- Scaffolding must be erected, with top railing, mid railing and toe board for fall Protection.

6.2. **DAILY SCAFFOLD INSPECTION FORM REQUIRED.**

- The competent person must also inspect the scaffold before each work shift.
- Dismantle scaffolding once work is completed. ☑

Mechanics:

6.3. **LO/TO** power to shaker/bag house unit. ☑

6.4. **VERIFY** absence of hazardous energy.

Sheet Metal:

6.5. **APPLY** LO/TO to shaker/bag house unit.

6.6. **VERIFY** absence of hazardous energy.

6.7. **PERFORM** removal of outer side panels of the shaker/bag house unit. ☑

Mechanics:

6.8. **REPLACE** bag filters to shaker/bag house unit. ☑

6.9. **REMOVE/REPLACE** shaker arm to shaker/bag house unit. Order arm part to shaker/bag house unit if possible. Second option get with iron workers to fabricate an arm at iron workers shop. ☑

Mechanics / Sheet Metal:

6.10. **REMOVE** LO/TOs. ☑

Mechanics:

6.11. **RE- ENERGIZE** shaker/bag house unit. ☑

7. Post Work Activities

Mechanics:

7.1. **TEST** shaker/bag house unit for proper operation. ☑

8. Closeout

8.1. **CLEAN** the work area and dispose of all work generated debris. ☑

Los Alamos National Laboratory — Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)			
Revision #: 0			**Activity/Task Title: TA-52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT**
Work Document #: (WO # / Task) 589389-01			**Planner/Preparer (Name/Z#/Date)** Ralph Dominguez, 100538 01-09-18
TA: 52	**Building:** 0011	**Room:**	**Additional Location Description:**

8.2. **CONTACT** the MC and inform them the work is completed. Complete all the required documentation and return the Master Work Package to the Area Work Control Office. ☐

***Insert Rows above** for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.*	The RLM, and FOD or FOD Representative (if required or recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized, workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review.	**RLM** (Signature/Z#/Date) **Required** [signature] 204635 1/24/18 **FOD or Representative** (Signature/Z#/Date) **If Required or Recommended by RLM** [signature] 100886 1-18-18 **ESO Review** (Signature/Z#/Date) **If Required** [signature] 100886 1-18-18 **Safety Review** (Signature/Z#/Date) **Required** [signature], 117605, 1/16/18

IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required 1/31/19 Other Conditions for Re-Approval Changes in Scope / Hazards (Print) Name of Primary PIC Ryan Campbell Name of Alternate PIC Eric Fernandez Name of Alternate PIC Matt Roberts	Any required classification review completed, Signature/Date

Los Alamos NATIONAL LABORATORY EST.1943

Form 2101

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg.	Room	Other Location
7	52	0011	All	N/A
FOD Designated Facility Point-of-Contact	Name: Bill Schleft	Phone: 699-5790	Pager: 664-3536	Email: schleft@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☐ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions: ____
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☐ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				
Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: _____ Revision #: _____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☐ Yes ■ No			
.nergized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:**	■ Yes ☐ No	Ensure worker recognize hazards associated with working near rotating equipment.		
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☐ Yes ■ No			
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per **P101-20, *Fall Protection Program***	☐ Yes ■ No			
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, ıstorical/archeological sites, or other work area condition that can be ımpacted by or can impact the environment. **Specify Hazards:**	☐ Yes ■ No			
Security Requirements **Specify:**	☐ Yes ■ No			
Other Hazards **Specify:**	☐ Yes ■ No			

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** _____

Date Approval Expires: 12/31/18 schleft@lanl.gov Digitally signed by schleft@lanl.gov DN: cn=schleft@lanl.gov Date: 2014.10.20 17:00:28 -06'00'

Los Alamos NATIONAL LABORATORY EST.1943

Form 2101

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg.	Room	Other Location
7	16	1374	All	N/A
FOD Designated Facility Point-of-Contact	Name	Phone	Pager	Email
	Bill Schleft	699-5790	664-3536	schleft@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☐ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions: ____
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☐ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
■ **No Work Area Hazards**				
Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ■ No			

IWD No./Work Request No: _____ Revision #: _____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☐ Yes ■ No			
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:**	☐ Yes ■ No			
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☐ Yes ■ No			
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☐ Yes ■ No			
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment **Specify Hazards:**	☐ Yes ■ No			
Security Requirements **Specify:**	☐ Yes ■ No			
Other Hazards **Specify:**	☐ Yes ■ No			

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** _____

Date Approval Expires: 12/31/18 schleft@lanl.gov Digitally signed by schleft@lanl.gov DN: cn=schleft@lanl.gov Date: 2014.10.20 17:00:38 -06'00'

Attachment B, LO/TO Orders

Lock Coordinator Name	Z#:	Phone #:	Alternate Lock Coordinator Name	Z#:	Phone #:
Jack A. Romero	0XXX4117	7-3662			

Section 1: General Information

1. Work Document Number (i.e., Package/Procedure #): 589389-01
2. LO/TO (Parent) Record #: 13443

Location of Equipment to be Isolated

3. TA: 52 4. Bldg: 11 5. Rm: OSW 6. Equipment Description (e.g. Machinery/Name/CMMS Number): STACKER - CYCLONE - Cyclone

7. Name of Equipment Owner/Operator: Jack A. Romero

8. Reason for LO/TO: Remove Filters / [illegible]

9. Energy Type to be Isolated (check all that apply):
☑ Electrical ☑ Mechanical ☐ Hydraulic ☐ Pneumatic ☐ Steam ☐ Capacitors ☐ Compressed Energy ☐ Gravity ☐ Other (specify):

10. Verification required for LO/TO:
☑ Installation ☑ Removal ☐ N/A (Verification Not Required)

11. Verification Type:
☑ Peer ☐ Independent ☐ N/A

12. Specific Sequencing of LO/TO devices required for:
☐ Installation ☐ Removal ☑ N/A (Sequencing Not Required)

13. LO/TO Orders Addendum with Operational Instructions/Procedures attached?
☐ Yes ☑ No

Equipment Owner/Operator Comments:
N/A

Section 2: LO/TO Installation & Removal Details

14. Group LO/TO? ☐ Yes ☑ No
Name of Lead Authorized Worker: Larry Romero

15. Group Lock Box used? ☐ Yes ☑ No
If yes, enter ID# of Lock Box:

LO/TO Installation

16. Approval to Install LO/TO
Signature: [signature] Z#: 0XXX4117
NOTE: Approver must ensure Affected Workers are notified prior to Authorized Workers performing LO/TO

LO/TO Removal / Return to Service

23. Approval to Remove LO/TO
Signature [signature] Call #: ☑ N/A
Z#: 0XXX4117
NOTE: Approver must ensure Affected Workers are notified of LO/TO Removal / Return to Service

17. Energy Isolation Device (use Specific ID)	18. Location of Energy Isolation Device	19. LO/TO Installation Sequence	20. Required LO/TO Position or Alignment	24. LO/TO Removal Sequence	25. Required Position/Alignment following Removal	26. As-Left Position
ODD-6	Panel L/D	NONE	NONE	NONE	NONE	OFF
ODD-7	Panel L/D	"	"	"	"	"
ODD-8	Panel L/D	"	"	"	"	"

☐ See continuation page for additional Energy Isolation Devices (continuation page must also be signed if applicable)

21. Energy Isolation Devices Positioned, Lock(s) and Tag(s) installed, and Zero Energy Checks Performed:
Signature: [signature] Z#: 107061 Date: 3-26-18

22. LO/TO verified by: ☐ N/A
Signature: [signature] Z#: 319262 Date: 3/26/18

27. LO/TO has been Removed & Isolation Devices Positioned:
Signature: [signature] Z#: 107061 Date: 3-30-18

28. Removal and Positioning verified by: ☐ NA
Signature: [signature] Z#: 319262 Date: 3/30/18

Attachment B, LO/TO Orders

Attachment B, LO/TO Orders (Cont.)

1. Work Document Number (i.e., Package/Procedure #): 589389-01

2. LO/TO (Parent) Record #: 73443

Section 3: All Authorized Workers (anyone applying a lock for this activity)

29. Authorized Workers Name(s)	Z#	30. Date worker's lock is hung	31. Date worker's lock is removed
1. Larry Romero	117 8644	3-26-18	
2. NAthan TBoylAN	311008	3-26-18	
3. Emiliano NAvio	239748	3-26-18	
4.			
5.			
6.			
7.			
8.			
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14.			
15.			
16.			
17.			
18.			
19.			
20.			

tion 4: Return of Lock(s)/Tag(s) and Locking Devices

All Lock(s)/Tag(s) and Locking Devices have been removed and returned to the Lock Coordinator:

32. Signature of Lock Coordinator: Lee A. Romero Z#: 0104167 Date: 4/18/18

*Instructions for completing this form (by numbered steps) appear on the last two pages of this document. Take the completed forms back to the Lock Coordinator for closeout.

Attachment B, LO/TO Orders

Continuation Page (print as needed)

Attachment B, LO/TO Orders (Cont.)						
1. Work Document Number (i.e., Package/Procedure #):				2. LO/TO (Parent) Record #:		
LO/TO Installation				**LO/TO Removal / Return to Service**		
17. Energy Isolation Device (Specific ID)	18. Location of Energy Isolation Device	19. LO/TO Installation Sequence	20. Required LO/TO Position or Alignment	24. LO/TO Removal Sequence	25. Required Position/Alignment following Removal	26. As-Left Position
21. Energy Isolation Devices Positioned, Lock(s) and Tag(s) installed, and Zero Energy Checks Performed:				27. LO/TO has been Removed & Isolation Devices Positioned:		
Signature:	Z#:	Date:		Signature:	Z#:	Date:
22. LO/TO verified by: ☐ N/A				28. Removal and Positioning verified by: ☐ NA		
Signature:	Z#:	Date:		Signature:	Z#:	Date:

Attachment B, LO/TO Orders

Instructions by Numbered Steps

Lock Coordinator (Header): Identify the individual who will issue Red Locks to persons performing LO/TO (individual[s] identified by the FOD).

1. Enter the Work Document Number. This will be the number from the IWD or the procedure number (i.e., TA88-DOP-0001).
2. Enter the LO/TO Parent Record number. This is obtained from the Lock Coordinator when the lock(s) are issued. The Remedy LO/TO database generates this number.
3. Enter the TA where the equipment is located.
4. Enter the Building number where the equipment is located.
5. Enter the Room number where the equipment is located.
   NOTE: Responses to steps 3 through 5 need to match information, identically, within both the LO/TO Orders and the tag (Attachment A).
6. Enter the Equipment/Machinery/Name/Number (example, HVA-001 [NOTE: LOG is to follow nomenclature contained within CMMS/MEL]).
7. Enter the Name of the Equipment Owner/Operator. The Equipment Owner/Operator is designated by the FOD. There may be both programmatic and facility Equipment Owner/Operators.
8. Write a brief description of the reason for LO/TO (example, removing and replacing exhaust fan belts).
9. Check the appropriate energy type to be isolated (check all that apply). Make sure you have considered all energy sources; if "Other" is checked, specify what "Other" is.
10. Is verification of the energy isolation configuration required for this LO/TO for installation and/or removal? Check the appropriate box(es).
    NOTE: Contact the FOD/Designee regarding verification requirements. Additionally, verification may be required by the Equipment Owner/Operator.
11. If verification is required, check the appropriate box (either "Peer" or "Independent"). If verification is NOT required, check the "N/A" box.
    NOTE: Independent verification may be required per ***P315, Conduct of Operations Manual,*** as determined by the FOD/Designee.
12. When installing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are to be positioned? If a specific sequence must be followed for Installation and/or Removal, check the appropriate box(es) and subsequently identify the sequence order in column numbers 19 and/or 24, accordingly. If there is not a specific sequence to follow, check the "N/A" box and place N/A in columns 19 and/or 24.
13. If an operating procedure/instruction/etc. is to be used in conjunction with the LO/TO Orders, check the "Yes" box and attach the pertinent document as an addendum. Additionally, a space is provided for Equipment Owner/Operator comments, if applicable.
14. Check either "Yes" or "No" to indicate if a Group LO/TO is applicable. A Group LO/TO is where two or more authorized workers, regardless of their occupation or craft, lock out and tag out the same equipment to perform servicing or maintenance. Enter the name of the Lead Authorized Worker.
15. Check either "Yes" or "No" to indicate if a Group Lock Box is to be used. If "Yes", enter the lock box ID#. Each organization that issues locks will be required to uniquely number and track lock boxes in their possession.
16. The FOD-designated Equipment Owner/Operator signs and enters their Z#, authorizing the installation of the LO/TO. The Approver is responsible to notify all Affected Workers prior to the Authorized Workers performing LO/TO ("Affected Workers" are those who either may work with the equipment or are affected by LO/TO activities).
17. Enter the specific energy isolation device/ID (e.g., MCC-A, A4). The ID used in the LO/TO orders must match information used on tag (Attachment A).
18. Location of energy isolation device (TA, Bldg, Rm, etc.). The location used in the LO/TO orders must match information used on tag (Attachment A).

19. If the LO/TO needs to be installed in a particular order (refer to Step #12), number the sequence in which the locks need to be installed. If sequencing is not applicable, then place N/A in this column.
20. Required Position/Alignment for LO/TO (open, closed, connected, disconnected, on, off, etc.). Follow the nomenclature on the piece of equipment (e.g., if a service disconnect has "ON"/"OFF" posted, ensure the position/alignment entered on this form matches the piece of equipment ["ON" or "OFF"]).
21. The Lead Authorized Worker documents (signature) that the energy isolation devices have been positioned correctly, that locks and tags have been installed on those energy isolation devices and a Zero Energy Check has been performed.
    NOTE: The Lead Authorized Worker may also be designated as the Person-in-Charge (PIC).
22. Is verification required (see #10)? If verification is required, the person who performs the verification signs, and places their Z# and the date here. If verification is not required, check the "N/A" box.
23. Documentation of Approval to Remove LO/TO. Equipment Owner/Operator or FOD Designee signs and places his/her Z# in this box. Alternatively, authorization per telecommunication may be performed via a phone number identified for the Lead Authorized Worker to call the Equipment Owner/Operator or FOD Designee. Once verbal authorization is given, the Lead Authorized Worker documents the authorization as "per telecom" and enters his/her initials. Example: John Smith per telecom, JS. By checking the "N/A" box, a phone call is NOT REQUIRED by the Lead Authorized Worker to the Equipment Owner/Operator or FOD Designee.
    NOTE: The Equipment Owner/Operator or FOD Designee is responsible to notify all Affected Workers after the LO/TO removal and of the equipment/machine's return to service.
24. If the LO/TO needs to be removed in a particular sequence (as per Step #12), number the sequence in which the locks need to be removed. If the "N/A" box is checked in #12, then place N/A in this column.
    NOTE: Often the sequence for removal is opposite the sequence for installation. For example, if the order specified for installation Column #19 is "1,2,3,4", the order specified for removal in Column #24 could be "4,3,2,1". The intention of the LO/TO Orders is to have the entries in Column #s 19 and 24 correspond with the energy isolation devices specified in Column #17.
25. Identify the required position/alignment in which the system/component is to be placed following the removal of the lock(s). Follow the nomenclature as listed on the piece of equipment ("On", "Off", etc.).
26. Enter the As-Left Position.
27. The Lead Authorized Worker documents (signature, Z# and date) that the locks and tags have been removed from the energy isolation devices and the energy isolation devices have been configured as per Equipment Owner/Operator specifications.
    NOTE: The Lead Authorized Worker may also be designated as the Person-in-Charge (PIC).
28. If verification is required for the positioning, the person who performs the verification signs here. Otherwise, check N/A.
29. All authorized workers applying a lock for this activity (names/Z#) must be documented. If more than 20 authorized workers are involved in a Group LO/TO, document the required information with an attached list.
30. Enter the date the authorized worker attaches his/her lock.
31. Enter the date the authorized worker removes his/her lock.
32. The Lock Coordinator or designee signs once locks, tags, and locking devices have been removed and returned. If a lock and/or tag are found to be contaminated, the lock and/or tag will be disposed of in accordance with local procedures and a verbal notification will be made to the Lock Coordinator to close out the record within Remedy.

Form 2103

Integrated Work Document (IWD) Part 3, Validation and Work Release

IWD #_____ Revision #:_____ **Work Release** 589389-01

By signing below, I verify this activity is compatible with current facility configuration and operating conditions.
FOD designated Operations Manager or other facility point-of-contact for work area

Signature/Z#/Date **(If required by FOD):** _____
Note: For Standing IWD, release may be given concurrently with signatures on Part 2.

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a validation walkdown with workers to confirm the IWD can be performed as written, and that required initial conditions and other prerequisites are in place.
- The assigned workers are authorized and are competent to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing, and all workers (including support workers) have been briefed.
- I have ensured coordination with any required FOD work-area representatives (e.g., area work coordinators).

PIC (Signature/Z#/Date) **Required:** [signature] 3/22/18

Alternate PIC Signatures **acknowledges** PIC authority is assumed for the first time. *(Note: Alternate PICs are required to sign only once, but formal handoff includes conferring with previous PIC to obtain all required information associated with the handoff.)*

Alternate PIC (Signature/Z#/Date) **Required:** [signature] 170010 3/22/2018

Alternate PIC (Signature/Z#/Date) **Required:** [signature] 107061 3-26-18

Pre-Job Brief Content

- What are the critical steps* or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the pause/stop work responsibilities and expectations (e.g., for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

* "Critical steps occur anytime human performance involves a substantial transfer of energy, or movement of solids, liquids, and gases, or the transmission of data and information that , if not performed under control, could cause serious harm to one or more important assets." (Performance Improvement, vol. 53, no. 9, October 2014)

Pre-Job Brief Attendance Roster

By signing below **as required**, I agree to the following:

- I agree to follow the work steps and implement the controls as written as applicable to my work assignments.
- I agree to pause/stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and fit to perform the work.

Worker (Signature/Z#/Date) Daniel Rodriguez 323955 3-22-18	**Worker** (Signature/Z#/Date) [illegible] 239798 3-26-18
Worker (Signature/Z#/Date) 296782 3-22-18	**Worker** (Signature/Z#/Date) Larry Romero 112864 3-26-18
Worker (Signature/Z#/Date) Samuel Quintana 311015 3-23-18	**Worker** (Signature/Z#/Date) 326738 3-28-18
Worker (Signature/Z#/Date) 194830 3-28-18	**Worker** (Signature/Z#/Date) 305386 4-3-18
Worker (Signature/Z#/Date) 326908 3-28-18	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date) 085931 3/28/18	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date) 311004 3-26-18	**Worker** (Signature/Z#/Date)

Work Completion Form

Work Order/Task: 589389-01

Start Date: 3/5/18	Completion Date: ~~3/28/18~~ 4-2-18

SUMMARIZE THE WORK PERFORMED

Date	
3/5/18	Sheet metal - Walk down to remove panels and replace tube filters, 2 guys 2 days. Man lift preferred instead of scaffold. Man lift already on building
3-22-18	Prep for material and started building scaffold; 2 carpenters
3-23-18	Continue w/scaffold and completed building; 3 carpenters
3-26-18	Sheet Metal - Prejob. Picked up goggles, dust mask and ~~FOR CORRECTIVE WORK – WHAT FAILED AND WHAT WAS FIXED~~
	Tyvek. We removed the panal on the north side of the shaker.
4.03.18	Dismantle Tube/clamp scaffold and took material back to TA 3-38

FOR PMs – SUMMARIZE AS FOUND AND AS LEFT CONDITIONS BELOW

As found	Down
As left	IN Operation
Parts/Repairs	New Filters & New Fabric Arm for Shaker. All is Working Good.
Read/meas.	
Post test info.	

Problems Encountered (delays, safety, etc.):

3-26-18	Delays - Waiting for IH to get back from their meeting to get dust masks. We had to get the package rewritten to include dust masks, goggles and tyvek. We had to wait for the stationary ladder to get signed off.

Lessons Learned/Recommendations:

Name:	Signature:	Date:
Eric Fernandez	Eric Fernandez	4-2-18

PIC/SUPT

☐ PM has been completed in its entirety and ready for closure.

IF A PM COULD NOT BE COMPLETED:

☐ Percentage complete is 00 % (corrective)

☐ Sections that did not work and need to be rescheduled

_____

Reasons why:

MAINTENANCE COORDINATOR/AREA WORK COORDINATOR

Work Package is Complete and may be closed out: YES ☑ NO ☐

IF no: State Reason

Additional Work Needed? ☐ YES ☑ NO

Document UP/WO/FSR Number: _____

ENGINEERING (FOR MD and CD Work Orders)

IF a configuration baseline has been changed, THEN indicate the changes are to be incorporated into the following documents and/or configuration baseline:

☐ Drawings	☐ FDD/SDD
☐ Procedures	☐ Master Equipment List
☐ Permits	☐ Checklists

SE Name: Signature: Date:

WORK CONTROL

Moderate/High Hazard – WMC/Planner reviewed for Lessons Learned/Feedback

☐ YES ☐ NO N/A ☐

☐ Review of the completed work package is complete per AP-WORK-005, and the work package is ready to be set to complete in CMMS.

Facility : F07 **Unit :** **Proj :**
Task Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
W/O Type : PM **W/O Group :** 3PM MOD **Task Priority :** 4
Planner : 185614 HARRIS JEANETTE S
W/O Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
Written To : CYCLONE SHAKER (SEPERATOR PARTICULATE) INDOOR/OUTDOOR)
Task Dspln : MECH **Due Date :** 05/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt :** TASK SPECIFC

Work Order Task

00604872 01

MASTER

Date: 03/30/2018

Work Order Task Written To

Facility : F07 **Unit :** **Op Sys :** BLDG
Room : BLDG **Area :** **Sys/Cls :** P/ML4
Equipment : UNITSPP **Component :**
Location : 52-0011
Job Type : PM
Tag 1 : **Tag 2 :**
Work Item : **Ops Review Reqd :**

Authorization

Start Permission : JOE ROMERO **Start Date :** 4/4/18
Complete Notice : JOE ROMERO **Complete Date :** 6/13/18

Work Order Task Instructions

M/L:4
TEXT DESCRIPTION
Install Lock-Out/Tag Out to the local disconnect at the Cyclone Unit
Requires 3 lockout/tag out cdd-6, 7 & 8
Verify Zero energy to the unit
Lubricate and inspect the chains on the rotary air lock valve and shaker
Lubrication of Rotor Bearings: Using an EP type grease quality grade 2
grease the existing fittings located on the lubrication manifolds mounted on
the pillow blocks
Lubricating Motor Bearings: Remove the drain plug and then inject new
grease at the fill hole. Replace the drain plug. Recommended grease
should be Polyrea based bearing lubricant
Lubricate, inspect and repair the gear box and chain bearings in gear box
Verify proper operation oil level and add as needed
Change the Air lock valve gear box oil following every

Facility : F07 **Unit** : **Proj** :
Task Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
W/O Type : PM **W/O Group** : 3PM MOD **Task Priority** : 4
Planner : 185614 HARRIS JEANETTE S
W/O Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
Written To : CYCLONE SHAKER (SEPERATOR PARTICULATE) INDOOR/OUTDOOR)
Task Dspln : MECH **Due Date** : 05/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00604872 01

MASTER

Date: 03/30/2018

5000 hours of operation
Check and lubricate all bearings associated with the Cyclone-
Shaker unit as required
Complete any lubrication, adjustments or replacement of any components
associated with the conveyor unit, to include bearings, belts, rollers and
all other associated components
Complete lubrication of the shaker flange bearings following a 3 year
recommended schedule
Complete any maintenance, as needed, on all motors per manufacturers
recommendations
Remove the Lock OUt from the local disconnect

POC: Melissa Metcalf

NOTE: ASSIGNED CRAFTS SHALL FOLLOW ALL APPLICABLE STATE, FEDERAL AND LANL
CODES AND STANDARDS
INTO SECURITY AREAS
ORIGINATOR: TELEPHONE#:
CONFIGURATION MANAGEMENT REVIEW REQUIRED] [ ] YES [X] NO
CHECK CRAFTS REQUIRED:

[ ] CUSTODIAL	[ ] ELECTRICIANS	[ ] LABORERS
[ ] TEAMSTERS	[ ] OPERATING ENGINEERS	[ ] PAINTERS
[ ] FITTERS	[ ] CEMENT MASONS	[ ] CARPENTERS
[ ] ROOFERS	[ ] IRON WORKERS	[ ] INSULATORS
[ ] SHEETMETAL	[ ] MECHANICS	[ ] ENGINEERING

[ ] OTHER (SPECIFY) :

AUTHORIZED FUNDING LEVEL:

FUNDING APPROVED BY: ( ) N/A
Z# DATE:
LOG-IN REQUIRED: [X] YES [ ] NO LOG-OUT REQUIRED: [X] YES [ ] NO
LOCATION OF LOG-IN: TA-3-142
Weekly Schedule or Plan of the Day

CHECK-IN REQUIRED: [X] YES [ ] NO CHECK-OUT REQUIRED: [X] YES [ ] NO
LOCATION OF CHECK-IN/CHECK-OUT:

PLANT ENGINEERING REVIEW:
PE REVIEW REQUIRED [ ] YES [X] NO
PE INSPECTION APPROVAL [ ] YES [X] NO

All debris/trash created by this work will be removed prior to completion
of job or work day

Facility : F07 **Unit** : **Proj** :
Task Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
W/O Type : PM **W/O Group** : 3PM MOD **Task Priority** : 4
Planner : 185614 HARRIS JEANETTE S
W/O Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
Written To : CYCLONE SHAKER (SEPERATOR PARTICULATE) INDOOR/OUTDOOR)
Task Dspln : MECH **Due Date** : 05/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00604872 01

MASTER

Date: 03/30/2018

.

QC Requirements / Comments

Work Completion Signatures

Name	Function/De	Date
Eric D	Mech 7	5-10-18

Comments

(rework?)

Cost Accounting

Cost Center : 8S010A **Activity** : 640CL000

Percentage : 100 **Acct No** : WL2300 **Sub Acct** : 00000000

Facility : F07 **Unit** : **Proj** :
Task Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
W/O Type : PM **W/O Group** : 3PM MOD **Task Priority** : 4
Planner : 185614 HARRIS JEANETTE S
W/O Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS
Written To : CYCLONE SHAKER (SEPERATOR PARTICULATE) INDOOR/OUTDOOR)
Task Dspln : MECH **Due Date** : 05/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00604872 01

MASTER

Date: 03/30/2018

Attachment B, LO/TO Orders

Lock Coordinator Name Z#:	Phone #:	Alternate Lock Coordinator Name Z#:	Phone #:
Joe Romero [illegible]	7-3618		

Section 1: General Information

1. Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Record #:
604872	[illegible]

Location of Equipment to be Isolated

3. TA:	4. Bldg:	5. Rm:	6. Equipment Description (e.g. Machinery/Name/CMMS Number):
52	11		Shaker

7. Name of Equipment Owner/Operator:

8. Reason for LO/TO: PM

9. Energy Type to be Isolated (check all that apply):
☑ Electrical ☐ Mechanical ☐ Hydraulic ☐ Pneumatic ☐ Steam ☑ Capacitors ☐ Compressed Energy ☐ Gravity ☐ Other (specify):

10. Verification required for LO/TO:	11. Verification Type:
☐ Installation ☐ Removal ☑ N/A (Verification Not Required)	☐ Peer ☐ Independent ☑ N/A
12. Specific Sequencing of LO/TO devices required for: ☐ Installation ☐ Removal ☑ N/A (Sequencing Not Required)	13. LO/TO Orders Addendum with Operational Instructions/Procedures attached? ☐ Yes ☐ No

Equipment Owner/Operator Comments: N/A

Section 2: LO/TO Installation & Removal Details

14. Group LO/TO? ☐ Yes ☑ No Name of Lead Authorized Worker:	15. Group Lock Box used? ☐ Yes ☑ No If yes, enter ID# of Lock Box:

LO/TO Installation	LO/TO Removal / Return to Service
16. Approval to Install LO/TO Signature: Joe Romero Z#: [illegible] **NOTE: Approver must ensure Affected Workers are notified prior to Authorized Workers performing LO/TO**	23. Approval to Remove LO/TO ☐ N/A Call #: Signature Joe Romero Z#: [illegible] **NOTE: Approver must ensure Affected Workers are notified of LO/TO Removal / Return to Service**

17. Energy Isolation Device (use Specific ID)	18. Location of Energy Isolation Device	19. LO/TO Installation Sequence	20. Required LO/TO Position or Alignment	24. LO/TO Removal Sequence	25. Required Position/Alignment following Removal	26. As-Left Position
Lock/chain	52 11	N/A	NA	N/A	NA	ON/OFF

☐ See continuation page for additional Energy Isolation Devices (continuation page must also be signed if applicable)

21. Energy Isolation Devices Positioned, Lock(s) and Tag(s) installed, and Zero Energy Checks Performed:	27. LO/TO has been Removed & Isolation Devices Positioned:
Signature: Joe Romero Z#: [illegible] Date: 5/10/18	Signature: Joe Romero Z#: Date:
22. LO/TO verified by: ☐ N/A Signature: [illegible] Z#: [illegible] Date: 5/10/18	28. Removal and Positioning verified by: ☐ N/A Signature: Greg Romero Z#: Date:

Attachment B, LO/TO Orders

Attachment B, LO/TO Orders (Cont.)

1. Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Record #:

Section 3: All Authorized Workers (anyone applying a lock for this activity)

29. Authorized Workers Name(s)	Z#	30. Date worker's lock is hung	31. Date worker's lock is removed
1. Larry Romero 112866	112866	5-10-18	
2. Brandon Madrid	239798	5-10-18	
3.			
4.			
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16.			
17.			
18.			
19.			
20.			

Section 4: Return of Lock(s)/Tag(s) and Locking Devices

All Lock(s)/Tag(s) and Locking Devices have been removed and returned to the Lock Coordinator:

32. Signature of Lock Coordinator: [signature] Z#: [illegible] Date: 5-10-18

*Instructions for completing this form (by numbered steps) appear on the last two pages of this document. Take the completed forms back to the Lock Coordinator for closeout.

Attachment B, LO/TO Orders

Continuation Page (print as needed)

Attachment B, LO/TO Orders (Cont.)

1. Work Document Number (i.e., Package/Procedure #):

2. LO/TO (Parent) Record #:

LO/TO Installation				LO/TO Removal / Return to Service		
17. Energy Isolation Device (Specific ID)	18. Location of Energy Isolation Device	19. LO/TO Installation Sequence	20. Required LO/TO Position or Alignment	24. LO/TO Removal Sequence	25. Required Position/Alignment following Removal	26. As-Left Position

21. Energy Isolation Devices Positioned, Lock(s) and Tag(s) installed, and Zero Energy Checks Performed:

Signature: Z#: Date:

22. LO/TO verified by:
☐ N/A

Signature: Z#: Date:

27. LO/TO has been Removed & Isolation Devices Positioned:

Signature: Z#: Date:

28. Removal and Positioning verified by:
☐ NA

Signature: Z#: Date:

Attachment B, LO/TO Orders

Instructions by Numbered Steps

Lock Coordinator (Header): Identify the individual who will issue Red Locks to persons performing LO/TO (individual[s] identified by the FOD).

1. Enter the Work Document Number. This will be the number from the IWD or the procedure number (i.e., TA88-DOP-0001).
2. Enter the LO/TO Parent Record number. This is obtained from the Lock Coordinator when the lock(s) are issued. The Remedy LO/TO database generates this number.
3. Enter the TA where the equipment is located.
4. Enter the Building number where the equipment is located.
5. Enter the Room number where the equipment is located.
   NOTE: Responses to steps 3 through 5 need to match information, identically, within both the LO/TO Orders and the tag (Attachment A).
6. Enter the Equipment/Machinery/Name/Number (example, HVA-001 [NOTE: LOG is to follow nomenclature contained within CMMS/MEL]).
7. Enter the Name of the Equipment Owner/Operator. The Equipment Owner/Operator is designated by the FOD. There may be both programmatic and facility Equipment Owner/Operators.
8. Write a brief description of the reason for LO/TO (example, removing and replacing exhaust fan belts).
9. Check the appropriate energy type to be isolated (check all that apply). Make sure you have considered all energy sources; if "Other" is checked, specify what "Other" is.
10. Is verification of the energy isolation configuration required for this LO/TO for installation and/or removal? Check the appropriate box(es). **NOTE:** Contact the FOD/Designee regarding verification requirements. Additionally, verification may be required by the Equipment Owner/Operator.
11. If verification is required, check the appropriate box (either "Peer" or "Independent"). If verification is NOT required, check the "N/A" box. **NOTE:** Independent verification may be required per ***P315, Conduct of Operations Manual***, as determined by the FOD/Designee.
12. When installing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are to be positioned? If a specific sequence must be followed for Installation and/or Removal, check the appropriate box(es) and subsequently identify the sequence order in column numbers 19 and/or 24, accordingly. If there is not a specific sequence to follow, check the "N/A" box and place N/A in columns 19 and/or 24.
13. If an operating procedure/instruction/etc. is to be used in conjunction with the LO/TO Orders, check the "Yes" box and attach the pertinent document as an addendum. Additionally, a space is provided for Equipment Owner/Operator comments, if applicable.
14. Check either "Yes" or "No" to indicate if a Group LO/TO is applicable. A Group LO/TO is where two or more authorized workers, regardless of their occupation or craft, lock out and tag out the same equipment to perform servicing or maintenance. Enter the name of the Lead Authorized Worker.
15. Check either "Yes" or "No" to indicate if a Group Lock Box is to be used. If "Yes", enter the lock box ID#. Each organization that issues locks will be required to uniquely number and track lock boxes in their possession.
16. The FOD-designated Equipment Owner/Operator signs and enters their Z#, authorizing the installation of the LO/TO. The Approver is responsible to notify all Affected Workers prior to the Authorized Workers performing LO/TO ("Affected Workers" are those who either may work with the equipment or are affected by LO/TO activities).
17. Enter the specific energy isolation device/ID (e.g., MCC-A, A4). The ID used in the LO/TO orders must match information used on tag (Attachment A).
18. Location of energy isolation device (TA, Bldg, Rm, etc.). The location used in the LO/TO orders must match information used on tag (Attachment A).

Attachment B, LO/TO Orders

19. If the LO/TO needs to be installed in a particular order (refer to Step #12), number the sequence in which the locks need to be installed. If sequencing is not applicable, then place N/A in this column.
20. Required Position/Alignment for LO/TO (open, closed, connected, disconnected, on, off, etc.). Follow the nomenclature on the piece of equipment (e.g., if a service disconnect has "ON"/"OFF" posted, ensure the position/alignment entered on this form matches the piece of equipment ["ON" or "OFF"]).
21. The Lead Authorized Worker documents (signature) that the energy isolation devices have been positioned correctly, that locks and tags have been installed on those energy isolation devices and a Zero Energy Check has been performed.
    NOTE: The Lead Authorized Worker may also be designated as the Person-in-Charge (PIC).
22. Is verification required (see #10)? If verification is required, the person who performs the verification signs, and places their Z# and the date here. If verification is not required, check the "N/A" box.
23. Documentation of Approval to Remove LO/TO. Equipment Owner/Operator or FOD Designee signs and places his/her Z# in this box. Alternatively, authorization per telecommunication may be performed via a phone number identified for the Lead Authorized Worker to call the Equipment Owner/Operator or FOD Designee. Once verbal authorization is given, the Lead Authorized Worker documents the authorization as "per telecom" and enters his/her initials. Example: John Smith per telecom, JS. By checking the "N/A" box, a phone call is NOT REQUIRED by the Lead Authorized Worker to the Equipment Owner/Operator or FOD Designee.
    NOTE: The Equipment Owner/Operator or FOD Designee is responsible to notify all Affected Workers after the LO/TO removal and of the equipment/machine's return to service.
24. If the LO/TO needs to be removed in a particular sequence (as per Step #12), number the sequence in which the locks need to be removed. If the "N/A" box is checked in #12, then place N/A in this column.
    NOTE: Often the sequence for removal is opposite the sequence for installation. For example, if the order specified for installation Column #19 is "1,2,3,4", the order specified for removal in Column #24 could be "4,3,2,1". The intention of the LO/TO Orders is to have the entries in Column #s 19 and 24 correspond with the energy isolation devices specified in Column #17.
25. Identify the required position/alignment in which the system/component is to be placed following the removal of the lock(s). Follow the nomenclature as listed on the piece of equipment ("On", "Off", etc.).
26. Enter the As-Left Position.
27. The Lead Authorized Worker documents (signature, Z# and date) that the locks and tags have been removed from the energy isolation devices and the energy isolation devices have been configured as per Equipment Owner/Operator specifications.
    NOTE: The Lead Authorized Worker may also be designated as the Person-in-Charge (PIC).
28. If verification is required for the positioning, the person who performs the verification signs here. Otherwise, check N/A.
29. All authorized workers applying a lock for this activity (names/Z#) must be documented. If more than 20 authorized workers are involved in a Group LO/TO, document the required information with an attached list.
30. Enter the date the authorized worker attaches his/her lock.
31. Enter the date the authorized worker removes his/her lock.
32. The Lock Coordinator or designee signs once locks, tags, and locking devices have been removed and returned. If a lock and/or tag are found to be contaminated, the lock and/or tag will be disposed of in accordance with local procedures and a verbal notification will be made to the Lock Coordinator to close out the record within Remedy.

Los Alamos NATIONAL LABORATORY EST. 1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic	Completed (X)
What permits, permissions, or support are required to safely start this work?	
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	
What can cause us to go beyond the scope of the work?	
What hazards in the work area may not have been considered during planning of this job	

Eric Fernandez 107001 5-10-18

Larry Romero 112864 5-10-18

Los Alamos NATIONAL LABORATORY EST.1943

Form 2103

Integrated Work Document (IWD) Part 3, Validation and Work Release

IWD #_____ Revision #:_____ **Work Release**

By signing below, I verify this activity is compatible with current facility configuration and operating conditions.
FOD designated Operations Manager or other facility point-of-contact for work area

Signature/Z#/Date **(If required by FOD)**: _____
Note: For Standing IWD, release may be given concurrently with signatures on Part 2.

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a validation walkdown with workers to confirm the IWD can be performed as written, and that required initial conditions and other prerequisites are in place.
- The assigned workers are authorized and are competent to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing and all workers (including support workers) have been briefed.
- I have ensured coordination with all required FOD work-area representatives (e.g., area work coordinators).

PIC (Signature/Z#/Date) **Required**: [signature] 10/06/2018

Alternate PIC Signatures **acknowledges** PIC authority is assumed for the first time. *(Note: Alternate PICs are required to sign only once, but formal handoff includes conferring with previous PIC to obtain all required information associated with the handoff.)*

Alternate PIC (Signature/Z#/Date) **Required**: _____

Alternate PIC (Signature/Z#/Date) **Required**: _____

Pre-Job Brief Content

- What are the critical steps* or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the pause/stop work responsibilities and expectations (e.g., for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

* "Critical steps occur anytime human performance involves a substantial transfer of energy, or movement of solids, liquids, and gases, or the transmission of data and information that , if not performed under control, could cause serious harm to one or more important assets." (Performance Improvement, vol. 53, no. 9, October 2014)

Pre-Job Brief Attendance Roster

By signing below **as required**, I agree to the following:

- I agree to follow the work steps and implement the controls as written as applicable to my work assignments.
- I agree to pause/stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and fit to perform the work.

Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)

AP-WORK-002 Attachment 15

FORM 2100-WC

Los Alamos	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision #: 0			**Activity/Task Title:** TA-52-0011 6M CYCLONE SEPARATOR/ SHAKER LUBE/INSP.
Work Document #: (WO # / Task)			**Planner/Preparer (Name/Z#/Date)** Ralph Dominguez, 100538 4-25-18
TA: 52	**Building:** 0011	**Room:**	**Additional Location Description:**

1. Scope of Work

Install Lock-Out/Tag-Out to the local disconnect at the Cyclone Unit. Requires three LO/TO CDD-6, 7 & 8. Verify Zero energy to the unit. Lubricate and inspect the chains on the rotary air lock valve and shaker. Lubrication of Rotor Bearings: Using an EP type grease quality grade 2. Grease the existing fittings located on the lubrication manifolds mounted on the pillow blocks. Lubricating Motor Bearings: Remove the drain plug and then inject new grease at the fill hole. Replace the drain plug. Recommended grease should be Polyrea based bearing lubricant. Lubricate, inspect and repair the gear box and chain bearings in gear box. .Verify proper operation oil level and add as needed. Change the Air lock valve gear box oil following every 5000 hours of operation. Check and lubricate all bearings associated with the Cyclone-.Shaker unit as required. Complete any lubrication, adjustments or replacement of any components associated with the conveyor unit, to include bearings, belts, rollers and all other associated components complete lubrication of the shaker flange bearings following a 3 year recommend schedule. Complete any maintenance, as needed, on all motors per manufacturers recommend actions. Remove the LO/TO from the local disconnect. POC: Melissa Metcalf PH # 667-7851

Hazard Analysis (HA) Team: Ralph Dominguez, and Eric Fernandez (HA) Date: 4-25-18

2. Precautions and Limitations

2.1. If steps cannot be completed as described, or if unforeseen situations occur, **PAUSE WORK**, stabilize the situation, contact your supervisor, and await further instructions before proceeding.

3. Prerequisites/Initial Conditions

Entry Conditions:

3.1. Notify facility tenants (maintenance repairs, noise, vibration, etc.) shall be performed.

3.2. Establish barricade flagging and robust barriers (this will be field directed during Pre-Job Briefing) to clearly define work execution area.

3.3. The following permits, forms, and documents are required to complete this work:

- LO/TO
- SDS for Lubricants used

3.4. Follow lock out/ tag out procedures in accordance with Lock Out/Tag Out for control of electrical energy sources for personnel safety (red lock procedures).

3.5. LO/TO devices shall be applied in accordance with requirements of P101-13 "Lock Out/Tag Out for Hazardous Energy Control"

Los Alamos National Laboratory	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision #: 0			**Activity/Task Title:** TA-52-0011 6M CYCLONE SEPARATOR/ SHAKER LUBE/INSP.
Work Document #: (WO # / Task)			**Planner/Preparer (Name/Z#/Date)** Ralph Dominguez, 100538 4-25-18
TA: 52	**Building:** 0011	**Room:**	**Additional Location Description:**

4.1. The following trainings are required for the General Hazard Section:
- Basic Craft Worker PPE #10968
- LO/TO Authorized worker TP #127
- Non Energized/Non-Electrical - Training Plan # 2909

5. Special Tools/Equipment

5.1. The following basic PPE is required:
- Safety Shoes
- Safety glasses with side shields.
- Work Gloves
- Hard hat
- Reflective vest

6. Work Instructions

Group Operator:

6.1. **TURN** off MCP-1. ☒

Mechanic Crafts:

6.2. **LO/TO** Cyclone Separator/ Shaker at local disconnect. ☒

6.3. **LO/TO** MCP-1. ☒

6.4. **VERIFY** absence of hazardous energy. ☒

6.5. **COMPLETE** items list listed on Activity Description. Complete minor repairs as needed. ☒

6.6. **REMOVE** LO/TOs re-energize local disconnect. ☒

Group Operator

6.7. **RE- ENERGIZE** Cyclone Separator/ Shaker at MCP-1. ☒

Los Alamos National Laboratory — Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)			
Revision #: 0			**Activity/Task Title:** TA-52-0011 6M CYCLONE SEPARATOR/ SHAKER LUBE/INSP.
Work Document #: (WO # / Task)			**Planner/Preparer (Name/Z#/Date)** Ralph Dominguez, 100538 4-25-18
TA: 52	**Building:** 0011	**Room:**	**Additional Location Description:**

7. Post Work Activities

Group Operator, and Mechanic Crafts:

7.1. **TEST** Cyclone Separator/ Shaker for proper operation. ☒

8. Closeout

8.1. **CLEAN** the work area and dispose of all work generated debris. ☒

8.2. **CONTACT** the MC and inform them the work is completed. Complete all the required documentation and return the Master Work Package to the Area Work Control Office. ☒

***Insert Rows above** for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.*	The RLM, and FOD or FOD Representative (if required or recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized, workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review.	**RLM** (Signature/Z#/Date) **Required** [signature] 204635 4/26/18 **FOD or Representative** (Signature/Z#/Date) **If Required or Recommended by RLM** [signature] 100896 4-25-18 **ESO Review** (Signature/Z#/Date) **If Required** [signature] 100896 4-25-18 **Safety Review** (Signature/Z#/Date) **Required** [signature] 117205, 4/25/18
IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required 4/30/19 Other Conditions for Re-Approval Changes in Scope / HAZARDS (Print) Name of Primary PIC RYAN Campbell Name of Alternate PIC ERIC FERNANDEZ Name of Alternate PIC TONY Marquez	Any required classification review completed, Signature/Date

Los Alamos NATIONAL LABORATORY EST. 1943

Form 2101

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
7	52	0011	All	N/A
FOD Designated Facility Point-of-Contact	Name: Bill Schleft	Phone: 699-5790	Pager: 664-3536	Email: schleft@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☐ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions: ____
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☐ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				
Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ■ No			

IWD No./Work Request No: _____ Revision #: _____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☐ Yes ■ No			
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:**	■ Yes ☐ No	Ensure worker recognize hazards associated with working near rotating equipment.		
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☐ Yes ■ No			
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*.	☐ Yes ■ No			
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment. **Specify Hazards:**	☐ Yes ■ No			
Security Requirements **Specify:**	☐ Yes ■ No			
Other Hazards **Specify:**	☐ Yes ■ No			

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** _____

Date Approval Expires: 12/31/18 schleft@lanl.gov Digitally signed by schleft@lanl.gov DN: cn=schleft@lanl.gov Date: 2014.10.20 17:00:28 -06'00'

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1306.A.

TA-03 Power Plant

Opacity for Sources Combusting Natural Gas

No opacity readings were taken for this source while combusting natural gas. Per Section A1306.A – "Use of natural gas fuel meeting the requirement at Condition A1305.A or B constitutes compliance with 20.2.61 NMAC….."

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1306.B.

TA-03 Power Plant

Opacity for Sources Combusting No. 2 Fuel Oil

Los Alamos NATIONAL LABORATORY EST. 1943

LOS ALAMOS NATIONAL LABORATORY (LANL)
VISIBLE EMISSION OBSERVATION FORM (10 MINUTE)

Source Name: TA-3-22 Power Plant Boiler #3

Source Location: TA-3-22

Type of Source: Boiler #3

Type of Control Equipment: NA

Describe Emission Point (Top of stack, etc.): Top of Stack

Height Above Ground Level: 150 Feet

Height Relative to Observer: 160 Feet

Distance From Observer: 200 Feet

Direction of Source From Observer: NNW

Description of Plume (stack exit only)
☒ Lofting ☐ Trapping ☐ Looping ☐ Fanning ☐ Coning ☐ No Plume Present

Emission Color: white

Plume Type ☐ No Plume Present ☐ Continuous ☐ Fugitive ☒ Intermittent

Water Droplets Present?
☒ NO ☐ YES If YES, droplet plume is ☐ Attached ☐ Detached

At what point in the plume was opacity determined? 2-3 ft. above stack

Describe Background (i.e. blue sky, trees, etc.): Blue sky, partly cloudy

Background Color: Blue, some white clouds

Sky Conditions: Partly cloudy

Wind Speed: 5 mph

Wind Direction (provide from/to, i.e. from North to South): From South west

Ambient Temperature: 40 °F

Relative Humidity: 60 %

Additional Comments/Information:
Fuel oil Start-up training on Boiler No. 3, Burner 1

Observation Date: 3/14/2018

Start Time: 9:18

End Time: 9:28

Min \ Sec	0	15	30	45	Comments
1	0	0	20	10	white smoke
2	0	0	5	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Average 10-Minute Opacity: 0.9

Range of Opacity Readings: Min. 0 Max. 20

OBSERVER (please print)
Name: Marjorie Stockton Title: Env. Prof.

Signature: Marjorie Stockton Date: 3/14/2018

Observer Organization: EPC-CP

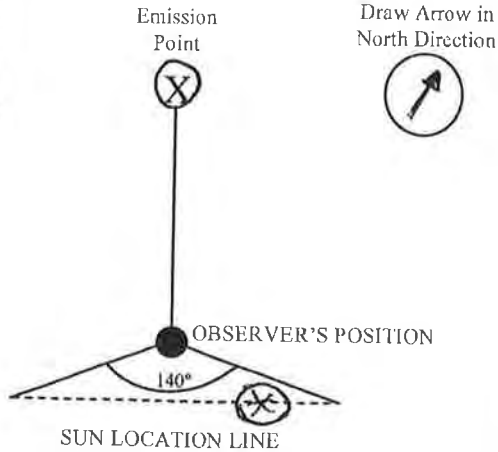
Certified by: Aeromet Certification Date: 10/26/2017

SOURCE LAYOUT SKETCH

Stack with Plume

Sun

Wind



Form ENV-CP-Form-1004 04/2015

Los Alamos NATIONAL LABORATORY

LOS ALAMOS NATIONAL LABORATORY (LANL)
VISIBLE EMISSION OBSERVATION FORM (10 MINUTE)

Source Name: TA-3-22 Boiler No. 3

Source Location: TA-3-22

Type of Source: Boiler No. 3

Type of Control Equipment: NA

Describe Emission Point (Top of stack, etc.): Top of Stack

Height Above Ground Level: 150 Feet

Height Relative to Observer: 160 Feet

Distance From Observer: 200 Feet

Direction of Source From Observer: NNW

Description of Plume (stack exit only)
☐Lofting ☐Trapping ☐Looping ☐Fanning ☐Coning
☒No Plume Present

Emission Color: NA

Plume Type ☒No Plume Present
☐Continuous ☐Fugitive ☐Intermittent

Water Droplets Present?
☒NO ☐YES If YES, droplet plume is ☐Attached ☐Detached

At what point in the plume was opacity determined?: 2-3 ft above stack

Describe Background (i.e. blue sky, trees, etc.): Blue sky

Background Color: Blue sky

Sky Conditions: Blue Sky

Wind Speed: 5 mph

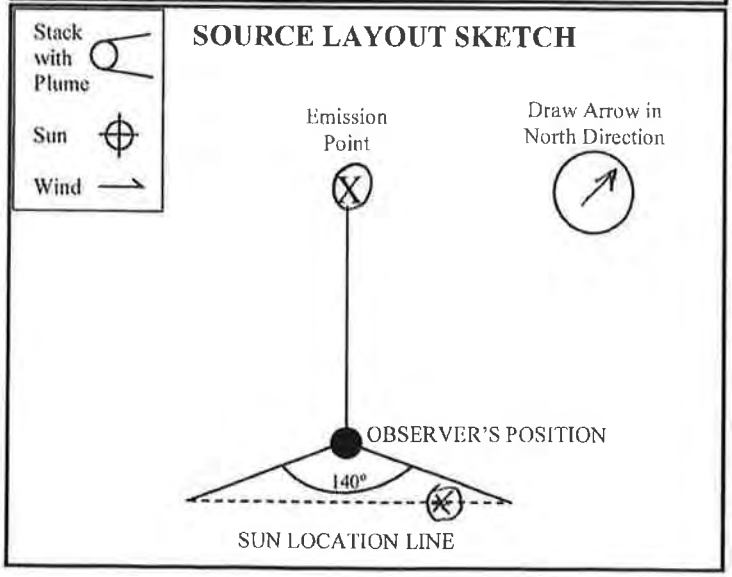
Wind Direction (provide from/to, i.e. from North to South): From SW

Ambient Temperature: 41 °F

Relative Humidity: 50 %

Additional Comments/Information:
Fuel oil Start up training - Boiler No. 3 Burner 3

SOURCE LAYOUT SKETCH



Observation Date: 3/14/2018

Start Time: 9:56

End Time: 10:06

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	Lit Burner 3
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Average 10-Minute Opacity: 0

Range of Opacity Readings: Min. 0 Max. 0

OBSERVER (please print)
Name: Marjorie Stockton Title: Env. Prof.

