Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1-June 30, 2018

ATTACHMENT A1007.A.b.

Degreaser

Completed Work Practice Checklist

Date of Action: 1/31/18	Location (TA/BLD		e :) TA-55-PF4-319
Monitoring Requirements(A1007.A ¹):		Yes/No	Comments
1. Does the operator monitor and record the amou added to the degreaser?	unt of solvent	Yes	
Recordkeeping Requirements (A1007.A ¹)		Yes/No	Comments
1. Are the actual emissions rate (pounds/month) of HAPS based on the quantity of solvent lost to 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) for this source category and added to the facil emissions rates in Table 106.B (Facility-wide Emissions)?	ity-wide	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degree content?	easer solvent	Yes	
4. Does the operator maintain work practice chec	klists?	Yes	
5. Does the operator maintain records in accordar Section B109, General Recordkeeping Requir		yes	
Operational Requirements (A1007.A ¹)		Yes/No	Comments
1. Does the operator ensure the degreaser is close fitting cover whenever not in use?	d with a tight	Yes	
2. Does the operator maintain a freeboard ratio of greater?	0.75 or	yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and solvent and wipe rags are placed in closed contain		Yes	
4. Does the operator ensure that flushing is perforwithin the freeboard area only?	med only	Yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for until dripping stops (whichever is longer)?	or 15 seconds	Yes	
6. Does the operator ensure that the solvent level of exceed the fill line on the solvent level?	Yes		
7. Does the operator ensure that all spills are wipe immediately?	ed up	Yes	
8. Does the operator ensure that there is no creation observable splashing with agitation device?	on of	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.A1) continued Yes/No Comments Glove box air flow rates based on system design descriptions average 9. Does the operator ensure that the degreaser is not exposed to between 5 acfm (normal operating) up drafts greater than 40 meters per minute (132 feet per minute)? 405 to 40 acfm maximum for a single glove 10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser? Jes 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

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

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).

¹ Title V Operating Permit No: P100-R2

Date of Action: 2/27/18	Location (TA/BLD		e :) TA-55-PF4-319
Monitoring Requirements(A1007.A ¹):		Yes/No	Comments
1. Does the operator monitor and record the amoun added to the degreaser?	t of solvent	yes	
Recordkeeping Requirements (A1007.A ¹)		Yes/No	Comments
1. Are the actual emissions rate (pounds/month) of HAPS based on the quantity of solvent lost to e 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) conforthis source category and added to the facility emissions rates in Table 106.B (Facility-wide A Emissions)?	y-wide	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degree content?		Yes	
4. Does the operator maintain work practice checkl	ists?	yes	
Does the operator maintain records in accordance Section B109, General Recordkeeping Requires		Yes	
Operational Requirements (A1007.A ¹)		Yes/No	Comments
1. Does the operator ensure the degreaser is closed fitting cover whenever not in use?	with a tight	Yes	
2. Does the operator maintain a freeboard ratio of 0. greater?	.75 or	yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and sto solvent and wipe rags are placed in closed container		Yes	
4. Does the operator ensure that flushing is perform within the freeboard area only?	ed only	Yes	*All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for or until dripping stops (whichever is longer)?	15 seconds	Yes	
6. Does the operator ensure that the solvent level do exceed the fill line on the solvent level?	es not	Yes	
7. Does the operator ensure that all spills are wiped immediately?	up	Yes	
8. Does the operator ensure that there is no creation	N/A	An air or pump agitated solvent bath is	

MONTHLY WORK PRACTICE CHECK LIST TA-55-DG-1 DEGREASER R 04/20/2015 Operational Requirements (A1007.A1) continued Yes/No Comments Glove box air flow rates based on system design descriptions average 9. Does the operator ensure that the degreaser is not exposed to between 5 acfm (normal operating) up drafts greater than 40 meters per minute (132 feet per minute)? yes to 40 acfm maximum for a single glove 10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser? 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

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

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).