Signature: Marjorie Stockton Date: 3/14/18

Observer Organization: EPC-CP

Certified by: Aeromet Certification Date: 10/26/2017

Form ENV-CP-Form-1004 04/2015

Lab Home | Phone | Search

Date: Wednesday, March 14, 2018 | Time: 08:23 MDT (14:23 UTC) | **Time Note »**

The Weather Machine

LOS ALAMOS NATIONAL LABORATORY

LANL Observations | Regional/U.S. Observations | Forecast Products | LANL Climatology | Data Requests

LANL Observations > Table Summaries

The table below provides a snapshot of current conditions at each tower location. Wind variables are measured at 11 meters above the ground (36 meters at PJMT) and the atmospheric state variables (temperature, humidity, and pressure) are measured at 1.2 meters above the ground (2 meters at PJMT).

Other Text Summaries Available: 15-Minute Short Summary (English)

Current Observations:	English | Metric			
Tower (tower)	TA6	TA49	TA53	TA54
Date (mm/dd)	03/14	03/14	03/14	03/14
Time (hhmm)	0715	0715	0715	0715
Wind Speed (mph)	4.5	7.2	10.1	8.3
Wind Direction (deg)	159	207	193	224
Max Gust (mph)	13.6	11.9	18.6	13.6
Max Gust Direction (deg)	231	230	221	228
Time of Max Gust (hhmm)	545	400	400	645
Temperature (deg-F)	35.8	36.7	38.1	37.9
Max Temp Since Midnight (deg-F)	39.4	39.9	41.4	41.4
Time of Max Temp (hhmm)	545		30	230
Min Temp Since Midnight (deg-F)	34.5	35.4	37.9	34.9
Time of Min Temp (hhmm)	500	600	700	615
Pressure (mb)	776.3	-	-	802.7
Relative Humidity (%)	63	60	58	57
Dew Point Temperature (deg-F)	24.6	24.4	24.8	24.4
Precip Last 15 Minutes (in)	0.00	0.00	0.00	0.00
Precip Since Midnight (in)	0.00	0.00	0.00	0.00
Downwelling Shortwave (BTU/hr*ft^2)	20	19	23	23
Wind Chill (deg-F)	31.8	31.1	31.3	32.0

NOTE: All times are reported in Mountain Standard Time (MST).

Los Alamos NATIONAL LABORATORY

LOS ALAMOS NATIONAL LABORATORY (LANL)
VISIBLE EMISSION OBSERVATION FORM (10 MINUTE)

Source Name: TA-3-22 Power & Steam Plant

Source Location: TA-3-22

Type of Source: Boiler Stack

Type of Control Equipment: None

Describe Emission Point (Top of stack, etc.): Top of East Stack

Height Above Ground Level: 150 Feet

Height Relative to Observer: 145 Feet

Distance From Observer: 200 Feet

Direction of Source From Observer: N-NW

Description of Plume (stack exit only)
☐Lofting ☐Trapping ☑Looping ☐Fanning ☐Coning
☐No Plume Present

Emission Color: White

Plume Type ☐No Plume Present ☐Continuous ☐Fugitive ☑Intermittent

Water Droplets Present?
☑NO ☐YES If YES, droplet plume is ☐Attached ☐Detached

At what point in the plume was opacity determined?
2ft above stack Height

Describe Background (i.e. blue sky, trees, etc.): Blue Sky

Background Color: Blue

Sky Conditions: Clear

Wind Speed: 2 mph

Wind Direction (provide from/to, i.e. from North to South): E to W

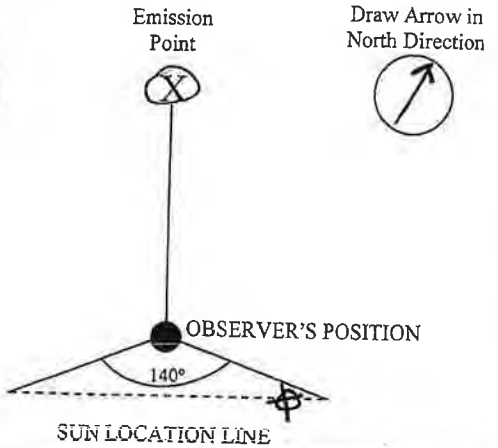
Ambient Temperature: 44 °F

Relative Humidity: 20 %

Additional Comments/Information:
Boiler #3, #1 Burner
-Emission only occurred when burner tripped.

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH



Observation Date: 3/21/18 Start Time: 9:24 End Time: 9:34

Min \ Sec	0	15	30	45	Comments
1	0	0	0	25	BI Tripped
2	0	0	0	0	
3	0	25	0	0	BI Tripped
4	0	0	25	0	BI Tripped
5	0	0	0	0	
6	0	0	0	0	
7	25	0	0	0	BI Tripped
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Average 10-Minute Opacity: 2.5 %

Range of Opacity Readings: Min. 0 Max. 25

OBSERVER (please print)
Name: Jillian Burgin Title: DEP

Signature: JBurgin Date: 3/21/18

Observer Organization: DESHS-UIS

Certified by: ETA Certification Date: 2/21/18

Form ENV-CP-Form-1004 04/2015

Los Alamos NATIONAL LABORATORY

LOS ALAMOS NATIONAL LABORATORY (LANL)
VISIBLE EMISSION OBSERVATION FORM (10 MINUTE)

Source Name: TA-3-22 Power + Steam Plant

Source Location: TA-3-22

Type of Source: Boiler Stack

Type of Control Equipment: None

Describe Emission Point (Top of stack, etc.): Top of East Stack

Height Above Ground Level: 150 Feet

Height Relative to Observer: 145 Feet

Distance From Observer: 200 Feet

Direction of Source From Observer: N-NW

Description of Plume (stack exit only)
☐Lofting ☐Trapping ☑Looping ☐Fanning ☐Coning
☐No Plume Present

Emission Color: White

Plume Type ☐No Plume Present ☐Continuous ☐Fugitive ☑Intermittent

Water Droplets Present?
☑NO ☐YES If YES, droplet plume is ☐Attached ☐Detached

At what point in the plume was opacity determined?
2 ft above Stack height

Describe Background (i.e. blue sky, trees, etc.)
Blue sky / White clouds

Background Color: Blue / White

Sky Conditions: Broken

Wind Speed: 2.9 mph

Wind Direction (provide from/to, i.e. from North to South): E to W

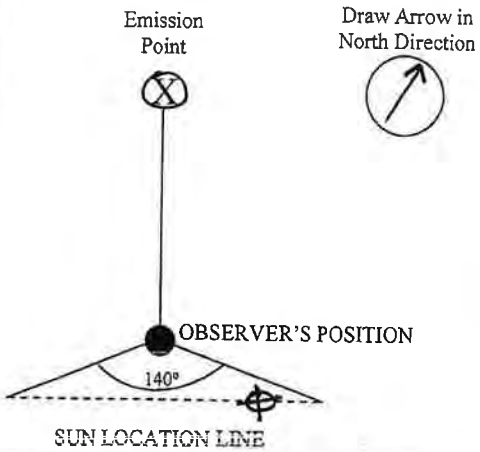
Ambient Temperature: 45 °F

Relative Humidity: 19 %

Additional Comments/Information:
Boiler # 3, #1 & 3 Burners
- Emission occurred only when burner tripped.

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH



Observation Date: 3/21/18 Start Time: 9:34 End Time: 9:44

Min \ Sec	0	15	30	45	Comments
1	0	25	0	0	B1 tripped
2	0	0	0	0	B3 on/off
3	0	0	0	0	leak on B3 fix gasket
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Average 10-Minute Opacity: 0.625 %

Range of Opacity Readings: Min. 0 Max. 25

OBSERVER (please print)
Name: Jillian Burgin Title: DEP

Signature: JBurgin Date: 3/21/18

Observer Organization: DESHS-MS

Certified by: ETA Certification Date: 2/21/18

Form ENV-CP-Form-1004 04/2015

Los Alamos NATIONAL LABORATORY

LOS ALAMOS NATIONAL LABORATORY (LANL)
VISIBLE EMISSION OBSERVATION FORM (10 MINUTE)

Source Name: TA-3-22 Power + Steam Plant

Source Location: TA-3-22

Type of Source: Boiler Stack

Type of Control Equipment: NONE

Describe Emission Point (Top of stack, etc.): TOP of East Stack

Height Above Ground Level: 150 Feet

Height Relative to Observer: 145 Feet

Distance From Observer: 200 Feet

Direction of Source From Observer: N-NW

Description of Plume (stack exit only)
☐Lofting ☐Trapping ☑Looping ☐Fanning ☐Coning
☐No Plume Present

Emission Color: White

Plume Type ☐No Plume Present ☐Continuous ☐Fugitive ☑Intermittent

Water Droplets Present?
☑NO ☐YES If YES, droplet plume is ☐Attached ☐Detached

At what point in the plume was opacity determined? 2 ft above Stack Height

Describe Background (i.e. blue sky, trees, etc.): Blue Sky | White Clouds

Background Color: Blue/White

Sky Conditions: Broken

Wind Speed: 5 mph

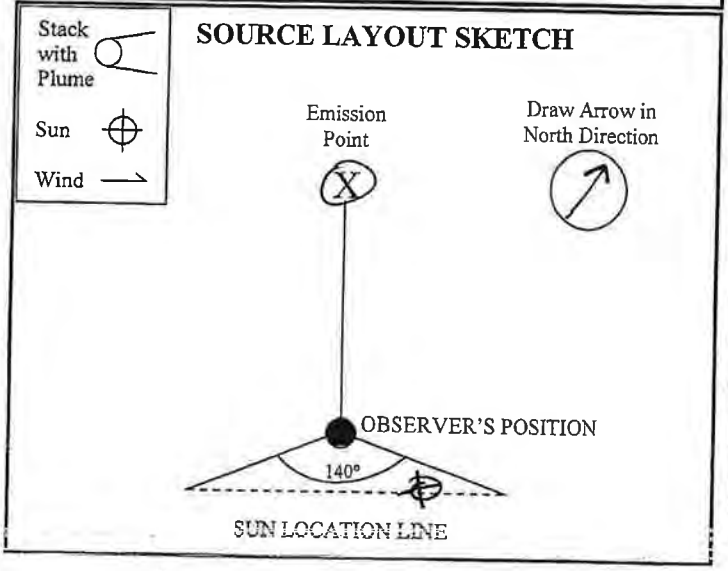
Wind Direction (provide from/to, i.e. from North to South): ESE to WNW

Ambient Temperature: 44 °F

Relative Humidity: 21 %

Additional Comments/Information:
Boiler #3, #3+1 Burners.
-Emission only occurred when burners tripped.

SOURCE LAYOUT SKETCH



Observation Date: 3/21/18 Start Time: 9:56 End Time: 10:06

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	B3 lit
2	0	0	25	0	B3 tripped
3	0	0	0	0	
4	0	0	0	25	B3 lit | tripped
5	0	0	0	0	
6	0	0	0	0	B1 lit
7	0	25	0	0	B1 tripped
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Average 10-Minute Opacity: 1.875 %

Range of Opacity Readings: Min. 0 Max. 25

OBSERVER (please print)
Name: Jillian Burgin Title: DEP

Signature: JBurgin Date: 3/21/18

Observer Organization: DESHS-UIS

Certified by: ETA Certification Date: 2/21/18

Form ENV-CP-Form-1004 04/2015

Los Alamos NATIONAL LABORATORY

LOS ALAMOS NATIONAL LABORATORY (LANL)
VISIBLE EMISSION OBSERVATION FORM (10 MINUTE)

Source Name: TA-3-22 Power & Steam Plant

Source Location: TA-3-22

Type of Source: Boiler Stack

Type of Control Equipment: NONE

Describe Emission Point (Top of stack, etc.): Top of East Stack

Height Above Ground Level: 150 Feet

Height Relative to Observer: 145 Feet

Distance From Observer: 200 Feet

Direction of Source From Observer: N-NW

Description of Plume (stack exit only)
☐Lofting ☐Trapping ☐Looping ☐Fanning ☐Coning
☒No Plume Present

Emission Color: N/A

Plume Type ☒No Plume Present ☐Continuous ☐Fugitive ☐Intermittent

Water Droplets Present?
☒NO ☐YES If YES, droplet plume is ☐Attached ☐Detached

At what point in the plume was opacity determined?
2 ft above Stack height

Describe Background (i.e. blue sky, trees, etc.): Blue Sky / White Clouds

Background Color: Blue/White

Sky Conditions: Broken

Wind Speed: 4.7 mph

Wind Direction (provide from/to, i.e. from North to South): E to W

Ambient Temperature: 46 °F

Relative Humidity: 19 %

Additional Comments/Information:
Boiler # 3, #1 Burner

Observation Date: 3/21/18

Start Time: 10:35

End Time: 10:45

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	Bl lit
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Average 10-Minute Opacity: 0

Range of Opacity Readings: Min. 0 Max. 0

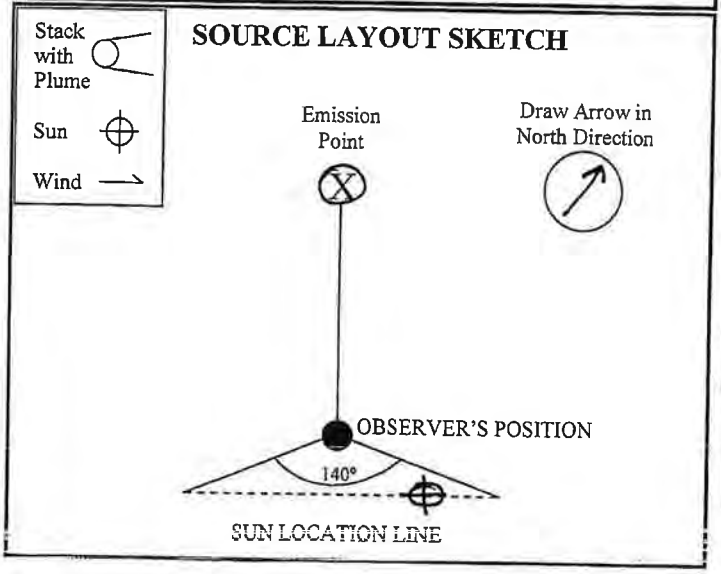
OBSERVER (please print)
Name: Jillian Burgin Title: DEP

Signature: JBurgin Date: 3/21/18

Observer Organization: DESHS-ULS

Certified by: ETA Certification Date: 2/21/18

SOURCE LAYOUT SKETCH



Form ENV-CP-Form-1004 04/2015

Los Alamos NATIONAL LABORATORY

LOS ALAMOS NATIONAL LABORATORY (LANL)
VISIBLE EMISSION OBSERVATION FORM (10 MINUTE)

Source Name: TA-3-22 Power + Steam Plant

Source Location: TA-3-22

Type of Source: Boiler Stack

Type of Control Equipment: NONE

Describe Emission Point (Top of stack, etc.): Top of East Stack

Height Above Ground Level: 150 Feet

Height Relative to Observer: 145 Feet

Distance From Observer: 200 Feet

Direction of Source From Observer: N - NW

Description of Plume (stack exit only)
☐Lofting ☐Trapping ☐Looping ☐Fanning ☐Coning
☑No Plume Present

Emission Color: N/A

Plume Type ☑No Plume Present
☐Continuous ☐ Fugitive ☐Intermittent

Water Droplets Present?
☑NO ☐YES If YES, droplet plume is ☐Attached ☐Detached

At what point in the plume was opacity determined?
2 ft above Stack height

Describe Background (i.e. blue sky, trees, etc.): Blue Sky / White Clouds

Background Color: Blue/White

Sky Conditions: Broken

Wind Speed: 4.9 mph

Wind Direction (provide from/to, i.e. from North to South): ESE to WNW

Ambient Temperature: 46 °F

Relative Humidity: 18 %

Additional Comments/Information:
Boiler #3, #1 + 3 Burners

Observation Date: 3/21/18

Start Time: 10:53

End Time: 11:03

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	B1 + B3 lit
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Average 10-Minute Opacity: 0

Range of Opacity Readings: Min. 0 Max. 0

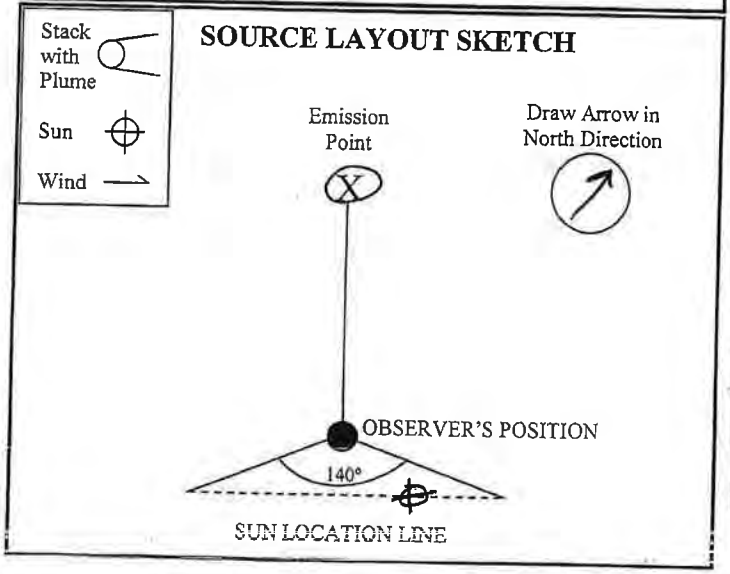
OBSERVER (please print)
Name: Jillian Burgin Title: DEP

Signature: JBurgin Date: 3/21/18

Observer Organization: DESHS-UIS

Certified by: ETA Certification Date: 2/21/18

SOURCE LAYOUT SKETCH



Form ENV-CP-Form-1004 04/2015

The Weather Machine

LOS ALAMOS NATIONAL LABORATORY

Data is for tower ta6.
This file was obtained from the LANL Weather Machine, http://weather.lanl.gov.
Request made on Wed Mar 21 10:45:38 2018 MST.
All data times are MST.

month	day	year	hour	minute	doy	spd1		dir1		temp0		rh
mm	dd	yyyy	hh	mm	ddd	m/s	mph	deg		deg-C	F	%RH
3	21	2018	8	15	80	0.9	2.01	81	E to W	6.7	44.06	20
3	21	2018	8	30	80	1.3	2.91	87	E to W	7.4	45.32	19
3	21	2018	8	45	80	1.4	3.13	79	E to W	7.6	45.68	19
3	21	2018	9	0	80	2.3	5.14	118	ESE to WNW	7.1	44.78	21
3	21	2018	9	15	80	1.9	4.25	98	E to W	7.2	44.96	20
3	21	2018	9	30	80	2.1	4.7	97	E to W	7.8	46.04	19
3	21	2018	9	45	80	2.2	4.92	119	ESE to WNW	8.2	46.76	18
3	21	2018	10	0	80	1.8	4.03	117	ESE to WNW	8.9	48.02	17
3	21	2018	10	15	80	2.1	4.7	107	ESE to WNW	9.1	48.38	16

Today is Wednesday, March 21, 2018. We are currently in Mountain Daylight Time (MDT)
Please add one hour to times reported on this site, as product and data feed times are reported in MST.

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1307.A.

TA-03 Power Plant

Emission Rate Calculations

Monthly Emission Calculation (Natural Gas) 2018

Average Hourly Emissions Rates (pph) for each Emission Unit
(Meets condition A1307.A, monitoring condition 1, of Title V Permit P100-R2M1)

Unit TA-3-22-1 (Boiler 1) pph

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Allowable Emissions[a]
NOx	3.69	3.78	3.05	2.44	0.00	0.00							10.2
SOx	0.04	0.04	0.03	0.03	0.00	0.00							1.1
PM	0.48	0.50	0.40	0.32	0.00	0.00							1.3
PM-10	0.48	0.50	0.40	0.32	0.00	0.00							1.3
PM-2.5	0.48	0.50	0.40	0.32	0.00	0.00							1.3
CO	2.55	2.61	2.10	1.69	0.00	0.00							7.0
VOC	0.35	0.36	0.29	0.23	0.00	0.00							1.0

Unit TA-3-22-2 (Boiler 2) pph

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Allowable Emissions[a]
NOx	2.37	3.26	2.58	2.19	1.45	1.06							10.2
SOx	0.02	0.03	0.03	0.02	0.02	0.01							1.1
PM	0.31	0.43	0.34	0.29	0.19	0.14							1.3
PM-10	0.31	0.43	0.34	0.29	0.19	0.14							1.3
PM-2.5	0.31	0.43	0.34	0.29	0.19	0.14							1.3
CO	1.63	2.25	1.78	1.51	1.00	0.73							7.0
VOC	0.22	0.31	0.24	0.21	0.14	0.10							1.0

Unit TA-3-22-3 (Boiler 3) pph

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Allowable Emissions[a]
NOx	3.04	2.88	1.87	0.00	0.00	0.00							10.2
SOx	0.03	0.03	0.02	0.00	0.00	0.00							1.1
PM	0.40	0.38	0.24	0.00	0.00	0.00							1.3
PM-10	0.40	0.38	0.24	0.00	0.00	0.00							1.3
PM-2.5	0.40	0.38	0.24	0.00	0.00	0.00							1.3
CO	2.09	1.98	1.29	0.00	0.00	0.00							7.0
VOC	0.29	0.27	0.18	0.00	0.00	0.00							1.0

(a) Allowable Emissions are from table A1302A of Permit P100-R2M1.
Condition A1307.A, monitoring condition 3, can't be calculated because the units are based on the emission factor. The emission factor for NOx is in lbs/MMscf, which is converted to lbs/MMBtu by dividing by 1020 (standard number of MMBtu in a MMscf). The NOx emission rate will always be 0.057 lbs/MMBtu unless the Btu value of the fuel changes significantly. The average Btu value for natural gas can be found in the GHG emission calculations in this spreadsheet.

1412/1711

Monthly Emission Calculation (Fuel Oil) 2018

Average Hourly Emissions Rates (pph) for each Emission Unit

(Meets condition A1307.A, monitoring condition 1, of Title V Permit P100-R2M1)

Unit TA-3-22-1 (Boiler 1)

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Allowable Emissions[a] Oil
NOx	0.00	0.00	0.00	0.00	0.00	0.00							11.3
SOx	0.00	0.00	0.00	0.00	0.00	0.00							9.6
PM	0.00	0.00	0.00	0.00	0.00	0.00							4.3
PM-10	0.00	0.00	0.00	0.00	0.00	0.00							3.0
PM-2.5	0.00	0.00	0.00	0.00	0.00	0.00							2.0
CO	0.00	0.00	0.00	0.00	0.00	0.00							6.5
VOC	0.00	0.00	0.00	0.00	0.00	0.00							0.3

Unit TA-3-22-2 (Boiler 2)

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Allowable Emissions[a] Oil
NOx	0.00	0.00	0.00	0.00	0.00	0.00							11.3
SOx	0.00	0.00	0.00	0.00	0.00	0.00							9.6
PM	0.00	0.00	0.00	0.00	0.00	0.00							4.3
PM-10	0.00	0.00	0.00	0.00	0.00	0.00							3.0
PM-2.5	0.00	0.00	0.00	0.00	0.00	0.00							2.0
CO	0.00	0.00	0.00	0.00	0.00	0.00							6.5
VOC	0.00	0.00	0.00	0.00	0.00	0.00							0.3

Unit TA-3-22-3 (Boiler 3)

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Allowable Emissions[a] Oil
NOx	0.00	0.00	10.23	0.00	0.00	0.00							11.3
SOx	0.00	0.00	8.74	0.00	0.00	0.00							9.6
PM	0.00	0.00	3.91	0.00	0.00	0.00							4.3
PM-10	0.00	0.00	2.72	0.00	0.00	0.00							3.0
PM-2.5	0.00	0.00	1.84	0.00	0.00	0.00							2.0
CO	0.00	0.00	5.92	0.00	0.00	0.00							6.5
VOC	0.00	0.00	0.24	0.00	0.00	0.00							0.3

1413/1711

12 Month Rolling Emissions 2018 (Tons)
All Three Boilers Combined

Pollutant	TSP	PM10	NOx	CO	VOC	SO_2
Permit Limit (tons/yr) **12-Month Rolling Total**	**8.4**	**8.2**	**60.2**	**41.3**	**5.6**	**7.9**
January	1.277	1.276	9.733	6.711	0.922	0.106
February	1.288	1.287	9.815	6.768	0.930	0.107
March	1.311	1.310	9.991	6.889	0.947	0.109
April	1.302	1.301	9.920	6.841	0.940	0.108
May	1.275	1.274	9.717	6.701	0.921	0.106
June	1.260	1.259	9.603	6.622	0.910	0.105
July						
August						
September						
October						
November						
December						

Meets permit condition A1307.A, Monitoring Condition 2.

Monthly Emission Totals (Tons)

Pollutant	TSP	PM10	NOx	CO	VOC	SO_2
January	0.183	0.183	1.394	0.961	0.132	0.014
February	0.149	0.149	1.139	0.785	0.108	0.012
March	0.148	0.148	1.125	0.775	0.107	0.013
April	0.107	0.107	0.818	0.564	0.078	0.008
May	0.071	0.071	0.541	0.373	0.051	0.006
June	0.050	0.050	0.380	0.262	0.036	0.004
July						
August						
September						
October						
November						
December						
Annual Totals	0.707	0.707	5.396	3.721	0.512	0.057

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Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1307.B.

TA-03 Power Plant

Boiler Fuel Use and Hours of Operation

TA-3 Power Plant Fuel Use Totals 2018 (Data Entry)

	DATA ENTRY							
	TA-3-22 Power Plant[b] Boiler # 1 (Edgemoor Iron Works, 210 mmBtu/hr)		TA-3-22 Power Plant[b] Boiler # 2 (Edgemoor Iron Works, 210 mmBtu/hr)		TA-3-22 Power Plant[b] Boiler # 3 (Union Iron Works, 210 mmBtu/hr)		Monthly Totals	
Month	Natural Gas (mscf)[a]	Fuel Oil (gallons)[a]	Natural Gas (mscf)[a]	Fuel Oil (gallons)[a]	Natural Gas (mscf)[a]	Fuel Oil (gallons)[a]	Natural Gas (mmscf)[a]	Fuel Oil (gallons)[a]
January	46,473	0	176	0	1,419	0	48.068	0
February	19,517	0	15,017	0	4,725	0	39.259	0
March	35,770	0	2,822	0	135	371	38.726	371
April	9,159	0	19,040	0	1	0	28.199	0
May	5	0	18,636	0	3	0	18.644	0
June	0	0	13,112	0	0	0	13.112	0
July								
August								
September								
October								
November								
December								
Annual Totals:	110,923	0	68,802	0	6,283	371	186.008	371
Jan. - June	110,923	0	68,802	0	6,283	371	186.008	371
July - Dec.	0	0	0	0	0	0	0.000	0

Month	12-Mo. Rolling Total Natural Gas (mmscf)	12-Mo. Rolling Total Fuel Oil (gallons)	Hours of Operation Nat Gas Boiler 1	Hours of Operation Nat Gas Boiler 2	Hours of Operation Nat Gas Boiler 3	Hours of Operation Fuel Oil Boiler 1	Hours of Operation Fuel Oil Boiler 2	Hours of Operation Fuel Oil Boiler 3	12-Month Rolling Total Hours (All Boilers)
January	335.4	1,469	729.5	4.3	27.1	0.0	0.0	0.0	8788.9
February	338.2	1,469	299.4	267.0	95.3	0.0	0.0	0.0	8775.4
March	344.3	1,562	680.3	63.5	4.2	0.0	0.0	0.3	8776.3
April	341.8	1,562	217.3	503.6	0.0	0.0	0.0	0.0	8778.4
May	334.8	1,562	0.0	743.9	0.0	0.0	0.0	0.0	8776.8
June	330.9	1,513	0.0	719.7	0.0	0.0	0.0	0.0	8776.5
July									
August									
September									
October									
November									
December									
Permit Limits:	1000 MMscf	500,000 gal							

12 Month Rolling Fuel Totals For Each TA-3 Power Plant Boiler - 2018

Month	Boiler 1		Boiler 2		Boiler 3	
	Natural Gas (mmscf)	Fuel Oil (gal.)	Natural Gas (mmscf)	Fuel Oil (gal.)	Natural Gas (mmscf)	Fuel Oil (gal.)
January	86	0	168	0	82	1,469
February	105	0	146	0	86	1,469
March	141	0	117	0	86	1,562
April	142	0	119	0	80	1,562
May	122	0	138	0	75	1,562
June	121	0	151	0	59	1,513
July						
August						
September						
October						
November						
December						

1417/1711

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Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1307.C.

TA-03 Power Plant

Turbine Fuel Use and Hours of Operation

CY2018 Daily Turbine Gas Use (Mscf), 12 Month Rolling Total Gas Use, & Hours of Operation

Day	Jan		Feb		Mar		Apr		May		Jun		July		Aug		Sept		Oct		Nov		Dec	
	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs	Gas Use	Hrs
1	0	0.0	2007	8.0	2139	8.0	0	0.0	0	0.0	0	0.0												
2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0												
3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0												
4	2106	8.0	0	0.0	0	0.0	0	0.0	1041	4.0	0	0.0												
5	0	0.0	0	0.0	0	0.0	2193	8.0	0	0.0	0	0.0												
6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.0												
7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	916	4.0												
8	0	0.0	2064	8.0	2057	7.0	0	0.0	0	0.0	54	0.2												
9	0	0.0	0	0.0	0	0.0	1553	6.5	0	0.0	0	0.0												
10	0	0.0	0	0.0	0	0.0	4610	16.0	0	0.0	0	0.0												
11	2109	8.0	0	0.0	0	0.0	5175	20.0	25	0.5	1	0.1												
12	0	0.0	0	0.0	0	0.0	5341	23.5	0	0.0	0	0.0												
13	0	0.0	0	0.0	0	0.0	6165	24.0	0	0.0	0	0.0												
14	0	0.0	6	0.02	0	0.0	6093	24.0	14	0.3	29	0.1												
15	0	0.0	82	0.3	837	3.0	5707	24.0	16	0.4	111	0.5												
16	0	0.0	0	0.0	0	0.0	5647	24.0	0	0.0	0	0.0												
17	0	0.0	0	0.0	0	0.0	5881	24.0	0	0.0	0	0.0												
18	1982	8.0	0	0.0	0	0.0	5985	24.0	0	0.0	0	0.0												
19	0	0.0	0	0.0	0	0.0	6415	24.0	0	0.0	21	0.1												
20	0	0.0	0	0.0	0	0.0	5595	24.0	0	0.0	0	0.0												
21	0	0.0	0	0.0	0	0.0	5897	24.0	0	0.0	345	1.5												
22	763	3.0	0	0.0	1960	8.0	4912	21.0	0	0.0	0	0.0												
23	0	0.0	0	0.0	0	0.0	5739	24.0	0	0.0	0	0.0												
24	0	0.0	0	0.0	0	0.0	5823	24.0	1337	6.0	0	0.0												
25	2060	8.0	0	0.0	0	0.0	5887	24.0	0	0.0	0	0.0												
26	0	0.0	0	0.0	0	0.0	3966	24.0	0	0.0	0	0.0												
27	0	0.0	0	0.0	0	0.0	2419	8.5	0	0.0	0	0.0												
28	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1458	7.0												
29	0	0.0			550	3.0	0	0.0	0	0.0	0	0.0												
30	0	0.0			0	0.0	0		0	0.0	0	0.0												
31	0	0.0			0	0.0			1773	8.0														
SUM	9020	35	4159	16.32	7543	29	101003	416	4206	19.2	2937	13.5												
12 Mo. Rolling Gas Mscf	51,729		51,536		54,845		149,967		148,493		145,870													
12 Mo. Rolling Gas MMscf	**51.7**		**51.5**		**54.8**		**150.0**		**148.5**		**145.9**													
12 Mo. Rolling Hours Hrs.	210		210		222		614		609		599													

First Half Gas Use: **128.87** **MMscf** | **Second Half Gas Use:** **0.0** **MMscf** | **Annual Gas Use:** **128.87** **MMscf**

Permit Limit (12 mo rolling): **1400** **MMscf**

Total Annual Hours: **528.5** **Hour**

High Heat Value (HHV) for natural gas[k] = **1020** MMBtu/MMscf

LANL ADESH-18-050 / LA-UR-18-26940

AI856 / LANL 2018H1 Semi-Annual Monitoring Report

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1307.D.

TA-03 Power Plant

Turbine Operating Logs

CGTG TURBINE UTILITIES AND INFRASTRUCTURE — CGTG GAS TURBINE — Hour Beginnning (MST)/MDT (circle one)

#	Item	Tag	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Instrument Air Compressor		Units	Low	Norm	Max																								
1	NOTE Blowdown Dry Receiver Tank	(BVT-013)	hourly											✓	✓	✓	✓	✓	✓	✓	✓									
2	NOTE Blowdown Wet Receiver Tank	(BVT-007)	hourly											✓	✓	✓	✓	✓	✓	✓	✓									
3	Wet Reciever Air Pressure	PI-002	psig	90	105	120								110	108	108	110	105	112	110	105									
4	Instrument Temperature	TI-001	deg C		20	50								15	16	16	16	17	18	18	18									
5	**Fin Fan Cooler**		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		/	/	/	/	/	/	/	190	190	190	190	190	190	190	190	/	/	/	/	/	/	/	/	/
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								102	110	101	110	105	111	107	100									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	2/3	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	In WC		60	80								60	60	60	62	61	62	61	62									
10	Coolant Return Differential from	FI-002	In WC		37	50								35	35	36	36	36	35	37	36									
11	**Control Room**		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								70	69	70	70	69	71	72	74									
13	Combustible Gas Detector monitor		% LEL		0%	20%								0	0	0	0	0	0	0	0									
15	**WECC Log**		operational			Not operational																								
16	Operation of the PSS/on at 6.3MW		Yes			No								yes	yes	yes	yes	yes	yes	yes	yes									
17	Operation of the AVR Voltage Mode @13.6 KV		Yes			No								yes	yes	yes	yes	yes	yes	yes	yes									
18	Time gas was first introduced into the Turbine (Turbine Rolling)	0629		200	575																									
19	Turbine on line. (When BKR Closes)	0754																												
20	Turbine off line. (When BKR Opens)	1600																												
21	Time of No Gas Flow	1607																												
22	**Entronic Control System**		Units	Low	Norm	Max																								
18	Air Diagram 2000 gal Oily Water Tank Level	LI-231	%			70%								34	34	34	34	34	34	34	34									
19	Air Diagram Page 10 gal Gas TG Drain Tank	LI-230	%			70%								0	0	0	0	0	0	0	0									
20	Air Diagram Page/Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD 5T-01	psig	35	20																									
21	Acknowledge Alarms hourly													✓	✓	✓	✓	✓	✓	✓	✓									
22	Power Management Page Generator Current	A54A-01	Amps			1200								1107	1108	1094	1073	1060	1048	1042	1040									
23	Power Management Page Mw Output		Mw			21								26.1	26.1	25.8	25.1	24.8	24.5	24.7	24.4									
24	Power Management Page 80 % Base Min Load													21.2	21.1	20.7	20.4	20.1	19.8	19.8	19.7									
25	Running Hours/ Unit Overview Page													3222	3223	3224	3225	3226	3227	3228	3228									
26	Ambient Temperature	T1												31.6	32.4	36.7	40.8	44.1	47.5	47.5	48.4									
27	Gas Fuel System/Waste Oil Tank	LI-120	%			70%								49	49	48	47	47	46	47	47									

DATE 1-4-2018 SIGNATURE [signature]

UI-LOG-033-R1
February 9, 2017

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0620																												
Combustible Gas Detector	AAH-303	%		0%	20%								N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A									
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL								48	48	47	47	47	46	46	46									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140								81	82	82	81	82	80	82	81									
Stage Disch. Press	PI-2101	psig		238	285								246	246	248	248	249	247	251	248									
2nd Stage Inlet Press	PI-2200	psig		267	285								242	243	244	244	245	243	247	246									
2nd Stage Disch. Press	PI-2201	psig		575	600								578	578	578	579	579	579	579	578									
Final Discharge Pressure	PI-2108	psig		575	600								574	574	574	575	575	574	574	575									
Lube Oil Pressure	PI-1572	psig	40	60									57	57	57	57	58	57	58	58									
Lube Oil Temp	TE-1584	deg		150	170								169	170	171	171	171	170	170	170									
Final Discharge Temp	TE-2120	deg		110	150								70.9	70	74	77	81	84	85	84									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								207.6	207	206	207	208	209	208	207									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								205	209	207	210	212	215	216	216									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								205	209	204	204	205	206	205	205									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								205	204	207	209	212	216	216	216									
Motor Frame Vibration	VT-1015	IPS			0.15								.03	.03	.03	.03	.02	.03	.03	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.08	.05	.05	.05	.05	.05	.05									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														575															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									570															
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									557															

DATE	1-4-18
SIGNATURE	
Mid Shift	
Days Shift	MBall

644011

Notes

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

CGTG GAS TURBINE

MS1/MD2 (circle one) Date: 01-11-2018

Time Gas Introduced (Turbine Rolling): 0642

Time of Turbine Online (Brkr Closed): 0752

Time Turbine Offline (Brkr Open): 1552

Time No Gas Flow: 1603

Notes:

#	Item	I.D.	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Instrument Air Compressor	I.D.	Units	Low	Norm	Max																								
1	Blowdown Dry Receiver Tank Hourly	BVT-013	✓											yes	yes	yes	yes	yes	yes	yes	yes									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	✓											yes	yes	yes	yes	yes	yes	yes	yes									
3	Wet Reciever Air Pressure	PI-002	psig	90	105	120								165	105	100	105	108	104	105	103									
4	Instrument Temperature	TI-001	deg C		20	50								14	14	15	15	16	15	16	16									
5	**Fin Fan Cooler**		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								109	106	109	104	109	105	108	109									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	In WC		60	80								62	60	60	60	60	60	60	60									
10	Coolant Return Differential from	FI-002	In WC		37	50								35	35	35	35	35	35	35	35									
11	**Control Room**		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								70	69	70	70	70	70	70	70									
13	Combustible Gas Detector monitor		% LEL	0%	0%	20%								0%	0%	0%	0%	0%	0%	0%	0%									
15	**WECC Log**			Operational?																										
16	Operation of the PSS/on @ 3.2MW		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes									
17	Operation of the AVR Voltage Mode @13.6 KV		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20) found on "air diagram page"																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								34%	34%	34%	34%	34%	34%	34%	34%									
19	10 gal Gas TG Drain Tank (air diagram page)	LI-230	%			70%								0%	0%	0%	0%	0%	0%	0%	0%									
20	Record on hard S/D trip over 4500 rpm BL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms hourly		✓											✓	✓	✓	✓	✓	✓	✓	✓									
	(22-24) found on "power management page"																													
22	Generator Current		Amps			1200								1103	1094	1085	1083	1073	1071	1067	1065									
23	Mw Output		MW			27								26.1	25.8	25.6	25.5	25.5	25.5	25.1	25.1									
24	80% Base Load minimum		MW											21.1	20.93	20.69	20.56	20.30	20.4	20.2	20.2									
25	Running Hours (Unit overview)													3230	3232	3233	3234	3235	3236	3236	3237									
26	Ambient Temperature	TI inlet												31.4	34.9	37.4	38.3	41.5	39.9	42	43.2									
	(27-28) found on "gas fuel system page"																													
27	Waste Oil Tank	LI-120	%			70%								50%	49%	48%	48%	48%	48%	48%	48%									
28	Total fuel flow		Mscf/h											245.	243	242	241	238	240	238	237.									

DATE 01-11-2018 SIGNATURE [illegible]

UI LOG 022 R4

GTC TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME 0618																													
Combustible Gas Detector	AAH 303	%		0%	20%								N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A									
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL								45	45	45	45	45	45	45	45									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140								81	82	82	82	81	81	81	81									
Stage Disch. Press	PI-2101	psig		238	285								246	246	247	247	248	248	248	249									
2nd Stage Inlet Press	PI-2200	psig		267	285								242	242	243	244	244	244	244	244									
2nd Stage Disch. Press	PI-2201	psig		575	600								578	578	579	579	579	579	579	579									
Final Discharge Pressure	PI-2108	psig		575	600								574	574	575	575	574	574	574	575									
Lube Oil Pressure	PI-1572	psig	40	60									57	57	57	57	57	57	57	57									
Lube Oil Temp	TF-1584	deg		150	170								169	170	171	171	171	171	170	170									
Final Discharge Temp	TE-2120	deg		110	150								70	71	73	75	77	77	79	78									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								208	208	208	207	207	207	207	206									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								205	205	207	208	212	210	212	211									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								206	206	205	204	204	204	204	203									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								205	206	207	208	216	210	212	211									
Motor Frame Vibration	VT-1015	IPS			0.15								.03	.03	.03	.03	.03	.03	.05	.03									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05	.05	.05	.05	.05	.05	.05									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.													575																
Double Block and Bleed Pressure	A63FGDD	49-48=psid			8								560																
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20								559																

DATE 1-11-18

SIGNATURE [signature]

Mid Shift

Days Shift

Notes

UI-LOG-034-R1
February 9, 2017

CGTG GAS TURBINE

Date: 18 JAN 2018

Time Gas Introduced (Turbine Rolling):	0623	Time Turbine Offline (Brkr Open):	1559
Time of Turbine Online (Brkr Closed):	0756	Time No Gas Flow:	1600

Notes: 648102 GAS READING

#	Item	ID	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Instrument Air Compressor	ID	Units	Low	Norm	Max																								
1	Blowdown Dry Receiver Tank Hourly	BVT-015	✓											✓	✓	✓	✓	✓	✓	✓	✓									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	✓											✓	✓	✓	✓	✓	✓	✓	✓									
3	Wet Reciever Air Pressure	PI-002	psig	90	105	120								104	106	112	108	109	110	112	110									
4	Instrument Temperature	TI-001	deg C		20	50								13	13	14	14	16	16	16	17									
5	**Fin Fan Cooler**		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									19	19	19	19	19	19	19	19									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								98	106	108	98	106	109	103	106									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	In WC		60	80								60	60	60	60	60	63	63	63									
10	Coolant Return Differential from	FI-002	In WC		37	50								35	35	35	35	35	36	35	36									
11	**Control Room**		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								67	69	69	69	70	71	73	74									
13	Combustible Gas Detector monitor		% LEL	0%	0%	20%								0	0	0	0	0	0	0	0									
15	**WECC Log**			Operational?																										
16	Operation of the PSS/ on at 5.2MW		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
17	Operation of the AVR Voltage Mode @13.6 KV		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20) found on "air diagram page"																													
18	2000 gal Oil Water Tank Level	LI-251	%			70%								35	35	35	34	34	34	34	34									
19	10 gal Gas TG Drain Tank (air diagram page)	LI-250	%			70%								0	0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms hourly		✓											✓	✓	✓	✓	✓	✓	✓	✓									
	(22-24) found on "power management page"																													
22	Generator Current		Amps			1200								973	973	974	974	974	973	972	973									
23	Mw Output		MW			27								23.0	22.7	23.1	23.1	23.1	23.1	23.1	23.1									
24	80% Base Load minimum		MW											21.0	21.0	20.6	20.4	20.2	19.9	19.7	19.7									
25	Running Hours (Unit overview)													3240	3241	3242	3243	3244	3245	3246	3247									
26	Ambient Temperature	T1 Inlet												32	33	38	39	43	46	49	50									
	(27-28) found on "gas fuel system page"																													
27	Waste Oil Tank	LI-120	%			70%								51	50	49	48	48	48	49	47									
28	Total fuel flow		Mscf/h											190	222	221	221	222	223	223	224									

DATE 1-16-2018 SIGNATURE [signature]

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%								N/A	N/A	N/A	N/A		N/A	N/A										
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	3/4									
Oil Day Tank Level	LI-1562	GAL	10		FULL								45	45	45	45	45	45	45	45									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140								82	82	81	82	82	82	81	81									
Stage Disch. Press	PI-2101	psig		238	285								248	248	247	249	246	249	250	249									
2nd Stage Inlet Press	PI-2200	psig		267	285								244	244	244	245	244	246	246	245									
2nd Stage Disch. Press	PI-2201	psig		575	600								578	578	578	578	576	578	578	579									
Final Discharge Pressure	PI-2108	psig		575	600								574	574	574	574	576	575	575	574									
Lube Oil Pressure	PI-1572	psig	40	60									57	57	57	57	56	57	58	58									
Lube Oil Temp	TE-1584	deg		150	170								168	170	170	171	171	170	170	168									
Final Discharge Temp	TE-2120	deg		110	150								70	71	74	76	80	82	85	86									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								205	205	206	207	208	209	209	209									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								203	203	206	209	211	214	217	218									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								203	203	203	204	205	206	206	206									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								203	203	206	209	211	215	218	218									
Motor Frame Vibration	VT-1015	IPS			0.15								.04	.03	.03	.03	.03	.03	.03	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05	.05	.06	.05	.05	.05	.06									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														575															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									570															
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									561															

DATE	1-16-2016
SIGNATURE	
Mid Shift	
Days Shift	
Notes	

UI-LOG-033-R2
January 4 2016

CGTG HOURLY READING LOG

Date: 01.22.2018

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0755

Time of Turbine Online (Brkr Closed): 0908

Time Turbine Offline (Brkr Open): 1159

Time No Gas Flow: 1204

Notes: HAD TWO TRIPPES

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√												Yes	Yes	Yes													
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√												Yes	Yes	Yes													
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120									104	104	106													
4	Instrument Temperature	TI-001	deg C		20	50									10	10	10													
5	**Fin Fan Cooler**		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25										19.5	19/5	19/5													
7	Coolant PLC Temperature	TI-002	deg F	100	110	120									111	105	105													
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL									1/2	1/2	1/2													
9	Coolant Return Differential from GG	FI-001	in WC		60	80									63	63	64													
10	Coolant Return Differential from	FI-002	in WC		37	50									34	34	35													
11	**Control Room**		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85									70	70	70													
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%									0%	0%	0%													
15	**WECC Log**		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)									Yes	Yes	Yes													
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)									Yes	Yes	Yes													
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%									35%	35%	35%													
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%									0%	0%	0%													
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√												Yes	Yes	Yes													
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200									1138	1148	1137													
23	Mw Output		MW			27									26.8	26.8	26.8													
24	80% Base Load Minimum		MW												21.75	21.53	21.5													
25	Running Hours (unit overview)														3249	3250	3251													
26	Ambient Temperature	T1 inlet													25.0	-2.6	-2.6													
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%									50%	50	49													
28	Total Fuel Flow		Mscf/h												249.6		247													

Date: 01-22-18 Signature:

UI-LOG-033-R2
January 4 2016

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0720																												
Combustible Gas Detector	AAH-303	%		0%	20%									1/4															
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK										B	B	B													
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY									E	E	E													
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL									1/2	1/2	1/2													
Oil Day Tank Level	LI-1562	GAL	10		FULL									44	43	43													
Lubricator Bulls eye		LEVEL	1/2	FULL										F	F	F													
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY									E	E	E													
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY									E	E	E													
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK										B	B	B													
1st Stage Inlet Press.	PI-2100	psig		88	140									81	81	81													
1st Stage Disch. Press	PI-2101	psig		238	285									244	244	246													
2nd Stage Inlet Press	PI-2200	psig		267	285									241	241	241													
2nd Stage Disch. Press	PI-2201	psig		575	600									578	578	579													
Final Discharge Pressure	PI-2108	psig		575	600									574	574	574													
Lube Oil Pressure	PI-1572	psig	40	60										57	57	57													
Lube Oil Temp	TE-1584	deg		150	170									169	169	169													
Final Discharge Temp	TE-2120	deg		110	150									70	70	69													
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297									205	205	203													
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283									204	204	203													
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297									202	202	200													
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283									204	204	203													
Motor Frame Vibration	VT-1015	IPS			0.15									.04	.04	.04													
Compresser Frame Vibration	VT-1512	IPS			0.35									.05	.05	.05													
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.													575																
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8								570																
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20								558																

DATE

SIGNATURE

Mid Shift

Days Shift

Notes

UI-LOG-034-R1
February 9, 2017

UI-LOG-033-R2
January 4 2018

Date: 1-25-18

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0652

Time of Turbine Online (Brkr Closed): 07:56

Time Turbine Offline (Brkr Open): 15:59

Time No Gas Flow: 16:06

Notes:

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V											✓	✓	✓	✓	✓	✓	L	✓									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V											✓	✓	✓	✓	✓	✓	✓	✓									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								104	110	111	112	111	112	110	110									
4	Instrument Temperature	TI-001	deg C		20	50								12	12	14	14	16	16	17	17									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									19.6	19.4	19.4	19.4	19.6	19.6	19	19.4									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								76	110	111	111	100	104	106	103									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	In WC		60	80								60	60	62	62	62	65	62	60									
10	Coolant Return Differential from	FI-002	In WC		37	50								34	35	35	35	36	38	38	37									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								68	68	68	69	70	70	72	73									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0	0	0	0	0	0	0	0									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								35	35	35	35	34	34	34	34									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0	0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V											✓	✓	✓	✓	✓	✓	✓	✓									
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200								1111	1101	1082	1066	1054	1038	1032	1026									
23	Mw Output		MW			27								26.3	26.1	25.5	25.1	25.1	24.4	24.5	24.1									
24	80% Base Load Minimum		MW											21.3	21.0	20.6	20.3	20.1	19.9	19.9	19.7									
25	Running Hours (unit overview)													3253	3254	3254	3256	3257	3258	3258	3259									
26	Ambient Temperature	T1 inlet												29.1	33.3	37.4	41.5	44.1	46.1	47.5	49.1									
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								52	51	50	49	49	49	50	51									
28	Total Fuel Flow		Mscf/h											245.6	242.6	239.3	235.3	235.2	231	230.9	228.7									

Date: 1-25-18 Signature:

UI-LOG-033-R2
January 4 2018

GAS TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME											0615																		
Combustible Gas Detector	AAH 303	%		0%	20%								N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A									
Packing Lube Oil Flow Indicator Left Side	FSL 1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI 7721	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Crankcase Bulls eye	LG 1574	LEVEL	1/4	1/2	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI 1562	GAL	10		FULL								44	44	43	43	43	43	43	43									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI 7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI 7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL 1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI 2100	psig		88	140								81.8	81.7	82.2	81.6	81.7	82	81.1	82.2									
Stage Disch. Press	PI-2101	psig		238	285								246	246	249	248	248	250	249	252									
2nd Stage Inlet Press	PI 2200	psig		267	285								242	242	245	245	244	247	245	248									
2nd Stage Disch. Press	PI 2201	psig		575	600								578	579	578	579	579	578	578	579									
Final Discharge Pressure	PI 2108	psig		575	600								574	575	575	575	574	575	575	574									
Lube Oil Pressure	PI 1572	psig	40	60									57	57.7	57.7	57.7	58.1	58	58	58.7									
Lube Oil Temp	TE 1584	deg		150	170								168	170	171	171	170	170	169	168									
Final Discharge Temp	TE 2120	deg		110	150								70	71	75	78	82	85	86	86									
1st Stage Cylinder Disch. Temperature A	TE 2054 A	deg		226	297								205	205	205	206	206	207	207	206									
2nd Stage Cylinder Disch. Temperature A	TE 2062 A	deg		258	283								205	203	208	212	215	216	217	217									
1st Stage Cylinder Disch. Temperature B	TE 2054 B	deg		226	297								203	203	203	203	203	204	203	203									
2nd Stage Cylinder Disch. Temperature B	TE 2062 B	deg		258	283								205	204	208	212	214	217	218	217									
Motor Frame Vibration	VT 1015	IPS			0.15								.04	.04	.04	.04	.04	.04	.04	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05	.05	.05	.05	.06	.05	.06									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														574															
Double Block and Bleed Pressure	A63I GDT	49-48=psid			8									970															
Fuel Gas Supply Pressure	A63FTGSI	50-49=psid			20									558															

DATE 1-25-18

SIGNATURE [illegible]

Mid Shift

Days Shift L Pacheco

Notes

UI-LOG-034-R1
February 9, 2017

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 02-01-2018

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0707

Time of Turbine Online (Brkr Closed): 0750

Time Turbine Offline (Brkr Open): 1558

Time No Gas Flow: 1604

Notes:

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V											Yes	Yes	Yes	Yes	Yes	Yes	Y	Y									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V											Yes	Yes	Yes	Yes	Yes	Yes	Y	Y									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								110	104	105	110	105	108	110	105									
4	Instrument Temperature	TI-001	deg C		20	50								19	20	20	20	20	20	20	20									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									195	19.5	195	195	19/5	19/5	19/5	19/5									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								110	99	105	104	103	105	10	110									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	In WC		60	80								61	62	63	64	64	64	64	63									
10	Coolant Return Differential from	FI-002	In WC		37	50								35	35	38	36	37	37	37	34									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								70	70	70	70	70	70	70	70									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0%	0%	0%	0%	0%	0%	0%	0%									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6 3MW		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								34%	34%	34%	34%	34%	34%	34%	34%									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0%	0%	0%	0%	0%	0%	0%	0%									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AG3GGD 5T-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V											Yes	Yes	Yes	Yes	Yes	Yes	Y	Yes									
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200								1051	1025	1028	1013	1004	993	1	988									
23	Mw Output		MW			27								24.8	24.1	24.2	23.8	23.5	23.5	23	23.0									
24	80% Base Load Minimum		MW											20.2	19.7	19.6	19.4	19.2	19.1	19.0	19.02									
25	Running Hours (unit overview)													3261	3264	3264	3265	3266	3267	32	3269									
26	Ambient Temperature	T1 inlet												43.3	49.1	50.7	53.2	55.2	56.7	-	58.3									
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								51%	51%	58%	50	50%	49%	5	51%									
28	Total Fuel Flow		Mscf/h											233.0	230	230	227	227	224	227	223									

223

Date: 02-01-2018 Signature: Ramon Vigil

UI-LOG-033-R2
January 4 2018

17332800UU

GTC TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0625																												
Combustible Gas Detector	AAH-303	%		0%	20%								4/A																
Packing Lube Oil Flow Indicator Left Side	FSL 1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7723	LIQID		EMPTY	ANY								E	E	E	F	E	F	F	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL								41	41	41	41	41	41	41	41									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	F	F	F	E	F	F									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	F	E	E	F									
Packing Lube Oil Flow Indicator Right Side	FSL 1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI 2100	psig		88	140								82	82	80	82	80	82	81	81									
Stage Disch. Press	PI 2101	psig		238	285								249	250	248	251	249	252	251	251									
2nd Stage Inlet Press	PI 2200	psig		267	285								246	247	245	248	245	248	247	248									
2nd Stage Disch. Press	PI 2201	psig		575	600								579	579	579	579	579	578	579	578									
Final Discharge Pressure	PI 2108	psig		575	600								574	574	575	575	574	575	575	575									
Lube Oil Pressure	PI 1572	psig	40	60									58	58	58	58	58	59	59	59									
Lube Oil Temp	TE 1584	deg		150	170								169	169	169	169	168	168	166	165									
Final Discharge Temp	TE 2120	deg		110	150								80	87	87	90	91	93	94	94									
1st Stage Cylinder Disch. Temperature A	TE 2054 A	deg		226	297								209	210	210	211	211	212	212	211									
2nd Stage Cylinder Disch. Temperature A	TE 2062 A	deg		258	283								213	217	219	221	222	223	223	223									
1st Stage Cylinder Disch. Temperature B	TE 2054 B	deg		226	297								207	208	207	208	208	209	209	206									
2nd Stage Cylinder Disch. Temperature B	TE 2062 B	deg		258	283								213	218	219	221	223	224	224	224									
Motor Frame Vibration	VT 1015	IPS			0.15								.03	.03	.03	.03	.04	.04	.04	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05	.05	.05	.05	.05	.05	.05									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.													573																
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8								567																
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20								556																

DATE 02-01-2018

SIGNATURE [signature]

Mid Shift

Days Shift ✓

Notes

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 2-8-18

(MST) / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0657 - 0708

Time of Turbine Online (Brkr Closed): 0752

Time Turbine Offline (Brkr Open): 1558

Time No Gas Flow: 1604

Notes:

	Instrument Air Compressor	I D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V											V	V	V	V	✓	/	✓	/									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V											V	V	V	V	✓	/	✓	/									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								108	108	106	105	106	104	112	110									
4	Instrument Temperature	TI-001	deg C		20	50								18	16	17	18	20	20	20	20									
5	**Fin Fan Cooler**		**Units**	**Low**	**Norm**	**Max**																								
6	Coolant Pressure	PI-250	psig		25									19	19	19.2	19.2	19	19	19.4	19									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								97	106	111	105	103	108	109	98									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	in WC		60	80								58	60	60	60	60	61	64	62									
10	Coolant Return Differential from	FI-002	in WC		37	50								35	35	36	35	35	36	36	36									
11	**Control Room**		**Units**	**Low**	**Norm**	**Max**																								
12	Room Temperature		deg F		72	85								69	69	70	72	76	75	74	76									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0	0	0	0	0	0	0	0									
15	**WECC Log**		**Operational?**																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								yes	yes	yes	yes	YES	YES	yes	YES									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								yes	yes	yes	yes	YES	YES	yes	YES									
	Entronic Control System		**Units**	**Low**	**Norm**	**Max**																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								35	35	34	34	34	34	34	34									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0	0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		✓											✓	✓	✓	✓	/	✓	✓	/									
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200								1078	1081	1065	1056	1038	1031	1021	1015									
23	Mw Output		MW			27								25.5	25.5	25.1	24.8	24.4	24.1	24.1	23.8									
24	80% Base Load Minimum		MW											20.7	20.4	20.1	19.9	19.7	19.5	19.4	19.4									
25	Running Hours (unit overview)													3270	3272	3272	3273	3274	3275	3276	3277									
26	Ambient Temperature	T1 inlet												37.4	39.9	43.3	46.6	49	51	525	54									
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								52	51	50	50	50	50	51	51									
28	Total Fuel Flow		Mscf/h											239	239	237	235	230	229	228	229									

Date: 2-8-18 Signature:

0653 HAD UNIT TRIP ONCE

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME											603																		
Combustible Gas Detector	AAH-303	%		0%	20%								N/A	N/A	N/A	N/A	N/A												
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E	F	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL								40	40	40	40	40	40	40	40									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140								81.9	81.9	81.6	80.7	81	81	80	81									
Stage Disch. Press	PI-2101	psig		238	285								247	248	248	248	249	249	250	251									
2nd Stage Inlet Press	PI-2200	psig		267	285								247	244	244	244	246	246	246	246									
2nd Stage Disch. Press	PI-2201	psig		575	600								578	578	579	579	579	579	578	579									
Final Discharge Pressure	PI-2108	psig		575	600								574	574	574	574	575	575	575	575									
Lube Oil Pressure	PI-1572	psig	40	60									57.1	57.8	57.8	58	58	58	58	59									
Lube Oil Temp	TE-1584	deg		150	170								169	170	171	170	169	168	168	167									
Final Discharge Temp	TE-2120	deg		110	150								74.8	76.8	77.7	84	87	88	90	90									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								208	207	208	209	209	210	210	209									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								207	208	212	216	220	221	222	221									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								205	205	205	204	207	207	207	206									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								208	209	212	216	219	221	222	222									
Motor Frame Vibration	VT-1015	IPS			0.15								.03	.04	.04	.03	.03	.04	.04	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.06	.06	.05	.05	.05	.06	.05									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														575															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									570															
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									559															

DATE	2-8-18
SIGNATURE	
Mid Shift	
Days Shift	LEONARD PACHECO

654996 -5566

Notes

UI-LOG-033-R2
January 4 2016

CGTG HOURLY READING LOG

Date: 02-14-18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1420

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow: 1424

Notes: WO) NOT PUT ON LINE. JUST TEST FOR JOE B. CGTG UNAVAILABLE DO TO SEVERAL ISSUES.

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-003	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	in WC		60	80																								
10	Coolant Return Differential from	FI-002	In WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√																											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-220	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 02-14-18 Signature:

UI-LOG-033-R2
January 4 2016

GTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	1300																												
Combustible Gas Detector	AAH 303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK																									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY																								
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL																								
Oil Day Tank Level	LI 1562	GAL	10		FULL																								
Lubricator Bulls eye		LEVEL	1/2	FULL																									
1st Stage Scrubber Liquid Level	LI 7416	LIQID		EMPTY	ANY																								
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY																								
Packing Lube Oil Flow Indicator Right Side	FSL 1501A	LIGHT		BLINK																									
1st Stage Inlet Press.	PI 2100	psig		88	140																								
Stage Disch. Press	PI 2101	psig		238	285																								
2nd Stage Inlet Press	PI 2200	psig		267	285																								
2nd Stage Disch. Press	PI 2201	psig		575	600																								
Final Discharge Pressure	PI 2108	psig		575	600																								
Lube Oil Pressure	PI 1572	psig	40	60																									
Lube Oil Temp	TE 1584	deg		150	170																								
Final Discharge Temp	TE 2120	deg		110	150																								
1st Stage Cylinder Disch. Temperature A	TE 2054 A	deg		226	297																								
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283																								
1st Stage Cylinder Disch. Temperature B	TE 2054 B	deg		226	297																								
2nd Stage Cylinder Disch. Temperature B	TE 2062 B	deg		258	283																								
Motor Frame Vibration	VT 1015	IPS			0.15																								
Compresser Frame Vibration	VT 1512	IPS			0.35																								
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE 02-14-18

SIGNATURE [signature]

Mid Shift

Days Shift Fun Test with Joe B.

Notes

UI-LOG-034-R1
February 9, 2017

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 02-15-2018

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1305

Time of Turbine Online (Brkr Closed): 1352

Time Turbine Offline (Brkr Open): 1405

Time No Gas Flow: 1412

Notes: For TEST ONLY. Per Pablo CO UNCL. SYN TO GRID LET RAMP UP THEN BRING DOWN OFF LINE

#	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	In WC		60	80																								
10	Coolant Return Differential from	FI-002	In WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log			Operational?																										
16	Operation of PSS/on at 6 3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√																											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27													24.8	24.5										
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

FOR TEST

Date: 02-15-2018 Signature: [signature]

UI-LOG-033-R2
January 4 2018

EGTC TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	1215																												
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL 1501B	LIGHT		BLINK																									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY																								
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL																								
Oil Day Tank Level	LI-1562	GAL	10		FULL																								
Lubricator Bulls eye		LEVEL	1/2	FULL																									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY																								
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY																								
Packing Lube Oil Flow Indicator Right Side	FSL 1501A	LIGHT		BLINK																									
1st Stage Inlet Press.	PI 2100	psig		88	140																								
Stage Disch. Press	PI-2101	psig		238	285																								
2nd Stage Inlet Press	PI 2200	psig		267	285																								
2nd Stage Disch. Press	PI 2201	psig		575	600																								
Final Discharge Pressure	PI 2108	psig		575	600																								
Lube Oil Pressure	PI 1572	psig	40	60																									
Lube Oil Temp	TE-1584	deg		150	170																								
Final Discharge Temp	TE 2120	deg		110	150																								
1st Stage Cylinder Disch. Temperature A	TE 2054 A	deg		226	297																								
2nd Stage Cylinder Disch. Temperature A	TE 2062 A	deg		258	283																								
1st Stage Cylinder Disch. Temperature B	TE 2054 B	deg		226	297																								
2nd Stage Cylinder Disch. Temperature B	TE 2062 B	deg		258	283																								
Motor Frame Vibration	VT 1015	IPS			0.15																								
Compresser Frame Vibration	VT 1512	IPS			0.35																								
Take Once per Shift / at Full Load		psig		Max psid	When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																								
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE 02.15.2018

SIGNATURE

Mid Shift

Days Shift

Notes For TEST ONLY

For TEST

UI-LOG-033-R2
January 4 2018

Date: 3-1-2018

(MST) / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0654

Time of Turbine Online (Brkr Closed): 0753

Time Turbine Offline (Brkr Open): 1608

Time No Gas Flow: 1615

Notes:

CGTG HOURLY READING LOG

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√											/	√	√	/	/	√	√	√									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√											/	√	√	/	/	√	√	√									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								109	105	106	110	107	108	108	108									
4	Instrument Temperature	TI-001	deg C		20	50								14	14	14	15	15	15	16	16									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									19	19	19	19	19	19	19	19									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								109	111	109	106	106	110	98	109									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	in WC		60	80								60	60	61	61	61	63	63	63									
10	Coolant Return Differential from	FI-002	in WC		37	50								35	35	35	36	36	36	36	36									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								70	67	69	70	71	73	74	74									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0	0	0	0	0	0	0	0									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								YES	Yes	Yes	YES	YES	Yes	Yes	Yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								YES	Yes	Yes	YES	YES	Yes	Yes	Yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								35	35	35	34	34	34	34	34									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0	0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√											/	√	√	/	/	√	√	√									
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200								1091	1086	1072	1068	1050	1051	1044	1040									
23	Mw Output		MW			27								25.8	25.8	25.5	25.1	24.8	24.8	24.8	24.4									
24	80% Base Load Minimum		MW											21.0	20.5	20.4	20.2	20.0	20.0	19.9	19.8									
25	Running Hours (unit overview)													3281	3282	3283	3284	3285	3286	3287	3288									
26	Ambient Temperature	T1 inlet												34	38	40	42	45	45.9	47.5	41.1									
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								53	52	51	51	51	51	51	52									
28	Total Fuel Flow		Mscf/h											243	242	240	239	235	236	235	234									

Date: 3-1-18 Signature:

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME											0617																		
Combustible Gas Detector	AAH-303	%		0%	20%								N/A	N/A	N/A														
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL								50	50	49	49	49	49	49	49									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140								81	81	81	82	81	81	82	82									
Stage Disch. Press	PI-2101	psig		238	285								247	249	249	249	250	249	251	251									
2nd Stage Inlet Press	PI-2200	psig		267	285								243	244	245	246	247	245	247	248									
2nd Stage Disch. Press	PI-2201	psig		575	600								579	579	579	579	579	579	579	579									
Final Discharge Pressure	PI-2108	psig		575	600								574	574	575	575	575	575	575	575									
Lube Oil Pressure	PI-1572	psig	40	60									57	57	57	57	58	58	59	59									
Lube Oil Temp	TE-1584	deg		150	170								169	171	171	171	170	169	168	168									
Final Discharge Temp	TE-2120	deg		110	150								72	75	77	80	82	85	86	86									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								206	206	206	206	206	207	207	206									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								205	209	210	213	214	217	218	217									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								204	204	203	203	203	204	204	203									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								205	209	210	213	214	217	218	217									
Motor Frame Vibration	VT-1015	IPS			0.15								.03	.03	.03	.03	.03	.03	.03	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05	.06	.05	.05	.05	.06	.05									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														575															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8							75		570	5														
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									559	11														

DATE 3-1-18

SIGNATURE

Mid Shift

Days Shift [signature]

0900

Notes [illegible] alert lube oil temp

0900 – 655207

55666

UI-LOG-034-R1
February 9, 2017

UI-LOG-033-R2
January 4 2018

Date: 3-8-2018

CGTG HOURLY READING LOG

(MST) / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0706
Time of Turbine Online (Brkr Closed): 0900

Time Turbine Offline (Brkr Open): 1559
Time No Gas Flow: 1606

Notes:

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V												✓	✓	✓	✓	✓	✓	✓									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V												✓	✓	✓	✓	✓	✓	✓									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120									106	112	110	112	110	108	106									
4	Instrument Temperature	TI-001	deg C		20	50									16	16	17	18	18	20	18									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25										19	19.4	19.4	19.4	19.4	19.8	19.4									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120									100	111	110	102	111	104	107									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	In WC		60	80									60	60	62	63	63	65	65									
10	Coolant Return Differential from	FI-002	In WC		37	50									35	35	35	36	38	38	38									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85									70	72	72	74	75	75	75									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%									0	0	0	0	0	0	0									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%									34	34	34	34	34	34	34									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%									0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V												✓	✓	✓	✓	✓	✓	✓									
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200									1031	1028	1021	1011	992	984	980									
23	Mw Output		MW			27									24.4	24.2	23.4	23.8	23.2	23.0	23.0									
24	80% Base Load Minimum		MW												19.7	19.6	19.4	19.3	19.0	18.9	19.0									
25	Running Hours (unit overview)												3259		3291	3292	3293	3294	3295	3296	3297									
26	Ambient Temperature	T1 inlet													48	50	53	54	57	59	59									
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%									52	50	50	50	51	51	51									
28	Total Fuel Flow		Mscf/h												233	230	229	228	222	223	223									

Date: 3-8-2018 Signature:

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0640													N/A															
Combustible Gas Detector	AAH-303	%		0%	20%									N/A	N/A	N/A	N/A	N/A	N/A	N/A									
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK										B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL									48	48	48	48	48	48	48									
Lubricator Bulls eye		LEVEL	1/2	FULL										F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK										B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140									80.9	81.7	82.0	81.7	81.7	81.5	81.4									
Stage Disch. Press	PI-2101	psig		238	285									248	250	250	250	250	251	251									
2nd Stage Inlet Press	PI-2200	psig		267	285									244	245	247	246	246	247	247									
2nd Stage Disch. Press	PI-2201	psig		575	600									578	578	579	579	578	579	579									
Final Discharge Pressure	PI-2108	psig		575	600									574	575	575	575	575	575	575									
Lube Oil Pressure	PI-1572	psig	40	60										58	58.3	58.4	58.7	58.9	59.2	59.9									
Lube Oil Temp	TE-1584	deg		150	170									170	170	169	168	168	166	167									
Final Discharge Temp	TE-2120	deg		110	150									85	88	90	92	94	95	95									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297									210	210	211	212	212	217	212									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283									216	218	221	222	224	225	225									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297									209	208	208	209	209	211	212									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283									217	218	220	222	224	226	226									
Motor Frame Vibration	VT-1015	IPS			0.15									.04	.04	.04	.04	.04	.04	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35									.05	.05	.05	.05	.06	.06	.06									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														576															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									570															
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									561															

DATE 3-8-2018

SIGNATURE [signature]

Mid Shift

Days Shift /

Notes 0900 - informed Jones & Chavis about lube oil temp.

UI-LOG-034-R1
February 9, 2017

CGTG HOURLY READING LOG

Time Turbine Offline (Brkr Open): 1231 1558
Time No Gas Flow: 1605

Notes: TESTING BEING DONE ON P55.

Log	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
															Y	Y	Y									
															4	4	4									
8	105	120													112	110	114									
	20	50													22	22	20									
Log	Norm	Max																								
	25														19.2	19.4	19.6									
12	110	120													100	107	103									
12	2/3	FULL													1/2	1/2	1/2									
	60	80													62	64	64									
	37	50													35	36	36									
Log	Norm	Max																								
	72	85													68	69	67									
0%	0%	20%													0	0	0									
Operational?																										
		No (N)													Yes	Yes	Yes									
		No (N)													Yes	Yes	Yes									
Low	Norm	Max																								
		70%													34	34	34									
		70%													0	0	0									
35	20																									
															✓	✓	✓									
		1200													1016	1004	1040									
		27													23.8	23.5	24.1									
															19.5	19.4	19.8									
															3294	3300	3301									
															51.6	53.2	47.5									
		70%													52	52	52									
															229	226	231									

Jody Cravens

UTILITIES AND INFRASTRUCTURE

	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2																												
-393	%		0%	20%													N/A	N/A	N/A									
1501B	LIGHT		BLINK														B	B	B									
72	LIQID		EMPTY	ANY													E	E	E									
574	LEVEL	1/4	1/2	FULL													1/2	1/2	1/2									
562	GAL	10		FULL													46	46	46									
	LEVEL	1/2	FULL														F	F	F									
11	LIQID		EMPTY	ANY													E	E	E									
68	LIQID		EMPTY	ANY													E	E	E									
1501A	LIGHT		BLINK														B	B	B									
100	psig		88	140													81.1	81.8	81.4									
101	psig		238	285													249	250	248									
200	psig		267	285													245	245	245									
203	psig		575	600													579	579	578									
108	psig		575	600													575	575	575									
572	psig	40	60														59.1	59.7	58.8									
584	deg		150	170													167	166	168									
120	deg		110	150													91	93	86									
054 A	deg		226	297													216	214	212									
062 A	deg		258	283													223	224	217									
054 B	deg		226	297													213	211	210									
062 B	deg		258	283													223	225	218									
015	IPS			0.15													.04	.04	.04									
512	IPS			0.35													.06	.06	.06									
	psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
																		576										
FCDT	49-48=psid			8														571										
FTEST	50-49=psid			20														559										

DL

S Done on P.SS.

1445/1711

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 3-22-18
MST / MDT (circle one) — MDT circled
Time Gas Introduced (Turbine Rolling): 0629
Time of Turbine Online (Brkr Closed): 0754
Time Turbine Offline (Brkr Open): 1600
Time No Gas Flow: 1606

Notes: 1030 - TURN ON A/C UNITS IN CONTROL ROOM.

#	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	✓											✓	✓	✓	✓	✓	✓	✓	✓									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	✓											✓	✓	✓	✓	✓	✓	✓	✓									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								114	107	106	109	106	109	106	104									
4	Instrument Temperature	TI-001	deg C		20	50								22	21	21	21	22	23	22	23									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									19	19	19	19	19	19	19	19									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								105	100	102	104	102	104	101	109									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	In WC		60	80								60	60	60	60	60	60	60	60									
10	Coolant Return Differential from	FI-002	In WC		37	50								37	37	37	37	32	32	32	32									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								75	76	77	79	72	74	75	75									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0	0	0	0	0	0	0	0									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								34%	34	34	34	34	34	34	33									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0%	0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGO ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		✓											✓	✓	✓	✓	✓	✓	✓	✓									
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200								1028	1025	1000	1003	986	976	953	954									
23	Mw Output		MW			27								24.1	24.0	23.4	23.3	22.7	22.4	22.0	22.0									
24	80% Base Load Minimum		MW											19.8	19.4	19.1	19.0	18.8	18.6	18.3	18.4									
25	Running Hours (unit overview)													3304	3305	3306	3307	3308	3309	3310	3311									
26	Ambient Temperature	T1 inlet												48.4	53.2	58.3	59.3	61.7	64.2	67.8	66.7									
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								52	51%	51	50	50	50	50	50									
28	Total Fuel Flow		Mscf/h											208	230	227	226	224	221	216	216									

Date: 3-22-2018 Signature: M. [signature]

UI-LOG-033-R2

GTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0615																												
Combustible Gas Detector	AAH-303	%		0%	20%								✓	✓	✓	✓	✓	✓	✓	✓									
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								½	½	½	½	½	½	½	½									
Oil Day Tank Level	LI-1562	GAL	10		FULL								45	45	45	45	45	45	45	45									
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140								82	82	81	81	81	81	81	81									
Stage Disch. Press	PI-2101	psig		238	285								249	250	250	249	250	250	250	251									
2nd Stage Inlet Press	PI-2200	psig		267	285								245	246	246	245	246	247	247	248									
2nd Stage Disch. Press	PI-2201	psig		575	600								578	574	574	574	574	574	574	574									
Final Discharge Pressure	PI-2108	psig		575	600								575	575	575	575	575	575	574	575									
Lube Oil Pressure	PI-1572	psig	40	60									59	59	59	59	59	60	60	60									
Lube Oil Temp	TE-1584	deg		150	170								169	168	167	166	165	165	165	164									
Final Discharge Temp	TE-2120	deg		110	150								88	91	94	96	99	102	103	104									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								213	213	214	215	216	216	214	217									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								217	219	222	225	228	231	232	232									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								210	211	20	213	213	213	214	215									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								218	220	222	225	227	231	234	232									
Motor Frame Vibration	VT-1015	IPS			0.15								.03	.04	.03	.04	.04	.04	.04	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05	.05	.06	.06	.06	.06	.06									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														575															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									571															
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									561															

DATE 3-22-16

SIGNATURE

Mid Shift

Days Shift

660309 GAS READING

Notes

UI-LOG-033-R2
January 4 2018

Date: 3-29-18

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0647

Time of Turbine Online (Brkr Closed): 0755

Time Turbine Offline (Brkr Open): 1000

Time No Gas Flow: 1007

Notes:

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√											√	√	√													
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√											√	√	√													
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								107	106	108													
4	Instrument Temperature	TI-001	deg C		20	50								20	19	19													
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		75									19.8	19.8	19.8													
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								102	98	100													
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2													
9	Coolant Return Differential from GG	FI-001	in WC		60	80								60	60	60													
10	Coolant Return Differential from	FI-002	in WC		37	50								37	37	38													
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								70	70	70													
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0	0	0													
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								Yes	Yes	Yes													
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								Yes	Yes	Yes													
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								35	35	35													
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0	0	0													
20	Record on hard S/D trip over 4500 rpm NL Compressor (on fine trip)	A63GGD ST-01	psig	35	20																								
21	Acknowledge Alarms Hourly		√											√	√	√													
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200								981	984	984													
23	Mw Output		MW			27								23.1	23.1	23.1													
24	80% Base Load Minimum		MW											20.8	20.4	20.3													
25	Running Hours (unit overview)													3313	3314	3315													
26	Ambient Temperature	T1 inlet												34.9	39.2	41.5													
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								54	53	53													
28	Total Fuel Flow		Mscf/h											220	221	222													

Date: 3-29-18 Signature: A. Cuellar

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0628																												
Combustible Gas Detector	AAH-303	%		0%	20%								.005	NA															
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									√	√															
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E															
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2															
Oil Day Tank Level	LI-1562	GAL	10		FULL								3/4	3/4															
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F															
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E															
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E															
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									√	√															
1st Stage Inlet Press.	PI-2100	psig		88	140								82	81															
Stage Disch. Press	PI-2101	psig		238	285								247	247															
2nd Stage Inlet Press	PI-2200	psig		267	285								243	243															
2nd Stage Disch. Press	PI-2201	psig		575	600								578	578															
Final Discharge Pressure	PI-2108	psig		575	600								575	575															
Lube Oil Pressure	PI-1572	psig	40	60									57	58															
Lube Oil Temp	TE-1584	deg		150	170								169	170															
Final Discharge Temp	TE-2120	deg		110	150								74	76															
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								210	210															
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								207	209															
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								207	208															
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								208	210															
Motor Frame Vibration	VT-1015	IPS			0.15								.03	.03															
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.03															
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.													575																
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8								571																
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20								561																

DATE 3-29-18

SIGNATURE [signature]

Mid Shift

Days Shift [signature]

Notes

UI-LOG-034-R1
February 9, 2017

Date: 4-5-18

MST / (MDT) (circle one)

Time Gas Introduced (Turbine Rolling): 0626

Time of Turbine Online (Brkr Closed): 0754

Time Turbine Offline (Brkr Open): 1659

Time No Gas Flow: 1706

CGTG HOURLY READING LOG

Notes: GAS READING: 663052

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Blowdown Dry Receiver Tank Hourly	BVT-013	v											✓	✓	✓	✓	✓	✓	✓	✓	✓		
2	Blowdown Wet Receiver Tank Hourly	BVT-007	v											✓	✓	✓	✓	✓		✓	✓	✓		
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								109	112	111	106	110	106	110	105	106		
4	Instrument Temperature	TI-001	deg C		20	50								19	19	19	20	20	20	22	22	22		
5	Fin Fan Cooler		Units	Low	Norm	Max																		
6	Coolant Pressure	PI-250	psig		25									19	19	19	19	19	19	19	19	19		
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								100	99	111	110	101	106	110	105	106		
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								½	½	½	½	½	½	½	½	½		
9	Coolant Return Differential from GG	FI-001	In WC		60	80								60	60	60	60	60	60	60	60	60		
10	Coolant Return Differential from	FI-002	In WC		37	50								35	36	36	36	36	36	36	36	36		
11	Control Room		Units	Low	Norm	Max																		
12	Room Temperature		deg F		72	85								70	70	70	710	71	70	70	71	71		
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0	0	0	0	0	0	0	0	0		
15	WECC Log		Operational?																					
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes	yes		
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								yes	yes	yes	yes	yes	yes	yes	yes	yes		
	Entronic Control System		Units	Low	Norm	Max																		
	(18–20 found on Air Diagram page)																							
18	2000 gal Oil Water Tank Level	LI-231	%			70%								34%	34	34	34	34	34	34	34	34		
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0%	0	0	0	0	0	0	0	0		
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																			
21	Acknowledge Alarms Hourly		v											✓	✓	✓	✓	✓	✓	✓	✓	✓		
	(22–24 found on Power Management page)																							
22	Generator Current		Amps			1200								1023	1012	1012	991	992	974	969	973	978		
23	Mw Output		MW			27								24.1	23.8	23.8	23.5	23.4	22.8	22.7	22.7	22.7		
24	80% Base Load Minimum		MW											19.9	19.9	19.3	19.1	19.0	18.6	18.5	18.6	18.5		
25	Running Hours (unit overview)													3317	3316	3319	3320	3321	3322	3323	3324	3325		
26	Ambient Temperature	T1 inlet												48.4	54.1	55.8	57.4	59.1	60.8	61.7	60.8	60.1		
	(27–28 found on Gas Fuel System page)																							
27	Waste Oil Tank	LI-120	%			70%								53%	53	53	53	51	51	51	51	51		
28	Total Fuel Flow		Mscf/h											231	228	227	225	223	220	220	222	223		

Date: 4-5-2018 Signature: MG Pairly

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
GAS COMPRESSOR START TIME	0615																								
Combustible Gas Detector	AAH-303	%		0%	20%								—	—	—	—	—	—	—	—	—				
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B	B	B	B	B	B	B	B				
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E	E				
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								½	½	½	½	½	½	½	½	½				
Oil Day Tank Level	LI-1562	GAL	10		FULL								44	44	44	44	44	44	44	44	44				
Lubricator Bulls eye		LEVEL	1/2	FULL									F	F	F	F	F	F	F	F	F				
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E	E				
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E	E				
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B	B	B	B	B	B	B	B				
1st Stage Inlet Press.	PI-2100	psig		88	140								81	81	81	81	81	81	81	81	81				
Stage Disch. Press	PI-2101	psig		238	285								246	247	249	246	249	249	250	250	250				
2nd Stage Inlet Press	PI-2200	psig		267	285								243	244	245	245	245	245	246	246	247				
2nd Stage Disch. Press	PI-2201	psig		575	600								574	574	574	574	574	574	574	574	574				
Final Discharge Pressure	PI-2108	psig		575	600								575	575	575	575	575	575	575	575	575				
Lube Oil Pressure	PI-1572	psig	40	60									58	59	59	59	59	60	60	60	60				
Lube Oil Temp	TE-1584	deg		150	170								169	168	166	167	165	164	164	164	163				
Final Discharge Temp	TE-2120	deg		110	150								97	91	94	95	98	99	100	98	99				
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								215	216	216	216	217	217	217	216	216				
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								214	221	225	226	229	229	230	228	228				
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								212	213	213	213	213	214	214	214	214				
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								227	224	224	224	225	224	230	226	226				
Motor Frame Vibration	VT-1015	IPS			0.15								.03	.04	.04	.04	.04	.04	.04	.04	.04				
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05	.05	.05	.05	.05	.05	.05	.05				
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engine																			
Natural Gas Comp.Discharge Press.														575											
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									570											
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									560											

1451/17

DATE

SIGNATURE

Mid Shift

Days Shift

Notes

UI-LOG-033-R2
January 4 2018

Date: 4-9-18

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0910

Time of Turbine Online (Brkr Closed): 0923

Time Turbine Offline (Brkr Open): 1558

Time No Gas Flow: 1604

Notes:

	Instrument Air Compressor	ID	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√												Y	Y	Y	Y	Y	Y	Y									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√												Y	Y	Y	Y	Y	Y	Y									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120									106	105	104	103	104	105	105									
4	Instrument Temperature	TI-001	deg C		20	50									19	19	19	19	20	20	21									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25										19.5	19.5	19.5	19.5	19.5	19.5	19.5									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120									82	87	105	111	105	106	107									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	in WC		60	80									63	63	64	63	63	63	64									
10	Coolant Return Differential from	FI-002	in WC		37	50									35	35	36	36	36	36	37									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85									73	73	73	73	73	73	73									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%									0%	0%	0%	0%	0%	0%	0%									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)									Yes	Yes	Yes	Yes	Yes	Yes	Yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)									Yes	Yes	Yes	Yes	Yes	Yes	Yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%									35%	34%	34%	34%	34%	34%	34%									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%									0%	0%	0%	0%	0%	0%	0%									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√												Yes	Yes	Yes	Yes	Yes	Yes	Yes									
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200									1009	1012	012	1000	996	983	973									
23	Mw Output		MW			27									23.8	23.8	23.8	23.5	23.4	23.1	22.7									
24	80% Base Load Minimum		MW												19.4	19.3	1.9	19.1	19.0	MZ	18.7									
25	Running Hours (unit overview)														3326	3330	3329	3329	3330	3331	3332									
26	Ambient Temperature	T1 Inlet													52.5	55.0	55.0	56.7	57.6	59.2	61.7									
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%									52%	52%	52%	52%	52%	52%	53%									
28	Total Fuel Flow		Mscf/h												228.1	228	223	223	222	219	218									

Date: 4-9-18 Signature:

UI-LOG-033-R2
January 4 2018

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	903																												
Combustible Gas Detector	AAH 303	%		0%	20%									M/M	M/M														
Packing Lube Oil Flow Indicator Left Side	ESL 1501B	LIGHT		BLINK										B	B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
Crankcase Bulls eye	LC 1574	LEVEL	1/4	1/2	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL									44	44	44	44	44	44	44									
Lubricator Bulls eye		LEVEL	1/2	FULL										F	F	F	F	F	F	F									
1st Stage Scrubber Liquid Level	LI-2416	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-2466	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	ESL 1501A	LIGHT		BLINK										B	B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140									81	81	80	80	81	81	81									
Stage Disch. Press	PI-2101	psig		238	285									247	247	247	247	249	249	249									
2nd Stage Inlet Press	PI-2200	psig		267	285									247	247	244	244	245	246	246									
2nd Stage Disch. Press	PI-2201	psig		575	600									578	578	579	578	578	578	577									
Final Discharge Pressure	PI-2108	psig		575	600									575	575	580	575	579	575	575									
Lube Oil Pressure	PI-1572	psig	40	60										61	61	58	59	59	59	59									
Lube Oil Temp	TE-1584	deg		150	170									160	160	166	167	166	166	166									
Final Discharge Temp	TE-2120	deg		110	150									89	89	93	93	94	98	97									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297									218	218	218	219	219	219	219									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283									219	219	225	226	226	227	227									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297									215	215	215	217	217	217	217									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283									220	220	225	225	225	227	227									
Motor Frame Vibration	VT-1015	IPS			0.15									03	03	03	04	04	04	04									
Compresser Frame Vibration	VT-1512	IPS			0.35									05	05	05	05	05	05	05									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														575															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									570															
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									559															

DATE	4-9-18
SIGNATURE	
Mid Shift	
Days Shift	

Notes

[redacted]

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 4-10-18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0852

Time of Turbine Online (Brkr Closed): 0855

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes:

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	v												✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	v												✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120									110	109	111	110	110	110	111	110	105	111	110	108	108	106	106	107
4	Instrument Temperature	TI-001	deg C		20	50									20	18	19	18	19	20	19	21	22	21	21	20	20	19	19	19
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25										19.2	19.5	18.3	12.0	19	19	19	19.2	19.2	19.2	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120									100	99	110	111	111	99	104	100	106	102	104	102	100	99	101	100
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	In WC		60	80									60	63	63	63	63	64	63	62	63	63	63	63	63	63	63	63
10	Coolant Return Differential from	FI-002	In WC		37	50									37	37	37	35	36	39	39	38	39	38	38	35	35	35	35	35
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85									68	72	70	70	70	72	73	73.5	73	74	74	74	72	72	72	73
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)									Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)									Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%									35	35	35	34	34	34	34	34	34	34	34	34	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%									0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		v												✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200									1058	1052	1027	1013	980	980	958	958	933	938	936	988	999	997	995	996
23	Mw Output		MW			27									25.1	24.8	24.1	23.8	23.1	23.0	22.4	22.4	22.0	21.8	22.4	22.5	23.3	23.4	23.3	23.6
24	80% Base Load Minimum		MW												20.08	19.7	19.4	19.2	18.9	18.8	18.6	18.5	18.2	18.3	18.6	19.3	19.2	19.2	19.1	19.2
25	Running Hours (unit overview)														3334	3335	3336	3337	3338	3339	3340	3341	3342	3343	3344	3345	3346	3347	3348	3348
26	Ambient Temperature	T1 inlet													45	49	53	55	61	61	64	64	69	67	64	62	60	57	56	56
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%									53	53%	52	5290	52	52	53	53	53	53	53	54	54	54	54	52
28	Total Fuel Flow		Mscf/h												234	233	229	225.6	223	220	217	216	213	211	211	220	223	224	223	223

Date: 4-10-18 Signature: A.WAR, R.VIGIL, C.GOMEZ

UI-LOG-033-R2
January 4 2018

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0745																												
Combustible Gas Detector	AAH-303	%		0%	20%									N/A															
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK										√	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY									E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL									2/3	43	43	42	42	42	42	42	42	42	42	42	42	42	42	42
Lubricator Bulls eye		LEVEL	1/2	FULL										F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY									E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY									E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK										√	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140									80	81	81	81	81	81	80	81	81	81	81	81	82	82	82	83
Stage Disch. Press	PI-2101	psig		238	285									245	248	249	250	250	250	250	251	251	251	251	251	251	251	252	251
2nd Stage Inlet Press	PI-2200	psig		267	285									241	245	245	246	246	246	246	247	247	246	246	248	246	248	248	248
2nd Stage Disch. Press	PI-2201	psig		575	600									578	579	579	579	579	579	578	579	578	579	579	579	579	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600									574	575	575	575	575	575	575	576	575	575	575	575	575	575	575	575
Lube Oil Pressure	PI-1572	psig	40	60										58	58	58	59	59	59	59	59	59	59	59	59	60	60	59	59
Lube Oil Temp	TE-1584	deg		150	170									169	169	168	167	165	164	164	163	163	164	164	164	165	165	165	166
Final Discharge Temp	TE-2120	deg		110	150									82	86	91	93	97	100	103	105	104	104	104	102	100	95	95	99
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297									219	215	216	217	218	218	219	220	220	220	220	220	218	215	217	213
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283									216	219	223	225	229	231	233	234	234	233	233	235	230	226	228	230
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297									211	212	219	213	215	215	215	216	216	216	216	216	216	212	216	214
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283									216	219	223	225	229	231	233	234	234	234	234	233	230	226	228	228
Motor Frame Vibration	VT-1015	IPS			0.15									.03	03	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
Compresser Frame Vibration	VT-1512	IPS			0.35									.05	05	.05	.05	.06	.06	.06	.06	.05	.05	.05	.05	.05	.01	.05	.05
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														573									575						
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									568									570						
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									566									560						

DATE 4-10-18

SIGNATURE

Mid Shift

Days Shift

Notes

APR 1 1 2018 UI-LOG-033-R2 January 4 2018

CGTG HOURLY READING LOG

Date: APR 1 1 2018

MST (MDT) (circle one)
Time Gas Introduced (Turbine Rolling): 0740
Time of Turbine Online (Brkr Closed): 0804

Time Turbine Offline (Brkr Open): 0310
Time No Gas Flow: 0311

Notes: TRIP DUE TO GEARBOX BEARING #1 HIGH TEMP
Restarted cgtg 0804

#	Item	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				Yes	Yes	Yes					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				Yes	Yes	Yes					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	106	110	104					112	110	110	108	112	110	165	108	110	108	110	110	110	108	111	110	110
4	Instrument Temperature	TI-001	deg C		20	50	19	19	19					20	20	21	22	22	23	23	23	23	26	26	25	22	22	23	23	23
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25	—	19	19	19					19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	102	102	104					101	101	99	100	108	110	102	106	100	108	110	111	109	111	110	108	110
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2					1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	In WC		80	80	65	65	65					62	62	63	64	63	64	63	63	63	63	64	65	65	65	65	65	65
10	Coolant Return Differential from	FI-002	In WC		37	50	35	35	35					37	37	37	37	37	37	37	37	38	37	37	35	35	35	35	35	35
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	71	71	71					71	71	70	70	70	71.5	71.5	71.5	73.5	72.5	73.5	67	67	68	68	68	68
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	Ø	Ø	Ø					0	0	0	0	0	0	0	0	0	0	0	Ø	Ø	Ø	Ø	Ø	Ø
15	WECC Log			Operational?																										
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	Yes	Yes	Yes					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	Yes	Yes	Yes					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34					34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	Ø	Ø	Ø					0	0	0	0	0	0	0	0	0	0	0	Ø	Ø	Ø	Ø	Ø	Ø
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGO ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				√	√	√					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200	1016	1018	1011					972	956	949	934	931	918	917	914	906	907	909	923	951	978	972	977	976
23	Mw Output		MW			27	23.8	24.1	24.1					22.7	22.4	22.1	21.7	21.7	21.4	21.4	21.3	21.1	21.1	21.4	21.4	21.6	22.5	22.7	22.7	22.7
24	80% Base Load Minimum		MW				19.4	19.4	19.4					19.1	18.7	18.5	18.2	18.2	18.1	18.1	18.1	17.9	17.9	18.01	18.2	18.4	18.8	18.8	18.8	18.8
25	Running Hours (unit overview)						3350	3351	3352					3352	3353	3354	3355	3356	3357	3358	3359	3360	3361	3362	3363	3364	3365	3366	3367	3368
26	Ambient Temperature	T1 inlet					54	54	54					58	63	64	68	69	70	70	70	71	71	70	70	68	66	64	62	62
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	54	54	54					54	53	52	51	51	52	52	52	53	53	53	53	53	53	53	53	53
28	Total Fuel Flow		Mscf/h				226.1	226.7	226.5					221	217	215	212	211	210	209	210	207	207	206	206	210	212	219	217	217

Date: APR 1 1 2018 Signature: [signature]

UI-LOG-033-R2 January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

APR 1 : 2018

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0726												N/A																
Combustible Gas Detector	AAH-303	%		0%	20%								B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B					E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E					½	½	½	½	½	½	½	½	½	½	½	½	½	½	½		
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	½	½	½					42	42	42	42	42	42	42	42	42	42	42	42	42	42	42		
Oil Day Tank Level	LI-1562	GAL	10		FULL	42	42	42					F	F	F	F	F	F	F	F	F	F	F	F	F	F	F		
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F					E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E					E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E					B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B					81	81	81	80	80	81	81	81	81	81	81	81	81	82	82	82		
1st Stage Inlet Press.	PI-2100	psig		88	140	82	82	82					250	250	251	250	250	251	251	251	252	252	251	251	251	252	252	252		
Stage Disch. Press	PI-2101	psig		238	285	251	251	251					247	247	248	246	246	247	247	247	248	248	248	248	248	249	249	248		
2nd Stage Inlet Press	PI-2200	psig		267	285	247	247	248					578	578	578	578	578	578	578	578	578	578	578	579	579	579	579	578		
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579					574	574	575	575	575	575	574	575	575	575	576	575	575	575	576	575		
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575					60	60	59	59	59	59	59	59	60	60	60	60	60	60	60	60		
Lube Oil Pressure	PI-1572	psig	40	60		59	59	59					164	163	163	164	164	164	164	164	163	163	164	164	164	165	165	165		
Lube Oil Temp	TE-1584	deg		150	170	168	168	168					97	101	100	104	106	106	107	107	109	109	109	105	105	98	99	99		
Final Discharge Temp	TE-2120	deg		110	150	90	90	90					218	218	220	221	222	223	223	223	223	222	223	223	220	217	218	218		
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	212	212	212					227	229	232	234	236	237	236	238	238	237	237	237	235	228	228	230		
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	221	221	221					215	214	217	219	219	220	219	220	220	220	220	220	218	214	214	218		
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	210	210	210					228	229	232	234	236	237	237	238	238	237	237	237	235	229	229	230		
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	221	221	221					.03	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.03	.03	.04		
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03					.06	.06	.05	.06	.05	.05	.06	.06	.05	.05	.06	.06	.06	.06	.06	.06		
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.05																					
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.													575										575						
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8								570										570						
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20								559										561						

DATE	APR 1 : 2018
SIGNATURE	
Mid Shift	
Days Shift	

Notes

APRIL 12 2018

UI-LOG-033-R2
January 4 2018

Date: APRIL 12 2018

MST / (MDT) circle one)

CGTG HOURLY READING LOG

Time Gas Introduced (Turbine Rolling): 0319 / 1416

Time of Turbine Online (Brkr Closed): 0330 / 1429

Time Turbine Offline (Brkr Open): 1404

Time No Gas Flow: 1404

Notes: TRIP @ 0606, BACK ON @ 0530
GEAR BOX BEARING TEMP OVERHEAT
UNIT TRIPPED AT 1404 WHILE ~~RE-LOADING~~ PULLING RTD

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	/	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	106	104	105	108	104	105	106	106	110	108	110	112	108		110	108	110	110	108	112	104	104	106	102
4	Instrument Temperature	TI-001	deg C		20	50	20	20	20	20	20	20	20	20	20	21	22	22	24	24	22	22	23	22	22	22	22	20	20	20
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19.5	19.5	19.5	19.5	19.5	19	19	19		19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	104	110	108	110	102	106	105	111	105	106	105	107	107		108	110	107	105	108	111	109	112	111	110
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	½	½	½	½	½	½	½	½	½	½	½	½	½		½	½	½	½	½	½	½	½	½	½
9	Coolant Return Differential from GG	FI-001	in WC		60	80	35	35	35	35	35	35	35	36	37	62	62	64	64		63	62	67	65	65	65	65	65	65	65
10	Coolant Return Differential from	FI-002	in WC		37	50	60	60	60	60	60	60	59	62	62	37	36	37	36		37	37	37	35	35	35	35	35	35	35
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	66	67	67	67	67	70	70	70	70	70	70	70	70		71	71	71	71	70	70	70	69	69	69
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	Ø	Ø	Ø	Ø	Ø	0%	0%	0	0	0	0	0	0		0	0	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	Y	Y	Y	Y	Y	Y	Y	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Y	Y	Y	Y	Y	Y	Y
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	Y	Y	Y	Y	Y	Y	Y	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Y	Y	Y	Y	Y	Y	Y
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34		34	34	34	34	34	34	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	Ø	Ø	Ø	Ø	Ø	Ø	0	0	0	0	0	0	0		0	0	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD 5T-01	psig	35	20																									
21	Acknowledge Alarms Hourly		v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22–24 found on Power Management page)																													
	Generator Current		Amps			1200	968	972	950	969	974	980	999	976	945	944	923	933	923		917	926	917	919	976	922	919	1000	1001	999
	Mw Output		MW			27	22.7	22.7	22.7	23.1	23.1	23.5	23.7	22.7	22.1	22.3	21.7	21.7	21.4		21.7	21.7	21.4	21.4	22.8	19.2	18.2	23.6	23.8	23.5
	80% Base Load Minimum		MW				18.8	19.1	19.1	19.2	19.2	19.2	19.3	18.9	18.6	18.5	18.3	18.3	18.2		18.4	18.5	18.4	18.4	19.2	19.2	19.2	19.6	19.6	19.6
	Running Hours (unit overview)						3369	3370	3371	3372	3373	3374	3375	3376	3377	3378	3379	3380	3381		3383	3384	3385	3386	3387	3388	3389	3390	3391	3392
	Ambient Temperature	T1 inlet					61	59	57	57	57	55.8	54.1	59	64	64	66	67	68		66	65	66	62	60	58	56	54	54	52
	(27–28 found on Gas Fuel System page)																													
	Waste Oil Tank	LI-120	%			70%	54	54	54	54	54	54	54	54	53	53	52	52	53		53	54	54	54	54	54	54	54	54	54
	Total Fuel Flow		Mscf/h				217	217	217	218	221	222	223	217	213	214	211	211	206		210	210	208	210	210	216	216	224	223	223

Date: APRIL 12 2018 Signature: [signature]

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

APRIL 12 2018

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B		B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2		1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	42	42	42	42	42	42	37	37	37	36	36	36	36		36	36	36	36	36	36	36	36	36	36
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B		B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	82	82	82	82	81	81	81	81	81	81	81	81		81	81	81	81	81	82	82	82	82	82
Stage Disch. Press	PI-2101	psig		238	285	253	253	253	250	251	250	250	250	251	251	251	251	251		252	251	252	252	252	251	251	251	250	253
2nd Stage Inlet Press	PI-2200	psig		267	285	249	249	249	248	248	247	247	247	247	247	247	247	247		248	247	248	248	248	248	248	248	246	247
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	579	578	578	579	578	578	578	578	578		579	578	578	579	579	579	579	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	575	575	575	575	575	575	575	575	575		575	575	575	575	575	575	575	575	575	575
Lube Oil Pressure	PI-1572	psig	40	60		60	60	60	60	60	59	59	59	60	60	60	60	60		60	60	60	60	60	60	60	60	59	59
Lube Oil Temp	TE-1584	deg		150	170	164	164	165	165	165	165	165	165	165	164	163	163	164		163	163	163	163	164	164	164	167	167	167
Final Discharge Temp	TE-2120	deg		110	150	98	98	98	94	94	93	93	95	101	103	103	103	104		103	105	103	103	100	101	101	100	90	90
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	216	216	216	214	214	213	213	214	217	218	219	220	220		221	219	219	219	219	220	220	215	212	212
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	226	226	226	223	223	222	222	224	229	230	231	232	232		233	232	233	233	235	234	233	222	219	219
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	213	213	213	211	211	210	210	211	214	215	216	217	217		218	217	216	216	216	215	215	215	210	212
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	227	227	227	223	224	223	223	225	229	230	232	232	232		234	232	234	234	234	233	233	225	220	226
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03		.03	.04	.04	.04	.04	.04	.04	.04	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.05	.05	.06	.06	.04	.05	.05	.05	.05	.05	.05		.05	.06	.06	.06	.06	.06	.06	.06	.05	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575						575																	
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	-						510																	
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20							559																	

DATE	APRIL 12 2018
SIGNATURE	
Mid Shift	
Days Shift	

Notes

1410 1416 1429

APR 13 2018

UI-LOG-033-R2
January 4 2018

Date: APR 13 2018

CGTG HOURLY READING LOG

MST MDT (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes: CONTINUATION OF SUPPORT FOR PNM.

#	Item	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Y	Y	Y	Y	Y	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Y	Y	Y	Y	Y	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	110	106	108	110	108	105	109	106	105	103	105	110	109	110	109	105	108	108	108	107	110	109	112	106
4	Instrument Temperature	TI-001	deg C		20	50	19	19	19	20	20	20	20	20	19	19	18	18	18	18	18	19	19	18	18	18	18	18	16	15
5	**Fin Fan Cooler**		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	104	111	107	108	110	109	110	106	110	104	105	110	111	106	108	105	103	105	105	98	101	103	107	110
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	in WC		60	80	60	60	60	60	60	62	60	60	60	60	60	60	60	63	63	63	63	62	62	62	62	62	62	62
10	Coolant Return Differential from	FI-002	in WC		37	50	35	35	35	35	35	35	35	35	35	35	35	30	35	37	37	35	35	36	36	36	36	36	36	36
11	**Control Room**		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	69	69	70	71	71	70	70	68	66	66	67	67	67	68	68	68	68	68	68	68	68	68	68	68
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	Ø	Ø	Ø	Ø	Ø	Ø	Ø	0	0.0	Ø	Ø	Ø	Ø	Ø	Ø	0	0	0	0	0	0	0	0	0
15	**WECC Log**		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	35	35	35	34	34	34	34	34	34	34	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	Ø	Ø	Ø	Ø	Ø	Ø	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AE8GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Y	Y	Y	Y	Y	Y	✓	✓	✓	✓	✓
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200	1069	1073	1071	1090	1093	1107	1105	1107	1102	1068	1077	1064	1070	1060	1046	1046	1047	1064	1064	1074	1079	1082	1089	1090
23	Mw Output		MW			27	25.6	25.5	25.5	25.6	25.8	26.2	26.1	26.1	25.8	25.8	25.5	25.1	25.1	24.8	24.8	24.8	24.9	25.1	25.1	25.5	25.5	25.5	25.8	25.8
24	80% Base Load Minimum		MW				20.8	20.8	20.7	21.1	21.2	21.3	21.3	21.4	21.3	21.0	20.8	20.5	20.6	20.3	20.1	20.1	20.1	20.3	20.3	20.4	20.5	20.6	20.7	20.7
25	Running Hours (unit overview)						3393	3394	3395	3396	3397	3398	3399	3400	3401	3402	3403	3404	3405	3406	3407	3408	3409	3411	3411	3412	3413	3414	3415	3416
26	Ambient Temperature	T1 Inlet					38	36	36	34	32	31	39.1	28.2	29.3	32.4	35.8	38.3	38.3	40.8	43.7	44.1	44.1		41.5	39	38	37	36	36
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	54	54	55	55	55	55	55	55	55	55	55	55	53	53	53	53	55		54	54	54	55	55	55
28	Total Fuel Flow		Mscf/h				235	234	236	238	238	240	242	241	240	239	238	234	234	233	234	231	229		234	236	237	237	239	239

Date: APR 13 2018

Signature: [signature]

4-13-18

1800 BUSY WITH BRIEFING + WALK DOWN ...

UI-LOG-033-R2
January 4 2018

APR 13 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME CONTINUATION																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	36	36	36	36	36	34	34	34	33	33	34	34	34	33	33	33	33	33	30	30	30	30	30	30
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	80	80	83	83	85	83	82	82	82	82	82	82	82	81	81	82	82	82	82	82	82	82	82	82
Stage Disch. Press	PI-2101	psig		238	285	250	250	250	251	251	245	248	248	245	248	247	248	249	247	249	249	249	249	249	249	249	250	249	248
2nd Stage Inlet Press	PI-2200	psig		267	285	245	245	246	246	245	245	244	245	246	244	243	245	245	243	245	245	246	246	245	245	245	246	245	244
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	578	579	579	579	579	579	579	579	578	578	579	578	578	578	578	578	579	579	579	578
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	576	575	575	574	574	574	574	574	575	574	575	575	575	575	575	575	574	574	574	574	574
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	59	59	58	57	57	57	57	57	57	58	58	58	58	58	58	58	57	57	57	57	57
Lube Oil Temp	TE-1584	deg		150	170	170	170	170	169	169	170	170	169	169	169	170	170	170	169	169	170	169	169	170	169	170	169	170	170
Final Discharge Temp	TE-2120	deg		110	150	77	77	75	75	75	73	70	70	70	71	74	74	76	79	80	82	81	81	80	77	76	75	74	75
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	206	206	207	207	207	206	203	201	201	201	205	205	205	207	208	207	207	207	205	208	209	204	203	204
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	205	205	205	205	206	203	201	202	200	205	205	207	206	209	211	211	211	211	207	209	207	205	204	204
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	207	208	207	208	208	205	201	199	199	201	203	203	203	205	206	204	205	205	203	203	203	203	202	203
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	207	207	207	206	206	208	201	201	201	203	205	205	206	209	211	211	211	211	208	209	207	205	204	205
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	03	03	03	03	04	04	03	03	03	03	03	03	03	03	03	03	03	03	03
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.06	.06	.06	.06	06	06	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																								575					
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																			580					
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																			558					

DATE APR 13 2018

SIGNATURE

Mid Shift

Days Shift

683941 - 55666

Notes

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: APR 14 2018
MST / (MDT) (circle one)
Time Gas Introduced (Turbine Rolling):
Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):
Time No Gas Flow:

Notes: 0755 - Place more absorbent pads below oil demister
0905 - Inform Blaine of main oil tank level at minimum.

#	Item	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	107	107	110	106	110	109	108	110	106	102	106	108	106	102	107	106	110	102	109	112	106	113	106	107
4	Instrument Temperature	TI-001	deg C		20	50	15	15	15	15	15	15	14	15	15	15	17	17	18	15	19	20	19	19	19	19	18	18	18	17
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	102	106	100	105	103	111	106	108	105	105	110	102	106	104	104	102	110	105	103	111	106	103	99	105
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	in WC		60	80	62	62	62	62	62	62	62	62	67	63	63	63	63	62	62	67	62	62	63	62	62	62	62	62
10	Coolant Return Differential from	FI-002	in WC		37	50	36	36	35	36	35	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	68	68	68	68	68	68	69	66	66	66	68	66	66	66	69	69	70	70	69	69	67	67	69	69
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log			Operational?																										
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	35	35	35	34	34	35	35	35	35	34	34	34	34	33	34	33	33	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGU ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200	1098	1097	1105	1104	1103	1103	1097	1099	1085	1073	1059	1053	1042	1021	1011	999	995	996	1019	1029	1039	1044	1047	1055
23	Mw Output		MW			27	25.8	25.8	26.1	26.1	26.1	26.1	26.0	25.6	25.5	25.4	24.8	24.8	24.4	24.1	24.1	23.5	23.4	23.5	24.1	24.1	24.8	24.6	24.8	24.8
24	80% Base Load Minimum		MW				20.8	20.9	21.0	21.0	21.0	21.0	21.0	20.9	20.6	20.3	20.0	20.0	19.5	19.6	19.4	19.2	19.2	19.2	19.4	19.6	19.8	19.9	19.9	20.0
25	Running Hours (unit overview)						3417	3418	3419	3420	3421	3422	3423	3424	3425	3426	3427	3428	3429	3430	3431	3432	3933	3434	3435	3436	3437	3438	3439	3440
26	Ambient Temperature	T1 Inlet					34.9	34.2	33.3	33.3	33.3	33.3	34.2	35.8	39.2	42.4	45.9	46.6	47.5	51.6	57.2	56.1	55.8	55.6	52	50	48	46	45	45
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	55	55	55	55	55	55	55	55	54	51	51	51	57	54	53	57	53	53	54	55	55	55	55	55
28	Total Fuel Flow		Mscf/h				241	238	242	241	242	242	243	240	237	236	237	237	234	231	230	228	226	226	224	232	234	235	236	236

Date: 4-14-18

Signature: [signature] Days: M Pauk

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	29	29	29	29	29	29	29
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	81	81	82	82	82	82	82
Stage Disch. Press	PI-2101	psig		238	285	249	249	249	249	249	249	249	246	246	246	246	246	246	246	246	246	246	250	250	250	251	250	251	251
2nd Stage Inlet Press	PI-2200	psig		267	285	245	245	245	245	245	245	246	246	246	246	246	246	246	246	246	246	246	247	247	246	246	247	246	247
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	578	578	579	578	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579	578	579
Final Discharge Pressure	PI-2108	psig		575	600	574	574	574	574	574	574	575	575	575	575	575	575	575	575	574	574	575	575	575	575	575	575	574	575
Lube Oil Pressure	PI-1572	psig	40	60		57	57	57	57	57	57	56	56	56	56	56	56	58	58	58	58	58	57	58	58	58	58	58	58
Lube Oil Temp	TE-1584	deg		150	170	170	169	170	169	169	169	169	169	169	168	169	168	168	168	168	169	168	166	168	168	168	169	169	169
Final Discharge Temp	TE-2120	deg		110	150	72	72	71	71	71	71	72	74	77	80	83	86	87	90	92	93	93	93	88	87	84	83	82	82
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	203	203	202	202	202	202	202	203	204	206	208	210	216	218	213	213	217	212	211	210	209	208	208	207
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	203	202	201	201	202	202	203	205	206	210	215	218	219	222	224	223	223	223	218	217	214	214	212	212
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	201	201	200	200	200	200	201	202	203	206	207	206	209	209	210	211	211	210	209	208	207	206	206	205
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	204	203	201	201	202	202	203	204	206	212	215	214	219	220	221	221	222	223	219	218	214	214	213	212
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.04	.03	.03	.03	.04	.04	.03	.04	.03	.04	.03	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.05	.05	.05	.06	.05	.06	.05	.05	.06	.05	.06	.06	.06	.06	.06	.06	.06	.05	.05	.05	.05	.05
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575						575										575							
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	570						570										570							
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20	558						557										554							

DATE	4-14-18
SIGNATURE	
Mid Shift	L Pacheco
Days Shift	M. G. Davis

4-15-18 0:00 689982 55666

Notes

685896

Date: 4-15-18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes: DLE 80% BASE MIN READING SHOWING ??? DLE MODE ON + OK JUST CANT GET NUMBERS

CGTG HOURLY READING LOG

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				/	/	/	/	/	/	√	√	√	/	√	√	√	✓	√	√	√	√	/	/	/	✓	/	/
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				/	/	/	/	/	/	√	√	√	/	√	√	√	√	√	√	√	√	/	/	/	✓	/	/
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	109	108	106	105	108	109	102	106	110	106	102	106	110	104	102	104	106	105	111	107	109	110	112	108
4	Instrument Temperature	TI-001	deg C		20	50	17	17	17	16	15	15	15	16	17	18	14	14	19	20	21	22	22	21	22	21	20	19	19	19
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	111	99	105	103	100	97	102	110	106	100	10	102	104	106	103	110	106	104	104	109	110	103	109	99
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	in WC		60	80	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
10	Coolant Return Differential from	FI-002	in WC		37	50	36	36	36	36	36	35	36	36	36	36	36	35	35	35	35	35	34	34	36	36	36	36	36	36
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	72	71	71	72	72	70	70	70	70	70	70	70	70	70	70	70	70	70	70	68	69	68	67	70
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/ on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	34	33	33	33	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD 5T-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	/	/	✓	/	/	✓	✓	/	/	✓	✓	✓	✓	✓	✓	✓	✓	/	/	/	/	✓	✓
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	1052	1060	1083	1085	1086	1095	1060	1057	1043	1032	1030	1024	1018	991	962	960	961	956	964	959	1001	1003	1017	1011
23	Mw Output		MW			27	24.8	25.1	25.4	25.8	25.8	25.8	25.6	25.5	24.9	24.4	24.2	24.1	23.8	23.5	22.7	22.6	22.7	22.5	22.7	23.3	23.8	23.8	24.0	23.8
24	80% Base Load Minimum		MW				19.9	20.1	20.3	20.3	20.6	20.7	20.3	20.3	19.9	19.7	19.6	19.5	19.3	19.1	18.7	18.7	18.7	18.7	18.7	NA	NA	NA	OUT NOT READING	
25	Running Hours (unit overview)						3441	3442	3443	3444	3445	3446	3447	3448	3449	3450	3451	3452	3453	3454	3455	3456	3457	3458	3459	3460	3461	3462	3463	3464
26	Ambient Temperature	T1 Inlet					45	44	40	38	37	36	37	41	47	50	51	53	54	57	62	63	63	62	61	58	55	55	53	53
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	55	55	55	55	55	56	55	55	54	53	53	53	54	54	54	55	55	54	54	55	55	55	55	55
28	Total Fuel Flow		Mscf/h				236	237	240	242	242	243	240	239	235	231	232	230	229	226	220	220	220	220	221	226	226	227	229	228

Date: APR 15 2018 Signature: L PACHECO MINS

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	28	28	28	28	28	28	28	26	26	26	28	26	29	29	28	27	27	27	26	25	25	25	25	25
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	83	82	87	82	82	82	82	82	82	81	81	81	82	82	81	82	81	81	81	82	81	82	82	81
Stage Disch. Press	PI-2101	psig		238	285	249	250	250	250	249	250	249	250	249	250	250	250	251	251	251	250	250	250	252	252	252	252	252	252
2nd Stage Inlet Press	PI-2200	psig		267	285	245	247	248	246	246	246	246	246	245	246	246	246	246	247	248	248	248	248	248	248	248	248	248	248
2nd Stage Disch. Press	PI-2201	psig		575	600	575	578	578	579	578	578	579	574	579	574	574	578	579	579	579	579	579	579	579	579	579	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600	574	574	574	574	574	574	575	574	575	575	575	575	575	575	575	575	574	575	574	574	575	575	575	574
Lube Oil Pressure	PI-1572	psig	40	60		58	58	57	57	57	57	56	56	56	58	56	60	57	57	59	59	60	60	59	59	59	59	58	58
Lube Oil Temp	TE-1584	deg		150	170	169	170	170	170	170	174	170	169	170	168	169	167	162	158	164	164	164	164	164	165	165	166	167	167
Final Discharge Temp	TE-2120	deg		110	150	81	81	78	77	74	74	76	79	79	82	88	89	91	93	99	100	100	98	98	95	93	92	90	90
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	208	207	207	206	205	205	206	207	208	209	212	213	213	214	216	217	216	216	215	213	213	212	211	212
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	214	211	211	209	206	207	209	211	210	214	220	221	224	226	230	230	230	229	228	225	224	222	220	221
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	206	205	205	204	203	203	204	204	206	208	209	210	211	211	213	214	214	213	213	211	210	210	209	210
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	214	217	211	209	207	207	210	211	212	214	219	220	223	225	230	230	231	230	229	225	224	223	221	222
Motor Frame Vibration	VT-1015	IPS			0.15	.03	6.3	.03	.03	.03	.03	.03	.04	.04	.03	.04	.03	.04	.04	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.05	.05	.05	.05	.05	.04	.06	.06	.06	.06	.06	.06	.06	.05	.06	.06	.06	.05	.05	.06	.05	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575										579													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	570										570													
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20	558										556													

DATE APR 15 2018

SIGNATURE

~~Mid Shift~~

~~Days Shift~~ (PACHECO

695944

000 55666

Notes

UI-LOG-033-R2
January 4 2018

Date: APR 16 2018

CGTG HOURLY READING LOG

MST / (MDT) (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes: ALE MODE ON / ILLUMINATED GREEN
BUT READING NOT SHOWING JUST ???
0851: HMI Rebooted.

	Instrument Air Compressor	ID	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				/	/	/	/	/	√	√	√	√	√	√	√	√	√	√	√	√	√	/	/	/	/	/	/
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				/	/	/	/	/	√	√	√	√	√	√	√	√	√	√	√	√	√	/	/	/	/	/	/
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	108	110	107	106	111	107	106	110	104	104	105	106	110	106	102	104	105	104	107	108	110	106	106	105
4	Instrument Temperature	TI-001	deg C		20	50	19	19	18	18	17	19	19	18	19	20	22	22	24	24	27	27	28	26	24	23	23	23	21	21
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	106	107	109	107	99	103	102	100	104	100	99	102	110	108	100	102	104	104	102	105	107	99	99	109
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	in WC		60	80	62	62	62	62	62	62	61	61	61	61	61	61	61	61	61	61	61	61	62	62	63	62	63	60
10	Coolant Return Differential from	FI-002	in WC		37	50	62	36	36	36	36	36	35	36	36	36	36	36	36	36	36	36	36	36	36	36	37	37	36	37
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	70	69	69	70	67	66	70	70	70	70	70	70	70	70	70	70	70	70	68	68	69	68	65	67
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operations?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	30	33	33	33	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AE3GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				√	/	/	/	/	/	√	√	√	√	√	√	√	√	√	√	√	√	/	/	/	/	/	/
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200	1011	1015	1036	1044	1056	1058	1051	1034	1031	970	960	938	934	925	924	924	930	932	945	956	962	970	969	964
23	Mw Output		MW			27	23.8	24.1	24.4	24.8	24.8	25.1	24.6	24.4	24.1	22.7	22.4	22.1	22.1	21.7	21.7	21.8	21.7	21.8	22.1	22.4	22.7	22.7	22.7	22.7
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)						NA	/	/	/	/	/	N/A	/	19.7	16.4	18.6	18.4	18.4	18.3	18.2	18.2	18.2	18.2	18.5	18.8	18.7	18.9	18.9	18.8
26	Ambient Temperature	T1 Inlet					3465	3466	3467	3468	3469	3470	3471	3472	3473	3474	3475	3476	3477	3477	3478	3479	3480	3481	3482	3483	3484	3485	3486	3487
	(27-28 found on Gas Fuel System page)						53	53	49	46	45	44	46	49	51	62	64	66	67	68	69	69	68	67	64	62	61	60	59	60
27	Waste Oil Tank	LI-120	%			70%	55	55	55	55	55	55	55	55	55	54	53	53	53	53	53	53	54	54	54	54	55	54	55	54
28	Total Fuel Flow		Mscf/h				229	229	233	234	236	237	235	233	231	221	217	216	215	214	214	214	213	215	217	218	221	221	221	220

Date: 4-16-18

Signature: L Pacheco Mims

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	25	24	24	24	24	24	24	24	24	24	24	24	24	24	Full	Full	Full	Full	Full	F	F	F	F	F
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	81	82	82	82	82	82	82	82	81	81	81	81	81	81	81	81	81	82	81	82	81	82	82
Stage Disch. Press	PI-2101	psig		238	285	252	252	251	252	251	251	252	252	252	252	252	251	252	252	251	252	253	252	252	252	252	252	252	252
2nd Stage Inlet Press	PI-2200	psig		267	285	248	248	247	247	247	247	248	246	247	246	248	249	248	248	246	246	245	245	248	248	248	248	248	248
2nd Stage Disch. Press	PI-2201	psig		575	600	578	578	579	578	579	579	579	577	579	579	579	579	579	576	577	579	578	579	579	578	579	578	579	579
Final Discharge Pressure	PI-2108	psig		575	600	575	574	574	574	575	575	575	577	574	576	575	575	575	575	575	575	575	575	575	574	575	574	574	575
Lube Oil Pressure	PI-1572	psig	40	60		59	59	58	58	57	58	58	58	58	59	60	60	60	60	60	60	60	59	60	59	59	59	59	59
Lube Oil Temp	TE-1584	deg		150	170	166	166	168	170	170	170	169	169	168	165	164	163	164	169	169	169	162	163	163	164	164	164	164	164
Final Discharge Temp	TE-2120	deg		110	150	91	91	86	83	81	85	82	87	89	98	100	102	105	105	108	110	104	107	101	99	97	96	97	97
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	211	211	209	209	208	209	208	209	210	215	216	217	216	220	221	221	219	218	217	216	215	215	215	215
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	222	221	217	214	213	213	212	212	214	214	230	231	234	235	236	234	237	236	230	228	226	226	226	226
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	211	209	207	207	206	206	206	207	208	212	214	215	216	217	219	216	217	216	215	214	213	213	213	213
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	222	222	217	215	214	215	217	217	219	227	230	232	235	235	238	239	239	236	236	229	227	227	227	227
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.04	.04	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.05	.05	.06	.05	.06	.05	.05	.05	.06	.06	.06	.06	.06	.06	.06	.06	.05	.06	.06	.06	.06	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.								575									575							575					
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8			570									570							570					
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20			558									560							559					

DATE APR 16 2018

SIGNATURE

Mid Shift L PACHECO

Days Shift

55666 701721

Notes

UI-LOG-033-R2
January 4 2018

Date: 4-17-18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

CGTG HOURLY READING LOG

Notes: 4-18-18 HAD TO COPY ORIGINAL LOG SHEET. PRINTER ~~SHE~~ CRUMBLED + TORE LOG

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				✓	✓	✓	✓	✓	√	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				✓	✓	✓	✓	✓	√	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	106	104	107	108	106	112	110	106	108	108	112	106	106	106	108	106	104	104	108	108	109	101	108	107
4	Instrument Temperature	TI-001	deg C		20	50	21	21	120	20	19	19	19.5	19.5	20	20.5	21	21.5	22	22	22	21.5	21	21	19	18	17	17	16	16
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19.2	19	19.5	19	19.4	19.4	19.4	19.2	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	107	106	105	99	105	107	108	103	105	106	100	105	100	105	107	106	106	102	110	103	110	101	100	104
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	in WC		60	80	62	62	62	62	62	62	63	62	64	64	62	64	64	65	65	62	64	64	63	62	62	62	62	62
10	Coolant Return Differential from	FI-002	in WC		37	50	37	36	36	36	36	37	36	36	36	36	37	37	37	38	39	38	38	38	36	36	37	37	35	36
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	65	70	69	68	67	66	70	70	70	70	70	70	70	70	70	70	70	70	68	69	66	67	69	72
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	—	—	—	—	—
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	970	973	983	992	99.6	1004	1013	995	992	980	962	950	950	954	975	980	989	991	1019	1042	1052	1068	1075	1070
23	Mw Output		MW			27	22.7	23	23.1	23.4	23.4	23.7	23.8	23.1	23.1	23.1	22.4	22.1	22.4	22.4	22.8	23.1	23.1	23.7	24.1	24.4	24.8	25.1	25.5	25.1
24	80% Base Load Minimum		MW				18.9	19	19	19.2	19.3	19.4	19.5	19.3	19.2	19	18.8	18.6	18.5	18.6	18.9	19	19.1	19.3	19.5	19.9	20.1	20.2	20.4	20.4
25	Running Hours (unit overview)						3488	3489	3490	3491	3492	3493	3494	3495	3496	3497	3498	3499	3500	3501	3502	3503	3504	3505	3506	3507	3508	3509	3510	3511
26	Ambient Temperature	T1 inlet					60	59	57	55	55	53	51	55	55	58	60	64	64	63	60	59	56	55	51	47	45	42	39	39
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	55	54	54	55	55	54	54	54	54	53	53	53	53	53	53	53	54	54	56	54	55	55	55	55
28	Total Fuel Flow		Mscf/h				221	221	220	221	221	223	224	221	223	222	219	216	216	217	221	221	223	222	230	234	236	236	239	240

Date: 4-17-18 Signature: MJOS JARNETT DAYS JP

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	53	53	52	52	52	52
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	E	E	E	F	E	FULL
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	81	82	82	81	81	82	81	81	81	81	81	81	81	81	81	81	81	81	81	82	82	82	82	82
Stage Disch. Press	PI-2101	psig		238	285	251	252	251	250	251	251	251	250	250	250	250	251	251	251	251	251	251	250	250	249	249	249	249	249
2nd Stage Inlet Press	PI-2200	psig		267	285	248	249	248	247	247	247	247	247	247	246	247	247	246	247	246	247	247	246	246	245	245	245	245	245
2nd Stage Disch. Press	PI-2201	psig		575	600	574	579	578	578	579	579	578	578	579	579	578	579	579	578	579	578	579	578	578	578	578	578	579	578
Final Discharge Pressure	PI-2108	psig		575	600	574	575	574	574	574	574	574	574	575	574	574	575	575	574	575	574	574	574	575	574	574	574	574	574
Lube Oil Pressure	PI-1572	psig	40	60		59	59	59	59	59	59	59	59	60	59	59	60	59	60	59	59	59	59	58	58	57	57	57	57
Lube Oil Temp	TE-1584	deg		150	170	164	164	164	165	165	165	167	164	163	164	164	164	163	164	163	164	164	164	168	169	171	171	170	170
Final Discharge Temp	TE-2120	deg		110	150	98	97	95	94	93	93	90	94	96	98	99	103	104	102	98	97	96	95	88	84	80	80	78	77
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	215	214	212	212	211	211	210	212	213	215	216	218	219	218	217	215	214	218	217	209	207	207	206	205
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	227	226	224	223	222	222	221	223	226	226	228	231	231	230	228	225	224	224	217	214	211	211	208	209
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	212	212	210	209	208	208	207	208	210	211	213	215	215	215	215	213	212	213	209	207	205	206	204	203
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	228	227	224	223	223	223	222	223	225	226	229	231	231	230	229	225	224	224	218	214	211	211	209	209
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	.04	.03	.03	.03	.03	.03	.04	.04	.04	.03	.04	.03	.03	.03	.03	.03	.03	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.06	.06	.05	.03	.04	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.05	.06	.06	.05	.05	.06	.05	.05
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575					578						574						575						
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	570					570						571						570						
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20	559					558						559						558						

DATE 4-17-18

SIGNATURE

Mid Shift L PACHECO

Days Shift

207476 - 55666

Notes

LP 4-17-18

9-20-21 HE FULL

UI-LOG-033-R2
January 4 2018

Date: 4-18-18

MST / (MDT) (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

CGTG HOURLY READING LOG

Notes: 0800 BUSY WITH NOISE EVALUATION

		I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Instrument Air Compressor																													
2	Blowdown Dry Receiver Tank Hourly	BVT-013	√				✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
3	Blowdown Wet Receiver Tank Hourly	BVT-007	√				✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
4	Wet Receiver Air Pressure	PI-002	psig	90	105	120	110	106	105	109	106	107	104	110		106	106	112	110	106	106	108	112	110	106	104	104	107	104	110
5	Instrument Temperature	TI-001	deg C		20	50	15	15	15	15	13	13	14	16		17	19	19	19	19	20	20	20	20	20	19	19	19	19	18
6	Fin Fan Cooler		Units	Low	Norm	Max																								
7	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19.4	19.4		19.6	19.4	19.6	19.2	19.4	19.4	19.6	19.6	19.6	19	19	19	19	19	19
8	Coolant PLC Temperature	TI-002	deg F	100	110	120	111	109	99	100	110	109	100	103		110	111	110	109	105	102	102	99	101	98	110	104	107	106	104
9	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2		1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
10	Coolant Return Differential from GG	FI-001	In WC		60	80	62	62	62	62	63	63	62	64		63	63	64	65	63	65	64	64	64	64	62	62	58	62	62
11	Coolant Return Differential from	FI-002	In WC		37	50	36	36	36	36	36	36	35	35		37	38	36	36	38	39	37	39	39	36	36	36	36	36	36
12	Control Room		Units	Low	Norm	Max																								
13	Room Temperature		deg F		72	85	67	72	73	73	68	73	69	69		69	70	70	70	70	70	70	71	71	68	71	67	71	69	70
14	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	35		35	34	34	34	34	34	33	33	33	33	33	33	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AESGGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	1090	1091	1098	1103	1117	1118	1109	1085	1069	1060	1050	1048	1027	999	991	988	983	981	992	1023	1030	1039	1046	1054
23	Mw Output		MW			27	25.8	25.8	26	26.1	26.4	26.1	26.1	25.5	25.1	25.1	24.8	24.8	24.3	23.5	23.5	23.4	23.1	23.2	23.5	24.1	24.4	24.4	24.8	24.8
24	80% Base Load Minimum		MW				20.7	20.7	20.7	20.9	21.2	21.1	21.0	20.4	20.1	20.1	19.7	19.7	19.4	19.1	19.0	18.9	18.9	18.9	19.0	19.5	19.6	19.7	19.8	19.9
25	Running Hours (unit overview)						3517	3513	3514	3515	3516	3517	3518	3520	3521	3522	3523	3527	3524	3525	3526	3527	3528	3529	3530	3531	3532	3533	3534	3535
26	Ambient Temperature	TI inlet					36	34	34	34	31	31	33	39		44	49	49	52	57	58	59	59	59	58	51	50	49	48	46
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	55	55	56	56	56	56	56	54		53	53	53	53	53	53	54	54	54	56	55	55	55	55	55
28	Total Fuel Flow		Mscf/h				242	242	242	245	246	246	245	240		237	235	233	231	228	226	223	223	223	226	230	233	234	234	235

Date: APR 18 2018 Signature: L PACHECO

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	1/8	1/8
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2		1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	51	51	51	51	50	50	50	50	50	50	50	50	50	50	50	50	50	50	49	49	48	48	48	48
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	82	82	82	82	82	82	81		81	81	82	81	81	81	81	81	81	81	81	81	81	81	82
Stage Disch. Press	PI-2101	psig		238	285	249	249	249	249	249	249	248	247		249	250	251	250	250	251	251	252	251	252	250	251	251	250	250
2nd Stage Inlet Press	PI-2200	psig		267	285	245	245	245	245	245	245	244	243		247	247	248	247	247	247	248	248	248	248	247	247	247	246	247
2nd Stage Disch. Press	PI-2201	psig		575	600	578	578	578	579	579	579	579	578		579	579	579	579	578	579	579	578	578	578	579	579	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600	574	574	574	574	575	574	574	574		575	574	574	578	575	575	575	575	578	575	575	575	575	575	574
Lube Oil Pressure	PI-1572	psig	40	60		57	57	57	57	57	57	57	58		58	58	58	58	59	59	59	59	59	59	59	58	58	58	58
Lube Oil Temp	TE-1584	deg		150	170	170	170	170	170	169	169	169	169		169	170	169	168	167	165	165	164	164	164	167	168	168	168	168
Final Discharge Temp	TE-2120	deg		110	150	74	74	74	72	70	70	70	77		81	87	89	92	95	97	99	99	99	95	90	88	88	87	85
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	204	204	204	203	203	203	202	206		207	209	210	211	213	214	214	213	214	212	211	209	209	208	207
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	205	205	205	203	202	202	202	207		214	217	219	222	226	227	228	228	228	224	221	218	218	216	215
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	202	202	202	202	201	201	200	202		205	206	207	208	209	210	210	210	210	209	208	207	206	205	205
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	206	206	206	204	202	202	200	207		211	217	219	222	224	227	228	228	228	225	221	219	218	217	216
Motor Frame Vibration	VT-1015	IPS			0.15	.04	.03	.04	.04	.04	.04	.04	.04		.04	.03	.04	.04	.04	.04	.04	.04	.04	.03	.03	.03	.03	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.05	.05	.05	.05	.06	.05		.05	.05	.05	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575										578					578			575					
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	570										570					574			570					
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20	558										558					559			559					

DATE APR 18 2018

SIGNATURE

Mid Shift L PACHECO

Days Shift

7134/10 - 55664

Notes 0800 busy with noise evaluation. 0800 BUSY WITH NOISE EVALUATION

UI-LOG-033-R2
January 4 2018

Date: 4-19-18

CGTG HOURLY READING LOG

MST / (MDT) (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes: 1400 PLACED COMBUSTION INTAKE FILTER CLEANING SYSTEM ON LINE IN AUTO

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	105	104	110	103	106	109	99	106	105	109	110	105	100	105	100	105	105	106	102	108	104	106	108	103
4	Instrument Temperature	TI-001	deg C		20	50	17	17	17	17	17	17	17	18	18	18	19	20	19	19	20	20	20	20	20	19	19	19	19	19
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	106	108	103	107	111	102	100	111	108	103	107	105	107	116	100	101	111	110	108	100	102	99	101	100
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	In WC		60	80	63	63	62	62	62	62	62	60	63	63	63	63	63	63	63	63	63	65	65	65	65	65	65	65
10	Coolant Return Differential from	FI-002	In WC		37	50	36	36	36	36	36	36	36	36	36	37	35	35	35	35	35	35	35	35	38	35	35	35	35	35
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	66	70	70	70	71	72	72	72	72	70	70	70	70	70	70	70	70	70	70	60	68	66	66	66
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	1060	1069	1075	1078	1085	1085	1056	1072	1075	1048	1038	1012	1000	989	964	974	976	978	995	1011	1022	1028	1066	1081
23	Mw Output		MW			27	25.1	25.1	25.5	25.5	25.5	25.5	25.5	25.4	25.1	24.8	24.4	23.8	23.5	23.1	22.7	22.7	23.1	23.1	23.1	24.1	24.1	24.1	24.1	24.1
24	80% Base Load Minimum		MW				20	20.1	20.3	20.3	20.4	20.4	20.4	20.1	20.0	19.8	19.6	19.2	19.0	18.8	18.6	18.3	18.8	18.8	18.8	19.6	19.7	19.6	19.6	19.8
25	Running Hours (unit overview)						3536	3537	3538	3539	3540	3541	3542	3543	3544	2545	3546	3547	3548	3549	3550	3551	3552	3553	3554	3555	3556	3557	3558	3559
26	Ambient Temperature	T1 Inlet					45	44	41	41	39	39	39	43.0	42.0	48.2	50.9	55.0	58.8	60.5	63.3	61.0	60.1	60	60	58	56	52	52	51
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	56	56	56	56	56	56	56	56	56	55	55	55	58	55	56	56	57	57	57	57	57	57	57	57
28	Total Fuel Flow		Mscf/h				236	237	240	240	240	240	240	236	235	233	232	229	226	225	219	221	220	222	224	221	232	230	232	231

Date: APR-19-2018 Signature: MIDS R VIGIL DAYS J WILLIAMS MIDS

231 18.8 989 60.5

UI-LOG-033-R2
January 4 2018

CGTG TURBINE — UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	48	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	81	81	82	82	81	82	82	82	81	81	81	81	81	81	81	81	81	81	81	80	81	82	82	82
Stage Disch. Press	PI-2101	psig		238	285	250	250	250	250	250	250	250	250	249	251	251	250	251	251	252	252	252	252	252	251	250	251	252	251
2nd Stage Inlet Press	PI-2200	psig		267	285	246	246	246	246	247	246	246	246	245	247	248	247	247	247	248	248	248	248	248	248	249	248	249	249
2nd Stage Disch. Press	PI-2201	psig		575	600	578	578	579	579	578	578	579	574	574	579	579	579	579	579	578	579	578	579	579	579	579	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600	574	574	574	574	574	574	574	574	574	574	575	575	574	574	574	575	575	575	575	575	575	575	575	575
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	58	57	57	57	57	58	59	59	59	59	59	60	60	60	60	60	59	59	59	60	60
Lube Oil Temp	TE-1584	deg		150	170	168	170	170	170	176	170	170	170	170	167	166	165	163	164	163	162	162	162	162	166	166	165	165	166
Final Discharge Temp	TE-2120	deg		110	150	85	81	79	80	77	77	78	78	85	88	91	94	98	98	103	102	99	99	99	92	92	92	91	91
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	207	206	206	206	205	205	205	205	208	209	210	212	213	213	215	214	213	212	212	212	210	210	208	210
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	214	212	210	210	205	208	208	206	215	218	221	224	228	228	231	230	228	228	229	230	225	220	222	221
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	204	204	203	203	203	203	202	202	204	205	206	208	209	209	212	211	210	210	210	210	208	207	208	209
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	215	213	211	211	209	209	209	209	210	218	221	224	227	227	231	230	228	229	229	229	225	222	221	224
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.04	.03	.03	.03	.03	.03	.03	.03	.03	.02	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.03	.04	.05	.05	.06	.06	.06	.04	.04	.06	.05	.05	.06	.06	.06	.06	.06	.06	.06	.06	.05	.05	.05
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575																							
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	570																							
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20	558																							

DATE	APR 19 2018
SIGNATURE	
Mid Shift	L PACHECO R. VIGIL DAYS J. WILLIAMS MIDS718898
Days Shift	

Notes

APRIL 20 2018

721624

UI-LOG-033-R2
January 4 2018

Date: APRIL 20 2018

CGTG HOURLY READING LOG

MST / (MDT) (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes:

	Instrument Air Compressor	I D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	F	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	108	105	110	111	108	118	107	105	105	109	105	110	109	108	105	103	108	110	108	111	110	105	106	108
4	Instrument Temperature	TI-001	deg C		20	50	18	18	18	18	17	17	18	18	19	19	19	19	19	19	19	19	19	19	19	19	18	18	18	18
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	99	100	101	102	100	100	105	111	111	110	106	106	109	111	110	107	110	105	108	106	100	99	101	99
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½
9	Coolant Return Differential from GG	FI-001	in WC		60	80	55	55	55	55	55	55	59	59	60	63	63	65	65	65	65	65	64	63	65	65	65	65	65	65
10	Coolant Return Differential from	FI-002	in WC		37	50	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	33	34	35	35	35	35	35	35
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	70	68	68	70	70	70	70	70	70	70	70	70	70	70	70	76	70	70	70	70	71	71	71	71
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	Ø	Ø	Ø	Ø	Ø	Ø	Ø	0	0	0	0	0	0	Ø	0	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	Ø	Ø	Ø	Ø	Ø	6	0	0	0	6	0	0	0	0	6	0	0	0	Ø	Ø	Ø	Ø	Ø	Ø
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD 57-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	(22–24 found on Power Management page)																								✓	✓	✓	✓	✓	✓
22	Generator Current		Amps			1200	1044	1048	1050	1056	1054	1057	1079	1072	1074	1059	1055	1039	1043	1022	1030	1021	1028	1034	1044	1068	1071	1081	1088	1072
23	Mw Output		MW			27	24.k	24.6	24.8	24.8	24.8	24.8	25.5	25.1	25.1	25.0	24.8	24.4	24.4	24.5	24.1	24.1	24.1	24.1	24.1	24.1	25.4	25.5	25.4	25.5
24	80% Base Load Minimum		MW				19.9	19.9	19.9	19.9	20.1	20.1	20.4	20.4	20.4	20.2	19.9	19.8	19.8	19.8	19.6	19.6	19.5	19.5	19.6	19.6	20.6	20.6	20.6	20.6
25	Running Hours (unit overview)						3561	3562	3563	3564	3565	3566	3567	3568	3569	3570	3571	3572	3573	3574	3575	3576	3577	3578	3579	3580	3581	3582	3583	3584
26	Ambient Temperature	T1 Inlet					48	48	46	46	64	44	39.2	40.0	40.6	40.6	46.6	47.5	45	51.5	50.0	50.0	50.0	50.	48	44	38	37	37	38
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	58	58	58	58	58	58	58	55	58	58	57	56	56	56	56	56	54	57	57	57	58	58	58	58
28	Total Fuel Flow		Mscf/h				233	234	233	234	235	234	238	236	237	235	233	232	231	228	228	228	229	230	232	238	236	240	242	239

Date: APRIL 20 2018 Signature:

UI-LOG-033-R2
January 4 2018

APRIL 20 2018

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	B	B	B	B	B	B	B	B	B	B	E	B	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½
Oil Day Tank Level	LI-1562	GAL	10		FULL	47	47	47	47	47	47	45	48	45	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	F	E	E	F	E	E	E	F	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	F	E	E	E	F	E	E	E	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	82	82	82	82	82	82	82	81	82	82	82	81	81	81	81	81	81	81	81	82	82	82	81
Stage Disch. Press	PI-2101	psig		238	285	251	251	253	252	252	252	250	251	248	250	252	251	250	250	250	249	249	250	250	250	250	250	250	250
2nd Stage Inlet Press	PI-2200	psig		267	285	248	248	248	248	242	248	[illegible]	246	244	246	247	246	246	247	246	245	245	246	248	248	248	247	247	248
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	579	579	578	578	578	578	579	579	578	578	578	579	578	579	579	579	579	579	579	578
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	575	575	574	574	575	575	575	575	574	575	578	575	575	574	575	575	575	575	575	578
Lube Oil Pressure	PI-1572	psig	40	60		59	59	59	59	59	59	58	58	58	58	59	58	58	58	58	58	58	58	59	59	59	58	58	58
Lube Oil Temp	TE-1584	deg		150	170	167	167	167	167	167	167	169	169	169	168	168	166	167	168	169	168	168	169	168	168	170	171	171	170
Final Discharge Temp	TE-2120	deg		110	150	87	87	86	85	85	85	78	78	79	87	87	85	85	88	88	87	87	87	86	85	81	77	78	78
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	208	208	208	208	208	207	204	205	206	207	208	216	210	211	211	210	210	209	210	210	210	206	209	208
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	216	216	216	216	215	215	208	[illegible]	210	217	217	215	215	219	218	218	218	217	217	215	215	208	210	210
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	205	205	205	205	205	203	[illegible]	202	204	204	204	207	207	208	207	208	208	207	207	207	204	204	208	208
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	217	217	216	216	216	215	209	209	210	217	217	215	215	220	215	218	218	217	218	218	215	209	210	205
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	.03	03	07	03	03	03	03	03	03	03	03	03	.03	.03	.03	.03	.03	.03	.03
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.06	.06	.06	.06	.06	04	06	06	06	04	.06	06	06	06	04	06	.06	.06	.06	.06	.06	.06	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE APRIL 20 2018

SIGNATURE 124975

Mid Shift JCWinn

Days Shift

Notes

UI-LOG-034-R1
February 9, 2017

APRIL 21 2018

UI-LOG-033-R2
January 4 2018

Date: APRIL 21 2018

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes:

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	106	102	108	104	106	102	108	109	108	103	110	105	110	105	111	110	105	110	108	104	110	102	104	110
4	Instrument Temperature	TI-001	deg C		20	50	18	18	18	18	18	18	16	16	17	18	19	19	19	19	20	20	20	20	20	20	20	20	20	20
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	101	100	111	102	100	99	110	99	110	109	100	104	110	109	103	106	103	110	102	106	102	100	101	104
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½
9	Coolant Return Differential from GG	FI-001	In WC		60	80	65	65	65	65	65	65	61	62	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
10	Coolant Return Differential from	FI-002	In WC		37	50	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	70	70	70	69	69	70	70	70	70	70	70	70	70	70	70	70	70	70	71	71	70	70	70	70
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	35	35	34	34	34	34	34	34	33	33	34	34	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	1089	1086	1091	1090	1088	1090	1102	1098	1048	1035	1028	1030	1031	1015	1000	1008	1010	999	1022	1025	1022	1022	1027	1023
23	Mw Output		MW			27	25.4	25.6	25.8	25.6	25.6	25.6	26.0	25.8	25.0	24.8	24.1	24.1	24.1	23.8	23.5	23.5	23.5	23.5	23.5	23.7	24.1	24.1	24.1	24.1
24	80% Base Load Minimum		MW				20.6	20.6	20.7	20.7	20.7	20.7	20.9	20.7	20.1	19.8	19.7	19.4	19.5	19.2	19.1	19.2	19.3	19.0	19.1	19.1	19.3	19.5	19.5	19.5
25	Running Hours (unit overview)						3584	3585	3586	3587	3588	3589	3590	3591	3592	3593	3594	3595	3596	3597	3598	3599	3600	3601	3602	3603	3604	3605	3606	3607
26	Ambient Temperature	T1 Inlet					37	37	37	37	38	38	34.9	36.7	44.1	48.1	50.0	52.5	51.6	55.8	57.4	56.7	56.5	57.6	56	56	55	53	53	53
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	58	58	58	58	58	58	58	58	58	58	56	56	56	54	56	57	57	57	57	57	57	57	57	57
28	Total Fuel Flow		Mscf/h				240	240	241	240	238	240	242	241	235	232	230	229	230	225	224	225	224	225	226	225	232	235	233	232

Date: APRIL 21 2018 Signature: JGins

APRIL 21 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	44	44	44	44	44	44	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	41	41	41
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	1/8	1/8	1/8	1/8	1/8	1/8	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	83	83	82	82	82	81	82	81	81	81	81	81	81	81	81	81	81	82	82	82	81	81	81
Stage Disch. Press	PI-2101	psig		238	285	250	250	251	251	251	251	248	249	248	250	249	251	251	250	251	251	251	252	250	250	252	252	251	251
2nd Stage Inlet Press	PI-2200	psig		267	285	248	248	247	247	247	248	244	245	244	246	245	247	247	246	247	247	247	248	248	248	249	248	248	248
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	579	579	579	578	579	579	579	579	579	579	579	579	578	579	579	579	579	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	575	575	574	574	574	574	575	575	575	575	575	575	575	575	575	575	575	575	575	575
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	59	58	58	57	57	58	58	58	58	58	58	59	59	59	59	58	58	58	59	59	58
Lube Oil Temp	TE-1584	deg		150	170	170	170	170	169	169	169	170	170	169	170	169	168	167	167	166	165	166	165	168	168	168	169	169	168
Final Discharge Temp	TE-2120	deg		110	150	75	75	75	75	76	75	73	74	81	87	88	91	91	92	96	95	95	95	95	95	94	94	92	92
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	204	203	204	204	204	205	203	204	207	208	209	211	210	212	213	212	[illegible]	212	210	210	208	208	206	206
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	204	204	205	205	205	205	204	206	211	215	217	220	221	222	226	226	226	224	224	222	222	226	220	220
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	202	202	202	202	202	202	201	201	204	205	206	208	207	209	210	209	209	209	208	208	208	206	206	206
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	206	206	206	206	206	206	205	206	211	215	217	220	220	222	224	225	224	224	224	222	222	222	220	220
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.04	.04	.04	.04	.04	.04	.04	.03	.03	.04
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.05	.05	.05	.05	.05	.06	.06	.06	.05	.06	.06	.06	.06	.06	.06	.06	.04	.06	.06	.06	.06	.06	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.											575																		
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8						570																		
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20						558																		

DATE APRIL 21 2018

SIGNATURE

Mid Shift

Days Shift [signature]

Notes

UI-LOG-034-R1
February 9, 2017

APRIL 22 2018

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: APRIL 22 2018

MST (MDT) (circle one)

Time Gas Introduced (Turbine Rolling): 1458 / 1652

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open): 1404

Time No Gas Flow: 1404

Notes: @ 1404 CGTG TRIPPED
IN Foam DISPATCH TO BE BACK ON LINE BY 1700
19 MWATT- @ 1800 22 MWATT

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	T			✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	U			✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	106	110	100	108	108	106	60	105	100	105	103	105	110	R			111	108	106	110	106	102	110	108
4	Instrument Temperature	TI-001	deg C		20	50	18	18	18	18	18	18	19	19	19	19	19	19	21	R			22	22	22	22	20	20	20	19
5	Air Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	I			19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	100	101	102	104	102	100	105	104	103	99	105	110	111	N			110	102	111	110	105	103	101	102
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	T			1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	in WC		60	80	65	65	65	65	65	65	65	65	65	65	65	65	65	I			65	65	65	65	65	65	65	65
10	Coolant Return Differential from	FI-002	in WC		37	50	35	35	35	35	35	35	35	38	38	38	38	36	36	C			35	35	35	35	35	35	35	35
11	Control Room		Units	Low	Norm	Max														A										
12	Room Temperature		deg F		72	85	71	71	71	70	70	70	70	70	70	70	70	70	70	L			70	70	69	69	68	68	66	66
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	I			0	0	0	0	0	0	0	0
15	WECC Log		Operational?																	B										
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES				YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	30	30				33	34	34	34	34	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AE3GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		v				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	1073	1077	1070	1098	1103	1102	1064	1035	1031	1017	1000	974	970				802	814	978	976	1014	1017	1016	1011
23	Mw Output		MW			27	25.1	25.1	25.1	25.3	25.6	25.8	25.1	24.1	24.1	23.8	23.5	22.7	22.7				19.0	19.0	23.1	23.1	24.1	24.1	24.1	24.1
24	80% Base Load Minimum		MW				20.2	20.2	20.2	20.4	20.4	20.6	20.0	19.8	19.5	19.2	18.9	18.7	18.6				18.6	18.8	19.0	19.0	19.5	19.5	19.5	19.5
25	Running Hours (unit overview)						3608	3609	3610	3611	3612	3613	3614	3615	3616	3617	3618	3619	3620				3623	3624	3625	3626	3627	3628	3629	3630
26	Ambient Temperature	T1 inlet					44	43	43	42	40	38	45	50	51.6	55.0	59	61	63				43.3	61	59	59	58	52	52	53
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	57	57	57	57	57	57	58	56	56	56	56	56	54				58	58	59	59	59	59	60	60
28	Total Fuel Flow		Mscf/h				238	237	238	239	239	239	235	230	229	227	224	220	219				192	198	224	224	220	230	231	230

Date: APRIL 22 2018 Signature:

UI-LOG-033-R2
January 4 2018

APRIL 22 2018

CGTG TURBINE 735116 — UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	T			B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	U			E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	R			1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	41	41	41	41	41	41	38	38	38	38	38	38	38	B			37	37	37	37	37	37	37	37
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	L			F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	I			E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	1/4	1/4	1/4	1/4	1/4	1/4	3/8	3/8	3/8	3/8	3/8	3/8	3/8	N			B	B	B	B	B	B	B	B
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	E			81	82	82	82	82	81	81	81
1st Stage Inlet Press.	PI-2100	psig		88	140	82	82	82	82	82	82	82	81	81	80	81	81	81	T			251	251	251	251	251	251	251	251
Stage Disch. Press	PI-2101	psig		238	285	249	249	249	250	250	251	250	250	250	250	250	250	250	R			248	248	248	248	248	247	248	248
2nd Stage Inlet Press	PI-2200	psig		267	285	246	246	246	248	248	248	246	246	246	246	246	246	247	I			578	579	579	579	579	579	579	579
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	579	579	579	579	579	579	578	578	578	F			575	575	575	575	575	575	575	575
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	575	575	574	575	575	574	575	574	575	O			59	59	59	59	59	59	59	59
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	58	59	59	58	58	58	58	59	59	59	F			163	165	165	164	166	167	167	167
Lube Oil Temp	TE-1584	deg		150	170	168	168	169	169	169	169	170	169	169	168	167	166	166	↑			102	102	100	99	99	99	99	101
Final Discharge Temp	TE-2120	deg		110	150	83	83	83	83	84	84	83	89	89	92	96	98	102	F			221	222	218	216	215	213	213	213
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	208	208	208	208	208	208	206	209	208	212	214	215	217	I			233	232	230	228	225	223	223	223
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	214	214	214	214	214	214	211	216	216	222	225	227	231	D			218	218	216	214	213	211	211	212
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	205	205	205	205	205	205	204	206	208	209	211	213	214				232	233	230	228	225	223	223	223
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	214	214	214	215	215	216	212	217	217	222	225	229	231				109	104	104	103	103	103	103	103
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.07	.07	.03				106	106	106	106	104	105	105	105
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.04	.04	.03											
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																575													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8											570													
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20											559													

DATE APRIL 22 2018

SIGNATURE 735946

Mid Shift

Days Shift

Notes @ 1404 CGTG TRIPPED OF. INFORM PLANT. ALARM ARE IN ALARM BOCK INFORM DISPATCH. TO BE BACK ON LINE BY 1700 WITH .19 MWATTS @1800 .22 MWATTS

Date: APRIL 23 2018

MST / (MDT) (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes:

CGTG HOURLY READING LOG

UI-LOG-033-R2
January 4 2018

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	104	110	106	114	110	108	106	108	104	102	104	112	106	106	108	110	108	111	108	108	105	106	106	109
4	Instrument Temperature	TI-001	deg C		20	50	18	18	18	18	18	18	17	17	18	19	21	22	23	24	25	25	24	26	25	25	23	22	22	21
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	106	102	101	110	106	109	102	106	106	110	100	102	104	106	102	105	106	106	110	106	106	100	102	103
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	In WC		60	80	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	67	67	63	63	63	63	63
10	Coolant Return Differential from	FI-002	In WC		37	50	35	35	35	35	35	35	35	36	36	36	36	35	36	36	35	35	35	37	35	36	36	36	36	36
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	66	68	68	65	68
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?				YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AG3GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200	1035	1036	1030	1058	1059	1056	1054	1040	1019	999	964	951	945	956	940	933	923	921	918	940	969	972	973	982
23	Mw Output		MW			27	24.4	24.4	24.4	24.8	24.8	25.1	25.1	24.8	24.1	23.5	22.7	22.2	23.1	22.1	21.8	21.7	21.4	21.4	21.7	22.1	22.7	23	23	23
24	80% Base Load Minimum		MW				19.8	19.8	19.8	19.8	20.1	20.1	20.1	19.8	19.5	19.1	18.6	18.4	18.3	18.4	18.2	18.2	18.0	18.1	18.1	18.4	18.7	18.8	18.9	19
25	Running Hours (unit overview)						3630	3631	3632	3633	3634	3635	3636	3637	3638	3639	3640	3641	3642	3643	3644	3645	3646	3647	3648	3649	3650	3651	3652	3653
26	Ambient Temperature	T1 Inlet					48	48	48	47	47	46	44	48	52	58	63	66	68	67	66	66	71	70	69	65	61	60	60	59
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	60	60	60	60	60	60	61	60	59	58	58	57	59	58	59	59	60	60	60	60	60	61	61	61
28	Total Fuel Flow		Mscf/h				232	233	233	236	237	237	238	233	229	226	220	216	215	216	214	213	209	210	213	216	220	221	221	223

Date: APRIL 23 2018 Signature:

CGTG TURBINE UTILITIES AND INFRASTRUCTURE APRIL 23 2018

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	1/2	1/2	1/2	1/2	1/2	½
Oil Day Tank Level	LI-1562	GAL	10		FULL	36	36	36	36	35	35	34	35	35	36	35	35	35	35	35	35	35	34	34	34	33	33	33	33
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	E	E	E	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	82	82	82	83	83	82	82	82	82	82	82	81	82	82	82	82	82	82	82	81	82	81	81
Stage Disch. Press	PI-2101	psig		238	285	250	251	250	251	250	251	250	251	252	251	251	251	252	253	252	252	253	254	253	253	252	253	251	252
2nd Stage Inlet Press	PI-2200	psig		267	285	246	248	248	248	248	248	246	248	247	247	246	247	248	250	250	249	249	250	249	250	248	249	248	248
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579	579	578	579	578	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	575	575	575	575	575	575	579	575	575	575	575	575	575	575	575	575	574	575	575	574
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	58	58	58	56	59	59	57	58	58	59	59	60	60	59	60	60	59	59	59	59	59
Lube Oil Temp	TE-1584	deg		150	170	168	168	167	168	168	169	170	164	167	167	164	163	164	164	164	164	164	164	163	164	164	164	164	165
Final Discharge Temp	TE-2120	deg		110	150	88	88	88	85	85	83	82	97	97	97	98	102	105	106	102	104	109	110	107	103	98	97	96	95
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	211	210	210	211	211	210	208	209	211	217	220	219	214	216	216	219	221	220	218	217	214	214	214	213
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	218	218	217	216	216	215	214	217	221	226	227	231	235	235	233	234	236	235	235	232	227	225	225	224
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	209	210	210	204	208	206	202	206	209	211	212	213	215	215	216	216	216	215	216	215	212	212	212	211
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	219	220	219	218	218	214	214	217	220	220	221	229	234	231	232	233	235	230	235	232	227	226	225	224
Motor Frame Vibration	VT-1015	IPS			0.15	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.05	.05	.05	.05	.05	.05	.05	.05	.05	.04	.04	.04	.04
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.06	.06	.06	.06	.06	.06	.06	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.												574												575					
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8							570												571					
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20							557												559					

DATE APRIL 23 2018

SIGNATURE

Mid Shift JWm

Days Shift

742149 - 55666

Notes

UI-LOG-033-R2
January 4 2018

Date: APR 24 2018

CGTG HOURLY READING LOG

MST (MDT) (circle one)
Time Gas Introduced (Turbine Rolling):
Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):
Time No Gas Flow:

Notes:

#	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	105	106	106	104	108	110	108	106		104	106	106	106	108	108	108	110	108	104	110	104	105	110	104
4	Instrument Temperature	TI-001	deg C		20	50	21	20	20	19	19	19	19	20		21	22	22	26	26	28	28	29	28	24	23	21	20	19	19
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	99	103	105	100	107	109	108	102		110	105	104	102	106	111	100	104	102	111	110	110	105	107	102
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2		1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	In WC		60	80	63	63	63	63	63	63	62	62		63	64	64	64	65	65	63	65	64	63	63	63	63	63	62
10	Coolant Return Differential from	FI-002	In WC		37	50	36	36	36	36	36	36	35	35	34	39	38	40	37	37	40	39	39	39	36	36	36	36	36	36
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	65	68	66	69	65	69	70	70		76	70	71	72	72	72	73	73	73	70	66	65	68	68	68
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log			Operational?																										
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES		yes	yes	yes	yes	yes	yes	yes	yes	yes	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES		yes	yes	yes	yes	yes	yes	yes	yes	yes	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34 1/2		34	34	34	33	33	33	33	33	33	33	33	33	34	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AS5GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	982	992	982	997	1001	1018	997	1012		958	973	937	933	910	923	923	921	923	977	986	1008	1023	1036	1051
23	Mw Output		MW			27	23.1	23.5	23.1	23.4	23.8	24.1	23.5	23.8		22.7	22.7	21.7	21.4	21.1	21.4	21.4	21.4	21.4	23	23	23.8	24.1	24.4	24.8
24	80% Base Load Minimum		MW				19	19.1	19	19.3	19.2	19.5	19.2	19.2		18.7	18.6	18.1	17.9	17.8	17.8	17.9	18.0	17.9	18.8	18.9	19.2	19.4	19.6	19.7
25	Running Hours (unit overview)						3654	3655	3656	3657	3658	3659	3660	3661		3663	3664	3665	3666	3667	3668	3669	3670	3671	3672	3673	3674	3675	3676	3677
26	Ambient Temperature	T1 inlet					58	56	57	55	55	51	55	54		62	64	70	71	74	73	72.5	71.8	71	61	60	55	53	51	49
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	61	61	61	61	61	61	61	60		59	59	60	60	60	60	61	61	61	61	61	62	62	62	62
28	Total Fuel Flow		Mscf/h				223	225	224	225	230	230	226	228		220	218	213	212	208	210	210	210	210	223	223	227	232	232	235

Date: 4-24-18 Signature: [signature] L PACHECO / [signature] [signature]

0900 lay service; boiler heavy cooling water to I/O fans.

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%									✓															
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	B	B	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	33	33	33	33	32	32	32			32	32	32	32	32	31	31	31	31	30	30	30	30	30	30
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E		E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1[st] Stage Inlet Press.	PI-2100	psig		88	140	82	82	82	81	81	81	82	82		81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
Stage Disch. Press	PI-2101	psig		238	285	252	252	251	251	250	250	257	257		251	252	252	252	253	253	253	252	252	251	252	250	249	250	249
2nd Stage Inlet Press	PI-2200	psig		267	285	248	248	248	247	246	246	247	247		247	249	249	249	249	250	250	248	248	248	248	246	246	246	245
2[nd] Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	579	578	579	579		579	579	579	579	579	579	579	578	578	579	579	579	579	579	579
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	575	574	575	575		575	575	575	575	576	575	575	575	575	575	575	575	575	575	575
Lube Oil Pressure	PI-1572	psig	40	60		59	59	59	59	58	58	59	59		59	59	59	59	59	59	59	60	59	60	59	59	59	59	58
Lube Oil Temp	TE-1584	deg		150	170	165	166	165	167	168	168	166	167		167	165	165	164	161	164	164	163	164	163	163	165	167	167	168
Final Discharge Temp	TE-2120	deg		110	150	95	94	94	92	88	88	93	91		99	102	106	109	111	112	110	111	110	100	99	94	90	90	87
1[st] Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	213	212	212	212	210	210	212	212		216	218	220	221	223	224	223	223	223	217	216	215	213	213	211
2[nd] Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	223	223	223	222	219	219	222	221		227	230	231	239	240	241	240	240	240	230	229	225	222	221	219
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	210	210	210	209	208	208	210	210		214	215	217	218	220	221	220	220	224	214	213	212	210	211	209
2[nd] Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	223	223	223	222	219	219	222	222		227	231	236	238	240	240	239	240	239	230	229	225	221	221	219
Motor Frame Vibration	VT-1015	IPS			0.15	.04	.04	.04	.04	.04	.04	.04	.04		.04	.05	.05	.05	.05	.05	.05	.05	.05	.04	.04	.04	.04	.04	.04
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.06	.06	.06	.06	.06	.06	.06		.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.							575								575							575							
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8		570								570							571							
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20		558								559							559							

DATE 4-24-2018

SIGNATURE 747812-55666

Mid Shift L PACHECO

Days Shift

Notes

0900 hvy scoring bearing cooling meter I&C I/O [illegible].

UI-LOG-034-R1
February 9, 2017

UI-LOG-033-R2
January 4 2018

Date: 4.25-18

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes:

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				/	/	/	/	/	√	√	√	√	√	√	√	√	√	√	√	√	√	/	/	/	√	/	/
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				/	/	/	/	/	√	√	√	√	√	√	√	√	√	√	√	√	√	/	/	/	√	/	/
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	105	106	104	106	110	109	108	106	104	106	102	106	104	104	104	104	108	106	104	109	106	104	110	104
4	Instrument Temperature	TI-001	deg C		20	50	18	17	17	17	16	16	18	17	19	19	19	20	20	20	21	22	22	22	23	22	21	20	19	19
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19.4	19.4	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	99	102	100	106	105	110	110	111	103	102	104	104	99	110	106	104	102	106	106	104	99	103	103	106
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	PI-001	In WC		60	80	63	63	63	63	63	63	62	62	63	64	64	65	64	65	65	65	65	65	63	63	63	63	63	63
10	Coolant Return Differential from	PI-002	In WC		37	50	37	36	36	36	36	36	35	36	36	35	39	34	37	39	39	39	35	37	36	36	36	37	37	37
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	70	67	68	69	69	68	70	70	70	70	70	70	70	70	71	71	71	71	71	70	69	69	70	69
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on fine trip)	AESGGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				/	/	/	/	/	/	√	√	√	√	√	√	√	√	√	√	√	√	/	/	/	√	/	/
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200	1070	1072	1082	1089	1090	1089	1081	1072	1061	1048	1031	1022	1008	987	996	974	965	978	966	991	997	1008	1009	1027
23	Mw Output		MW			27	25.1	25.4	25.5	25.8	25.8	25.7	25.5	25.1	24.8	24.6	24.2	24.1	23.5	23.1	23.5	22.7	22.7	22.1	22.7	23.5	23.4	23.8	23.8	24.4
24	80% Base Load Minimum		MW				20.1	20.2	20.3	20.4	20.4	20.4	20.3	20.0	19.9	19.6	19.4	19.2	19.0	18.7	18.9	18.5	18.6	18.7	18.7	19.0	19.2	19.2	19.3	19.5
25	Running Hours (unit overview)						3678	3679	3680	3681	3682	3683	3684	3685	3686	3687	3688	3689	3690	3691	3692	3693	3694	3695	3696	3697	3698	3699	3700	3701
26	Ambient Temperature	T1 Inlet					45	42	41	40	39	39	41	45	47	50	53	55	57	61	60	64	64	64	62	58	56	55	54	51
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	62	62	62	62	62	62	62	62	61	61	61	61	60	66	60	61	61	61	62	62	62	62	62	62
28	Total Fuel Flow		Mscf/h				237	239	240	241	242	242	239	238	236	234	231	229	227	223	224	220	220	220	221	224	225	228	228	228

Date: APR 25 2018 Signature:

UI-LOG-033-R2
January 4 2018

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	28	28	27	27	27	27	27	27
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	81	81	82	82	82	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
Stage Disch. Press	PI-2101	psig		238	285	250	249	249	249	250	250	247	249	249	249	250	249	249	251	251	252	252	252	251	252	251	251	250	250
2nd Stage Inlet Press	PI-2200	psig		267	285	246	245	245	246	246	246	244	245	244	245	246	246	246	247	248	248	248	247	248	248	248	247	247	247
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	578	579	578	579	579	579	579	579	579	579	579	579	579	579	578	579	579	579	579	578
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	574	575	574	575	575	575	575	575	575	575	575	574	575	575	575	574	575	575	575	574
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	58	57	58	58	58	58	58	58	58	58	59	59	59	59	59	59	59	59	59	59	59
Lube Oil Temp	TE-1584	deg		150	170	169	169	169	170	171	170	171	169	168	169	168	167	167	167	166	164	164	164	163	164	165	165	166	166
Final Discharge Temp	TE-2120	deg		110	150	82	81	81	78	77	77	79	83	85	87	90	92	95	98	98	103	102	101	100	97	94	94	92	92
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	209	208	208	208	208	208	209	210	211	212	213	214	215	216	216	218	217	218	216	215	214	214	214	213
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	215	214	213	211	210	210	212	214	216	220	222	224	225	228	229	232	231	230	230	227	225	225	223	223
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	207	206	206	205	206	206	207	208	208	209	210	212	212	213	214	215	214	214	214	213	213	213	212	212
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	215	213	213	211	210	210	212	215	216	219	222	223	225	228	228	232	231	230	230	227	225	225	223	223
Motor Frame Vibration	VT-1015	IPS			0.15	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.05	.05	.05	.05	.06	.05	.05	.05	.05	.04	.04	.04
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.06	.06	.06	.06	.06	.06	.05	.05	.05	.05	.05	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575						575							575										
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	570						570							571										
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20	558						556							558										

DATE	4-25-2018
SIGNATURE	
Mid Shift	L PACHECO
Days Shift	

Notes

UI-LOG-033-R2
January 4 2018

Date: 4-26-2018

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow:

Notes:

CGTG HOURLY READING LOG

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				/	/	/	/	/	√	√	√	√	√	√	√	√	L	√	√	√	L	/	/	/	√	/	/
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				/	/	/	/	/	√	√	√	√	√	√	√	√	L	√	√	√	L	/	/	/	√	/	/
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	110	106	108	106	107	108	112	106	114	110	108	106	108	106	110	106	104	106	105	104	108	106	104	110
4	Instrument Temperature	TI-001	deg C		20	50	18	18	18	18	18	18	18	18	20	20	22	22	24	24	25	25	24	24	24	22	21	20	19	18
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	104	105	110	104	99	100	105	103	104	100	103	111	100	109	106	101	106	102	109	107	109	98	101	110
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
9	Coolant Return Differential from GG	FI-001	In WC		60	80	63	63	63	63	63	63	62	60	64	64	63	65	63	65	65	65	65	65	63	63	63	63	63	63
10	Coolant Return Differential from	FI-002	In WC		37	50	36	36	36	36	36	36	35	35	35	38	38	39	40	38	40	40	39	39	36	36	36	36	36	36
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	67	68	71	69	66	69	70	70	70	70	71	71	71	72	72	72	72	72	68	69	70	66	65	66
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	32	33	33	33	34	34
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A53GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				/	/	/	/	/	/	√	√	√	√	√	√	√	√	√	√	/	/	/	/	/	√	/	/
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	1023	1032	1046	1043	1035	1044	1039	1018	989	980	962	962	943	933	933	927	930	928	949	990	1003	1016	1029	1040
23	Mw Output		MW			27	24.1	24.4	24.8	24.8	24.4	24.5	24.4	23.9	23.1	23.1	22.4	22.4	22.0	21.7	21.7	21.4	21.5	21.6	22.4	23.1	23.7	24.1	24.1	24.6
24	80% Base Load Minimum		MW				19.6	19.7	19.9	19.9	19.7	19.9	19.8	19.4	18.9	18.8	18.1	18.5	18.3	18.1	18.1	18.1	18.0	18.1	18.4	18.9	19.2	19.4	19.5	19.7
25	Running Hours (omit overview)						3702	3703	3704	3705	3706	3707	3708	3709	3710	3711	3712	3713	3714	3715	3716	3717	3718	3719	3720	3721	3722	3723	3724	3725
26	Ambient Temperature	T1 Inlet					50	50	46	46	48	46	47	53	59	60	64	65	67	69	69	70	70	70	65	60	56	54	52	49
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-130	%			70%	62	62	62	62	62	-	62	61	61	60	60	60	60	60	61	61	61	61	61	61	62	62	62	62
28	Total Fuel Flow		Mscf/h				231	232	235	234	232	-	234	229	224	223	219	217	215	213	213	213	212	213	221	226	228	230	232	234

Date: APR 26 2018 Signature: J. Pacheco

UI-LOG-033-R2
January 4 2018

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
Oil Day Tank Level	LI-1562	GAL	10		FULL	27	26	26	26	26	26	26	26	26	26	26	26	25	25	25	25	25	25	24	24	24	24	24	24
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	E	F	F	F	F	F
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1st Stage Inlet Press.	PI-2100	psig		88	140	82	81	81	81	81	81	82	81	81	81	81	81	81	81	81	80	81	81	81	81	81	81	81	81
Stage Disch. Press	PI-2101	psig		238	285	250	249	249	249	250	250	250	250	251	250	251	251	252	252	252	250	252	251	252	251	251	251	250	250
2nd Stage Inlet Press	PI-2200	psig		267	285	248	246	245	245	247	246	247	247	247	247	247	248	248	248	248	246	249	248	248	248	247	247	247	246
2nd Stage Disch. Press	PI-2201	psig		575	600	578	579	579	579	579	578	578	579	579	579	579	579	578	579	579	578	579	578	579	579	579	579	578	578
Final Discharge Pressure	PI-2108	psig		575	600	574	575	575	575	575	574	574	574	575	575	575	576	575	575	575	574	576	575	575	575	574	575	574	574
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	58	58	58	58	58	59	59	59	59	59	59	59	59	59	60	59	59	59	59	59	58
Lube Oil Temp	TE-1584	deg		150	170	168	169	169	169	168	169	169	169	167	166	165	165	165	164	165	165	165	165	163	164	164	166	167	168
Final Discharge Temp	TE-2120	deg		110	150	88	86	86	84	89	84	85	91	95	98	100	107	106	107	108	109	109	109	104	98	95	94	97	88
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	211	210	209	209	210	209	209	211	214	215	216	218	219	220	221	221	220	220	217	214	213	213	212	211
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	219	217	216	216	218	215	215	220	224	224	228	231	234	235	236	236	237	236	232	226	224	222	220	219
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	209	208	207	207	208	207	207	209	211	213	214	215	216	218	219	218	219	218	215	212	211	210	210	209
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	219	217	216	216	218	215	215	219	223	225	228	230	234	235	236	237	237	237	232	226	224	222	220	218
Motor Frame Vibration	VT-1015	IPS			0.15	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.05	.04	.05	.05	.05	.05	.04	.04	.04	.04	.04	.04
Compresser Frame Vibration	VT-1512	IPS			0.35	.06	.05	.06	.05	.06	.06	.06	.06	.06	.05	.06	.05	.05	.06	.06	.06	.06	.06	.06	.06	.06	.06	.05	.05
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.						575						578									575								
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8	571						570									571								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20	558						558									561								

DATE	4-26-2018
SIGNATURE	
Mid Shift	L Pacheco
Days Shift	

759443 - 55666

Notes

UI-LOG-033-R2
January 4 2016

Date: APR 27 2018

MST (MDT) (circle one)

Time Gas Introduced (Turbine Rolling):

Time of Turbine Online (Brkr Closed):

CGTG HOURLY READING LOG

Time Turbine Offline (Brkr Open): 0935

Time No Gas Flow: 0940

Notes: INITIATED UNIT STOP. DO TO AUX NOT RESPONSIVE

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√				✓	✓	✓	✓	✓	✓	✓	✓																
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√				✓	✓	✓	✓	✓	✓	✓	✓																
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120	105	110	106	104	106	102	105	109																
4	Instrument Temperature	TI-001	deg C		20	50	18	18	18	17	17	17	17	19																
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25		19	19	19	19	19	19	19	19	19															
7	Coolant PLC Temperature	TI-002	deg F	100	110	120	106	104	104	105	98	102	103	105	98															
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2															
9	Coolant Return Differential from GG	PI-001	in WC		60	80	63	63	63	63	63	63	62	63	65															
10	Coolant Return Differential from	PI-002	in WC		37	50	36	36	36	36	36	36	35	35	34															
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85	68	68	71	69	66	70	70	70	70															
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%	0	0	0	0	0	0	0	0	0															
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES															
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)	YES	YES	YES	YES	YES	YES	YES	YES	YES															
	Extronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%	34	34	34	34	34	34	34	34	34															
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%	0	0	0	0	0	0	0	0	0															
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√				✓	✓	✓	✓	✓	✓																		
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200	1056	1060	1074	1079	1086	1097	1090	1089	1103															
23	Mw Output		MW			27	24.8	25.1	25.1	25.5	25.5	25.5	25.5	25.1	24.5															
24	80% Base Load Minimum		MW				19.9	20	20.1	20.3	20.3	20.4	20.3	20.6	19.7															
25	Running Hours (unit overview)						3726	3727	3728	3729	3730	3731	3732	3733	3734															
26	Ambient Temperature	T1 inlet					47	45	43	42	40	39	41	45.9	49.1															
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%	62	62	63	63	63	63	63	62																
28	Total Fuel Flow		Mscf/h				236	237	240	240	241	243	241	237																

Date: 4-27-18

Signature: MIOS

UI-LOG-033-R2
January 4 2016

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK		B	B	B	B	B	B	B	B	B															
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E															
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2															
Oil Day Tank Level	LI-1562	GAL	10		FULL	24	24	23	23	23	23	23	22	22															
Lubricator Bulls eye		LEVEL	1/2	FULL		F	F	F	F	F	F	F	F	F															
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E															
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY	E	E	E	E	E	E	E	E	E															
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK		B	B	B	B	B	B	B	B	B															
1st Stage Inlet Press.	PI-2100	psig		88	140	81	82	82	82	81	82	81	81	82															
Stage Disch. Press	PI-2101	psig		238	285	250	250	249	249	248	250	249	249	250															
2nd Stage Inlet Press	PI-2200	psig		267	285	246	246	245	244	245	246	245	246	246															
2nd Stage Disch. Press	PI-2201	psig		575	600	579	579	579	579	579	578	578	579	579															
Final Discharge Pressure	PI-2108	psig		575	600	575	575	575	575	574	575	575	575	575															
Lube Oil Pressure	PI-1572	psig	40	60		58	58	58	58	58	57	58	58	58															
Lube Oil Temp	TE-1584	deg		150	170	168	169	170	170	170	170	169	169	167															
Final Discharge Temp	TE-2120	deg		110	150	86	84	82	81	80	79	79	85	89															
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297	210	209	208	208	208	207	207	209	210															
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	216	215	213	212	212	211	211	216	219															
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	208	207	206	206	205	205	205	206	208															
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	216	215	213	213	213	211	211	216	219															
Motor Frame Vibration	VT-1015	IPS			0.15	.04	.04	.04	.04	.04	.04	.04	.04	.04															
Compresser Frame Vibration	VT-1512	IPS			0.35	.05	.06	.05	.05	.05	.05	.05	.05	.05															
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.							575																						
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8		570																						
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20		556																						

DATE	APR 27 2018
SIGNATURE	
Mid Shift	L PACHECO
Days Shift	MIOS

Notes UNIT OFF LINE NOT RUNNING

1208

UI-LOG-033-R2
January 4 2018

174 & 111,000

Date: 05-04-18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0845

Time of Turbine Online (Brkr Closed): 0953

Time Turbine Offline (Brkr Open): 1357

Time No Gas Flow: 1403

Notes:

CGTG HOURLY READING LOG

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√													✓	✓	✓	✓											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√													✓	✓	✓	✓											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120										110	111	105	109											
4	Instrument Temperature	TI-001	deg C		20	50										20	20	20	26											
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25											19	19	19	19											
7	Coolant PLC Temperature	TI-002	deg F	100	110	120										105	104	102	101											
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL										1/2	1/2	1/2	1/2											
9	Coolant Return Differential from GG	FI-001	In WC		60	80										61	61	62	62											
10	Coolant Return Differential from	FI-002	In WC		37	50										35	35	35	35											
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85										70	70	70	70											
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%										0%	0%	0%	0%											
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)										Y	Y	Y	Y											
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)										Y	Y	Y	Y											
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%										34%	34%	34%	34%											
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%										0%	0%	0%	0%											
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD 5T-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√													✓	✓	✓	✓											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200										1014	1005	996	1034											
23	Mw Output		MW			27										23.8	23.5	23.5	24.1											
24	80% Base Load Minimum		MW													19.0	19.6	18.8	19.5											
25	Running Hours (unit overview)															3736	3737	3738	3739											
26	Ambient Temperature	T1 inlet														57.6	59.2	60	52											
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%										72%	72%	72%	72											
28	Total Fuel Flow		Mscf/h													229.5	227	226	253											

Date: 05-04-2018 Signature: Randy Vigil

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	0835																												
Combustible Gas Detector	AAH-303	%		0%	20%										N/A														
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK											B	B	B	B											
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY										E	E	E	E											
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL										1/2	1/2	1/2	1/2											
Oil Day Tank Level	LI-1562	GAL	10		FULL										20	20	20	20											
Lubricator Bulls eye		LEVEL	1/2	FULL											F	F	F	F											
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY										E	E	E	E											
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY										E	E	E	E											
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK											B	B	B	B											
1st Stage Inlet Press.	PI-2100	psig		88	140										80	81	81	81											
Stage Disch. Press	PI-2101	psig		238	285										245	249	249	249											
2nd Stage Inlet Press	PI-2200	psig		267	285										224	245	245	244											
2nd Stage Disch. Press	PI-2201	psig		575	600										578	579	579	579											
Final Discharge Pressure	PI-2108	psig		575	600										575	575	575	575											
Lube Oil Pressure	PI-1572	psig	40	60											59	59	59	59											
Lube Oil Temp	TE-1584	deg		150	170										168	167	167	165											
Final Discharge Temp	TE-2120	deg		110	150										93	96	96	89											
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297										223	223	223	220											
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283										228	229	229	233											
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297										221	221	224	218											
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283										228	229	230	223											
Motor Frame Vibration	VT-1015	IPS			0.15										.04	.04	.04	.04											
Compresser Frame Vibration	VT-1512	IPS			0.35										.06	.06	.06	.06											
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.															575														
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8										571														
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20										558														

DATE 05-04-2018

SIGNATURE Ramey Vigil

Mid Shift

Days Shift ✓

Notes

UI-LOG-033-R2
January 4 2016

CGTG HOURLY READING LOG

Date: 05.11.18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1017

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow: 1050

Notes: FOR TEST + OIL SAMPLE FOR JOE B.

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	in WC		60	80																								
10	Coolant Return Differential from	FI-002	in WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AG3GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√																											
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 05-11-18 Signature:

UI-LOG-033-R2
January 4 2016

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	1005																												
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK																									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY																								
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL																								
Oil Day Tank Level	LI-1562	GAL	10		FULL																								
Lubricator Bulls eye		LEVEL	1/2	FULL																									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY																								
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY																								
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK																									
1st Stage Inlet Press.	PI-2100	psig		88	140																								
Stage Disch. Press	PI-2101	psig		238	285																								
2nd Stage Inlet Press	PI-2200	psig		267	285																								
2nd Stage Disch. Press	PI-2201	psig		575	600																								
Final Discharge Pressure	PI-2108	psig		575	600																								
Lube Oil Pressure	PI-1572	psig	40	60																									
Lube Oil Temp	TE-1584	deg		150	170																								
Final Discharge Temp	TE-2120	deg		110	150																								
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297																								
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283																								
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297																								
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283																								
Motor Frame Vibration	VT-1015	IPS			0.15																								
Compresser Frame Vibration	VT-1512	IPS			0.35																								
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE 05-11-18

SIGNATURE [signature]

Mid Shift

Days Shift

Notes FOR GTE SERVICES FOR JOE B.

UI-LOG-033-R2
January 4 2018

Date: 05-14-2018

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1327

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow: 1347

Notes: 15:07 - GAS COMPRESSOR START
POST MAINTENANCE CHECK / BRING CGTG TO SYNCH SPEED/
UNIT STOP

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	In WC		60	80																								
10	Coolant Return Differential from	FI-002	In WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√																											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 5-14-2018 Signature:

UI-LOG-033-R2
January 4 2018

UI-LOG-033-R2
January 4 2018

Date: 5-15-2018

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1321

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow: 1346

Notes: Training Bringing CGTG up to Synch Speed

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	in WC		60	80																								
10	Coolant Return Differential from	FI-002	in WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√																											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: Signature:

UI-LOG-033-R2
January 4 2018

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 5-24-2018

MST (MDT) (circle one)

Time Gas Introduced (Turbine Rolling): 0903 / 0700

Time of Turbine Online (Brkr Closed): 0954

Time Turbine Offline (Brkr Open): 1558

Time No Gas Flow: 0917 / 1603

Notes: CGTG Schedule Changed To 1000 AM

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	v													✓	✓	✓	✓	✓	✓									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	v													✓	✓	✓	✓	✓	✓									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120										110	108	108	100	106	109									
4	Instrument Temperature	TI-001	deg C		20	50										26	26	26	27	28	29									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25											18.5	19	19	19	19	19									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120										107	106	107	106	106	106									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL										5/8	5/8	5/8	5/8	5/8	5/8									
9	Coolant Return Differential from GG	FI-001	In WC		60	80										62	62	62	62	62	62									
10	Coolant Return Differential from	FI-002	In WC		37	50										35	36	36	36	36	36									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85										71.5	70.0	70.0	71.5	72.5	72.5									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%										0	0	0	0	0	0									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)										YES	YES	YES	YES	YES	YES									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)										YES	YES	YES	YES	YES	YES									
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%										35	35	34	34	34	34									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%										0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20											.6	.7	.9	.9	.9	.9									
21	Acknowledge Alarms Hourly		v													✓	✓	✓	✓	✓	✓									
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200										909	921	901	883	880	870									
23	Mw Output		MW			27										21.1	21.7	21.1	20.7	20.7	20.4									
24	80% Base Load Minimum		MW													18.0	17.94	17.73	17.59	17.51	17.37									
25	Running Hours (unit overview)															3742	3743	3744	3745	3746	3747									
26	Ambient Temperature	T1 Inlet														70.9	72.5	74.8	76.6	76.3	79.2									
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%										69	70	70	70	70	70									
28	Total Fuel Flow		Mscf/h													212.6	213.3	209.9	208.8	206.4	204.3									

Date: 05-24-18 Signature: Robert Long

UI-LOG-033-R2
January 4 2018

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME 0639	0845																												
Combustible Gas Detector	AAH-303	%		0%	20%										N/A	005	005	005	005	005									
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK											B	B	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY										E	E	E	E	E	E									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL										1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL										FULL	FULL	FULL	FULL	FULL	FULL									
Lubricator Bulls eye		LEVEL	1/2	FULL											3/4	3/4	3/4	3/4	3/4	3/4									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY										E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY										E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK											B	B	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140										81.9	81.9	82	82	82	82									
Stage Disch. Press	PI-2101	psig		238	285										250	250	252	252	252	252									
2nd Stage Inlet Press	PI-2200	psig		267	285										247	247	248	249	249	249									
2nd Stage Disch. Press	PI-2201	psig		575	600										578	579	579	579	579	579									
Final Discharge Pressure	PI-2108	psig		575	600										575	575	575	576	575	575									
Lube Oil Pressure	PI-1572	psig	40	60											59.9	59.8	59.8	59.9	59.7	59.5									
Lube Oil Temp	TE-1584	deg		150	170										164	164	164	163	163	164									
Final Discharge Temp	TE-2120	deg		110	150										110	112	115	119	119	120									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297										233	233	233	234	235	235									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283										241	242	244	247	248	248									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297										230	230	230	230	231	232									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283										240	242	244	247	247	247									
Motor Frame Vibration	VT-1015	IPS			0.15										.05	.05	.05	.04	.04	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35										.05	.06	.05	.06	.06	.06									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																576													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8											571													
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20											561													

DATE 5-24-2018	
SIGNATURE	
Mid Shift	
Days Shift	Robert Lucas

Notes 0705 CGTG Schedule changed TO 1000 AM

UI-LOG-033-R2
January 4 2018

Date: 5-31-18

CGTG HOURLY READING LOG

MST / (MDT) circle one)

Time Gas Introduced (Turbine Rolling): 0638

Time of Turbine Online (Brkr Closed): 0754

Time Turbine Offline (Brkr Open): 1557

Time No Gas Flow: 1604

Notes:

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	v											✓	✓	✓	✓	✓	✓	✓	✓									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	v											✓	✓	✓	✓	✓	✓	✓	✓									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								110	110	110	104	108	106	108	108									
4	Instrument Temperature	TI-001	deg C		20	50								25	25	25	27	28	29	29	30									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									19	19	19	19	19	19	19	19									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								101	102	103	104	107	102	100	101									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	FI-001	in WC		60	80								61	61	61	62	64	64	62	64									
10	Coolant Return Differential from	FI-002	in WC		37	50								36	36	36	36	37	37	37	37									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								71	70	70	72	72	73	74	74									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								0	0	0	0	1	0	1	0									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								35	35	34	34	34	34	34	33									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0	0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		v											✓	✓	✓	✓	✓	✓	L	✓									
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200								930	919	907	893	870	858	849	857									
23	Mw Output		MW			27								21.7	21.4	21.1	21.1	20.4	20.1	20.1	20.1									
24	80% Base Load Minimum		MW											18.4	18.1	17.8	17.6	17.4	17.2	17.2	17.6									
25	Running Hours (unit overview)													3749.8	3751	3752	3752.8	3753.3	3754.8	3755	3756									
26	Ambient Temperature	T1 inlet												66.9	70.9	73.4	75.6	78.4	81.0	81.0	81.0									
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								72	71	71	71	71	71	71	71									
28	Total Fuel Flow		Mscf/h											215.9	213	211	209	206	203	202	202									

Date: 5-31-18 Signature:

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME											658		005																
Combustible Gas Detector	AAH-303	%		0%	20%								B	B	B	B	B	B	B	B									
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									E	E	E	E	E	E	E	E									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								F	F	F	F	F	F	F	F									
Oil Day Tank Level	LI-1562	GAL	10		FULL								3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4									
Lubricator Bulls eye		LEVEL	1/2	FULL									E	E	E	E	E	E	E	E									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								B	B	B	B	B	B	B	B									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									82	82	82	82	82	82	82	82									
1st Stage Inlet Press.	PI-2100	psig		88	140								249	250	251	25	252	254	252	553									
Stage Disch. Press	PI-2101	psig		238	285								246	247	247	248	248	249	249	249									
2nd Stage Inlet Press	PI-2200	psig		267	285								579	579	579	579	579	579	579	76									
2nd Stage Disch. Press	PI-2201	psig		575	600								575	575	575	575	575	575	575	576									
Final Discharge Pressure	PI-2108	psig		575	600								60	60	60	59	59	59	59	59									
Lube Oil Pressure	PI-1572	psig	40	60									163	164	164	165	164	164	164	164									
Lube Oil Temp	TE-1584	deg		150	170								105	108	112	116	119	121	121	123									
Final Discharge Temp	TE-2120	deg		110	150								234	235	236	275	235	257	237	237									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								237	240	243	275	248	250	251	252									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								232	239	274	232	232	233	233	234									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								237	240	248	246	247	250	250	251									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								.04	.04	.05	.05	.04	.05	.04	.04									
Motor Frame Vibration	VT-1015	IPS			0.15								.05	.05	.05	.05	.06	.05	.05	.05									
Compressor Frame Vibration	VT-1512	IPS			0.35																								
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																								
Natural Gas Comp.Discharge Press.													575							575									
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8								571							571									
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20								560							561									

DATE	5-31-18
SIGNATURE	
Mid Shift	
Days Shift	C PACHECO

Notes

UI-LOG-033-R2
January 4 2018

Date: 06-7-2018

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1635

Time of Turbine Online (Brkr Closed): 1750

Time Turbine Offline (Brkr Open): 2155

Time No Gas Flow: 2155

Notes: TO BE ON LINE BY 1800 DO TO CCR PROBLEMS / UNIT DID NOT UNLOAD WHEN STOP BUTTON PUSHED TRIPPED IMMEDIATELY WITH 20 MW. SEE BELOW

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√																						✓	✓	✓			
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√																						✓	✓	✓			
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																			108	107	104			
4	Instrument Temperature	TI-001	deg C		20	50																			32	30	30			
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																				20	20	20			
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																			102	106	104			
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																			½	½	½			
9	Coolant Return Differential from GG	FI-001	in WC		60	80																			60	60	60			
10	Coolant Return Differential from	FI-002	in WC		37	50																			35	35	35			
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																			74	74	73			
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																			1	1	1			
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																			YES	YES	YES			
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																			YES	YES	YES			
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																			33	33	33			
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																			Ø	Ø	Ø			
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√																						✓	✓	✓			
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																			825	841	850			
23	Mw Output		MW			27																			19.3	19.8	20.4			
24	80% Base Load Minimum		MW																						17.0	17.2	17.5			
25	Running Hours (unit overview)																								3760	3761	3762			
26	Ambient Temperature	T1 inlet																							84	82	71			
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																			72	72	73			
28	Total Fuel Flow		Mscf/h																						198	201	205			

Date: 06-07-2018 Signature:

THERE WERE 9 FAILED STARTS OF UNIT. FUEL WAS ON FOR LESS THAN ONE MINUTE AT 0717

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME	1625																												
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK																				B	B	B			
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY																			E	E	E			
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL																			1/2	1/2	1/2			
Oil Day Tank Level	LI-1562	GAL	10		FULL																			F	F	F			
Lubricator Bulls eye		LEVEL	1/2	FULL																				3/4	3/4	3/4			
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY																			E	E	E			
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY																			E	E	E			
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK																				B	B	B			
1st Stage Inlet Press.	PI-2100	psig		88	140																			83	83	83			
Stage Disch. Press	PI-2101	psig		238	285																			253	255	255			
2nd Stage Inlet Press	PI-2200	psig		267	285																			250	250	250			
2nd Stage Disch. Press	PI-2201	psig		575	600																			579	579	580			
Final Discharge Pressure	PI-2108	psig		575	600																			575	575	575			
Lube Oil Pressure	PI-1572	psig	40	60																				60	60	60			
Lube Oil Temp	TE-1584	deg		150	170																			165	165	164			
Final Discharge Temp	TE-2120	deg		110	150																			122	120	115			
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297																			242	241	238			
2ndStage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283																			253	248	245			
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297																			240	238	234			
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283																			253	248	245			
Motor Frame Vibration	VT-1015	IPS			0.15																			.04	.04	.04			
Compresser Frame Vibration	VT 1512	IPS			0.35																			.05	.04	.05			
Take Once per Shift / at Full Load		psig		Max psid	When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																										
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE 06-7-2018

SIGNATURE Ronnie Ward

Mid Shift

Days Shift

Notes UNIT WAS ALSO STARTED AT 0837 AND 0638. THERE WERE 9 FAILED STARTS OF CGTG

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 6-8-18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1018

Time of Turbine Online (Brkr Closed): 1052

Time Turbine Offline (Brkr Open): 1102

Time No Gas Flow: 1108

Notes: JET ONLINE CAME UP TO 19 MW AND THEN SHUT IT DOWN

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	√																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	√																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	In WC		60	80																								
10	Coolant Return Differential from	FI-002	In WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)										Y														
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)										Y														
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	U-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	U-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		√																											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	U-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 6-8-18 Signature:

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME															1018														
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK																									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY																								
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL																								
Oil Day Tank Level	LI-1562	GAL	10		FULL																								
Lubricator Bulls eye		LEVEL	1/2	FULL																									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY																								
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY																								
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK																									
1st Stage Inlet Press.	PI-2100	psig		88	140																								
Stage Disch. Press	PI-2101	psig		238	285																								
2nd Stage Inlet Press	PI-2200	psig		267	285																								
2nd Stage Disch. Press	PI-2201	psig		575	600																								
Final Discharge Pressure	PI-2108	psig		575	600																								
Lube Oil Pressure	PI-1572	psig	40	60																									
Lube Oil Temp	TE-1584	deg		150	170																								
Final Discharge Temp	TE-2120	deg		110	150																								
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297																								
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283																								
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297																								
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283																								
Motor Frame Vibration	VT-1015	IPS			0.15																								
Compresser Frame Vibration	VT-1512	IPS			0.35																								
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE	6-8-18
SIGNATURE	
Mid Shift	
Days Shift	

Notes: RAMP UP TO SPEED + SYNCHRONIZED FOR TESTING + SHUT DOWN AFTER GETTING TO 19 MW

UI-LOG-033-R2
January 4 2018

Date: 6-11-18

CGTG HOURLY READING LOG

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0657

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow: 0711

Notes: GAS COMP NEVER PUT ON / STARTED. CGTG UNIT STARTED TO BURN OFF GAS FOR LOTO FROM LINES

							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Instrument Air Compressor	LD	Units	Low	Norm	Max																								
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	In WC		60	80																								
10	Coolant Return Differential from	FI-002	In WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	40%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V																											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 6-11-18 Signature:

UI-LOG-033-R2
January 4 2018

UI-LOG-033-R2
January 4 2018

Date: 06-14-18

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1732

Time of Turbine Online (Brkr Closed):

Time Turbine Offline (Brkr Open):

Time No Gas Flow: 1741

Notes: GAS COMPRESSOR ON AT 1340 DID 2 WASH CYCLES AT CGTG AND 4 RINSE CYCLES, UNIT BROUGHT TO IDLE SPEED TO DRY

CGTG HOURLY READING LOG

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	In WC		60	80																								
10	Coolant Return Differential from	FI-002	In WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AS3GSD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V																											
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 Inlet																												
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 06-14-2018 Signature: JOE GOMEZ

UI-LOG-033-R2
January 4 2018

UH-LOG-033-R2
January 4 2018

Date: JUNE 15 2018

MST (MDT (circle one)

Time Gas Introduced (Turbine Rolling): 1149

Time of Turbine Online (Brkr Closed): ~~1235~~ 1206

Time Turbine Offline (Brkr Open): 1235

Time No Gas Flow: 1235

Notes: GAS COMPRESSOR TRIPPED

CGTG HOURLY READING LOG

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V																✓											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V																✓											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120													110											
4	Instrument Temperature	TI-001	deg C		20	50													32											
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25														20											
7	Coolant PLC Temperature	TI-002	deg F	100	110	120													102											
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL													1/2											
9	Coolant Return Differential from GG	FI-001	in WC		60	80													60											
10	Coolant Return Differential from	FI-002	in WC		37	50													35											
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85													70											
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%													1											
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)													Y											
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)													Y											
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%													L											
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%													Ø											
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	~~AS3GGD ST-01~~	psig	35	20																									
21	Acknowledge Alarms Hourly		V																✓											
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200													815											
23	Mw Output		MW			27													18											
24	80% Base Load Minimum		MW																14.7											
25	Running Hours (unit overview)																		3765											
26	Ambient Temperature	T1 inlet																	83											
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 6-15-18 Signature: W. WILLIAMS

UH-LOG-033-R2
January 4 2018

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK														B											
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY													E											
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL													1/2											
Oil Day Tank Level	LI-1562	GAL	10		FULL													F											
Lubricator Bulls eye		LEVEL	1/2	FULL														3/4											
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY													E											
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY													E											
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK														B											
1st Stage Inlet Press.	PI-2100	psig		88	140													83											
Stage Disch. Press	PI-2101	psig		238	285													252											
2nd Stage Inlet Press	PI-2200	psig		267	285													249											
2nd Stage Disch. Press	PI-2201	psig		575	600													579											
Final Discharge Pressure	PI-2108	psig		575	600													576											
Lube Oil Pressure	PI-1572	psig	40	60														60											
Lube Oil Temp	TE-1584	deg		150	170													164											
Final Discharge Temp	TE-2120	deg		110	150													121											
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297													245											
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283													252											
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297													242											
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283													252											
Motor Frame Vibration	VT-1015	IPS			0.15													.05											
Compresser Frame Vibration	VT-1512	IPS			0.35													.05											
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE	6-15-18
SIGNATURE	
Mid Shift	
Days Shift	WILLIAMS

Notes COMPRESSOR TRIP, GENERATION CANCELED

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 06-19-2018

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 14:32

Time of Turbine Online (Brkr Closed): N/A

Time Turbine Offline (Brkr Open): N/A

Time No Gas Flow: 14:51

Notes: 06-19-2018- Test Gas Comp. / bring CGTG up to synch speed.

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V																											
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V																											
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120																								
4	Instrument Temperature	TI-001	deg C		20	50																								
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25																									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120																								
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL																								
9	Coolant Return Differential from GG	FI-001	In WC		60	80																								
10	Coolant Return Differential from	FI-002	In WC		37	50																								
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85																								
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%																								
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)																								
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)																								
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%																								
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%																								
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V																											
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200																								
23	Mw Output		MW			27																								
24	80% Base Load Minimum		MW																											
25	Running Hours (unit overview)																													
26	Ambient Temperature	T1 inlet																												
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%																								
28	Total Fuel Flow		Mscf/h																											

Date: 6-19-2018 Signature: Paul A Martinez

UI-LOG-033-R2
January 4 2018

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME													09:26			11:45													
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK																									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY																								
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL																								
Oil Day Tank Level	LI-1562	GAL	10		FULL																								
Lubricator Bulls eye		LEVEL	1/2	FULL																									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY																								
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY																								
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK																									
1st Stage Inlet Press.	PI-2100	psig		88	140																								
Stage Disch. Press	PI-2101	psig		238	285																								
2nd Stage Inlet Press	PI-2200	psig		267	285																								
2nd Stage Disch. Press	PI-2201	psig		575	600																								
Final Discharge Pressure	PI-2108	psig		575	600																								
Lube Oil Pressure	PI-1572	psig	40	60																									
Lube Oil Temp	TE-1584	deg		150	170																								
Final Discharge Temp	TE-2120	deg		110	150																								
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297																								
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283																								
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297																								
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283																								
Motor Frame Vibration	VT-1015	IPS			0.15																								
Compresser Frame Vibration	VT-1512	IPS			0.35																								
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.																													
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8																								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20																								

DATE 6-19-2018

SIGNATURE Paul A. Martinez

Mid Shift

Days Shift

Notes Gas Compressor start 09:26 / 11:45 for bring up CGTG to SYNCH. Speed.

UI-LOG-033-R2
January 4 2018

Date: 6-21-2018

MST / MDT (circle one)

Time Gas Introduced (Turbine Rolling): 0651

Time of Turbine Online (Brkr Closed): 0752

Time Turbine Offline (Brkr Open): 0915

Time No Gas Flow: 0915

Notes: 09:15 UNIT TRIPPED DUE TO GAS COMPRESSOR TRIPPED

CGTG HOURLY READING LOG

	Instrument Air Compressor	I.D	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	V											Y	Y															
2	Blowdown Wet Receiver Tank Hourly	BVT-007	V											Y	Y															
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120								104	113															
4	Instrument Temperature	TI-001	deg C		20	50								26	24															
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25									19.5	19.5															
7	Coolant PLC Temperature	TI-002	deg F	100	110	120								104	105															
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL								2/3	3/3															
9	Coolant Return Differential from GG	PI-001	in WC		60	80								62	62															
10	Coolant Return Differential from	PI-002	in WC		37	50								35	37															
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85								73	73															
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%								1	2															
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)								Yes	Yes															
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)								Yes	Yes															
	Entronic Control System		Units	Low	Norm	Max																								
	(18-20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%								5	5															
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%								0	0															
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	A63GGD ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		V											Yes	Yes															
	(22-24 found on Power Management page)																													
22	Generator Current		Amps			1200								926	958															
23	Mw Output		MW			27								22.1	22.4															
24	80% Base Load Minimum		MW											18.3	18.2															
25	Running Hours (unit overview)													3766	3769															
26	Ambient Temperature	T1 inlet												66.7	68.4															
	(27-28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%								42	41															
28	Total Fuel Flow		Mscf/h											216.7	217.9															

Date: 6-21-18 Signature:

UI-LOG-033-R2
January 4 2018

CGTG TURBINE

UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME											0629																		
Combustible Gas Detector	AAH-303	%		0%	20%																								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK									B	B															
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY								E	E															
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL								1/2	1/2															
Oil Day Tank Level	LI-1562	GAL	10		FULL								47	47															
Lubricator Bulls eye		LEVEL	1/2	FULL									3/4	3/4															
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY								E	E															
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY								E	E															
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK									B	B															
1st Stage Inlet Press.	PI-2100	psig		88	140								[illegible]8	92															
Stage Disch. Press	PI-2101	psig		238	285								250	250															
2nd Stage Inlet Press	PI-2200	psig		267	285								246	246															
2nd Stage Disch. Press	PI-2201	psig		575	600								578	578															
Final Discharge Pressure	PI-2108	psig		575	600								575	575															
Lube Oil Pressure	PI-1572	psig	40	60									60	60															
Lube Oil Temp	TE-1584	deg		150	170								162	163															
Final Discharge Temp	TE-2120	deg		110	150								108	110															
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297								235	235															
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283								239	240															
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297								232	232															
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283								239	240															
Motor Frame Vibration	VT-1015	IPS			0.15								.05	.03															
Compresser Frame Vibration	VT-1512	IPS			0.35								.05	.05															
Take Once per Shift / at Full Load		psig		Max psid	When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																								
Natural Gas Comp.Discharge Press.													573																
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8								568																
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20								559																

DATE 6-21-2018

SIGNATURE

Mid Shift

Days Shift [signature]

Notes to gas compressor tripped around 9:12 per Robert Ortiz generation cancelled.