¹ Title V Operating Permit No: P100-R2

Date of Action: 3/30/18	Location (TA/BLD		e :) TA-55-PF4-319
Monitoring Requirements(A1007.A ¹):		Yes/No	Comments
1. Does the operator monitor and record the amoun added to the degreaser?	t of solvent	Yes	
Recordkeeping Requirements (A1007.A ¹)		Yes/No	Comments
1. Are the actual emissions rate (pounds/month) of HAPS based on the quantity of solvent lost to excalculated on a monthly basis?	/aporation	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) car for this source category and added to the facility emissions rates in Table 106.B (Facility-wide A Emissions)?	-wide	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degrea content?	ser solvent	707	
4. Does the operator maintain work practice checkli	sts?	yes	
5. Does the operator maintain records in accordance Section B109, General Recordkeeping Requirem	with nents?	Ver	
Operational Requirements (A1007.A ¹)		Yes/No	Comments
1. Does the operator ensure the degreaser is closed fitting cover whenever not in use?	with a tight	yes	
2. Does the operator maintain a freeboard ratio of 0. greater?	75 or	yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and sto solvent and wipe rags are placed in closed container.		Yes	
4. Does the operator ensure that flushing is performed within the freeboard area only?	ed only	yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 1 or until dripping stops (whichever is longer)?	5 seconds	Yes	
6. Does the operator ensure that the solvent level doe exceed the fill line on the solvent level?	es not	Yos	
7. Does the operator ensure that all spills are wiped immediately?	ıp	yes	
8. Does the operator ensure that there is no creation observable splashing with agitation device?	of	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.A1) continued Yes/No Comments Glove box air flow rates based on system design descriptions average 9. Does the operator ensure that the degreaser is not exposed to between 5 acfm (normal operating) up drafts greater than 40 meters per minute (132 feet per minute)? 405 to 40 acfm maximum for a single glove 10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser? Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338. Comments: Form completed by: 3/30/0 Name (print)

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

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).

¹ Title V Operating Permit No: P100-R2

Date of Action: 4/30/18	Location (TA/BLD		e :) TA-55-PF4-319
Monitoring Requirements(A1007.A ¹):		Yes/No	Comments
1. Does the operator monitor and record the amoun added to the degreaser?	t of solvent	405	
Recordkeeping Requirements (A1007.A ¹)		Yes/No	Comments
1. Are the actual emissions rate (pounds/month) of HAPS based on the quantity of solvent lost to excalculated on a monthly basis?	/aporation	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) car for this source category and added to the facility emissions rates in Table 106.B (Facility-wide A Emissions)?	-wide	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degrease content?		405	
4. Does the operator maintain work practice checkli		Yes	
Does the operator maintain records in accordance Section B109, General Recordkeeping Requiren		Yes	
Operational Requirements (A1007.A ¹)		Yes/No	Comments
1. Does the operator ensure the degreaser is closed that fitting cover whenever not in use?	with a tight	Yes	
2. Does the operator maintain a freeboard ratio of 0.7 greater?	75 or	ye >	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and sto solvent and wipe rags are placed in closed containers		res	
4. Does the operator ensure that flushing is performe within the freeboard area only?	d only	Yes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for 1 or until dripping stops (whichever is longer)?	5 seconds	Yes	
6. Does the operator ensure that the solvent level doe exceed the fill line on the solvent level?	es not	Yes	
7. Does the operator ensure that all spills are wiped u immediately?	ıp	Yes	
8. Does the operator ensure that there is no creation	of	N/A	An air or pump agitated solvent bath is

MONTHLY WORK PRACTICE CHECK LIST TA-55-DG-1 DEGREASER R 04/20/2015 Operational Requirements (A1007.A¹) continued Yes/No Comments Glove box air flow rates based on system design descriptions average 9. Does the operator ensure that the degreaser is not exposed to between 5 acfm (normal operating) up drafts greater than 40 meters per minute (132 feet per minute)? to 40 acfm maximum for a single glove 10. Does the operator ensure that no sponges, fabric, wood or paper products are cleaned in the degreaser? 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

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

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).