UI-LOG-034-R1
February 9, 2017

UI-LOG-033-R2
January 4 2018

CGTG HOURLY READING LOG

Date: 6-28-18

MST / (MDT) (circle one)

Time Gas Introduced (Turbine Rolling): 0823

Time of Turbine Online (Brkr Closed): 0855

Time Turbine Offline (Brkr Open): 1600

Time No Gas Flow: 1606

Notes:

	Instrument Air Compressor	LD	Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Blowdown Dry Receiver Tank Hourly	BVT-013	Y												✓	✓	✓	✓	✓	✓	✓									
2	Blowdown Wet Receiver Tank Hourly	BVT-007	Y												✓	✓	✓	✓	✓	✓	✓									
3	Wet Receiver Air Pressure	PI-002	psig	90	105	120									106	112	110	111	108	110	106									
4	Instrument Temperature	TI-001	deg C		20	50									32	32	32	32	32	34	36									
5	Fin Fan Cooler		Units	Low	Norm	Max																								
6	Coolant Pressure	PI-250	psig		25										19	19	19	19	19	1	19									
7	Coolant PLC Temperature	TI-002	deg F	100	110	120									106	108	104	108	106	105	111									
8	Sight glass Level Expansion Tank	LI-001	LEVEL	1/3	2/3	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2									
9	Coolant Return Differential from GG	PI-001	In WC		60	80									62	62	64	66	65	65	65									
10	Coolant Return Differential from	PI-002	In WC		37	50									37	37	38	38	36	38	38									
11	Control Room		Units	Low	Norm	Max																								
12	Room Temperature		deg F		72	85									74	74	75	68	66	66	66									
13	Combustible Gas Detector Monitor		% LEL	0%	0%	20%									1	1	1	1	1	1	1									
15	WECC Log		Operational?																											
16	Operation of PSS/on at 6.3MW		Yes (Y)			No (N)									Yes	Yes	Yes	Yes	Yes	Yes	Yes									
17	Operation of AVR Voltage Mode @ 13.6 KV		Yes (Y)			No (N)									Yes	Yes	Yes	Yes	Yes	Yes	Yes									
	Entronic Control System		Units	Low	Norm	Max																								
	(18–20 found on Air Diagram page)																													
18	2000 gal Oil Water Tank Level	LI-231	%			70%									5	5	5	5	5	5	5									
19	10 gal gas TG Drain Tank (Air Diagram page)	LI-230	%			70%									0	0	0	0	0	0	0									
20	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	AE3GG0 ST-01	psig	35	20																									
21	Acknowledge Alarms Hourly		Y												✓	✓	✓	✓	✓	✓	✓									
	(22–24 found on Power Management page)																													
22	Generator Current		Amps			1200									1407	1423	1397	805	802	800	796									
23	Mw Output		MW			27									19.3	19.4	19.3	19.0	19.2	18.9	18.7									
24	80% Base Load Minimum		MW												17.1	16.8	16.7	16.4	16.4	16.2	16.2									
25	Running Hours (unit overview)														3768	3769	3770	3771	3772	3773	3774									
26	Ambient Temperature	T1 Inlet													81	85	85	90	90	91	91									
	(27–28 found on Gas Fuel System page)																													
27	Waste Oil Tank	LI-120	%			70%									37	36	36	36	36	38	38									
28	Total Fuel Flow		Mscf/h												199	198	197	193	192	192	191									

Date: 6-28-18 Signature: A. Wan

769005

1517/1711

CGTG TURBINE UTILITIES AND INFRASTRUCTURE

Natural Gas Compressor		Units	Low	Norm	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
GAS COMPRESSOR START TIME																													
Combustible Gas Detector	AAH-303	%		0%	20%									N/A	—	—													
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT		BLINK										Y	Y	Y	B	B	B	B									
Liquid Level Coalescing	LI-7721	LIQID		EMPTY	ANY									E	E	E	E	E	E	C									
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	FULL									1/2	1/2	1/2	1/2	1/2	1/2	1/2									
Oil Day Tank Level	LI-1562	GAL	10		FULL									46	46	46	46	46	46	46									
Lubricator Bulls eye		LEVEL	1/2	FULL										3/4	3/4	3/4	3/4	3/4	3/4	3/4									
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY	ANY									E	E	E	E	E	E	E									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK										Y	Y	Y	B	B	B	B									
1st Stage Inlet Press.	PI-2100	psig		88	140									82	82	82	83	83	83	84									
Stage Disch. Press	PI-2101	psig		238	285									252	252	252	253	253	254	254									
2nd Stage Inlet Press	PI-2200	psig		267	285									248	248	249	249	250	250	253									
2nd Stage Disch. Press	PI-2201	psig		575	600									58	578	579	579	579	579	579									
Final Discharge Pressure	PI-2108	psig		575	600									575	575	575	575	575	575	575									
Lube Oil Pressure	PI-1572	psig	40	60										60	59	59	59	59	59	59									
Lube Oil Temp	TE-1584	deg		150	170									164	165	166	168	168	168	169									
Final Discharge Temp	TE-2120	deg		110	150									121	125	126	130	132	133	133									
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297									243	249	246	248	249	249	251									
2nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283									252	254	256	261	262	262	264									
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297									240	241	241	245	245	248	248									
2nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283									251	253	255	262	264	264	264									
Motor Frame Vibration	VT-1015	IPS			0.15									.04	.05	.04	.04	.04	.04	.04									
Compresser Frame Vibration	VT-1512	IPS			0.35									.05	.05	.05	.05	.05	.05	.05									
Take Once per Shift / at Full Load		psig		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer																							
Natural Gas Comp.Discharge Press.														575															
Double Block and Bleed Pressure	A63FGDT	49-48=psid			8									571															
Fuel Gas Supply Pressure	A63FTGST	50-49=psid			20									562															

DATE	6-28-18
SIGNATURE	A. Wan
Mid Shift	
Days Shift	A Wan

Notes

AI 856 | Los Alamos National Laboratory

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1307.E.

TA-03 Power Plant

FGR Fan Inspection and Maintenance

Facility : F08 **Unit :** **Proj :**
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group :** UTIL **Task Priority :** 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date :** 01/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt :** N/A LOW HZRD

Work Order Task

00595731 01

MASTER

Date: 10/17/2017

Work Order Task Written To

Facility : F08 **Unit :** **Op Sys :**
Room : **Area :** **Sys/Cls :**
Equipment : **Component :**
Location :
Job Type : PM
Tag 1 : **Tag 2 :**
Work Item : TA03-0022 FGR **Ops Review Reqd :**

Authorization

Start Permission : Glenn Martinez **Start Date :** 12-18-17
Complete Notice : Glenn martinez **Complete Date :** 1-2-18

Work Order Task Instructions

DO NOT lubricate the bearings if the FGR fan is NOT in operation or in service so that proper amount of grease can be applied
using headphones
You can hear when grease reaches the bearing rolling element. At this point, stop adding grease to prevent bearing damage from overheating

There are two bearings on the fan, each with its own zerk plug
Remove the shaft guard located in the middle of the drive. The two zerk plugs are located on each of the two bearings

1. Use grease gun with the Ultralube headphones to insert the correct amount of Mobilith SHC 100 grease into zerk fitting
b. Apply grease while fan is running and stop when you hear the grease enter the running bearing

1520/1711

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 01/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00595731 01

MASTER

Date: 10/17/2017

Lubricated fan bearings on FGR-001,FGR-002 & FGR-003

4. Add grease with a hand-operated pressure gun until new grease enters the running bearing
a. This is accomplished by using the ultrasonic sensor and headphones to hear when the new grease enters the running bearing
b. Stop adding grease when the grease reaches the bearing to limit excess grease from migrating down the motor shaft and into the windings
Note: Be careful when greasing the fan end bearing of the TEFC (Totally (Totally Enclosed Fan Cooled) motors. Some motors have a spring-relief outlet grease fitting on the fan end that is not accessible. This spring-relief fitting normally does not have to be removed when regreasing. When greasing, take care in the amount of pressure you apply and verify relief is working
5. Putting in too much or too little grease can cause overheating of the motors and result in motor failure. Use this rule of thumb when adding grease to a motor that has been lubricated on a regular basis: It is better to use a little grease more often than a lot of grease less often
Note: Watch out for motors that were shipped only with the bearings packed and not the fill tube or even the bearing housing Apply new grease until you can hear it enter the running bearing
6. Now that greasing is complete, leave the relief plug off and run the motor for 10 minutes to expel any excess grease
7. Replace the drain plug and wipe the bearing housing clean
8. Dispose of dirty rags in accordance with Hazardous Waste Guidelines
9. Ensure correct operation of electric motors.

QC Requirements / Comments

1521/1711

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 01/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00595731 01

MASTER

Date: 10/17/2017

Work Completion Signatures

Name	Function/Dept.	Date
Chris Salazar	LOG-CS/PP MAINT....	01/02/2018

Comments

(rework?)

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 01/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00595731 01

MASTER

Date: 10/17/2017

Los Alamos NATIONAL LABORATORY EST.1943

Form 2101

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg.	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas. No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: _____ Revision #: _____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process. For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee . If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=LA, email=pfc@lanl.gov, c=US Date: 2017.06.26 11:53:41 -06'00'

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY EST. 1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic FGR Imo Lube 01/02/18	Completed (X)
What permits, permissions, or support are required to safely start this work?	X
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	X
What can cause us to go beyond the scope of the work?	X
What hazards in the work area may not have been considered during planning of this job?	X

Pre-job by C. Salazar Z# 202847

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 01/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00595745 01

MASTER

Date: 10/17/2017

Work Order Task Written To

Facility : F08 **Unit** : **Op Sys** :
Room : **Area** : **Sys/Cls** :
Equipment : **Component** :
Location :
Job Type : PM
Tag 1 : **Tag 2** :
Work Item : SM22VID **Ops Review Reqd** :

Authorization

Start Permission :	Robert Simpson	1/9/2018
Complete Notice :	Robert Simpson	1/26/2018

Work Order Task Instructions

CRAFT: UICS ELECTRICIANS

FURTHER INSTRUCTIONS/DETAILS
LOTO OF EACH UNIT TO CLEAN INTERNALLY THE INSIDE OF EACH VFD PANEL
TASK IS TO BE DONE THE USE OF COMPRESSED AIR AND A VACUUM CLEANER. REMOVE
ALL DUST AND DEBRIS FROM THE ENCLOSURES

.

Facility : F08 **Unit :** **Proj :**
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group :** UTIL **Task Priority :** 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date :** 01/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt :** TASK SPECIFC

Work Order Task

00595745 01

MASTER

Date: 10/17/2017

QC Requirements / Comments

Work Completion Signatures

Name	Function/Dept.	Date
Carlos Chacon	UPES Electricians	1-25-18

Comments None

(rework?) No

Cost Accounting

Cost Center : P2030A **Activity :** 640CL000

Percentage : 100 **Acct No :** XU5000 **Sub Acct :** 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 01/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00595745 01

MASTER

Date: 10/17/2017

Form 2103

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 3, Validation and Work Release

IWD #_____ REVISION #:_____ **WORK RELEASE**

By signing below, I verify this activity is compatible with current facility configuration and operating conditions.

FOD designated Ops Mgr or other facility point-of-contact for work area

Signature/Z#/Date **(If required by FOD)**: _____

Note: For Standing IWD, release may be given concurrently with signatures on Part 2.

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a validation walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.
- The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing, and all workers (including support workers) have been briefed.
- I have ensured coordination with any required FOD work-area representatives (*e.g., area work coordinators*).

Primary PIC (Signature/Z#/Date) **Required**: [signature] 128981 1-17-18

Alternate PIC Signatures **acknowledges** PIC authority is assumed for the first time *(Note: Alternate PICs are required to sign only once, but formal handoff includes conferring with previous PIC to obtain all required information associated with the handoff)*.

Alternate PIC (Signature/Z#/Date) **Required**: _____

Alternate PIC (Signature/Z#/Date) **Required**: _____

Pre-Job Brief Content

- What are the critical steps or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the pause/stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

Pre-Job Brief Attendance Roster

By signing below **as required**, I agree to the following:

- I agree to follow the work steps and implement the controls as written as applicable to my work assignments.
- I agree to pause/stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and fit to perform the work.

Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date) [signature] 305762
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date) [signature] 1/19/18	**Worker** (Signature/Z#/Date) [signature] 322595 1/19/18

Attachment B, LO/TO Orders

Lock Coordinator Name/Z# **Phone #** **Alternate Lock Coordinator Name/Z#** **Phone #**

Section 1: General Information					
1. Work Document Number (i.e., Package/Procedure #):			2. LO/TO (Parent) Record #		3. Date:
Location					
4. TA:	5. Bldg:	6. Rm:	7. Equipment/Machinery/Name/Number:		
8. Reason for LO/TO:					
9. Name of Equipment Owner/Operator:					
10. Energy Type to be Isolated (check all that apply) ☐ Electrical ☐ Mechanical ☐ Hydraulic ☐ Pneumatic ☐ Steam ☐ Capacitors ☐ Compressed Energy ☐ Gravity ☐ Other (specify):					
11. Group LO/TO: ☐ Yes ☐ No If Yes, Name of Lead Authorized Worker:			12. Group Lock Box used: ☐ Yes ☐ No If yes, enter ID# of Lock Box Lock Box ID:		
13. Sequencing Required for LO/TO ***Installation*** If Yes, enter the required sequence in column 20 below. If No, place N/A in column 20 below. ☐ Yes ☐ No			14. Sequencing Required for LO/TO ***Removal*** If Yes, enter the required sequence in column 28 below. If No, place N/A in column 28 below. ☐ Yes ☐ No		

Section 2: LO/TO Installation & Removal									
LO/TO Installation					**LO/TO Removal / Return to Service**				
15. Approval to Install LO/TO (signature & Z#)					24. Approval to Remove LO/TO (signature & Z#). Call # —				
16. Verification required for LO/TO Installation ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification					25. Verification required for LO/TO Removal ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification				
17. Verification Determination Approved by FOD/Designee (signature)		Z#	Date		26. Verification Determination Approved by		Z#	Date	
18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position	
23. LO/TO Points Positioned and First Lock installed by Signature		Z#	Date		31. LO/TO Removed, Positioned and Verified by Signature		Z#	Date	

Attachment B, LO/TO Orders

Attachment B, LO/TO Orders (Cont.)			
1. Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Record #	3. Date:	
32. Zero Energy Checks have been completed ☐ Yes ☐ No	33. Completed by Signature	Z#	Date

Section 3: Lead Authorized Worker and Authorized Workers (anyone applying a lock for this activity)			
34. Authorized Workers Name(s)	Z#	35. Date workers lock is hung	36. Date workers lock is removed
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Section 4: Return of Lock(s)/Tag(s) and Locking Devices		
All Lock(s)/Tag(s) and Locking Devices have been removed and returned to the Lock Coordinator or Designee		
37. Signature of Lock Coordinator or Designee	Z#	Date

*If you have questions with regards to filling out the Attachment B, LO/TO Orders form, see the directions associated with the form.

*Take the completed forms back to the Lock Coordinator or Designee for closeout.

Attachment B, LO/TO Orders

Continuation Page (print as needed)

18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
23. LO/TO Points Positioned and First Lock installed by Signature		Z#	Date		31. LO/TO Removed, Positioned and Verified by Signature		Z#	Date

Attachment B, LO/TO Orders

The following are directions for filling out Attachment B.

1. Enter the Work Document Number, this will be the number from the IWD or the procedure number (i.e., TA88-DOP-0001)
2. Enter the LO/TO Parent Record number, this is obtained from the Lock Coordinator when the HEC lock(s) are issued. The Remedy LO/TO database issues this number.
3. Enter the date of when the locks will be applied.
4. Enter the TA where the lock(s) will be hung.
5. Enter the Building number of where the lock(s) will be hung.
6. Enter the Room number where the equipment is located/where work is being performed.
7. Enter the Equipment/Machinery/Name/Number (example, HVA-001)
8. Write a brief description of the reason for LO/TO (example, Removing and replacing belts)
9. Enter the Name of the Equipment Owner/Operator. Each FOD is different in the assigning of Equipment Owner/Operators. There are also programmatic Equipment Owner/Operators.
10. Check the appropriate energy type to be isolated, check all that apply. Make sure you have considered all energy sources, if other you will need to specify what "other" is.
11. Check applicable box to identify if a group LO/TO (A LO/TO where two or more authorized workers, regardless of their occupation or craft, lock out and tag out the same equipment to perform servicing or maintenance).
12. Check applicable box if lock box is used for the job. Enter the lock box ID#. Each organization that issues locks will be required to uniquely number and track lock boxes in their possession.
13. When installing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are to be positioned. If a specific sequence must be followed, THEN number the sequence order in column 20. If there is not a specific sequence to follow then place N/A in column 20. This needs to be an operations type person (Operator) who understands the equipment/system/component.
14. When removing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are positioned after lock/tag removal? If a specific sequence must be followed, THEN number the sequence order in column 28. If not, place N/A in the box(s).

NOTE: Section 2, LO/TO Installation & Removal – In some of the nuclear facilities, the operations personnel will identify the required position(s) for credited equipment/machinery depending on operational requirements for return to service. In most cases when workers remove locks, the "As-Left" Position will be different then the final position the operations personnel will place the equipment in.

15. The Equipment Owner/Operator signs and enters their Z#, authorizing the installation of the LO/TO. With some FODs this will be the maintenance coordinators.
16. Is verification required for this LO/TO. Determine if this is Peer Verification (see P101-3, Section 3.15) or Concurrent Dual verification (see P315, Attachment 10, Section 10.3.6), or Independent Verification. For Independent Verification see P315, Attachment 10, Independent Verification, The Operations Manager (OM) prepares and maintains a facility-specific list of systems and components requiring Independent Verification.

Attachment B, LO/TO Orders

17. The FOD/Designee must sign after determining if verification is required. If Independent Verifier is identified at this time then it must be entered into the Remedy database.
18. Enter the specific Energy isolation device/ID, (example, MCC-A, A4)
19. Location of locking device, this is the location of where the lock is applied (example, MCC-A, A4 TA-XX, Bld. XXX, rm. 123)
20. If the LO/TO needs to be installed in a particular order, number the order in which the locks need to be installed. If the "No" box is checked in #13, then place N/A in this column.
21. Required Position/alignment for LO/TO, open, closed, connected, disconnected, on, off, etc.
22. LO/TO installation verified by – Has the equipment /system/component being locked out, been identified by the FOD as requiring verification, see #16. If verification is required the person who performed the verification initials here.
23. The Lead Authorized worker positions the LO/TO points and installs his/her lock and signs that this has been completed.
24. This is the person, who authorized the LO/TO to be removed, signs and places his/her Z# in this box. This signature authority may place a phone number here for the Lead Authorized worker to call for authorization to remove the LO/TO. When verbal authorization is given, it must be documented in this section. Example: John Smith per telecom, 8/13/14 and your initials. Note: It is also permissible to pre-authorize the removal of the lock by pre-signing.
25. Depending on the verification type required for LO/TO removal, check the appropriate verification type box, otherwise check the "No" box.
26. If verification is required, the FOD/Designee must sign. Independent Verifier is identified at this time and entered into the database.
27. Write the required position/alignment the system/component will be placed in following the removal of the lock(s).
28. If the isolation device needs to be positioned in a particular order/sequence, (per Post Maintenance) number the order/sequence in which the isolation device is to be position. If not, place N/A in the box(s).
29. LO/TO removal verified by Lead Authorized Worker – the lock(s) have been removed and the As-Left position is documented in column 30.
30. Enter the As-Left Position.
31. If the removal of the lock has been identified as needing to be verified, the verifier writes name and Z# after verifying the lock has been removed.
32. The authorized worker must verify that the steps utilized in the energy control procedure have effectively isolated the machine or equipment from the hazardous energy.
33. The authorized worker signs after zero energy checks have been completed.
34. All authorized workers applying a lock for this activity names/Z# and the Date must be entered.
35. Enter the date the authorized worker hangs lock.
36. Enter the date the authorized worker removes lock.
37. The Lock Coordinator or designee signs once locks, tags, and locking devices have been removed and returned. If a lock and/or tag are found to be contaminated then that will be noted by the Lock Coordinator or designee and the Lock Coordinator or designee will sign.

Form 2101

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: _____ Revision #: _____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg.	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex : Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas. No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: ____ Revision #: ____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process. For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee. If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=LA, email=pfc@lanl.gov, c=US Date: 2017.06.26 11:53:41 -06'00'

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY EST.1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic	Completed (X)
What permits, permissions, or support are required to safely start this work?	✓
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	✓
What can cause us to go beyond the scope of the work?	✓
What hazards in the work area may not have been considered during planning of this job?	✓

AP-WORK-002: Attachment 15
FORM 2100-WC

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

1.0 Work Scope

This work order task will cover the moderate hazard maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

2.1 Entry Conditions

- PAUSE/STOP WORK if steps cannot be completed as described, or if unforeseen situations occur. Stabilize the situation if safe, contact your supervisor or Person-In-Charge (PIC), and await further instructions before proceeding
- Ensure activity is on appropriate Plan(s) of the Day
- Check-in with ops prior to performing work
- Steps in this procedure may be worked out of sequence as directed by supervisor/PIC
- Ensure permits required for the work have been approved and posted, as required
- PIC will be available while work is being conducted
- PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers
- All hold points will be discussed on a daily basis
- Verify all identified hazards have been eliminated, mitigated or minimized

(HAZARD ANALYSIS performed by Robert Simpson, art sparks– 9/9/2015)

2.2 Electrical

- Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.

2.3 Mechanical

- Ensure all guards are in place before accessing equipment.
- Relieve all stored energy before performing maintenance activities.

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TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

2.4 Pneumatic
- Relieve all stored pressure.
- Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.

2.5 Elevated Work
- Ensure all scaffolding/ladders are inspected daily before use.
- Utilize fall protection equipment when required with approved tie-off points.
- Maintain 3-points of contact when utilizing a ladder
- Ensure ladder is properly oriented to work
- Scaffolding shall be erected and inspected by a competent person only

2.6 Hot Surfaces
- Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
- Utilize insulating blankets to protect against hot surfaces.

2.7 Welding, Grinding / Torch Cutting
- Use appropriate welding procedure checklist
- Keep combustible materials clear or protect surrounding
- Wear welding hood with appropriate lens for welding operation performed. Wear welding gloves.
- Ensure adequate ventilation or use welding fume extractor
- Spark and flame permit required

2.8 Chemical
- Consult IH&S for PPE requirements
- Place a catch pan under chemical and collect all residual chemicals.
- Review and follow the safety data sheets for all chemical and oil products.
- An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
- Wear chemical goggles for liquids
- PPE must be worn completely and properly

2.9 Slip, Trip & Fall:
- Be aware of ground and floor conditions

2.10 Back Strains
- Use proper lifting and bending technique at all times

2.11 Simple Hand Tools, Cuts & Abrasions:
- Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
- Use of cordless power tools, power tools-electric shock.
- Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.

2.12 Pinching or Crushing
- Do not place body parts in the path of potential pinch points or crush points
- Hand / foot / body position awareness
- Be aware of line of fire

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

2.13 Asbestos Abatement Pipe and Equipment Insulation:

- Reference MSS Procedure 41-55-001-R1
- Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
- Two person rule is required during abatement
- Personal air monitoring will be required.
- Full face APR with P100 cartridges.
- Wear Tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
- Wear nitrile gloves and/or leather gloves
- HEPA vacuum debris.
- Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
- All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.

2.14 LO/TO:

- Utilize LO/TO Attachment
- Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.

2.15 230V to 1000V Zero Voltage check requirements:

- Mode "1" Class 1.3 a,b
- Wear CAL 8+ PPE: Double-Layer switching hood.
- Class 0 Dielectric Gloves.
- AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
- 2-man rule applies.
- Use NRTL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

2.16 50V to 230V Zero Voltage check requirements:

- Mode "1, Class 1.2 a,b
- Use NRTL approved calibrated voltage meter. Test meter on a known live circuit before and after zero voltage verification.
- Class "0" Dielectric Gloves
- AR clothing, minimum arc-rating of 4 cal for voltage of < 230 V (long sleeve shirt & pants of non-melting fabric **or** coveralls, face shield)
- AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

2.17 Cone of Safety Identification:

- The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
- Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
- Ensure lift plan is completed for all critical lifts.

2.18 General PPE Requirements for working within the Power Plant Complex:

- Safety shoes
- Safety glasses with side shields
- Hard hat
- Reflective Safety Vest
- Leather work gloves
- Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach
50-300	3'-6"	Avoid Contact
301-750	3'-6"	1'-0"

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

3.0 Training Requirements

3.1 MSS Maintenance Worker, TP 10968

3.2 LO/TO, TP 127

3.3 Electrical Worker Training, Curriculum 642

3.4 Stationary Equipment Mechanics, Curriculum 630

3.5 Sheet metal Workers, Curriculum 649

3.6 Pipefitters, Curriculum 647

3.7 Carpenters, Curriculum 641

3.8 Insulators, Curriculum 643

3.9 Power Plant Operators, Curriculum 632

3.10 Confined space entry, supervisor and attendant (for entry)

3.11 Training to work with Cranes and Rigging:

- Incidental Crane Classroom course # 20295
- Incidental Crane Exam # 20296

3.12 Site Specific Training (one-time requirement)

4.0 Work Execution

4.1 **Notes**

- Following system conditions are configuration and conditions which have been anticipated for performance of PM activities covered under this IWD:
  - Electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and electrical system lineup is considered to be in a normal configuration.
  - Steam plant may either be in shutdown, standby or normal operation configuration. Mechanical components are under control of steam plant operations personnel and no major upset conditions or unanticipated outages are present within facility.
  - Power Plant operations personnel are manned to required level and sufficient support is available to support performance of maintenance activity.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

- Permits required for this work: LO/TO Attachment, confined space.
- LO/TO devices shall be applied in accordance with P101-3. "Lockout/Tagout for Hazardous Energy Control"
- Discuss emergency evacuation procedures and muster areas
- Discuss possible error situations and mitigations

4.2 **Prerequisites**

- VERIFY pre-job briefing has been performed for all affected personnel including 2101 hazards

PIC : _____ **Z#:** 177551 **Date:** 3-28-16

- VERIFY all personnel have the appropriate PPE for job execution
- BARRICADE work area to protect against inadvertent access
- USE robust barriers and flagging to clearly define execution area
- VERIFY all required permits are approved and posted as required
- REVIEW planned activity for Life Critical Steps (to be performed by the PIC/RLM):

HOLD

IF fall protection is to be used:

- VERIFY that a safety system is in place (where workers understand hazard controls and required PPE) at work site.
- VERIFY workers understand fall protection plan

PIC : N/A **Z#:**_____ **Date:**_____

HOLD

IF aerial platform/lift is to be used:

- VERIFY a clear travel path with all necessary clearances is defined and adequate
- VERIFY geographic terrain will support execution of activity
- VERIFY identification of all energized electrical systems, structure and components has occurred and their impact to activity has been accounted for and communicated to workers
- VERIFY all personnel are qualified to operate aerial lift device assigned to activity.

PIC : N/A **Z#:**_____ **Date:**_____

Confined Spaces: Complete confined space permit per the CSP evaluation.
Perform ventilation and air monitoring according to the evaluation.
Set up non-entry rescue equipment if required by the evaluation.
Contact pest control, as required to remove rodents and droppings.
Pest control to use 10% bleach solution and full face respirator.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

4.3 **Execution**

1. **ERECT/DISMATLE** scaffolding as needed to access work area
   - INSPECT scaffold daily by competent person only
   - WEAR hard hats when working on / near scaffold
2. **PERFORM** LO/TO when required to perform maintenance

HOLD

VFD:

- **VERIFY** there is not a VFD within this system. This IWD does NOT account for any stored energy that could be present in a VFD.
- **IF** VFD is present or found within system to be worked. DO NOT proceed with any work until UI Engineering has given approval to do so.

OK to Proceed:

PIC : _____ **Z#:** 120931 **Date:** 1-19-18

3. **PERFORM** zero voltage checks for maintenance involving electrical work.
4. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
5. **PERFORM** maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in work order task instructions when applicable. Utilize master work order equipment list when performing maintenance.
6. **REMOVE** all LO/TO
7. **REMOVE** posting or signs
8. **OPERATIONS** acknowledges work is complete and ready to place into service

Operations: Carlos Chacon **Z#:** 120931 **Date:** 1-25-18

9. **CLEAN** up work area and properly dispose of all waste
   - SEGREGATE waste as required by WMC.

5.0 Close Out

5.1 Contact OMC (MC) and inform them work is complete.

5.2 Complete all required documentation and return Work Package

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task) UPPS-FY17-001			**Planner/Preparer (Name/Z#/Date)** **Justin Maestas 177550 3/28/16**
TA: 03	**Building:** 0022	**Room:**	**Additional Location Description:**

***Insert Rows above** for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.*	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	**RLM** (Signature/Z#/Date) **Required** Kevin M Graham 105008 4/11/16 **FOD or Representative** (Signature/Z#/Date) **Required** Pablo F. CdeVaca Digitally signed by Pablo F CdeVaca DN: cn=Pablo F CdeVaca, o=LANS, ou=UI, email=pfc@lanl.gov, c=US Location: TA 03 SM 0022 Room 114 Date: 2016.04.12 10:08:25 -06'00' **SME Review** (Signature/Z#/Date) **If Required** N/A **ESO Review** (Signature/Z#/Date) **If Required** 190622 4/11/16 **ESH Safety Review** (Signature/Z#/Date) 153338 4/7/16 **Peer RLM /Work Execution Manager/Maintenance Manager** (Signature/Z#/Date) **Required** Robert Simpson 240725 4/11/16

IWD Type		
☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval Change in scope or additional hazards identified (Print) Name of Primary PIC Carlos Chacon Name of Alternate PIC Greg Donnelly Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)	
Revision # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task		Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022 Room:	Additional Location Description:

1.0 Work Scope:

This work order task will cover the moderate hazard preventive maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

(HAZARD ANALYSIS performed by Robert Simpson, Kedrick Mendez– 9/9/2015)

1. Entry conditions:
   - Ensure that the activity is on the Plan of the Day.
   - If steps cannot be completed as described, or if unforeseen situations occur, PAUSE/STOP WORK, stabilize the situation, contact your supervisor or the Person-In-Charge (PIC), and await further instructions before proceeding.
   - Certain steps in the procedure may be worked out of sequence as directed by the supervisor.
   - The permits and work packages required for the project have been approved and are posted, as required.
   - The PIC will be available while work is being conducted.
   - PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers.
   - All hold points will be discussed on a daily basis.
- Controls needed to perform the work are identified in this IWD.
2. Electrical Hazards:
   - Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.
3. Mechanical Hazards:
   - Ensure all guards are in place before accessing equipment.
   - Relieve all stored energy before performing maintenance activities.
4. Pneumatic Hazards:
   - Relieve all stored pressure.
   - Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.
5. Elevated Work:
   - Ensure all scaffolding is inspected daily before use.
   - Utilize fall protection equipment when required with approved tie-off points.
   - Maintain 3-points of contact when utilizing a ladder.
6. Hot Surfaces:
   - Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
   - Utilize insulating blankets to protect against hot surfaces.

Los Alamos	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

7. Chemical Hazards:
   - Consult IH&S for PPE requirements.
   - Place a catch pan under chemical and collect all residual chemicals. Deposit chemical in the day tank.
   - Review the safety data sheets for all chemical and oil products.
   - An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
8. Slips, Trips and Falls:
   - Be aware of ground and floor conditions
9. Back strains
   - Use proper lifting and bending technique at all times
10. Working with simple hand tools, cuts and abrasions:
    - Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
    - Use of cordless power tools, power tools-electric shock.
    - Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.
11. Pinching or crushing/hand injury:
    - Do not place hands in the path of potential pinch points or crush points
    - Hand/foot/ body position awareness
12. Asbestos Abatement Pipe and Equipment Insulation:
    - Reference MSS Procedure 41-55-001-R1
    - Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
    - Two person rule is required during abatement
    - Personal air monitoring will be required.
    - Full face APR with P100 cartridges.
    - Wear tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
    - Wear nitrile gloves and/or leather gloves
    - HEPA vacuum debris.
    - Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
    - All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.
13. LO/TO:
    - Utilize LO/TO Attachment "B"
    - Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.
14. 240V to 600V Zero Voltage check requirements:
    - Mode "1"
    - Wear CAL 8+ PPE: Double-Layer switching hood.
    - Class 0 Dielectric Gloves.
    - AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
    - 2-man rule applies.
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

15. Less than 240V Zero Voltage check requirements:
    - Mode "1"
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
    - Class "0" Dielectric Gloves
    - AR clothing, minimum arc-rating of 4 cal for voltage of < 240 V (long sleeve shirt, pants or coveralls, face shield)
    - AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
    - No metallic objects worn.
    - Voltage rated test equipment.
    - Ensure no un-insulated body part enters prohibited space.
    - Voltage rated tools.
16. Cone of Safety Identification:
    - The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
    - Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
    - Ensure lift plan is completed for all critical lifts.
17. General PPE Requirements for working within the Power Plant Complex:
    - Safety shoes
    - Safety glasses with side shields
    - Hard hat
    - Reflective Safety Vest
    - Leather work gloves
    - Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach	Prohibited Approach
50-300	3'6"	Avoid Contact	Avoid Contact
301-750	3'6"	1'0"	0'1"

3.0 Training Requirements

- MSS Maintenance Worker, TP 10968
- LO/TO, TP 127
- Electrical Worker Training, Curriculum 642

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

- Stationary Equipment Mechanics, Curriculum 630
- Sheet metal Workers, Curriculum 649
- Pipefitters, Curriculum 647
- Carpenters, Curriculum 641
- Insulators, Curriculum 643
- Power Plant Operators, Curriculum 632
- Training to work with Cranes and Rigging:
  - Incidental Crane Classroom course # 20295
  - Incidental Crane Exam # 20296
- Site Specific Training (one-time requirement)

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

4.0 Work Execution

1.

2. The following system conditions are the configuration and conditions which have been anticipated for performance of the PM activities covered under this standing IWD:

   a. The electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and the electrical system lineup is considered to be in a normal configuration.

   b. The steam plant may be either in a shutdown, standby or normal operation configuration. The mechanical components are under the control of the steam plant operations personnel and no major upset conditions or unanticipated outages are present within the facility.

   c. The Power Plant operational personnel are manned to the required level and sufficient support is available to support the performance of the preventive maintenance activity.

3. Prerequisites:

   a. **REVIEW** work package for Life Critical Steps (to be performed by the PIC/RLM).

      I. **Fall Protection:**
      - Verify that a safety system is in place (where workers understand hazard controls and required PPE) at the work site.
      - Verify that workers understand the fall protection plan.

      II. **Elevated Work Platforms:**
      - Verify a clear travel path with all necessary clearances has been defined and is adequate.
      - Verify the geographic terrain will support execution of the desired activity.
      - Verify the identification of all energized electrical Systems, structure and components has occurred and their impact to the activity has been accounted for and communicated to the workers.
      - Verify all personnel are qualified to operate the aerial lift device assigned to the activity.

   b. **INSERT** Life Critical Step hold points into the work package.

   c. **VERIFY** a daily pre-job brief has been performed with the 5 mandatory questions and 2101has been read for site hazards and entry requirements. With all affected personnel. Perform a reverse pre-job brief and encourage all craft workers to stay involved.

   d. **VERIFY** all personnel have appropriate PPE for job execution.

   e. **BARRICADE** the work area in accordance with MSS-Guide-038 to protect tenants/unexpected personnel/or traffic as directed by the Supervisor or PIC. Clearly identify work zone due to look-alike equipment.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)	
Revision # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task		Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room: / Additional Location Description:

Execution

4. **PERFORM** LO/TO, when required to perform preventive maintenance.
5. **PERFORM** zero voltage checks for maintenance involving electrical work.
6. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
7. **PERFORM** preventive maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. Utilize the master work order equipment list when performing preventive maintenance.
8. **REMOVE** all LO/TO.
9. **REMOVE** posting or signs.
10. **CLEAN** up work area and properly dispose of all waste.
11. **COMPLETE** all documentation.

5.0 Close Out

1. Complete closeout of the work activity in accordance with AP-WORK requirements.

Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety	**RLM** (Signature/Z#/Date) **Required** 190429 7-11-17 **FOD or Representative** (Signature/Z#/Date) **Required** 090206 7-12-17 **IH&S Review** (Signature/Z#/Date) 7/10/17

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

	basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	SME Review (Signature/Z#/Date) If Required Not Required ESO Review (Signature/Z#/Date) If Required
IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC _____ Name of Alternate PIC_____ Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 02/28/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00597795 01

MASTER

Date: 11/08/2017

Work Order Task Written To

Facility : F08 **Unit** : **Op Sys** :
Room : **Area** : **Sys/Cls** :
Equipment : **Component** :
Location :
Job Type : PM
Tag 1 : **Tag 2** :
Work Item : TA03-0022 FGR **Ops Review Reqd** :

Authorization

Start Permission : Glenn Martinez **Start Date** : 1-22-18
Complete Notice : Glenn Martinez **Complete Date** : 2-3-18

Work Order Task Instructions

DO NOT lubricate the bearings if the FGR fan is NOT in operation or in service so that proper amount of grease can be applied
using headphones
You can hear when grease reaches the bearing rolling element. At this point, stop adding grease to prevent bearing damage from overheating

There are two bearings on the fan, each with its own zerk plug
Remove the shaft guard located in the middle of the drive. The two zerk plugs are located on each of the two bearings

1. Use grease gun with the Ultralube headphones to insert the correct amount of Mobilith SHC 100 grease into zerk fitting
b. Apply grease while fan is running and stop when you hear the grease enter the running bearing

1560/1711

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 02/28/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00597795 01

MASTER

Date: 11/08/2017

Lubricated fan bearings on FGR-001,FGR-002 & FGR-003

4. Add grease with a hand-operated pressure gun until new grease enters the running bearing
a. This is accomplished by using the ultrasonic sensor and headphones to hear when the new grease enters the running bearing
b. Stop adding grease when the grease reaches the bearing to limit excess grease from migrating down the motor shaft and into the windings
Note: Be careful when greasing the fan end bearing of the TEFC (Totally (Totally Enclosed Fan Cooled) motors. Some motors have a spring-relief outlet grease fitting on the fan end that is not accessible. This spring-relief fitting normally does not have to be removed when regreasing. When greasing, take care in the amount of pressure you apply and verify relief is working
5. Putting in too much or too little grease can cause overheating of the motors and result in motor failure. Use this rule of thumb when adding grease to a motor that has been lubricated on a regular basis: It is better to use a little grease more often than a lot of grease less often
Note: Watch out for motors that were shipped only with the bearings packed and not the fill tube or even the bearing housing Apply new grease until you can hear it enter the running bearing
6. Now that greasing is complete, leave the relief plug off and run the motor for 10 minutes to expel any excess grease
7. Replace the drain plug and wipe the bearing housing clean
8. Dispose of dirty rags in accordance with Hazardous Waste Guidelines
9. Ensure correct operation of electric motors.

QC Requirements / Comments

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 02/28/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00597795 01

MASTER

Date: 11/08/2017

Work Completion Signatures

Name	Function/Dept.	Date
Chris Salazar	LOG-CS/PP MAINT...	02/01/2018

Comments

(rework?)

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 02/28/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00597795 01

MASTER

Date: 11/08/2017

Los Alamos NATIONAL LABORATORY EST.1943

Form 2101

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No /Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas.No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: ____ Revision #: ____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard.	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process. For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee . If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=UI, email=pfc@lanl.gov, c=US Date: 2017.06.26 11:53:41 -06'00'

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY EST.1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic Imo FGR Fan Lube 2-1-18	Completed (X)
What permits, permissions, or support are required to safely start this work?	X
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	X
What can cause us to go beyond the scope of the work?	X
What hazards in the work area may not have been considered during planning of this job?	X

Pre-job by C. Salazar Z#202847 2-1-18

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 02/28/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00597794 01

MASTER

Date: 11/08/2017

Work Order Task Written To

Facility : F08 **Unit** : **Op Sys** :
Room : **Area** : **Sys/Cls** :
Equipment : **Component** :
Location :
Job Type : PM
Tag 1 : **Tag 2** :
Work Item : SM22VID **Ops Review Reqd** :

Authorization

Start Permission :	Robert Simpson	2/2/2018
Complete Notice :	Robert Simpson	2/28/2018

Work Order Task Instructions

CRAFT: UICS ELECTRICIANS

FURTHER INSTRUCTIONS/DETAILS
LOTO OF EACH UNIT TO CLEAN INTERNALLY THE INSIDE OF EACH VFD PANEL
TASK IS TO BE DONE THE USE OF COMPRESSED AIR AND A VACUUM CLEANER. REMOVE
ALL DUST AND DEBRIS FROM THE ENCLOSURES

.

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 02/28/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00597794 01

MASTER

Date: 11/08/2017

QC Requirements / Comments

Work Completion Signatures

Name	Function/Dept.	Date
Carlos Chacon	UPES Electricians	2-28-18

Comments None
(rework?) No

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 02/28/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00597794 01

MASTER

Date: 11/08/2017

Form 2103

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 3, Validation and Work Release

IWD #_____ REVISION #:_____ **WORK RELEASE**

By signing below, I verify this activity is compatible with current facility configuration and operating conditions.

FOD designated Ops Mgr or other facility point-of-contact for work area

Signature/Z#/Date **(If required by FOD)**: _____

Note: For Standing IWD, release may be given concurrently with signatures on Part 2.

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a validation walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.
- The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing, and all workers (including support workers) have been briefed.
- I have ensured coordination with any required FOD work-area representatives (*e.g., area work coordinators*).

Primary PIC (Signature/Z#/Date) **Required**: [illegible] 270936 2-21-18

Alternate PIC Signatures **acknowledges** PIC authority is assumed for the first time *(Note: Alternate PICs are required to sign only once, but formal handoff includes conferring with previous PIC to obtain all required information associated with the handoff)*.

Alternate PIC (Signature/Z#/Date) **Required**: [illegible] 179552 2/23/18

Alternate PIC (Signature/Z#/Date) **Required**: _____

Pre-Job Brief Content

- What are the critical steps or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the pause/stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

Pre-Job Brief Attendance Roster

By signing below **as required**, I agree to the following:

- I agree to follow the work steps and implement the controls as written as applicable to my work assignments.
- I agree to pause/stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and fit to perform the work.

Worker (Signature/Z#/Date) [illegible] 179552 2/21/18	**Worker** (Signature/Z#/Date) [illegible] 2/23/18
Worker (Signature/Z#/Date) [illegible] 2/23/18	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date) [illegible] 312595 2/23/18

Attachment B, LO/TO Orders

Lock Coordinator Name/Z# **Phone #** **Alternate Lock Coordinator Name/Z#** **Phone #**

Section 1: General Information

1. Work Document Number (i.e., Package/Procedure #):			2. LO/TO (Parent) Record #	3. Date:
Location				
4. TA:	5. Bldg:	6. Rm:	7. Equipment/Machinery/Name/Number:	
8. Reason for LO/TO:				
9. Name of Equipment Owner/Operator:				
10. Energy Type to be Isolated (check all that apply) ☐ Electrical ☐ Mechanical ☐ Hydraulic ☐ Pneumatic ☐ Steam ☐ Capacitors ☐ Compressed Energy ☐ Gravity ☐ Other (specify):				
11. Group LO/TO: ☐ Yes ☐ No If Yes, Name of Lead Authorized Worker:			12. Group Lock Box used: ☐ Yes ☐ No If yes, enter ID# of Lock Box Lock Box ID:	
13. Sequencing Required for LO/TO ***Installation*** If Yes, enter the required sequence in column 20 below. If No, place N/A in column 20 below. ☐ Yes ☐ No			14. Sequencing Required for LO/TO ***Removal*** If Yes, enter the required sequence in column 28 below. If No, place N/A in column 28 below. ☐ Yes ☐ No	

Section 2: LO/TO Installation & Removal

LO/TO Installation					**LO/TO Removal / Return to Service**			
15. Approval to Install LO/TO (signature & Z#)					24. Approval to Remove LO/TO (signature & Z#). Call # —			
16. Verification required for LO/TO Installation ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification					25. Verification required for LO/TO Removal ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification			
17. Verification Determination Approved by FOD/Designee (signature) Z# Date					26. Verification Determination Approved by Z# Date			
18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
23. LO/TO Points Positioned and First Lock installed by Signature Z# Date					31. LO/TO Removed, Positioned and Verified by Signature Z# Date			

Attachment B, LO/TO Orders

Attachment B, LO/TO Orders (Cont.)			
1. Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Record #	3. Date:	
32. Zero Energy Checks have been completed ☐ Yes ☐ No	33. Completed by Signature	Z#	Date

Section 3: Lead Authorized Worker and Authorized Workers (anyone applying a lock for this activity)			
34. Authorized Workers Name(s)	Z#	35. Date workers lock is hung	36. Date workers lock is removed
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Section 4: Return of Lock(s)/Tag(s) and Locking Devices		
All Lock(s)/Tag(s) and Locking Devices have been removed and returned to the Lock Coordinator or Designee		
37. Signature of Lock Coordinator or Designee	Z#	Date

*If you have questions with regards to filling out the Attachment B, LO/TO Orders form, see the directions associated with the form.

*Take the completed forms back to the Lock Coordinator or Designee for closeout.

Attachment B, LO/TO Orders

Continuation Page (print as needed)

18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
23. LO/TO Points Positioned and First Lock installed by Signature		Z#	Date		31. LO/TO Removed, Positioned and Verified by Signature		Z#	Date

Attachment B, LO/TO Orders

The following are directions for filling out Attachment B.

1. Enter the Work Document Number, this will be the number from the IWD or the procedure number (i.e., TA88-DOP-0001)
2. Enter the LO/TO Parent Record number, this is obtained from the Lock Coordinator when the HEC lock(s) are issued. The Remedy LO/TO database issues this number.
3. Enter the date of when the locks will be applied.
4. Enter the TA where the lock(s) will be hung.
5. Enter the Building number of where the lock(s) will be hung.
6. Enter the Room number where the equipment is located/where work is being performed.
7. Enter the Equipment/Machinery/Name/Number (example, HVA-001)
8. Write a brief description of the reason for LO/TO (example, Removing and replacing belts)
9. Enter the Name of the Equipment Owner/Operator. Each FOD is different in the assigning of Equipment Owner/Operators. There are also programmatic Equipment Owner/Operators.
10. Check the appropriate energy type to be isolated, check all that apply. Make sure you have considered all energy sources, if other you will need to specify what "other" is.
11. Check applicable box to identify if a group LO/TO (A LO/TO where two or more authorized workers, regardless of their occupation or craft, lock out and tag out the same equipment to perform servicing or maintenance).
12. Check applicable box if lock box is used for the job. Enter the lock box ID#. Each organization that issues locks will be required to uniquely number and track lock boxes in their possession.
13. When installing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are to be positioned. If a specific sequence must be followed, THEN number the sequence order in column 20. If there is not a specific sequence to follow then place N/A in column 20. This needs to be an operations type person (Operator) who understands the equipment/system/component.
14. When removing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are positioned after lock/tag removal? If a specific sequence must be followed, THEN number the sequence order in column 28. If not, place N/A in the box(s).

NOTE: Section 2, LO/TO Installation & Removal – In some of the nuclear facilities, the operations personnel will identify the required position(s) for credited equipment/machinery depending on operational requirements for return to service. In most cases when workers remove locks, the "As-Left" Position will be different then the final position the operations personnel will place the equipment in.

15. The Equipment Owner/Operator signs and enters their Z#, authorizing the installation of the LO/TO. With some FODs this will be the maintenance coordinators.
16. Is verification required for this LO/TO. Determine if this is Peer Verification (see P101-3, Section 3.15) or Concurrent Dual verification (see P315, Attachment 10, Section 10.3.6), or Independent Verification. For Independent Verification see P315, Attachment 10, Independent Verification, The Operations Manager (OM) prepares and maintains a facility-specific list of systems and components requiring Independent Verification.

Attachment B, LO/TO Orders

17. The FOD/Designee must sign after determining if verification is required. If Independent Verifier is identified at this time then it must be entered into the Remedy database.
18. Enter the specific Energy isolation device/ID, (example, MCC-A, A4)
19. Location of locking device, this is the location of where the lock is applied (example, MCC-A, A4 TA-XX, Bld. XXX, rm. 123)
20. If the LO/TO needs to be installed in a particular order, number the order in which the locks need to be installed. If the "No" box is checked in #13, then place N/A in this column.
21. Required Position/alignment for LO/TO, open, closed, connected, disconnected, on, off, etc.
22. LO/TO installation verified by – Has the equipment /system/component being locked out, been identified by the FOD as requiring verification, see #16. If verification is required the person who performed the verification initials here.
23. The Lead Authorized worker positions the LO/TO points and installs his/her lock and signs that this has been completed.
24. This is the person, who authorized the LO/TO to be removed, signs and places his/her Z# in this box. This signature authority may place a phone number here for the Lead Authorized worker to call for authorization to remove the LO/TO. When verbal authorization is given, it must be documented in this section. Example: John Smith per telecom, 8/13/14 and your initials. Note: It is also permissible to pre-authorize the removal of the lock by pre-signing.
25. Depending on the verification type required for LO/TO removal, check the appropriate verification type box, otherwise check the "No" box.
26. If verification is required, the FOD/Designee must sign. Independent Verifier is identified at this time and entered into the database.
27. Write the required position/alignment the system/component will be placed in following the removal of the lock(s).
28. If the isolation device needs to be positioned in a particular order/sequence, (per Post Maintenance) number the order/sequence in which the isolation device is to be position. If not, place N/A in the box(s).
29. LO/TO removal verified by Lead Authorized Worker – the lock(s) have been removed and the As-Left position is documented in column 30.
30. Enter the As-Left Position.
31. If the removal of the lock has been identified as needing to be verified, the verifier writes name and Z# after verifying the lock has been removed.
32. The authorized worker must verify that the steps utilized in the energy control procedure have effectively isolated the machine or equipment from the hazardous energy.
33. The authorized worker signs after zero energy checks have been completed.
34. All authorized workers applying a lock for this activity names/Z# and the Date must be entered.
35. Enter the date the authorized worker hangs lock.
36. Enter the date the authorized worker removes lock.
37. The Lock Coordinator or designee signs once locks, tags, and locking devices have been removed and returned. If a lock and/or tag are found to be contaminated then that will be noted by the Lock Coordinator or designee and the Lock Coordinator or designee will sign.