¹ Title V Operating Permit No: P100-R2

Date of Action: 5/29/18	Location (TA/BLD		e :) TA-55-PF4-319
Monitoring Requirements(A1007.A ¹):		Yes/No	Comments
1. Does the operator monitor and record the amoun added to the degreaser?	t of solvent	yes	÷
Recordkeeping Requirements (A1007.A1)		Yes/No	Comments
1. Are the actual emissions rate (pounds/month) of HAPS based on the quantity of solvent lost to e calculated on a monthly basis?	vaporation	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
2. Are the semi-annual emissions rate (tons/year) carefor this source category and added to the facility emissions rates in Table 106.B (Facility-wide A Emissions)?	-wide	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.
3. Does the operator maintain records of the degrea content?		Yes	
4. Does the operator maintain work practice checkl	ists?	Yes	
Does the operator maintain records in accordance Section B109, General Recordkeeping Requirer		Yes	
Operational Requirements (A1007.A ¹)		Yes/No	Comments
1. Does the operator ensure the degreaser is closed fitting cover whenever not in use?	with a tight	Yes	
2. Does the operator maintain a freeboard ratio of 0. greater?	75 or	yes	Glove box is included in freeboard ratio determination.
3. Does the operator ensure that all collected and sto solvent and wipe rags are placed in closed container		Yes	
4. Does the operator ensure that flushing is performed within the freeboard area only?	ed only	Xes	All rinsing is performed within the freeboard area.
5. Does the operator allow cleaned parts to drip for or until dripping stops (whichever is longer)?	15 seconds	Yes	
6. Does the operator ensure that the solvent level do exceed the fill line on the solvent level?	es not	Yes	
7. Does the operator ensure that all spills are wiped immediately?	up	Yes	
8. Does the operator ensure that there is no creation	of	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.A¹) continued Yes/No Comments Glove box air flow rates based on system design descriptions average 9. Does the operator ensure that the degreaser is not exposed to between 5 acfm (normal operating) up 405 drafts greater than 40 meters per minute (132 feet per minute)? to 40 acfm maximum for a single glove 10. Does the operator ensure that no sponges, fabric, wood or yes paper products are cleaned in the degreaser? Notification Requirements: If any of the boxes were checked with "No", please contact Air Quality Compliance Personnel at 665-1338. Comments: Form completed by: Salazor 163479

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

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).

¹ Title V Operating Permit No: P100-R2

Date of Action: 6/26/18	Location (TA/BLD		e :) TA-55-PF4-319	
Monitoring Requirements(A1007.A ¹):		Yes/No	Comments	
1. Does the operator monitor and record the amoun added to the degreaser?	t of solvent	Xes		
Recordkeeping Requirements (A1007.A1)		Yes/No	Comments	
1. Are the actual emissions rate (pounds/month) of HAPS based on the quantity of solvent lost to excalculated on a monthly basis?	vaporation	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.	
2. Are the semi-annual emissions rate (tons/year) car for this source category and added to the facility emissions rates in Table 106.B (Facility-wide A Emissions)?	-wide	Yes	Emissions are calculated using the Degreaser Compliance Database by air quality compliance personnel.	
3. Does the operator maintain records of the degreat content?		49		
4. Does the operator maintain work practice checkli	sts?	Yes		
5. Does the operator maintain records in accordance Section B109, General Recordkeeping Requirem		Xcs	_	
Operational Requirements (A1007.A ¹)		Yes/No	Comments	
1. Does the operator ensure the degreaser is closed fitting cover whenever not in use?	with a tight	Yas		
2. Does the operator maintain a freeboard ratio of 0. greater?	75 or	Yes	Glove box is included in freeboard ratio determination.	
3. Does the operator ensure that all collected and sto solvent and wipe rags are placed in closed container.		xes		
4. Does the operator ensure that flushing is performe within the freeboard area only?	ed only	Yes	All rinsing is performed within the freeboard area.	
5. Does the operator allow cleaned parts to drip for 1 or until dripping stops (whichever is longer)?	5 seconds	Ves		
6. Does the operator ensure that the solvent level doe exceed the fill line on the solvent level?	es not	xc3	_	
7. Does the operator ensure that all spills are wiped to	YSY			
immediately?		An air or pump agitated solvent bath is not used.		

	·
Yes/No	Comments
	-
405	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.
Y ?)	
	405

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

Co	m	m	en	ts:
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Form completed by:

Signature

Arsono Splazan

7 number

6/26/18 Date

R 04/20/2015

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

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).

¹ Title V Operating Permit No: P100-R2

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 o	peration	Hour Meter Reading Start Reading End Reading		Hours of operation	Purpose	Operator/User Name
	Start Time	End Time			6 P 3. 3. 3. 3. 3. 3. 3. 3.		
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

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1-June 30, 2018

ATTACHMENT A1104.B.