Form 2101

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No /Work Request No: _____ Revision #: _____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg.	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: ____ Revision #: ____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process. For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee. If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=LI, email=pfc@lanl.gov, c=US Date: 2017.06.26 11:53:41 -06'00'

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY

Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)

Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

1.0 Work Scope:

This work order task will cover the moderate hazard preventive maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

(HAZARD ANALYSIS performed by Robert Simpson, Kedrick Mendez– 9/9/2015)

1. Entry conditions:
   - Ensure that the activity is on the Plan of the Day.
   - If steps cannot be completed as described, or if unforeseen situations occur, PAUSE/STOP WORK, stabilize the situation, contact your supervisor or the Person-In-Charge (PIC), and await further instructions before proceeding.
   - Certain steps in the procedure may be worked out of sequence as directed by the supervisor.
   - The permits and work packages required for the project have been approved and are posted, as required.
   - The PIC will be available while work is being conducted.
   - PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers.
   - All hold points will be discussed on a daily basis.
- Controls needed to perform the work are identified in this IWD.
2. Electrical Hazards:
   - Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.
3. Mechanical Hazards:
   - Ensure all guards are in place before accessing equipment.
   - Relieve all stored energy before performing maintenance activities.
4. Pneumatic Hazards:
   - Relieve all stored pressure.
   - Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.
5. Elevated Work:
   - Ensure all scaffolding is inspected daily before use.
   - Utilize fall protection equipment when required with approved tie-off points.
   - Maintain 3-points of contact when utilizing a ladder.
6. Hot Surfaces:
   - Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
   - Utilize insulating blankets to protect against hot surfaces.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

7. Chemical Hazards:
   - Consult IH&S for PPE requirements.
   - Place a catch pan under chemical and collect all residual chemicals. Deposit chemical in the day tank.
   - Review the safety data sheets for all chemical and oil products.
   - An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
8. Slips, Trips and Falls:
   - Be aware of ground and floor conditions
9. Back strains
   - Use proper lifting and bending technique at all times
10. Working with simple hand tools, cuts and abrasions:
    - Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
    - Use of cordless power tools, power tools-electric shock.
    - Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.
11. Pinching or crushing/hand injury:
    - Do not place hands in the path of potential pinch points or crush points
    - Hand/foot/ body position awareness
12. Asbestos Abatement Pipe and Equipment Insulation:
    - Reference MSS Procedure 41-55-001-R1
    - Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
    - Two person rule is required during abatement
    - Personal air monitoring will be required.
    - Full face APR with P100 cartridges.
    - Wear tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
    - Wear nitrile gloves and/or leather gloves
    - HEPA vacuum debris.
    - Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
    - All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.
13. LO/TO:
    - Utilize LO/TO Attachment "B"
    - Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.
14. 240V to 600V Zero Voltage check requirements:
    - Mode "1"
    - Wear CAL 8+ PPE: Double-Layer switching hood.
    - Class 0 Dielectric Gloves.
    - AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
    - 2-man rule applies.
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage

Los Alamos NATIONAL LABORATORY

Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)

Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

15. Less than 240V Zero Voltage check requirements:
    - Mode "1"
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
    - Class "0" Dielectric Gloves
    - AR clothing, minimum arc-rating of 4 cal for voltage of < 240 V (long sleeve shirt, pants or coveralls, face shield)
    - AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
    - No metallic objects worn.
    - Voltage rated test equipment.
    - Ensure no un-insulated body part enters prohibited space.
    - Voltage rated tools.
16. Cone of Safety Identification:
    - The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
    - Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
    - Ensure lift plan is completed for all critical lifts.
17. General PPE Requirements for working within the Power Plant Complex:
    - Safety shoes
    - Safety glasses with side shields
    - Hard hat
    - Reflective Safety Vest
    - Leather work gloves
    - Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach	Prohibited Approach
50-300	3'6"	Avoid Contact	Avoid Contact
301-750	3'6"	1'0"	0'1"

3.0 Training Requirements

- MSS Maintenance Worker, TP 10968
- LO/TO, TP 127
- Electrical Worker Training, Curriculum 642

AP-WORK-002: Attachment 15
FORM 2100-WC

Los Alamos NATIONAL LABORATORY	**Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)**		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16**
TA: 03	**Building:** 0022	**Room:**	**Additional Location Description:**

- Stationary Equipment Mechanics, Curriculum 630
- Sheet metal Workers, Curriculum 649
- Pipefitters, Curriculum 647
- Carpenters, Curriculum 641
- Insulators, Curriculum 643
- Power Plant Operators, Curriculum 632
- Training to work with Cranes and Rigging:
  - Incidental Crane Classroom course # 20295
  - Incidental Crane Exam # 20296
- Site Specific Training (one-time requirement)

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

4.0 Work Execution

1.

2. The following system conditions are the configuration and conditions which have been anticipated for performance of the PM activities covered under this standing IWD:

   a. The electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and the electrical system lineup is considered to be in a normal configuration.

   b. The steam plant may be either in a shutdown, standby or normal operation configuration. The mechanical components are under the control of the steam plant operations personnel and no major upset conditions or unanticipated outages are present within the facility.

   c. The Power Plant operational personnel are manned to the required level and sufficient support is available to support the performance of the preventive maintenance activity.

3. Prerequisites:

   a. **REVIEW** work package for Life Critical Steps (to be performed by the PIC/RLM).

      I. **Fall Protection:**
      - Verify that a safety system is in place (where workers understand hazard controls and required PPE) at the work site.
      - Verify that workers understand the fall protection plan.

      II. **Elevated Work Platforms:**
      - Verify a clear travel path with all necessary clearances has been defined and is adequate.
      - Verify the geographic terrain will support execution of the desired activity.
      - Verify the identification of all energized electrical Systems, structure and components has occurred and their impact to the activity has been accounted for and communicated to the workers.
      - Verify all personnel are qualified to operate the aerial lift device assigned to the activity.

   b. **INSERT** Life Critical Step hold points into the work package.

   c. **VERIFY** a daily pre-job brief has been performed with the 5 mandatory questions and 2101has been read for site hazards and entry requirements. With all affected personnel. Perform a reverse pre-job brief and encourage all craft workers to stay involved.

   d. **VERIFY** all personnel have appropriate PPE for job execution.

   e. **BARRICADE** the work area in accordance with MSS-Guide-038 to protect tenants/unexpected personnel/or traffic as directed by the Supervisor or PIC. Clearly identify work zone due to look-alike equipment.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

Execution

4. **PERFORM** LO/TO, when required to perform preventive maintenance.
5. **PERFORM** zero voltage checks for maintenance involving electrical work.
6. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
7. **PERFORM** preventive maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. Utilize the master work order equipment list when performing preventive maintenance.
8. **REMOVE** all LO/TO.
9. **REMOVE** posting or signs.
10. **CLEAN** up work area and properly dispose of all waste.
11. **COMPLETE** all documentation.

5.0 Close Out

1. Complete closeout of the work activity in accordance with AP-WORK requirements.

Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety	**RLM** (Signature/Z#/Date) **Required** 190429 7-11-17 **FOD or Representative** (Signature/Z#/Date) **Required** 090206 7-12-17 **IH&S Review** (Signature/Z#/Date) 7/10/17

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

	basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	SME Review (Signature/Z#/Date) If Required Not Required ESO Review (Signature/Z#/Date) If Required
IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC _____ Name of Alternate PIC_____ Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

1.0 Work Scope

This work order task will cover the moderate hazard maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

2.1 Entry Conditions

- PAUSE/STOP WORK if steps cannot be completed as described, or if unforeseen situations occur. Stabilize the situation if safe, contact your supervisor or Person-In-Charge (PIC), and await further instructions before proceeding
- Ensure activity is on appropriate Plan(s) of the Day
- Check-in with ops prior to performing work
- Steps in this procedure may be worked out of sequence as directed by supervisor/PIC
- Ensure permits required for the work have been approved and posted, as required
- PIC will be available while work is being conducted
- PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers
- All hold points will be discussed on a daily basis
- Verify all identified hazards have been eliminated, mitigated or minimized

(HAZARD ANALYSIS performed by Robert Simpson, art sparks– 9/9/2015)

2.2 Electrical

- Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.

2.3 Mechanical

- Ensure all guards are in place before accessing equipment.
- Relieve all stored energy before performing maintenance activities.

AP-WORK-002: Attachment 15
FORM 2100-WC

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

2.4 Pneumatic
- Relieve all stored pressure.
- Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.

2.5 Elevated Work
- Ensure all scaffolding/ladders are inspected daily before use.
- Utilize fall protection equipment when required with approved tie-off points.
- Maintain 3-points of contact when utilizing a ladder
- Ensure ladder is properly oriented to work
- Scaffolding shall be erected and inspected by a competent person only

2.6 Hot Surfaces
- Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
- Utilize insulating blankets to protect against hot surfaces.

2.7 Welding, Grinding / Torch Cutting
- Use appropriate welding procedure checklist
- Keep combustible materials clear or protect surrounding
- Wear welding hood with appropriate lens for welding operation performed. Wear welding gloves.
- Ensure adequate ventilation or use welding fume extractor
- Spark and flame permit required

2.8 Chemical
- Consult IH&S for PPE requirements
- Place a catch pan under chemical and collect all residual chemicals.
- Review and follow the safety data sheets for all chemical and oil products.
- An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
- Wear chemical goggles for liquids
- PPE must be worn completely and properly

2.9 Slip, Trip & Fall:
- Be aware of ground and floor conditions

2.10 Back Strains
- Use proper lifting and bending technique at all times

2.11 Simple Hand Tools, Cuts & Abrasions:
- Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
- Use of cordless power tools, power tools-electric shock.
- Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.

2.12 Pinching or Crushing
- Do not place body parts in the path of potential pinch points or crush points
- Hand / foot / body position awareness
- Be aware of line of fire

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)	
Revision # 0		**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task		**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022** / **Room:**	**Additional Location Description:**

2.13 Asbestos Abatement Pipe and Equipment Insulation:

- Reference MSS Procedure 41-55-001-R1
- Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
- Two person rule is required during abatement
- Personal air monitoring will be required.
- Full face APR with P100 cartridges.
- Wear Tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
- Wear nitrile gloves and/or leather gloves
- HEPA vacuum debris.
- Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
- All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.

2.14 LO/TO:

- Utilize LO/TO Attachment
- Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.

2.15 230V to 1000V Zero Voltage check requirements:

- Mode "1" Class 1.3 a,b
- Wear CAL 8+ PPE: Double-Layer switching hood.
- Class 0 Dielectric Gloves.
- AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
- 2-man rule applies.
- Use NRTL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

2.16 50V to 230V Zero Voltage check requirements:

- Mode "1, Class 1.2 a,b
- Use NRTL approved calibrated voltage meter. Test meter on a known live circuit before and after zero voltage verification.
- Class "0" Dielectric Gloves
- AR clothing, minimum arc-rating of 4 cal for voltage of < 230 V (long sleeve shirt & pants of non-melting fabric **or** coveralls, face shield)
- AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

2.17 Cone of Safety Identification:

- The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
- Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
- Ensure lift plan is completed for all critical lifts.

2.18 General PPE Requirements for working within the Power Plant Complex:

- Safety shoes
- Safety glasses with side shields
- Hard hat
- Reflective Safety Vest
- Leather work gloves
- Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach
50-300	3'-6"	Avoid Contact
301-750	3'-6"	1'-0"

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

3.0 Training Requirements

3.1 MSS Maintenance Worker, TP 10968

3.2 LO/TO, TP 127

3.3 Electrical Worker Training, Curriculum 642

3.4 Stationary Equipment Mechanics, Curriculum 630

3.5 Sheet metal Workers, Curriculum 649

3.6 Pipefitters, Curriculum 647

3.7 Carpenters, Curriculum 641

3.8 Insulators, Curriculum 643

3.9 Power Plant Operators, Curriculum 632

3.10 Confined space entry, supervisor and attendant (for entry)

3.11 Training to work with Cranes and Rigging:

- Incidental Crane Classroom course # 20295
- Incidental Crane Exam # 20296

3.12 Site Specific Training (one-time requirement)

4.0 Work Execution

4.1 **Notes**

- Following system conditions are configuration and conditions which have been anticipated for performance of PM activities covered under this IWD:
  - Electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and electrical system lineup is considered to be in a normal configuration.
  - Steam plant may either be in shutdown, standby or normal operation configuration. Mechanical components are under control of steam plant operations personnel and no major upset conditions or unanticipated outages are present within facility.
  - Power Plant operations personnel are manned to required level and sufficient support is available to support performance of maintenance activity.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

- Permits required for this work: LO/TO Attachment, confined space.
- LO/TO devices shall be applied in accordance with P101-3. "Lockout/Tagout for Hazardous Energy Control"
- Discuss emergency evacuation procedures and muster areas
- Discuss possible error situations and mitigations

4.2 **Prerequisites**

- VERIFY pre-job briefing has been performed for all affected personnel including 2101 hazards

PIC : [signature] **Z#:** 120936 **Date:** 3-24-16

- VERIFY all personnel have the appropriate PPE for job execution
- BARRICADE work area to protect against inadvertent access
- USE robust barriers and flagging to clearly define execution area
- VERIFY all required permits are approved and posted as required
- REVIEW planned activity for Life Critical Steps (to be performed by the PIC/RLM):

HOLD

IF fall protection is to be used:

- VERIFY that a safety system is in place (where workers understand hazard controls and required PPE) at work site.
- VERIFY workers understand fall protection plan

PIC : N/A **Z#:**_____ **Date:**_____

HOLD

IF aerial platform/lift is to be used:

- VERIFY a clear travel path with all necessary clearances is defined and adequate
- VERIFY geographic terrain will support execution of activity
- VERIFY identification of all energized electrical systems, structure and components has occurred and their impact to activity has been accounted for and communicated to workers
- VERIFY all personnel are qualified to operate aerial lift device assigned to activity.

PIC : N/A **Z#:**_____ **Date:**_____

Confined Spaces: Complete confined space permit per the CSP evaluation.
Perform ventilation and air monitoring according to the evaluation.
Set up non-entry rescue equipment if required by the evaluation.
Contact pest control, as required to remove rodents and droppings.
Pest control to use 10% bleach solution and full face respirator.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

4.3 **Execution**

1. **ERECT/DISMATLE** scaffolding as needed to access work area
   - INSPECT scaffold daily by competent person only
   - WEAR hard hats when working on / near scaffold
2. **PERFORM** LO/TO when required to perform maintenance

HOLD

VFD:

- **VERIFY** there is not a VFD within this system. This IWD does NOT account for any stored energy that could be present in a VFD.
- **IF** VFD is present or found within system to be worked. DO NOT proceed with any work until UI Engineering has given approval to do so.

OK to Proceed:

PIC: _____ **Z#:** 120931 **Date:** 2-28-18

3. **PERFORM** zero voltage checks for maintenance involving electrical work.
4. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
5. **PERFORM** maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in work order task instructions when applicable. Utilize master work order equipment list when performing maintenance.
6. **REMOVE** all LO/TO
7. **REMOVE** posting or signs
8. **OPERATIONS** acknowledges work is complete and ready to place into service

Operations: Carlos ChaconType Text Here **Z#:** 120931 **Date:** 2-28-18

9. **CLEAN** up work area and properly dispose of all waste
   - SEGREGATE waste as required by WMC.

5.0 Close Out

5.1 Contact OMC (MC) and inform them work is complete.

5.2 Complete all required documentation and return Work Package

Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)

Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task) UPPS-FY17-001			**Planner/Preparer (Name/Z#/Date)** **Justin Maestas 177550 3/28/16**
TA: 03	**Building:** 0022	**Room:**	**Additional Location Description:**

***Insert Rows above** for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.*	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	**RLM** (Signature/Z#/Date) **Required** Kevin M Graham 105008 4/11/16 **FOD or Representative** (Signature/Z#/Date) **Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=UI, email=pfc@lanl.gov, c=US Location: TA-03 SM-0022 Room 114 Date: 2016.04.12 10:08:25 -06'00' **SME Review** (Signature/Z#/Date) **If Required** N/A **ESO Review** (Signature/Z#/Date) **If Required** 180622 4/11/16 **ESH Safety Review** (Signature/Z#/Date) 153338 4/7/16 **Peer RLM /Work Execution Manager/Maintenance Manager** (Signature/Z#/Date) **Required** Robert Simpson 240725 4/11/16

IWD Type		
☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval Change in scope or additional hazards identified (Print) Name of Primary PIC Carlos Chacon Name of Alternate PIC Greg Donnelly Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

Los Alamos NATIONAL LABORATORY EST. 1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic	Completed (X)
What permits, permissions, or support are required to safely start this work?	✓
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	✓
What can cause us to go beyond the scope of the work?	✓
What hazards in the work area may not have been considered during planning of this job?	✓

Facility : F08 **Unit :** **Proj :**
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group :** UTIL **Task Priority :** 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date :** 03/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt :** N/A LOW HZRD

Work Order Task

00600283 01

MASTER

Date: 12/13/2017

Work Order Task Written To

Facility : F08 **Unit :** **Op Sys :**
Room : **Area :** **Sys/Cls :**
Equipment : **Component :**
Location :
Job Type : PM
Tag 1 : **Tag 2 :**
Work Item : TA03-0022 FGR **Ops Review Reqd :**

Authorization

Start Permission : Glenn Martinez **Start Date :** 2-22-18
Complete Notice : Glenn Martinez **Complete Date :** 3-5-18

Work Order Task Instructions

DO NOT lubricate the bearings if the FGR fan is NOT in operation or in service so that proper amount of grease can be applied
using headphones
You can hear when grease reaches the bearing rolling element. At this point, stop adding grease to prevent bearing damage from overheating

There are two bearings on the fan, each with its own zerk plug
Remove the shaft guard located in the middle of the drive. The two zerk plugs are located on each of the two bearings

1. Use grease gun with the Ultralube headphones to insert the correct amount of Mobilith SHC 100 grease into zerk fitting
b. Apply grease while fan is running and stop when you hear the grease enter the running bearing

1600/1711

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 03/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00600283 01

MASTER

Date: 12/13/2017

Lubricated fan bearings on FGR-001,FGR-002 & FGR-003

4. Add grease with a hand-operated pressure gun until new grease enters the running bearing
a. This is accomplished by using the ultrasonic sensor and headphones to hear when the new grease enters the running bearing
b. Stop adding grease when the grease reaches the bearing to limit excess grease from migrating down the motor shaft and into the windings
Note: Be careful when greasing the fan end bearing of the TEFC (Totally (Totally Enclosed Fan Cooled) motors. Some motors have a spring-relief outlet grease fitting on the fan end that is not accessible. This spring-relief fitting normally does not have to be removed when regreasing. When greasing, take care in the amount of pressure you apply and verify relief is working
5. Putting in too much or too little grease can cause overheating of the motors and result in motor failure. Use this rule of thumb when adding grease to a motor that has been lubricated on a regular basis: It is better to use a little grease more often than a lot of grease less often
Note: Watch out for motors that were shipped only with the bearings packed and not the fill tube or even the bearing housing Apply new grease until you can hear it enter the running bearing
6. Now that greasing is complete, leave the relief plug off and run the motor for 10 minutes to expel any excess grease
7. Replace the drain plug and wipe the bearing housing clean
8. Dispose of dirty rags in accordance with Hazardous Waste Guidelines
9. Ensure correct operation of electric motors.

QC Requirements / Comments

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 03/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00600283 01

MASTER

Date: 12/13/2017

Work Completion Signatures

Name	Function/Dept.	Date
Chris Salazar	LOG-CS/PP maint.....	03/01/2018

Comments

(rework?)

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 03/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00600283 01

MASTER

Date: 12/13/2017

Los Alamos NATIONAL LABORATORY EST. 1943

Form 2101

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name Pablo C de Vaca	Phone 699-8226	Pager N/A	Email pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas.No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: _____ Revision #: _____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process. For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee. If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=LE, email=pfc@lanl.gov, c=US Date: 2017.08.24 11:53:41 -06'00'

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY EST. 1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

2/1/18

Topic: IMO. FOR BEARING LUBRICATION	Completed (X)
What permits, permissions, or support are required to safely start this work?	X
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	X
What can cause us to go beyond the scope of the work?	X
What hazards in the work area may not have been considered during planning of this job?	X

Briefing by J.Miller 171769
Briefing to : C.Salazar 202847
J.Lujan 217001

Facility : F08 **Unit :** **Proj :**
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group :** UTIL **Task Priority :** 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date :** 03/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt :** TASK SPECIFC

Work Order Task

00600268 01

MASTER

Date: 12/14/2017

Work Order Task Written To

Facility : F08 **Unit :** **Op Sys :**
Room : **Area :** **Sys/Cls :**
Equipment : **Component :**
Location :
Job Type : PM
Tag 1 : **Tag 2 :**
Work Item : SM22VID **Ops Review Reqd :**

Authorization

Start Permission :	Robert Simpson	3/13/2018
Complete Notice :	Robert Simpson	3/23/2018

Work Order Task Instructions

CRAFT: UICS ELECTRICIANS

FURTHER INSTRUCTIONS/DETAILS
LOTO OF EACH UNIT TO CLEAN INTERNALLY THE INSIDE OF EACH VFD PANEL
TASK IS TO BE DONE THE USE OF COMPRESSED AIR AND A VACUUM CLEANER. REMOVE
ALL DUST AND DEBRIS FROM THE ENCLOSURES

.

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 03/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00600268 01

MASTER

Date: 12/14/2017

QC Requirements / Comments

Work Completion Signatures

Name	Function/Dept.	Date
Carlos Chacon	UPES Controls Electricians	3-21-18

Comments None

(rework?) No

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
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Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 03/31/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00600268 01

MASTER

Date: 12/14/2017

Form 2103

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 3, Validation and Work Release

IWD #_____ REVISION #:_____ **WORK RELEASE**

By signing below, I verify this activity is compatible with current facility configuration and operating conditions.

FOD designated Ops Mgr or other facility point-of-contact for work area

Signature/Z#/Date **(If required by FOD)**: _____

Note: For Standing IWD, release may be given concurrently with signatures on Part 2.

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a validation walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.
- The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing, and all workers (including support workers) have been briefed.
- I have ensured coordination with any required FOD work-area representatives (*e.g., area work coordinators*).

Primary PIC (Signature/Z#/Date) **Required**: [signature] 209231 3-20-18

Alternate PIC Signatures **acknowledges** PIC authority is assumed for the first time *(Note: Alternate PICs are required to sign only once, but formal handoff includes conferring with previous PIC to obtain all required information associated with the handoff)*

Alternate PIC (Signature/Z#/Date) **Required**: _____

Alternate PIC (Signature/Z#/Date) **Required**: _____

Pre-Job Brief Content

- What are the critical steps or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the pause/stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

Pre-Job Brief Attendance Roster

By signing below **as required**, I agree to the following:

- I agree to follow the work steps and implement the controls as written as applicable to my work assignments.
- I agree to pause/stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and fit to perform the work.

Worker (Signature/Z#/Date) [signature] 3/20/18	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date) [signature]
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)

Attachment B, LO/TO Orders

Lock Coordinator Name/Z# **Phone #** **Alternate Lock Coordinator Name/Z#** **Phone #**

Section 1: General Information

1. Work Document Number (i.e., Package/Procedure #):		2. LO/TO (Parent) Record #	3. Date:
Location			
4. TA:	5. Bldg:	6. Rm:	7. Equipment/Machinery/Name/Number:
8. Reason for LO/TO:			
9. Name of Equipment Owner/Operator:			
10. Energy Type to be Isolated (check all that apply) ☐ Electrical ☐ Mechanical ☐ Hydraulic ☐ Pneumatic ☐ Steam ☐ Capacitors ☐ Compressed Energy ☐ Gravity ☐ Other (specify):			
11. Group LO/TO: ☐ Yes ☐ No If Yes, Name of Lead Authorized Worker:		12. Group Lock Box used: ☐ Yes ☐ No If yes, enter ID# of Lock Box Lock Box ID:	
13. Sequencing Required for ~~LO/TO~~ ***Installation*** If Yes, enter the required sequence in column 20 below. If No, place N/A in column 20 below. ☐ Yes ☐ No		14. Sequencing Required for LO/TO ***Removal*** If Yes, enter the required sequence in column 28 below. If No, place N/A in column 28 below. ☐ Yes ☐ No	

Section 2: LO/TO Installation & Removal

LO/TO Installation					LO/TO Removal / Return to Service			
15. Approval to Install LO/TO (signature & Z#)					24. Approval to Remove LO/TO (signature & Z#). Call # —			
16. Verification required for LO/TO Installation ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification					25. Verification required for LO/TO Removal ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification			
17. Verification Determination Approved by FOD/Designee (signature)		Z#	Date		26. Verification Determination Approved by	Z#	Date	
18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
23. LO/TO Points Positioned and First Lock installed by Signature		Z#	Date		31. LO/TO Removed, Positioned and Verified by Signature	Z#	Date	

Attachment B, LO/TO Orders

Attachment B, LO/TO Orders (Cont.)			
1. Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Record #	3. Date:	
32. Zero Energy Checks have been completed ☐ Yes ☐ No	33. Completed by Signature	Z#	Date
Section 3: Lead Authorized Worker and Authorized Workers (anyone applying a lock for this activity)			
34. Authorized Workers Name(s)	Z#	35. Date workers lock is hung	36. Date workers lock is removed
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
Section 4: Return of Lock(s)/Tag(s) and Locking Devices			
All Lock(s)/Tag(s) and Locking Devices have been removed and returned to the Lock Coordinator or Designee			
37. Signature of Lock Coordinator or Designee	Z#	Date	

*If you have questions with regards to filling out the Attachment B, LO/TO Orders form, see the directions associated with the form.

*Take the completed forms back to the Lock Coordinator or Designee for closeout.

Attachment B, LO/TO Orders

Continuation Page (print as needed)

18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
23. LO/TO Points Positioned and First Lock installed by Signature		Z#	Date		31. LO/TO Removed, Positioned and Verified by Signature		Z#	Date

Attachment B, LO/TO Orders

The following are directions for filling out Attachment B.

1. Enter the Work Document Number, this will be the number from the IWD or the procedure number (i.e., TA88-DOP-0001)
2. Enter the LO/TO Parent Record number, this is obtained from the Lock Coordinator when the HEC lock(s) are issued. The Remedy LO/TO database issues this number.
3. Enter the date of when the locks will be applied.
4. Enter the TA where the lock(s) will be hung.
5. Enter the Building number of where the lock(s) will be hung.
6. Enter the Room number where the equipment is located/where work is being performed.
7. Enter the Equipment/Machinery/Name/Number (example, HVA-001)
8. Write a brief description of the reason for LO/TO (example, Removing and replacing belts)
9. Enter the Name of the Equipment Owner/Operator. Each FOD is different in the assigning of Equipment Owner/Operators. There are also programmatic Equipment Owner/Operators.
10. Check the appropriate energy type to be isolated, check all that apply. Make sure you have considered all energy sources, if other you will need to specify what "other" is.
11. Check applicable box to identify if a group LO/TO (A LO/TO where two or more authorized workers, regardless of their occupation or craft, lock out and tag out the same equipment to perform servicing or maintenance).
12. Check applicable box if lock box is used for the job. Enter the lock box ID#. Each organization that issues locks will be required to uniquely number and track lock boxes in their possession.
13. When installing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are to be positioned. If a specific sequence must be followed, THEN number the sequence order in column 20. If there is not a specific sequence to follow then place N/A in column 20. This needs to be an operations type person (Operator) who understands the equipment/system/component.
14. When removing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are positioned after lock/tag removal? If a specific sequence must be followed, THEN number the sequence order in column 28. If not, place N/A in the box(s).

NOTE: Section 2, LO/TO Installation & Removal – In some of the nuclear facilities, the operations personnel will identify the required position(s) for credited equipment/machinery depending on operational requirements for return to service. In most cases when workers remove locks, the "As-Left" Position will be different then the final position the operations personnel will place the equipment in.

15. The Equipment Owner/Operator signs and enters their Z#, authorizing the installation of the LO/TO. With some FODs this will be the maintenance coordinators.
16. Is verification required for this LO/TO. Determine if this is Peer Verification (see P101-3, Section 3.15) or Concurrent Dual verification (see P315, Attachment 10, Section 10.3.6), or Independent Verification. For Independent Verification see P315, Attachment 10, Independent Verification, The Operations Manager (OM) prepares and maintains a facility-specific list of systems and components requiring Independent Verification.

Attachment B, LO/TO Orders

17. The FOD/Designee must sign after determining if verification is required. If Independent Verifier is identified at this time then it must be entered into the Remedy database.
18. Enter the specific Energy isolation device/ID, (example, MCC-A, A4)
19. Location of locking device, this is the location of where the lock is applied (example, MCC-A, A4 TA-XX, Bld. XXX, rm. 123)
20. If the LO/TO needs to be installed in a particular order, number the order in which the locks need to be installed. If the "No" box is checked in #13, then place N/A in this column.
21. Required Position/alignment for LO/TO, open, closed, connected, disconnected, on, off, etc.
22. LO/TO installation verified by – Has the equipment /system/component being locked out, been identified by the FOD as requiring verification, see #16. If verification is required the person who performed the verification initials here.
23. The Lead Authorized worker positions the LO/TO points and installs his/her lock and signs that this has been completed.
24. This is the person, who authorized the LO/TO to be removed, signs and places his/her Z# in this box. This signature authority may place a phone number here for the Lead Authorized worker to call for authorization to remove the LO/TO. When verbal authorization is given, it must be documented in this section. Example: John Smith per telecom, 8/13/14 and your initials. Note: It is also permissible to pre-authorize the removal of the lock by pre-signing.
25. Depending on the verification type required for LO/TO removal, check the appropriate verification type box, otherwise check the "No" box.
26. If verification is required, the FOD/Designee must sign. Independent Verifier is identified at this time and entered into the database.
27. Write the required position/alignment the system/component will be placed in following the removal of the lock(s).
28. If the isolation device needs to be positioned in a particular order/sequence, (per Post Maintenance) number the order/sequence in which the isolation device is to be position. If not, place N/A in the box(s).
29. LO/TO removal verified by Lead Authorized Worker – the lock(s) have been removed and the As-Left position is documented in column 30.
30. Enter the As-Left Position.
31. If the removal of the lock has been identified as needing to be verified, the verifier writes name and Z# after verifying the lock has been removed.
32. The authorized worker must verify that the steps utilized in the energy control procedure have effectively isolated the machine or equipment from the hazardous energy.
33. The authorized worker signs after zero energy checks have been completed.
34. All authorized workers applying a lock for this activity names/Z# and the Date must be entered.
35. Enter the date the authorized worker hangs lock.
36. Enter the date the authorized worker removes lock.
37. The Lock Coordinator or designee signs once locks, tags, and locking devices have been removed and returned. If a lock and/or tag are found to be contaminated then that will be noted by the Lock Coordinator or designee and the Lock Coordinator or designee will sign.

Los Alamos NATIONAL LABORATORY EST.1943

AP-WORK-004: Attachment 1 Maintenance & Site Services Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic	Completed (X)
What permits, permissions, or support are required to safely start this work?	✓
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	✓
What can cause us to go beyond the scope of the work?	✓
What hazards in the work area may not have been considered during planning of this job?	✓

Los Alamos	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

1.0 Work Scope:

This work order task will cover the moderate hazard preventive maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

(HAZARD ANALYSIS performed by Robert Simpson, Kedrick Mendez– 9/9/2015)

1. Entry conditions:
   - Ensure that the activity is on the Plan of the Day.
   - If steps cannot be completed as described, or if unforeseen situations occur, PAUSE/STOP WORK, stabilize the situation, contact your supervisor or the Person-In-Charge (PIC), and await further instructions before proceeding.
   - Certain steps in the procedure may be worked out of sequence as directed by the supervisor.
   - The permits and work packages required for the project have been approved and are posted, as required.
   - The PIC will be available while work is being conducted.
   - PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers.
   - All hold points will be discussed on a daily basis.
- Controls needed to perform the work are identified in this IWD.
2. Electrical Hazards:
   - Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.
3. Mechanical Hazards:
   - Ensure all guards are in place before accessing equipment.
   - Relieve all stored energy before performing maintenance activities.
4. Pneumatic Hazards:
   - Relieve all stored pressure.
   - Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.
5. Elevated Work:
   - Ensure all scaffolding is inspected daily before use.
   - Utilize fall protection equipment when required with approved tie-off points.
   - Maintain 3-points of contact when utilizing a ladder.
6. Hot Surfaces:
   - Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
   - Utilize insulating blankets to protect against hot surfaces.

Los Alamos	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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TA: 03	Building: 0022	Room:	Additional Location Description:

7. Chemical Hazards:
   - Consult IH&S for PPE requirements.
   - Place a catch pan under chemical and collect all residual chemicals. Deposit chemical in the day tank.
   - Review the safety data sheets for all chemical and oil products.
   - An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
8. Slips, Trips and Falls:
   - Be aware of ground and floor conditions
9. Back strains
   - Use proper lifting and bending technique at all times
10. Working with simple hand tools, cuts and abrasions:
    - Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
    - Use of cordless power tools, power tools-electric shock.
    - Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.
11. Pinching or crushing/hand injury:
    - Do not place hands in the path of potential pinch points or crush points
    - Hand/foot/ body position awareness
12. Asbestos Abatement Pipe and Equipment Insulation:
    - Reference MSS Procedure 41-55-001-R1
    - Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
    - Two person rule is required during abatement
    - Personal air monitoring will be required.
    - Full face APR with P100 cartridges.
    - Wear tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
    - Wear nitrile gloves and/or leather gloves
    - HEPA vacuum debris.
    - Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
    - All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.
13. LO/TO:
    - Utilize LO/TO Attachment "B"
    - Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.
14. 240V to 600V Zero Voltage check requirements:
    - Mode "1"
    - Wear CAL 8+ PPE: Double-Layer switching hood.
    - Class 0 Dielectric Gloves.
    - AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
    - 2-man rule applies.
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage

Los Alamos	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

15. Less than 240V Zero Voltage check requirements:
    - Mode "1"
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
    - Class "0" Dielectric Gloves
    - AR clothing, minimum arc-rating of 4 cal for voltage of < 240 V (long sleeve shirt, pants or coveralls, face shield)
    - AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
    - No metallic objects worn.
    - Voltage rated test equipment.
    - Ensure no un-insulated body part enters prohibited space.
    - Voltage rated tools.
16. Cone of Safety Identification:
    - The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
    - Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
    - Ensure lift plan is completed for all critical lifts.
17. General PPE Requirements for working within the Power Plant Complex:
    - Safety shoes
    - Safety glasses with side shields
    - Hard hat
    - Reflective Safety Vest
    - Leather work gloves
    - Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach	Prohibited Approach
50-300	3'6"	Avoid Contact	Avoid Contact
301-750	3'6"	1'0"	0'1"

3.0 Training Requirements

- MSS Maintenance Worker, TP 10968
- LO/TO, TP 127
- Electrical Worker Training, Curriculum 642

Los Alamos	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

- Stationary Equipment Mechanics, Curriculum 630
- Sheet metal Workers, Curriculum 649
- Pipefitters, Curriculum 647
- Carpenters, Curriculum 641
- Insulators, Curriculum 643
- Power Plant Operators, Curriculum 632
- Training to work with Cranes and Rigging:
  - Incidental Crane Classroom course # 20295
  - Incidental Crane Exam # 20296
- Site Specific Training (one-time requirement)

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

4.0 Work Execution

1.

2. The following system conditions are the configuration and conditions which have been anticipated for performance of the PM activities covered under this standing IWD:

   a. The electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and the electrical system lineup is considered to be in a normal configuration.

   b. The steam plant may be either in a shutdown, standby or normal operation configuration. The mechanical components are under the control of the steam plant operations personnel and no major upset conditions or unanticipated outages are present within the facility.

   c. The Power Plant operational personnel are manned to the required level and sufficient support is available to support the performance of the preventive maintenance activity.

3. Prerequisites:

   a. **REVIEW** work package for Life Critical Steps (to be performed by the PIC/RLM).

      I. **Fall Protection:**
      - Verify that a safety system is in place (where workers understand hazard controls and required PPE) at the work site.
      - Verify that workers understand the fall protection plan.

      II. **Elevated Work Platforms:**
      - Verify a clear travel path with all necessary clearances has been defined and is adequate.
      - Verify the geographic terrain will support execution of the desired activity.
      - Verify the identification of all energized electrical Systems, structure and components has occurred and their impact to the activity has been accounted for and communicated to the workers.
      - Verify all personnel are qualified to operate the aerial lift device assigned to the activity.

   b. **INSERT** Life Critical Step hold points into the work package.

   c. **VERIFY** a daily pre-job brief has been performed with the 5 mandatory questions and 2101has been read for site hazards and entry requirements. With all affected personnel. Perform a reverse pre-job brief and encourage all craft workers to stay involved.

   d. **VERIFY** all personnel have appropriate PPE for job execution.

   e. **BARRICADE** the work area in accordance with MSS-Guide-038 to protect tenants/unexpected personnel/or traffic as directed by the Supervisor or PIC. Clearly identify work zone due to look-alike equipment.

Los Alamos NATIONAL LABORATORY

Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)

Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

Execution

4. **PERFORM** LO/TO, when required to perform preventive maintenance.
5. **PERFORM** zero voltage checks for maintenance involving electrical work.
6. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
7. **PERFORM** preventive maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. Utilize the master work order equipment list when performing preventive maintenance.
8. **REMOVE** all LO/TO.
9. **REMOVE** posting or signs.
10. **CLEAN** up work area and properly dispose of all waste.
11. **COMPLETE** all documentation.

5.0 Close Out

1. Complete closeout of the work activity in accordance with AP-WORK requirements.

Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety	**RLM** (Signature/Z#/Date) **Required** 190429 7-11-17 **FOD or Representative** (Signature/Z#/Date) **Required** 090206 7-12-17 **IH&S Review** (Signature/Z#/Date) 7/10/17

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

	basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	**SME Review** (Signature/Z#/Date) **If Required** Not Required **ESO Review** (Signature/Z#/Date) **If Required** Robert Simpson 240725 1/8/2018
IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC Carlos Chacon Name of Alternate PIC Greg Donnelly Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

Form 2101

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas. No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: ____ Revision #: ____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee. If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=LI, email=pfc@lanl.gov, c=US Date: 2017.06.26 11:53:41 -06'00'

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task			Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

1.0 Work Scope:

This work order task will cover the moderate hazard preventive maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

(HAZARD ANALYSIS performed by Robert Simpson, Kedrick Mendez– 9/9/2015)

1. Entry conditions:
   - Ensure that the activity is on the Plan of the Day.
   - If steps cannot be completed as described, or if unforeseen situations occur, PAUSE/STOP WORK, stabilize the situation, contact your supervisor or the Person-In-Charge (PIC), and await further instructions before proceeding.
   - Certain steps in the procedure may be worked out of sequence as directed by the supervisor.
   - The permits and work packages required for the project have been approved and are posted, as required.
   - The PIC will be available while work is being conducted.
   - PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers.
   - All hold points will be discussed on a daily basis.
- Controls needed to perform the work are identified in this IWD.
2. Electrical Hazards:
   - Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.
3. Mechanical Hazards:
   - Ensure all guards are in place before accessing equipment.
   - Relieve all stored energy before performing maintenance activities.
4. Pneumatic Hazards:
   - Relieve all stored pressure.
   - Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.
5. Elevated Work:
   - Ensure all scaffolding is inspected daily before use.
   - Utilize fall protection equipment when required with approved tie-off points.
   - Maintain 3-points of contact when utilizing a ladder.
6. Hot Surfaces:
   - Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
   - Utilize insulating blankets to protect against hot surfaces.

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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TA: 03	Building: 0022	Room:	Additional Location Description:

7. Chemical Hazards:
   - Consult IH&S for PPE requirements.
   - Place a catch pan under chemical and collect all residual chemicals. Deposit chemical in the day tank.
   - Review the safety data sheets for all chemical and oil products.
   - An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
8. Slips, Trips and Falls:
   - Be aware of ground and floor conditions
9. Back strains
   - Use proper lifting and bending technique at all times
10. Working with simple hand tools, cuts and abrasions:
    - Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
    - Use of cordless power tools, power tools-electric shock.
    - Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.
11. Pinching or crushing/hand injury:
    - Do not place hands in the path of potential pinch points or crush points
    - Hand/foot/ body position awareness
12. Asbestos Abatement Pipe and Equipment Insulation:
    - Reference MSS Procedure 41-55-001-R1
    - Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
    - Two person rule is required during abatement
    - Personal air monitoring will be required.
    - Full face APR with P100 cartridges.
    - Wear tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
    - Wear nitrile gloves and/or leather gloves
    - HEPA vacuum debris.
    - Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
    - All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.
13. LO/TO:
    - Utilize LO/TO Attachment "B"
    - Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.
14. 240V to 600V Zero Voltage check requirements:
    - Mode "1"
    - Wear CAL 8+ PPE: Double-Layer switching hood.
    - Class 0 Dielectric Gloves.
    - AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
    - 2-man rule applies.
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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TA: 03	Building: 0022	Room:	Additional Location Description:

verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

15. Less than 240V Zero Voltage check requirements:
    - Mode "1"
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
    - Class "0" Dielectric Gloves
    - AR clothing, minimum arc-rating of 4 cal for voltage of < 240 V (long sleeve shirt, pants or coveralls, face shield)
    - AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
    - No metallic objects worn.
    - Voltage rated test equipment.
    - Ensure no un-insulated body part enters prohibited space.
    - Voltage rated tools.
16. Cone of Safety Identification:
    - The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
    - Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
    - Ensure lift plan is completed for all critical lifts.
17. General PPE Requirements for working within the Power Plant Complex:
    - Safety shoes
    - Safety glasses with side shields
    - Hard hat
    - Reflective Safety Vest
    - Leather work gloves
    - Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach	Prohibited Approach
50-300	3'6"	Avoid Contact	Avoid Contact
301-750	3'6"	1'0"	0'1"

3.0 Training Requirements

- MSS Maintenance Worker, TP 10968
- LO/TO, TP 127
- Electrical Worker Training, Curriculum 642

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TA: 03	Building: 0022	Room:	Additional Location Description:

- Stationary Equipment Mechanics, Curriculum 630
- Sheet metal Workers, Curriculum 649
- Pipefitters, Curriculum 647
- Carpenters, Curriculum 641
- Insulators, Curriculum 643
- Power Plant Operators, Curriculum 632
- Training to work with Cranes and Rigging:
  - Incidental Crane Classroom course # 20295
  - Incidental Crane Exam # 20296
- Site Specific Training (one-time requirement)

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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TA: 03	Building: 0022	Room:	Additional Location Description:

4.0 Work Execution

1.

2. The following system conditions are the configuration and conditions which have been anticipated for performance of the PM activities covered under this standing IWD:

   a. The electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and the electrical system lineup is considered to be in a normal configuration.

   b. The steam plant may be either in a shutdown, standby or normal operation configuration. The mechanical components are under the control of the steam plant operations personnel and no major upset conditions or unanticipated outages are present within the facility.

   c. The Power Plant operational personnel are manned to the required level and sufficient support is available to support the performance of the preventive maintenance activity.

3. Prerequisites:

   a. **REVIEW** work package for Life Critical Steps (to be performed by the PIC/RLM).

      I. **Fall Protection:**
      - Verify that a safety system is in place (where workers understand hazard controls and required PPE) at the work site.
      - Verify that workers understand the fall protection plan.

      II. **Elevated Work Platforms:**
      - Verify a clear travel path with all necessary clearances has been defined and is adequate.
      - Verify the geographic terrain will support execution of the desired activity.
      - Verify the identification of all energized electrical Systems, structure and components has occurred and their impact to the activity has been accounted for and communicated to the workers.
      - Verify all personnel are qualified to operate the aerial lift device assigned to the activity.

   b. **INSERT** Life Critical Step hold points into the work package.

   c. **VERIFY** a daily pre-job brief has been performed with the 5 mandatory questions and 2101has been read for site hazards and entry requirements. With all affected personnel. Perform a reverse pre-job brief and encourage all craft workers to stay involved.

   d. **VERIFY** all personnel have appropriate PPE for job execution.

   e. **BARRICADE** the work area in accordance with MSS-Guide-038 to protect tenants/unexpected personnel/or traffic as directed by the Supervisor or PIC. Clearly identify work zone due to look-alike equipment.

Los Alamos NATIONAL LABORATORY

Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)

Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

Execution

4. **PERFORM** LO/TO, when required to perform preventive maintenance.
5. **PERFORM** zero voltage checks for maintenance involving electrical work.
6. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
7. **PERFORM** preventive maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. Utilize the master work order equipment list when performing preventive maintenance.
8. **REMOVE** all LO/TO.
9. **REMOVE** posting or signs.
10. **CLEAN** up work area and properly dispose of all waste.
11. **COMPLETE** all documentation.

5.0 Close Out

1. Complete closeout of the work activity in accordance with AP-WORK requirements.

Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety	**RLM** (Signature/Z#/Date) **Required** 190429 7-11-17 **FOD or Representative** (Signature/Z#/Date) **Required** 090208 7-12-17 **IH&S Review** (Signature/Z#/Date) 7/10/17

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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TA: 03	Building: 0022	Room:	Additional Location Description:

	basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	SME Review (Signature/Z#/Date) If Required Not Required ESO Review (Signature/Z#/Date) If Required
IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC _____ Name of Alternate PIC_____ Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 04/30/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00602515 01

MASTER

Date: 01/10/2018

Work Order Task Written To

Facility : F08 **Unit** : **Op Sys** :
Room : **Area** : **Sys/Cls** :
Equipment : **Component** :
Location :
Job Type : PM
Tag 1 : **Tag 2** :
Work Item : TA03-0022 FGR **Ops Review Reqd** :

Authorization

Start Permission : Glenn martinez **Start Date** : 3-24-18
Complete Notice : Glenn Martinez **Complete Date** : 4-3-18

Work Order Task Instructions

DO NOT lubricate the bearings if the FGR fan is NOT in operation or in service so that proper amount of grease can be applied
using headphones
You can hear when grease reaches the bearing rolling element. At this point, stop adding grease to prevent bearing damage from overheating

There are two bearings on the fan, each with its own zerk plug
Remove the shaft guard located in the middle of the drive. The two zerk plugs are located on each of the two bearings

1. Use grease gun with the Ultralube headphones to insert the correct amount of Mobilith SHC 100 grease into zerk fitting
b. Apply grease while fan is running and stop when you hear the grease enter the running bearing

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
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Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 04/30/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00602515 01

MASTER

Date: 01/10/2018

Lubricated fan bearings on FGR-001,FGR-002 & FGR-003

4. Add grease with a hand-operated pressure gun until new grease enters the running bearing
a. This is accomplished by using the ultrasonic sensor and headphones to hear when the new grease enters the running bearing
b. Stop adding grease when the grease reaches the bearing to limit excess grease from migrating down the motor shaft and into the windings
Note: Be careful when greasing the fan end bearing of the TEFC (Totally (Totally Enclosed Fan Cooled) motors. Some motors have a spring-relief outlet grease fitting on the fan end that is not accessible. This spring-relief fitting normally does not have to be removed when regreasing. When greasing, take care in the amount of pressure you apply and verify relief is working
5. Putting in too much or too little grease can cause overheating of the motors and result in motor failure. Use this rule of thumb when adding grease to a motor that has been lubricated on a regular basis: It is better to use a little grease more often than a lot of grease less often
Note: Watch out for motors that were shipped only with the bearings packed and not the fill tube or even the bearing housing
Apply new grease until you can hear it enter the running bearing
6. Now that greasing is complete, leave the relief plug off and run the motor for 10 minutes to expel any excess grease
7. Replace the drain plug and wipe the bearing housing clean
8. Dispose of dirty rags in accordance with Hazardous Waste Guidelines
9. Ensure correct operation of electric motors.

QC Requirements / Comments

1639/1711

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
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Task Dspln : **Due Date** : 04/30/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00602515 01

MASTER

Date: 01/10/2018

Work Completion Signatures

Name	Function/Dept.	Date
Dennis Gutierrez	LOGCS/Maintenance	04/02/2018

Comments

(rework?)

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
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Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00602515 01

MASTER

Date: 01/10/2018

Los Alamos NATIONAL LABORATORY EST.1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic 1mo FGR Fans lube 4-2-18	Completed (X)
What permits, permissions, or support are required to safely start this work?	X
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	X
What can cause us to go beyond the scope of the work?	X
What hazards in the work area may not have been considered during planning of this job?	X

Prejob by C. Salazar 202847 4-2-18

Jerry Lujan

Dennis Gutierrez

Form 2101

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex : Cellphone, No Foreign Nationals, etc)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas. No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: _____ Revision #: _____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process. For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee. If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=LI, email=pfc@lanl.gov, c=US Date: 2017.06.26 11:53:43 -06'00'

Date Approval Expires: 09/30/2020

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 04/30/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00602501 01

MASTER

Date: 01/10/2018

Work Order Task Written To

Facility : F08 **Unit** : **Op Sys** :
Room : **Area** : **Sys/Cls** :
Equipment : **Component** :
Location :
Job Type : PM
Tag 1 : **Tag 2** :
Work Item : SM22VID **Ops Review Reqd** :

Authorization

Start Permission : Robert Simpson 4/10/2018

Complete Notice : Robert Simpson 4/26/2018

Work Order Task Instructions

CRAFT: UICS ELECTRICIANS

FURTHER INSTRUCTIONS/DETAILS
LOTO OF EACH UNIT TO CLEAN INTERNALLY THE INSIDE OF EACH VFD PANEL
TASK IS TO BE DONE THE USE OF COMPRESSED AIR AND A VACUUM CLEANER. REMOVE
ALL DUST AND DEBRIS FROM THE ENCLOSURES

.

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR
Task Dspln : **Due Date** : 04/30/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00602501 01

MASTER

Date: 01/10/2018

QC Requirements / Comments

Work Completion Signatures

Name	Function/Dept.	Date
Carlos Chacon	UPES Controls Electricians	4-26-18

Comments None
(rework?) No

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS
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Task Dspln : **Due Date** : 04/30/2018
Superintendant :
Hazard : MODERATE **IWD Reqmt** : TASK SPECIFC

Work Order Task

00602501 01

MASTER

Date: 01/10/2018

Form 2103

Los Alamos NATIONAL LABORATORY EST. 1943

Integrated Work Document (IWD) Part 3, Validation and Work Release

IWD #_____ REVISION #:_____ **WORK RELEASE**

By signing below, I verify this activity is compatible with current facility configuration and operating conditions.

FOD designated Ops Mgr or other facility point-of-contact for work area

Signature/Z#/Date **(If required by FOD)**: _____

Note: For Standing IWD, release may be given concurrently with signatures on Part 2

By signing below, I have verified the following:

- I have verified authorization by ensuring approval signatures of the RLM and FOD.
- I have jointly conducted a validation walkdown with workers to confirm the IWD can be performed as written, required initial conditions and other prerequisites are in-place.
- The assigned workers are authorized and are qualified to perform the work in a safe, secure, and environmentally responsible manner.
- I have conducted the pre-job briefing, and all workers (including support workers) have been briefed.
- I have ensured coordination with any required FOD work-area representatives (*e.g., area work coordinators*).

Primary PIC (Signature/Z#/Date) **Required**: _____

Alternate PIC Signatures **acknowledges** PIC authority is assumed for the first time *(Note: Alternate PICs are required to sign only once, but formal handoff includes conferring with previous PIC to obtain all required information associated with the handoff)*

Alternate PIC (Signature/Z#/Date) **Required**: _____

Alternate PIC (Signature/Z#/Date) **Required**: _____

Pre-Job Brief Content

- What are the critical steps or phases of this activity?
- How can we make a mistake at that point?
- What is the worst thing that can go wrong?
- What controls, preventive measures, and bounding conditions are needed?
- What work permits are required and how will we meet their requirements?
- What are the handoffs and coordination requirements among workers and multiple PICs?
- Are there hold-points including those that require sign-offs?
- What are the pause/stop work responsibilities and expectations (e.g. for unanticipated conditions or hazards)?
- How would we respond to alarms and emergencies?
- Are there lessons learned from previous similar work?
- Is other information needed to perform this activity in a safe, secure, and environmentally responsible manner?
- Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

Pre-Job Brief Attendance Roster

By signing below **as required**, I agree to the following:

- I agree to follow the work steps and implement the controls as written as applicable to my work assignments.
- I agree to pause/stop work when conditions or hazards change or when I encounter unexpected conditions during the execution of work, or when work cannot be performed as written, or instructions become unclear during execution.
- I confirm that I am authorized, qualified, and fit to perform the work.

Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)
Worker (Signature/Z#/Date)	**Worker** (Signature/Z#/Date)

Attachment B, LO/TO Orders

Lock Coordinator Name/Z# **Phone #** **Alternate Lock Coordinator Name/Z#** **Phone #**

Section 1: General Information				
1. Work Document Number (i.e., Package/Procedure #):			2. LO/TO (Parent) Record #	3. Date:
Location				
4. TA:	5. Bldg:	6. Rm:	7. Equipment/Machinery/Name/Number:	
8. Reason for LO/TO:				
9. Name of Equipment Owner/Operator:				
10. Energy Type to be Isolated (check all that apply) ☐ Electrical ☐ Mechanical ☐ Hydraulic ☐ Pneumatic ☐ Steam ☐ Capacitors ☐ Compressed Energy ☐ Gravity ☐ Other (specify):				
11. Group LO/TO: ☐ Yes ☐ No If Yes, Name of Lead Authorized Worker:			12. Group Lock Box used: ☐ Yes ☐ No If yes, enter ID# of Lock Box Lock Box ID:	
13. Sequencing Required for LO/TO ***Installation*** If Yes, enter the required sequence in column 20 below. If No, place N/A in column 20 below. ☐ Yes ☐ No			14. Sequencing Required for LO/TO ***Removal*** If Yes, enter the required sequence in column 28 below. If No, place N/A in column 28 below. ☐ Yes ☐ No	

Section 2: LO/TO Installation & Removal

LO/TO Installation					**LO/TO Removal / Return to Service**			
15. Approval to Install LO/TO (signature & Z#)					24. Approval to Remove LO/TO (signature & Z#). Call # —			
16. Verification required for LO/TO Installation ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification					25. Verification required for LO/TO Removal ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification			
17. Verification Determination Approved by FOD/Designee (signature)		Z#	Date		26. Verification Determination Approved by	Z#	Date	
18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
23. LO/TO Points Positioned and First Lock installed by Signature		Z#	Date		31. LO/TO Removed, Positioned and Verified by Signature	Z#	Date	

Attachment B, LO/TO Orders

Attachment B, LO/TO Orders (Cont.)		
1. Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Record #	3. Date:

32. Zero Energy Checks have been completed ☐ Yes ☐ No	33. Completed by Signature	Z#	Date

Section 3: Lead Authorized Worker and Authorized Workers (anyone applying a lock for this activity)

34. Authorized Workers Name(s)	Z#	35. Date workers lock is hung	36. Date workers lock is removed
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Section 4: Return of Lock(s)/Tag(s) and Locking Devices

All Lock(s)/Tag(s) and Locking Devices have been removed and returned to the Lock Coordinator or Designee

37. Signature of Lock Coordinator or Designee	Z#	Date

*If you have questions with regards to filling out the Attachment B, LO/TO Orders form, see the directions associated with the form.

*Take the completed forms back to the Lock Coordinator or Designee for closeout.

Attachment B, LO/TO Orders

Continuation Page (print as needed)

18. Specific Energy Isolation Device/ID	19. Location of locking Device	20. LO/TO Installation Sequence	21. Required Position/Alignment for LO/TO	22. LO/TO Installation verified By:	27. Required Position/Alignment following Removal	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
23. LO/TO Points Positioned and First Lock installed by Signature		Z#	Date		31. LO/TO Removed, Positioned and Verified by Signature		Z#	Date

Attachment B, LO/TO Orders

The following are directions for filling out Attachment B.

1. Enter the Work Document Number, this will be the number from the IWD or the procedure number (i.e., TA88-DOP-0001)
2. Enter the LO/TO Parent Record number, this is obtained from the Lock Coordinator when the HEC lock(s) are issued. The Remedy LO/TO database issues this number.
3. Enter the date of when the locks will be applied.
4. Enter the TA where the lock(s) will be hung.
5. Enter the Building number of where the lock(s) will be hung.
6. Enter the Room number where the equipment is located/where work is being performed.
7. Enter the Equipment/Machinery/Name/Number (example, HVA-001)
8. Write a brief description of the reason for LO/TO (example, Removing and replacing belts)
9. Enter the Name of the Equipment Owner/Operator. Each FOD is different in the assigning of Equipment Owner/Operators. There are also programmatic Equipment Owner/Operators.
10. Check the appropriate energy type to be isolated, check all that apply. Make sure you have considered all energy sources, if other you will need to specify what "other" is.
11. Check applicable box to identify if a group LO/TO (A LO/TO where two or more authorized workers, regardless of their occupation or craft, lock out and tag out the same equipment to perform servicing or maintenance).
12. Check applicable box if lock box is used for the job. Enter the lock box ID#. Each organization that issues locks will be required to uniquely number and track lock boxes in their possession.
13. When installing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are to be positioned. If a specific sequence must be followed, THEN number the sequence order in column 20. If there is not a specific sequence to follow then place N/A in column 20. This needs to be an operations type person (Operator) who understands the equipment/system/component.
14. When removing the lock(s)/tag(s), is there a specific sequence in which the isolation devices are positioned after lock/tag removal? If a specific sequence must be followed, THEN number the sequence order in column 28. If not, place N/A in the box(s).

NOTE: Section 2, LO/TO Installation & Removal – In some of the nuclear facilities, the operations personnel will identify the required position(s) for credited equipment/machinery depending on operational requirements for return to service. In most cases when workers remove locks, the "As-Left" Position will be different then the final position the operations personnel will place the equipment in.

15. The Equipment Owner/Operator signs and enters their Z#, authorizing the installation of the LO/TO. With some FODs this will be the maintenance coordinators.
16. Is verification required for this LO/TO. Determine if this is Peer Verification (see P101-3, Section 3.15) or Concurrent Dual verification (see P315, Attachment 10, Section 10.3.6), or Independent Verification. For Independent Verification see P315, Attachment 10, Independent Verification, The Operations Manager (OM) prepares and maintains a facility-specific list of systems and components requiring Independent Verification.

Attachment B, LO/TO Orders

17. The FOD/Designee must sign after determining if verification is required. If Independent Verifier is identified at this time then it must be entered into the Remedy database.
18. Enter the specific Energy isolation device/ID, (example, MCC-A, A4)
19. Location of locking device, this is the location of where the lock is applied (example, MCC-A, A4 TA-XX, Bld. XXX, rm. 123)
20. If the LO/TO needs to be installed in a particular order, number the order in which the locks need to be installed. If the "No" box is checked in #13, then place N/A in this column.
21. Required Position/alignment for LO/TO, open, closed, connected, disconnected, on, off, etc.
22. LO/TO installation verified by – Has the equipment /system/component being locked out, been identified by the FOD as requiring verification, see #16. If verification is required the person who performed the verification initials here.
23. The Lead Authorized worker positions the LO/TO points and installs his/her lock and signs that this has been completed.
24. This is the person, who authorized the LO/TO to be removed, signs and places his/her Z# in this box. This signature authority may place a phone number here for the Lead Authorized worker to call for authorization to remove the LO/TO. When verbal authorization is given, it must be documented in this section. Example: John Smith per telecom, 8/13/14 and your initials. Note: It is also permissible to pre-authorize the removal of the lock by pre-signing.
25. Depending on the verification type required for LO/TO removal, check the appropriate verification type box, otherwise check the "No" box.
26. If verification is required, the FOD/Designee must sign. Independent Verifier is identified at this time and entered into the database.
27. Write the required position/alignment the system/component will be placed in following the removal of the lock(s).
28. If the isolation device needs to be positioned in a particular order/sequence, (per Post Maintenance) number the order/sequence in which the isolation device is to be position. If not, place N/A in the box(s).
29. LO/TO removal verified by Lead Authorized Worker – the lock(s) have been removed and the As-Left position is documented in column 30.
30. Enter the As-Left Position.
31. If the removal of the lock has been identified as needing to be verified, the verifier writes name and Z# after verifying the lock has been removed.
32. The authorized worker must verify that the steps utilized in the energy control procedure have effectively isolated the machine or equipment from the hazardous energy.
33. The authorized worker signs after zero energy checks have been completed.
34. All authorized workers applying a lock for this activity names/Z# and the Date must be entered.
35. Enter the date the authorized worker hangs lock.
36. Enter the date the authorized worker removes lock.
37. The Lock Coordinator or designee signs once locks, tags, and locking devices have been removed and returned. If a lock and/or tag are found to be contaminated then that will be noted by the Lock Coordinator or designee and the Lock Coordinator or designee will sign.

Form 2101

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: _____ Revision #: _____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas. No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: ____ Revision #: ____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee. If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=LM, email=pfc@lanl.gov, c=US Date: 2017.06.26 11:53:41 -06'00'

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY EST.1943

AP-WORK-004: Attachment 1 Maintenance & Site Services Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

Topic	Completed (X)
What permits, permissions, or support are required to safely start this work?	✓
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	✓
What can cause us to go beyond the scope of the work?	✓
What hazards in the work area may not have been considered during planning of this job?	✓

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
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TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

1.0 Work Scope

This work order task will cover the moderate hazard maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

2.1 Entry Conditions

- PAUSE/STOP WORK if steps cannot be completed as described, or if unforeseen situations occur. Stabilize the situation if safe, contact your supervisor or Person-In-Charge (PIC), and await further instructions before proceeding
- Ensure activity is on appropriate Plan(s) of the Day
- Check-in with ops prior to performing work
- Steps in this procedure may be worked out of sequence as directed by supervisor/PIC
- Ensure permits required for the work have been approved and posted, as required
- PIC will be available while work is being conducted
- PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers
- All hold points will be discussed on a daily basis
- Verify all identified hazards have been eliminated, mitigated or minimized

(HAZARD ANALYSIS performed by Robert Simpson, art sparks– 9/9/2015)

2.2 Electrical

- Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.

2.3 Mechanical

- Ensure all guards are in place before accessing equipment.
- Relieve all stored energy before performing maintenance activities.

AP-WORK-002: Attachment 15
FORM 2100-WC

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2.4 Pneumatic
- Relieve all stored pressure.
- Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.

2.5 Elevated Work
- Ensure all scaffolding/ladders are inspected daily before use.
- Utilize fall protection equipment when required with approved tie-off points.
- Maintain 3-points of contact when utilizing a ladder
- Ensure ladder is properly oriented to work
- Scaffolding shall be erected and inspected by a competent person only

2.6 Hot Surfaces
- Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
- Utilize insulating blankets to protect against hot surfaces.

2.7 Welding, Grinding / Torch Cutting
- Use appropriate welding procedure checklist
- Keep combustible materials clear or protect surrounding
- Wear welding hood with appropriate lens for welding operation performed. Wear welding gloves.
- Ensure adequate ventilation or use welding fume extractor
- Spark and flame permit required

2.8 Chemical
- Consult IH&S for PPE requirements
- Place a catch pan under chemical and collect all residual chemicals.
- Review and follow the safety data sheets for all chemical and oil products.
- An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
- Wear chemical goggles for liquids
- PPE must be worn completely and properly

2.9 Slip, Trip & Fall:
- Be aware of ground and floor conditions

2.10 Back Strains
- Use proper lifting and bending technique at all times

2.11 Simple Hand Tools, Cuts & Abrasions:
- Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
- Use of cordless power tools, power tools-electric shock.
- Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.

2.12 Pinching or Crushing
- Do not place body parts in the path of potential pinch points or crush points
- Hand / foot / body position awareness
- Be aware of line of fire

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2.13 Asbestos Abatement Pipe and Equipment Insulation:

- Reference MSS Procedure 41-55-001-R1
- Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
- Two person rule is required during abatement
- Personal air monitoring will be required.
- Full face APR with P100 cartridges.
- Wear Tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
- Wear nitrile gloves and/or leather gloves
- HEPA vacuum debris.
- Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
- All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.

2.14 LO/TO:

- Utilize LO/TO Attachment
- Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.

2.15 230V to 1000V Zero Voltage check requirements:

- Mode "1" Class 1.3 a,b
- Wear CAL 8+ PPE: Double-Layer switching hood.
- Class 0 Dielectric Gloves.
- AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
- 2-man rule applies.
- Use NRTL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

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2.16 50V to 230V Zero Voltage check requirements:

- Mode "1, Class 1.2 a,b
- Use NRTL approved calibrated voltage meter. Test meter on a known live circuit before and after zero voltage verification.
- Class "0" Dielectric Gloves
- AR clothing, minimum arc-rating of 4 cal for voltage of < 230 V (long sleeve shirt & pants of non-melting fabric **or** coveralls, face shield)
- AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

2.17 Cone of Safety Identification:

- The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
- Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
- Ensure lift plan is completed for all critical lifts.

2.18 General PPE Requirements for working within the Power Plant Complex:

- Safety shoes
- Safety glasses with side shields
- Hard hat
- Reflective Safety Vest
- Leather work gloves
- Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach
50-300	3'-6"	Avoid Contact
301-750	3'-6"	1'-0"

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3.0 Training Requirements

3.1 MSS Maintenance Worker, TP 10968

3.2 LO/TO, TP 127

3.3 Electrical Worker Training, Curriculum 642

3.4 Stationary Equipment Mechanics, Curriculum 630

3.5 Sheet metal Workers, Curriculum 649

3.6 Pipefitters, Curriculum 647

3.7 Carpenters, Curriculum 641

3.8 Insulators, Curriculum 643

3.9 Power Plant Operators, Curriculum 632

3.10 Confined space entry, supervisor and attendant (for entry)

3.11 Training to work with Cranes and Rigging:

- Incidental Crane Classroom course # 20295
- Incidental Crane Exam # 20296

3.12 Site Specific Training (one-time requirement)

4.0 Work Execution

4.1 **Notes**

- Following system conditions are configuration and conditions which have been anticipated for performance of PM activities covered under this IWD:
  - Electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and electrical system lineup is considered to be in a normal configuration.
  - Steam plant may either be in shutdown, standby or normal operation configuration. Mechanical components are under control of steam plant operations personnel and no major upset conditions or unanticipated outages are present within facility.
  - Power Plant operations personnel are manned to required level and sufficient support is available to support performance of maintenance activity.

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TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

- Permits required for this work: LO/TO Attachment, confined space.
- LO/TO devices shall be applied in accordance with P101-3. "Lockout/Tagout for Hazardous Energy Control"
- Discuss emergency evacuation procedures and muster areas
- Discuss possible error situations and mitigations

4.2 **Prerequisites**

- VERIFY pre-job briefing has been performed for all affected personnel including 2101 hazards

PIC : _____ **Z#:** 177951 **Date:** 4.1.18

- VERIFY all personnel have the appropriate PPE for job execution
- BARRICADE work area to protect against inadvertent access
- USE robust barriers and flagging to clearly define execution area
- VERIFY all required permits are approved and posted as required
- REVIEW planned activity for Life Critical Steps (to be performed by the PIC/RLM):

HOLD

IF fall protection is to be used:

- VERIFY that a safety system is in place (where workers understand hazard controls and required PPE) at work site.
- VERIFY workers understand fall protection plan

PIC : N/A **Z#:** _____ **Date:** _____

HOLD

IF aerial platform/lift is to be used:

- VERIFY a clear travel path with all necessary clearances is defined and adequate
- VERIFY geographic terrain will support execution of activity
- VERIFY identification of all energized electrical systems, structure and components has occurred and their impact to activity has been accounted for and communicated to workers
- VERIFY all personnel are qualified to operate aerial lift device assigned to activity.

PIC : N/A **Z#:** _____ **Date:** _____

Confined Spaces: Complete confined space permit per the CSP evaluation.
Perform ventilation and air monitoring according to the evaluation.
Set up non-entry rescue equipment if required by the evaluation.
Contact pest control, as required to remove rodents and droppings.
Pest control to use 10% bleach solution and full face respirator.

AP-WORK-002: Attachment 15
FORM 2100-WC

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TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

4.3 **Execution**

1. **ERECT/DISMATLE** scaffolding as needed to access work area
   - INSPECT scaffold daily by competent person only
   - WEAR hard hats when working on / near scaffold
2. **PERFORM** LO/TO when required to perform maintenance

HOLD

VFD: (VFD)'s accounted for with zero Voltage readings. RO 5240725 4/18/18

- **VERIFY** there is not a VFD within this system. This IWD does NOT account for any stored energy that could be present in a VFD.
- **IF** VFD is present or found within system to be worked. DO NOT proceed with any work until UI Engineering has given approval to do so.

OK to Proceed:

PIC :_____ **Z#:**_____ **Date:**_____

3. **PERFORM** zero voltage checks for maintenance involving electrical work.
4. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
5. **PERFORM** maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in work order task instructions when applicable. Utilize master work order equipment list when performing maintenance.
6. **REMOVE** all LO/TO
7. **REMOVE** posting or signs
8. **OPERATIONS** acknowledges work is complete and ready to place into service

Operations: Carlos Chacon **Z#:** 120931 **Date:** 4-26-18

9. **CLEAN** up work area and properly dispose of all waste
   - SEGREGATE waste as required by WMC.

5.0 Close Out

5.1 Contact OMC (MC) and inform them work is complete.

5.2 Complete all required documentation and return Work Package

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FORM 2100-WC

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Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)

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TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

***Insert Rows above** for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.*	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	**RLM** (Signature/Z#/Date) **Required** Kevin M Graham 105008 4/11/16 **FOD or Representative** (Signature/Z#/Date) **Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca DN: cn=Pablo F. CdeVaca, o=LANS, ou=UI, email=pfc@lanl.gov, c=US Location: TA-03 SM-0022 Room 114 Date: 2016.04.12 10:08:25 -06'00' **SME Review** (Signature/Z#/Date) **If Required** N/A **ESO Review** (Signature/Z#/Date) **If Required** 190622 4/11/16 **ESH Safety Review** (Signature/Z#/Date) 153338 4/7/16 **Peer RLM /Work Execution Manager/Maintenance Manager** (Signature/Z#/Date) **Required** Robert Simpson 240725 4/15/16

IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval Change in scope or additional hazards identified (Print) Name of Primary PIC Carlos Chacon Name of Alternate PIC Greg Donnelly Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

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TA: 03	Building: 0022	Room:	Additional Location Description:

1.0 Work Scope:

This work order task will cover the moderate hazard preventive maintenance within the Power Plant Complex. All work will be performed in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. This IWD is considered the controlling document for the work being covered.

2.0 Hazard Identification and Mitigation

(HAZARD ANALYSIS performed by Robert Simpson, Kedrick Mendez– 9/9/2015)

1. Entry conditions:
   - Ensure that the activity is on the Plan of the Day.
   - If steps cannot be completed as described, or if unforeseen situations occur, PAUSE/STOP WORK, stabilize the situation, contact your supervisor or the Person-In-Charge (PIC), and await further instructions before proceeding.
   - Certain steps in the procedure may be worked out of sequence as directed by the supervisor.
   - The permits and work packages required for the project have been approved and are posted, as required.
   - The PIC will be available while work is being conducted.
   - PIC will review site specific hazards noted on IWD Part 2, Form 2101 with all workers.
   - All hold points will be discussed on a daily basis.
- Controls needed to perform the work are identified in this IWD.
2. Electrical Hazards:
   - Arc Flash: Follow PPE requirements and barricade area in accordance with the arc flash label for the specified equipment.
3. Mechanical Hazards:
   - Ensure all guards are in place before accessing equipment.
   - Relieve all stored energy before performing maintenance activities.
4. Pneumatic Hazards:
   - Relieve all stored pressure.
   - Ensure all fittings and hoses are inspected prior to use. Utilize safety devices on the fittings.
5. Elevated Work:
   - Ensure all scaffolding is inspected daily before use.
   - Utilize fall protection equipment when required with approved tie-off points.
   - Maintain 3-points of contact when utilizing a ladder.
6. Hot Surfaces:
   - Wear long sleeve shirts or Ansell sleeves when working near hot surfaces.
   - Utilize insulating blankets to protect against hot surfaces.

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7. Chemical Hazards:
   - Consult IH&S for PPE requirements.
   - Place a catch pan under chemical and collect all residual chemicals. Deposit chemical in the day tank.
   - Review the safety data sheets for all chemical and oil products.
   - An eyewash station and safety shower must be within 10 seconds of where the chemicals are being used. Verify eyewash and safety shower have a current inspection.
8. Slips, Trips and Falls:
   - Be aware of ground and floor conditions
9. Back strains
   - Use proper lifting and bending technique at all times
10. Working with simple hand tools, cuts and abrasions:
    - Inspect all tools prior to use, wear proper work gloves as determined by the job scope.
    - Use of cordless power tools, power tools-electric shock.
    - Use all tools properly and to safety standards. Inspect cords / batteries prior to use. GFCI protection required.
11. Pinching or crushing/hand injury:
    - Do not place hands in the path of potential pinch points or crush points
    - Hand/foot/ body position awareness
12. Asbestos Abatement Pipe and Equipment Insulation:
    - Reference MSS Procedure 41-55-001-R1
    - Area regulated to OSHA standards(29CFR1926.1101(e) and paragraph (j) decontamination area
    - Two person rule is required during abatement
    - Personal air monitoring will be required.
    - Full face APR with P100 cartridges.
    - Wear tyvek coveralls with booties and hood, protection with full body coverage from head to toe.
    - Wear nitrile gloves and/or leather gloves
    - HEPA vacuum debris.
    - Asbestos will be removed using hand tools and wet methods using amended wetting solution and wipes.
    - All asbestos wastes must be kept damp enough during handling and disposal operations to prevent fibers from becoming airborne, but must not have any free liquid present during transportation.
13. LO/TO:
    - Utilize LO/TO Attachment "B"
    - Wear Untreated Natural Fiber Shirt (long sleeve), Pants (long), Safety glasses or safety goggles, Hearing protection (ear canal inserts) and Leather gloves.
14. 240V to 600V Zero Voltage check requirements:
    - Mode "1"
    - Wear CAL 8+ PPE: Double-Layer switching hood.
    - Class 0 Dielectric Gloves.
    - AR coveralls (with an arc rating of 8 or more), hardhat, and safety glasses underneath hood.
    - 2-man rule applies.
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage

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verification.
- No metallic objects worn.
- Voltage rated test equipment.
- Ensure no un-insulated body part enters prohibited space.
- Voltage rated tools.

15. Less than 240V Zero Voltage check requirements:
    - Mode "1"
    - Use UL approved voltage meter. Test meter on a known live circuit before and after zero voltage verification.
    - Class "0" Dielectric Gloves
    - AR clothing, minimum arc-rating of 4 cal for voltage of < 240 V (long sleeve shirt, pants or coveralls, face shield)
    - AR Protective Equipment (hard hat, safety glasses or safety goggles, hearing protection).
    - No metallic objects worn.
    - Voltage rated test equipment.
    - Ensure no un-insulated body part enters prohibited space.
    - Voltage rated tools.
16. Cone of Safety Identification:
    - The Cone of Safety as defined P101-25.0 Cranes, Hoists, Lifting Devices, and Rigging Equipment shall be identified.
    - Time/distance requirements shall be assured by the LANS Hoisting/Rigging Supervisor throughout all lifts.
    - Ensure lift plan is completed for all critical lifts.
17. General PPE Requirements for working within the Power Plant Complex:
    - Safety shoes
    - Safety glasses with side shields
    - Hard hat
    - Reflective Safety Vest
    - Leather work gloves
    - Hearing Protection at all times within the Power Plant. A noise evaluation shall be made by a safety engineer for other work as required.

Approach Boundaries

Voltage (VAC)	Limited Approach	Restricted Approach	Prohibited Approach
50-300	3'6"	Avoid Contact	Avoid Contact
301-750	3'6"	1'0"	0'1"

3.0 Training Requirements

- MSS Maintenance Worker, TP 10968
- LO/TO, TP 127
- Electrical Worker Training, Curriculum 642

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TA: 03	Building: 0022	Room:	Additional Location Description:

- Stationary Equipment Mechanics, Curriculum 630
- Sheet metal Workers, Curriculum 649
- Pipefitters, Curriculum 647
- Carpenters, Curriculum 641
- Insulators, Curriculum 643
- Power Plant Operators, Curriculum 632
- Training to work with Cranes and Rigging:
  - Incidental Crane Classroom course # 20295
  - Incidental Crane Exam # 20296
- Site Specific Training (one-time requirement)

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TA: 03	Building: 0022	Room:	Additional Location Description:

4.0 Work Execution

1.

2. The following system conditions are the configuration and conditions which have been anticipated for performance of the PM activities covered under this standing IWD:

   a. The electrical power systems are in a configuration which will support nominal steam plant operations. No major disruptions or outages are present and the electrical system lineup is considered to be in a normal configuration.

   b. The steam plant may be either in a shutdown, standby or normal operation configuration. The mechanical components are under the control of the steam plant operations personnel and no major upset conditions or unanticipated outages are present within the facility.

   c. The Power Plant operational personnel are manned to the required level and sufficient support is available to support the performance of the preventive maintenance activity.

3. Prerequisites:

   a. **REVIEW** work package for Life Critical Steps (to be performed by the PIC/RLM).

      I. **Fall Protection:**
      - Verify that a safety system is in place (where workers understand hazard controls and required PPE) at the work site.
      - Verify that workers understand the fall protection plan.

      II. **Elevated Work Platforms:**
      - Verify a clear travel path with all necessary clearances has been defined and is adequate.
      - Verify the geographic terrain will support execution of the desired activity.
      - Verify the identification of all energized electrical Systems, structure and components has occurred and their impact to the activity has been accounted for and communicated to the workers.
      - Verify all personnel are qualified to operate the aerial lift device assigned to the activity.

   b. **INSERT** Life Critical Step hold points into the work package.

   c. **VERIFY** a daily pre-job brief has been performed with the 5 mandatory questions and 2101has been read for site hazards and entry requirements. With all affected personnel. Perform a reverse pre-job brief and encourage all craft workers to stay involved.

   d. **VERIFY** all personnel have appropriate PPE for job execution.

   e. **BARRICADE** the work area in accordance with MSS-Guide-038 to protect tenants/unexpected personnel/or traffic as directed by the Supervisor or PIC. Clearly identify work zone due to look-alike equipment.

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TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

Execution

4. **PERFORM** LO/TO, when required to perform preventive maintenance.
5. **PERFORM** zero voltage checks for maintenance involving electrical work.
6. **PERFORM** zero energy checks for mechanical maintenance. Relieve stored energy.
7. **PERFORM** preventive maintenance in accordance with work order title and task instructions. UI Procedures will be referenced in the work order task instructions when applicable. Utilize the master work order equipment list when performing preventive maintenance.
8. **REMOVE** all LO/TO.
9. **REMOVE** posting or signs.
10. **CLEAN** up work area and properly dispose of all waste.
11. **COMPLETE** all documentation.

5.0 Close Out

1. Complete closeout of the work activity in accordance with AP-WORK requirements.

Insert Rows above for additional Tasks/Steps or attach pages to clearly communicate ESH&Q/S&S hazards and associated controls.	The RLM and FOD or FOD Representative (if required or Recommended by RLM, e.g. high hazard) approval indicates IWM has been applied appropriately, work is authorized , workers are qualified, work will be performed in accordance with ESH&Q/S&S requirements and the IWD, and facility safety	**RLM** (Signature/Z#/Date) **Required** 190429 7-11-17 **FOD or Representative** (Signature/Z#/Date) **Required** 090206 7-12-17 **IH&S Review** (Signature/Z#/Date) 7/10/17

AP-WORK-002: Attachment 15
FORM 2100-WC

Los Alamos NATIONAL LABORATORY	Facilities Maintenance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0			**Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD**
Work Document #: (WO # / Task			**Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16**
TA: 03	**Building: 0022**	**Room:**	**Additional Location Description:**

	basis, aggregate hazards, and collocated hazards were appropriately included in the hazard analysis and acknowledges completion of a peer review	**SME Review** (Signature/Z#/Date) **If Required** Not Required **ESO Review** (Signature/Z#/Date) **If Required**
IWD Type ☒ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required_____ Other Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC _____ Name of Alternate PIC_____ Name of Alternate PIC_____	Classification review completed, if required. N/A Reviewer Signature/Z#/Date

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 05/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00605131 01

MASTER

Date: 02/15/2018

Work Order Task Written To

Facility : F08 **Unit** : **Op Sys** :
Room : **Area** : **Sys/Cls** :
Equipment : **Component** :
Location :
Job Type : PM
Tag 1 : **Tag 2** :
Work Item : TA03-0022 FGR **Ops Review Reqd** :

Authorization

Start Permission : Herman Madrid Jr **Start Date** : 4-27-2018
Complete Notice : Herman Madrid Jr **Complete Date** : 5-10-2018

Work Order Task Instructions

DO NOT lubricate the bearings if the FGR fan is NOT in operation or in service so that proper amount of grease can be applied
using headphones
You can hear when grease reaches the bearing rolling element. At this point, stop adding grease to prevent bearing damage from overheating

There are two bearings on the fan, each with its own zerk plug
Remove the shaft guard located in the middle of the drive. The two zerk plugs are located on each of the two bearings

1. Use grease gun with the Ultralube headphones to insert the correct amount of Mobilith SHC 100 grease into zerk fitting
b. Apply grease while fan is running and stop when you hear the grease enter the running bearing

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 05/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00605131 01

MASTER

Date: 02/15/2018

Lubricated fan bearings on FGR-001,FGR-002 & FGR-003

4. Add grease with a hand-operated pressure gun until new grease enters the running bearing
a. This is accomplished by using the ultrasonic sensor and headphones to hear when the new grease enters the running bearing
b. Stop adding grease when the grease reaches the bearing to limit excess grease from migrating down the motor shaft and into the windings
Note: Be careful when greasing the fan end bearing of the TEFC (Totally (Totally Enclosed Fan Cooled) motors. Some motors have a spring-relief outlet grease fitting on the fan end that is not accessible. This spring-relief fitting normally does not have to be removed when regreasing. When greasing, take care in the amount of pressure you apply and verify relief is working
5. Putting in too much or too little grease can cause overheating of the motors and result in motor failure. Use this rule of thumb when adding grease to a motor that has been lubricated on a regular basis: It is better to use a little grease more often than a lot of grease less often
Note: Watch out for motors that were shipped only with the bearings packed and not the fill tube or even the bearing housing Apply new grease until you can hear it enter the running bearing
6. Now that greasing is complete, leave the relief plug off and run the motor for 10 minutes to expel any excess grease
7. Replace the drain plug and wipe the bearing housing clean
8. Dispose of dirty rags in accordance with Hazardous Waste Guidelines
9. Ensure correct operation of electric motors.

QC Requirements / Comments

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 05/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00605131 01

MASTER

Date: 02/15/2018

Work Completion Signatures

Name	Function/Dept.	Date
Chris Salazar	LOG-CS/PP MAINT....	05/01/2018

Comments

(rework?)

Cost Accounting

Cost Center : P2030A **Activity** : 640CL000

Percentage : 100 **Acct No** : XU5000 **Sub Acct** : 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 05/31/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00605131 01

MASTER

Date: 02/15/2018

Form 2101

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No./Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name Pablo C de Vaca	Phone 699-8226	Pager N/A	Email pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS. POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas.No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: ____ Revision #: ____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process. For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment.	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee . If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System.	Site Specific Training video. Electrical Safety LOTO if applicable to task.
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca

Date Approval Expires: 09/30/2020

Los Alamos NATIONAL LABORATORY EST. 1943

AP-WORK-004: Attachment 1 Maintenance & Site Services Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

5/1/18

Topic FGR BEARINGS LUBRICATE	Completed (X)
What permits, permissions, or support are required to safely start this work?	X
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	X
What can cause us to go beyond the scope of the work?	X
What hazards in the work area may not have been considered during planning of this job?	X

Pre job by [signature] 171769
Given to: C. [signature] 202897
J. [signature] 217801

Facility : F08 **Unit :** **Proj :**
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group :** UTIL **Task Priority :** 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date :** 06/30/2018
Superintendant :
Hazard : LOW **IWD Reqmt :** N/A LOW HZRD

Work Order Task

00607483 01

MASTER

Date: 03/07/2018

Work Order Task Written To

Facility : F08 **Unit :** **Op Sys :**
Room : **Area :** **Sys/Cls :**
Equipment : **Component :**
Location :
Job Type : PM
Tag 1 : **Tag 2 :**
Work Item : TA03-0022 FGR **Ops Review Reqd :**

Authorization

Start Permission : Glenn martinez **Start Date :** 5-24-18
Complete Notice : Glenn Martinez **Complete Date :** 6-7-18

Work Order Task Instructions

DO NOT lubricate the bearings if the FGR fan is NOT in operation or in service so that proper amount of grease can be applied
using headphones
You can hear when grease reaches the bearing rolling element. At this point, stop adding grease to prevent bearing damage from overheating

There are two bearings on the fan, each with its own zerk plug
Remove the shaft guard located in the middle of the drive. The two zerk plugs are located on each of the two bearings

1. Use grease gun with the Ultralube headphones to insert the correct amount of Mobilith SHC 100 grease into zerk fitting
b. Apply grease while fan is running and stop when you hear the grease enter the running bearing

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 06/30/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00607483 01

MASTER

Date: 03/07/2018

Lubricated fan bearings on FGR-001,FGR-002 & FGR-003

4. Add grease with a hand-operated pressure gun until new grease enters the running bearing
a. This is accomplished by using the ultrasonic sensor and headphones to hear when the new grease enters the running bearing
b. Stop adding grease when the grease reaches the bearing to limit excess grease from migrating down the motor shaft and into the windings
Note: Be careful when greasing the fan end bearing of the TEFC (Totally (Totally Enclosed Fan Cooled) motors. Some motors have a spring-relief outlet grease fitting on the fan end that is not accessible. This spring-relief fitting normally does not have to be removed when regreasing. When greasing, take care in the amount of pressure you apply and verify relief is working
5. Putting in too much or too little grease can cause overheating of the motors and result in motor failure. Use this rule of thumb when adding grease to a motor that has been lubricated on a regular basis:
It is better to use a little grease more often than a lot of grease less often
Note: Watch out for motors that were shipped only with the bearings packed and not the fill tube or even the bearing housing
Apply new grease until you can hear it enter the running bearing
6. Now that greasing is complete, leave the relief plug off and run the motor for 10 minutes to expel any excess grease
7. Replace the drain plug and wipe the bearing housing clean
8. Dispose of dirty rags in accordance with Hazardous Waste Guidelines
9. Ensure correct operation of electric motors.

QC Requirements / Comments

Facility : F08 **Unit :** **Proj :**
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group :** UTIL **Task Priority :** 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date :** 06/30/2018
Superintendant :
Hazard : LOW **IWD Reqmt :** N/A LOW HZRD

Work Order Task

00607483 01

MASTER

Date: 03/07/2018

Work Completion Signatures

Name	Function/Dept.	Date
John M. Miller	Maint.Foreman/LOG-CS	6/4/18

Comments

(rework?)

Cost Accounting

Cost Center : P2030A **Activity :** 640CL000

Percentage : 100 **Acct No :** XU5000 **Sub Acct :** 7E2P0000

Facility : F08 **Unit** : **Proj** :
Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
W/O Type : PM **W/O Group** : UTIL **Task Priority** : 4
Planner : 189099 LOPEZ THERESA M
W/O Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE
Written To : TA03-0022 FAN, FLUE GAS RECIRCULING (FGR-001, FGR-002, FGR-003)
Task Dspln : **Due Date** : 06/30/2018
Superintendant :
Hazard : LOW **IWD Reqmt** : N/A LOW HZRD

Work Order Task

00607483 01

MASTER

Date: 03/07/2018

Los Alamos NATIONAL LABORATORY EST.1943

AP-WORK-004: Attachment 1
Maintenance & Site Services
Worker Engagement Questions

Worker engagement questions are intended to focus attention on the task and ensure uncertainties are addressed. Examples of worker engagement questions are provided below. Worker engagement questions should be tailored to the situation.

Each of the questions listed below will be discussed at each Pre-Job Brief with all affected personnel.

6/4/2018

Topic: 1MO. FGR Fan Shaft Lubrication	Completed (X)
What permits, permissions, or support are required to safely start this work?	X
What is the most likely thing that could go wrong (not the worst thing) and what, specifically, will prevent it?	X
What can cause us to go beyond the scope of the work?	X
What hazards in the work area may not have been considered during planning of this job?	X

Form 2101

Los Alamos NATIONAL LABORATORY EST.1943

Integrated Work Document (IWD) Part 2, FOD Requirements and Approval for Entry and Area Hazards and Controls

Non-Tenant Activity Form

IWD No /Work Request No: ____ Revision #: ____

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S) hazards and controls associated with the activity location.

FOD	TA	Bldg	Room	Other Location
8	3	22	N/A	Power Plant Bldg - Inside
FOD Designated Facility Point-of-Contact	Name: Pablo C de Vaca	Phone: 699-8226	Pager: N/A	Email: pfc@lanl.gov

Entry and Coordination Requirements (*Check one or more of the following*)

- ☐ No Entry/Coordination Requirements
- ☒ Plan of the Day/Plan of the Week (POTD/POTW)
- ☒ Security Clearance Requirements
- ☐ Co-located Hazards/Concerns
- ☒ Check out at End of Work
- ☐ Escort Required
- ☐ Other Bounding Conditions:
- ☐ FOD-designated facility Point-of-Contact must sign IWD Part 3
- ☒ Check in at Start of Work
- ☒ Work must be Scheduled
- ☐ Other Security Requirements (ex : Cellphone, No Foreign Nationals, etc.)
- ☐ Quality Issues
- ☐ Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
- ☒ Work-Area Training Required
- ☒ Check in Daily
- ☒ Check out Daily

PIC is responsible to conduct a pre-job brief for work activities to ensure that work conditions and worker communications are adequate. A pre job briefing shall be conducted at the job site. UI-OPS will determine if onsite ESH representation is required during work activities

Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)

All work must be approved by the Utilities FOD or UI-OPS POD/POTW-contact Facility POC. No Smoking around Natural Gas Systems. Evaluate inside floor and housekeeping conditions to safely proceed with activities. Check in with Plant Operations Manager/Specialist or Operations Shift Head for final approval to proceed with tasks. Work around power plant chemical pumps and lines. Inspect for leaks before beginning any work task and pause work and report if a leak is found to operations. All personnel entering area must view the site specific training video in room 116 (Boiler Control Room), one time requirement. Observe safety signs and floor markings in all buildings and areas. No safety shoes required for visitors if escorted by Operations or UI Engineering personnel. The West end front lobby and office areas of Bldg 22 are considered a no hazard area.

Instructions: In the block below, identify work-area hazards that could potentially affect the worker(s) or others. Specify the facility controls and preventive measures that must be implemented by the worker(s) to protect against the site hazards as well as any special training required.

ESH/S&S WORK AREA HAZARDS & CONTROLS

Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
☐ **No Work Area Hazards**				

Ionizing Radiation Work in posted radiological areas, work with radioactive materials, or work on or near radiation producing devices. **Specify Hazard:**	☐ Yes ☒ No			

IWD No./Work Request No: _____ Revision #: _____

ESH/S&S WORK AREA HAZARDS & CONTROLS				
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	**Work Area Hazard Present**	**Facility Controls/ Preventive Measures/ Bounding Conditions** Specify preventive measures, controls and bounding conditions for each site hazard	**Reference Documents** List permits, operating manuals, and other reference procedures	**Training and Qualification** List training requirements (P300, Integretated Work Management, Section 6.1)
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. **Specify Hazards:**	☒ Yes ☐ No	Required PPE: Hard hat, safety shoes, safety glasses. Hearing protection (noise > 85 dba). Avoid hot surfaces and piping. Long sleeve shirt or Ansell sleeves or coveralls. Gloves when operating valves or contacting pipe/fitting openings where there is potential for hot water/steam release. Be aware of encapsulated asbestos. Follow LANL Asbestos program/rqmts if PACM identified outside containment. Be aware of chemical containers and check labeling. Be aware of piping, associated systems for any leaks. If chemical leak is noticed contact operations manager, IH&S Rep during regular working hrs. Over100 gallons of a chemical spill leave area, and control	P101-6 PPE • P101-23 Asbestos • P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

		access. Call Serf Operators 667-8982 or by Radio Lanl 2 Util 6 For mitigation cleanup process For after-hours contact the UI Duty Officer, 699-7452 to re-assess any abnormal situation		
Energized and Operative Systems Working near energized electrical parts, pressure systems, steam lines; near unprotected belts, pulleys, chains or rotating equipment; fuel fired equipment other than vehicles; or spark or flame producing operations. **Specify Hazards:** Energized/rotating equipment, High Temperature, High Pressure Water and Steam equipment	☒ Yes ☐ No	Stay within established walking areas. Observe safety signage alarm lights and horns. Identify explosive hazards and follow task specific IWD if working on plant equipment or components. Note: All TA3-22 independent verification requirement will be determined by the FOD or FOD designee. If questions consult with UI system engineer, Operation Mgr. Designee, or Safety rep.	P101-13 Electrical Safety P101-3 LOTO P101-34 Pressure, Vacuum, and Cryogenic System	Site Specific Training video. Electrical Safety LOTO if applicable to task
Confined Spaces Entry into tanks, manholes, cooling towers, sumps, or any other area with potentially low oxygen concentration or other hazards such as toxic vapors or engulfment. **Specify Hazards:**	☒ Yes ☐ No	Observe confined space signs or markings and follow LANL Confined Space Requirements if task requires confined space entry.	P 101-27 Conf. Space	Confined Space Training
Elevated Work Surface Elevated work when fall protection is not provided by conventional handrail systems or required per P101-20, *Fall Protection Program*	☒ Yes ☐ No	Stay within established walking areas, stairways and paths. Observe safety signage. Follow LANL Fall Protection Requirements if task on roofs or work above 4 feet.	P101-20 Fall Protection	Fall Protection
Environmental Impact Activities conducted in areas containing potential release site, contaminated soil, sensitive species, watercourse wetlands, floodplain, historical/archeological sites, or other work area condition that can be impacted by or can impact the environment.	☐ Yes ☒ No			

Specify Hazards:				
Security Requirements **Specify:**	☐ Yes ☒ No			
Other Hazards **Specify:** Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	☒ Yes ☒ No	Adequette barriers and controls will be established to prevent unauthorized personnel/workers from entering job site and encounter uncontrolled hazards.	IWD	Pre-job briefing emphasis. Worker confirmation of look-alike potential hazards, locations and barriers set in place to identify those potential hazards.

I have verified that the hazards identified above adequately identify the area hazards and that the IWM process has been applied appropriately.

FOD or Representative (Signature/Z #/Date) **Approval Required** Pablo F. CdeVaca Digitally signed by Pablo F. CdeVaca

Date Approval Expires: 09/30/2020

AI 856 | Los Alamos National Laboratory

LANL Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1 – June 30, 2018

Attachment A1307.H. – TA-3 Power Plant

Combustion Turbine Emission Stack Test Report

The most recent annual emission stack test for the TA-3 Combustion Turbine was conducted on December 16, 2014. An emission stack test is not required during this reporting period because the combustion turbine operated less than 25% of the monitoring period (January 1 – June 30, 2018).

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Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1 – June 30, 2018

Attachment A1407.A. – Open Burning

There was no open burning conducted during this reporting period.

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Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1 – June 30, 2018

Attachment A1507.A.a.

Evaporative Sprayers

Analytical Data for Basin Water

The monitoring requirement for analysis of the evaporative sprayer basin water is required to be completed every two years beginning no later than calendar year 2018. Water sampling is scheduled for summer 2018.

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Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1507.A.b

Evaporative Sprayers

Hours of Operation

2018 Operational Data for SERF Spray Evaporators - Data entry

	Evap Sprayer #1 (SN 0053)		Evap Sprayer #2 (SN 0054)		Evap Sprayer #3 (SN 0055)		Evap Sprayer 4 (not installed)	Evap Sprayer 5 (not installed)
	Hrs of Op	Gallons Sprayed	Hrs of Op	Gallons Sprayed	Hrs of Op	Gallons Sprayed		
Jan	311	112,174	296	70,408	-	-		
Feb	374	134,402	147	88,946	-	-		
Mar	536	193,376	304	109,614	-	-		
Apr	620	227,150	383	139,812	-	-		
May	704	267,490	442	168,198	-	-		
Jun	711	306,734	397	147,074				
Jul								
Aug								
Sep								
Oct								
Nov								
Dec								
Annual Totals	3,256	1,241,326	1,969	724,052	-	-		

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Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1–June 30, 2018

ATTACHMENT A1507.B.

Evaporative Sprayers

Work Practice Standards–Maintenance and Repair Requirements

UTILITIES AND INSTITUTIONAL FACILITIES

Los Alamos NATIONAL LABORATORY

UI-PROC-81-00-027-R1

Operations Procedure

SERF Sigma Basin SMI 120F Evaporator Inspections

Review frequency 1 yr ☐ 2 yr ☐ 3 yr ☒

Issue date 6/18/18 **Next review** 6/18/21

Process Owner

Jared Hornberger	SERF Lead Operator	
	Z-# 281223	Date 6/13/18

Reviewed by

Joshua Begay	SERF System Engineer	
	Z-# 304395	Date 6/13/2018

ESH Review

Russell Stone	ESH Manager	
	Z-# 117365	Date 6/14/2018

Approved by

Lawrence Chavez	Operations Manager	
	Z-# 186199 090208	Date 6-18-18

Derivative Classifier Review

Michael E. Gallegos	VERIFIED UNCLASSIFIED	
	~~Z-# 089711~~ 120179	Date 14 June 18

History of Revisions

Document Number	Issue Date	Action
UI-PROC-81-00-027-R1	6/18/18	Review and reissue. Minor changes.
UI-PROC-81-00-027-R0	06/01/18	New procedure.

Table of Contents

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Utilities & Institutional Facilities
Operations Procedure

SERF Sigma Basin SMI 120F Evaporator Inspections

1 Purpose

The purpose of this procedure is to provide instructions for inspecting and removing scale and debris from SMI Evaporative Solutions Model 120F Floating Mechanical Evaporators used at SERF evaporation ponds at TA-60-0221/0222 on Sigma Mesa.

2 Scope/Applicability

1. The procedure includes inspecting evaporator housings and pump sleeves for scale, inspecting fan blades for wear, removing scale, removing obstructions, and cleaning evaporator pump static inlet filters.
2. Affected personnel: SERF Operations and other personnel

3 Prerequisites

1. Required training and qualifications:
   a. Utilities & Institutional Facilities (UI) procedures and work control processes
   b. The current procedure, equipment, supplies, etc.
   c. P101-3, Lockout/Tagout for Hazardous Energy Control
2. Pre-job briefing

4 Precautions and Limitations

1. Required Personal Protective Equipment (PPE)
   - Steel-toe safety shoes
   - Safety glasses with side shields
   - Personal floatation device
2. All procedure hazards, both task and site, must be addressed in accordance with UI work control processes.
3. Refer to Integrated Work Document (IWD) for specific task and site hazards.
4. Lockout/tagout (LO/TO) must be performed per P101-3, Lockout/Tagout for Hazardous Energy Control.

5 Equipment, Supplies, etc.

1. Equipment, tools, instruments:
   - Pressure washer
   - Power generator
   - Pump
   - Flat and/or combination screwdriver
   - Hand tools
   - Flashlight

6 Responsibilities

1. Persons performing this procedure are responsible for –
   - Complying with its requirements
   - Notifying appropriate supervisory personnel of equipment damage or other conditions that could require corrective action
   - Issuing a PAUSE/STOP WORK order whenever warranted by conditions related to health or safety in accordance with P101-18, Procedure for Pause/Stop Work
2. Managers are responsible for ensuring procedure compliance.

7 Work Steps

7.1 General Items

1. Schedule performance of the procedure in coordination with SERF Operations.
   - Inform affected personnel when the inspection process is about to begin.
2. Make sure evaporators are operational.

   If an evaporator is out of service, record the following information in SERF Operator Log:
   - Reason out of service
   - Submitted Work Order/FSR number

     (if MSS repair)

7.2 Perform Inspections

Perform inspections yearly.

1. Turn evaporators OFF.
2. Apply LO/TO per P101-3, Lockout/Tagout for Hazardous Energy Control.
3. Remove evaporators from ponds using tethering cable.
   - Inspect cables for tear or excessive jacket wear.
4. Inspect exterior of evaporators for scale build-up.
   - Use pressure washer to remove scale.
5. Inspect fan blades for wear.
   - Note that the blades are not sharp.
   - Notify appropriate personnel of excessive wear.
6. Inspect pump sleeves through viewing port for obstructions and scale build-up.
   - Remove any obstructions.
   - Use pressure washer to remove scale.
7. Remove static inlet filters from pumps and clean them.
8. Reinstall cleaned static inlet filters.
9. Return evaporators and tethering cables where they came from in pond.
10. Remove LO/TO.
11. Turn evaporators ON and check for normal operation.
12. If a problem is found, immediately notify appropriate personnel so corrective action can be taken.

8 Records

Records generated as a result of implementing this procedure are maintained in accordance with the UI records program.

9 Abbreviations, Acronyms, and Terms

Abbreviation, Acronym, or Term	Definition
ESH	Environment, Safety, and Health
IWD	Integrated Work Document
LO/TO	Lockout/tagout
PPE	Personal Protective Equipment
SERF	Sanitary Effluent Reclamation Facility
UI	Utilities & Institutional Facilities

10 References

P101-3, Lockout/Tagout for Hazardous Energy Control

11 Appendices and Attachments

None