Internal Combustion
Permitted Generator Hours

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ESH-18	-050 / L	A-UF	R-18	8-269	40					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
	* Total Run Hours		1.4	0.1		0.0	4.0	0.0	43.0	13.5	0.0	0.0	0.0	6.9
7.	Hours Run		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Second Half	Reading							3000						
ဟိ	12 Month Reading Date					1								
	Hours Run		1.4	0.1		0.0	4.0	0.0	43.0	13.5	0.0	0.0	0.0	6.9
First Half	Reading		1.969	469.0		233.9	3770.0	221.9	215.7	172.9		15.0	14.0	98.6
Firs	6 Month Reading Date		Jun-18	Jun-18		Jun-18	Jun-18	Jun-18	Jun-18	Jun-18		Jun-18	Jun-18	Jun-18
	Reading 2nd half of previous year		694.7	468.9		233.9	3766.0	221.9	172.7	159.4	J - 3	15.0	14.0	91.7
	Re 2nd half oi		Dec-17	Dec-17		Dec-17	Dec-17	Dec-17	Dec-17	Dec-17		Dec-17	Dec-17	Dec-17
	engine kWm		281.25	25		25	281.25	1656.1	1656.1	1656.1	186	40.2	40.2	1335
erators	gen kWe		1000	20		20	225	1500	1500	1500	150	30	30	006
Permitted Generators	Engine Serial #		37199764	52993		52992	8JJ00615	25314401	25314399	33165566	73176927	4LE2-298868	4LE2-299432	SYCO5263
Per	Engine Model		QST30-G5	4TNE84T		4TNE84T	3306	KTA50G9	KTA50G9	KTA50G9	QSB7-G3 NR3	BZ-4LE2T	BZ-4LE2T	C32
	Engine Make		Cummins	Kohler/Yanm ar	Kohler/Yanm	ar	Caterpillar	Cummins	Cummins	Cummins	Cummins	Isuzu	Isuzu	Caterpillar
2018	# QI		G-0053	G-0008		G-0010	G-0007	G-0058	G-0059	C-0060	G-0067	G-0065	G-0066	G-0064
YEAR	Location		33-Port	33-209		33-280	33-151	55-585	55-584	55-583	TA-48-1	TA-55-PF10	TA-55-PF11	TA-55-371
	Permit ID		TA-33-G-1P	TA-33-G-2		TA-33-G-3	TA-33-G-4	RLUOB-GEN-1	RLUOB-GEN-2	RLUOB-GEN-3	TA-48-GEN-1	TA-55-GEN-1	TA-55-GEN-2	TA-55-GEN-3

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.

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.

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1-June 30, 2018

ATTACHMENT A1107.A.

Internal Combustion Operating Records for RLUOB Generators

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Date Date Start Time End Jime Run Time Reason/Notes	ummins Generator	Cumr	Cummins Serial # 1060976811 Gen B	1060976811	Gen B		Model DFLE 5754172	E 5754172
Description 1, 20-16 8:15 120 3.4 160.7 Maritha 2m Mar	Authorized Worker	Date	Start Time	End Time	Run Time		Reason/Notes	
December 18:31/4 12:50 1520 2:5 162.7 Mandrid Din 18:30 15:30 163:0 Mandrid Din 18:30 163:0 Mandrid Di	of Domin	20.	21:8	02]]	3.4	11,00.7	1 61	Jim
December 11:3-14 8:50 11:60 2.3 11.5.0 Mendly 2m 2mm 12.7 11 1005 1315 2.0 167.0 Mendly 2m 2mm 12.7 17 12.50 0.7 167.5 Cod oxide 2mm 12.7 17 09:30 0.849 0.1 167.5 Cod oxide 2mm 12.7 17 09:30 0.849 0.1 167.5 Cod oxide 2mm 12.7 17 09:30 1490 3.7 171.0 Mendly 2mm 12.7 17 17 09:30 1490 2.7 172.7 Mendly 2mm 12.5 17 09:5 1490 2.9 174.7 Mendly 2mm 12.5 18.5 1490 2.9 182.7 Mendly 2mm 12.5 18.5 1490 2.9 182.7 Mendly 2mm 12.5 18.5 18.5 19.5 2.18 8:40 2.3 2.3 2.5 1 Mendly 2mm 12.5 18.5 19.5 2.18 8:40 2mm 12.5 18.5 1 Mendly 2mm 12.5 18.5 19.5 2.3 2.5 2.5 1 Mendly 2mm 12.5 18.5 19.5 2.5 2.3 2.5 1 Mendly 2mm 12.5 18.5 19.5 2mm 12.5 18.5 2mm 12.5 2mm	5	16/13/16	12:50	2531	2.5	11,2 7	New Unit	Dw.
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Reason/Notes	Run Time Accumulative	Run Time	End Time	Start I ime	Pate	THE PROPERTY OF THE PROPERTY O
STREET, SQUARE DESIGNATION				J		

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.

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)

Data Entry Data Entry	Boxes ^(c)	Shredded Month	iry 656 July	ary 734 August	th 650 September	October October	November November	e 1561 December	o Total· 5 247 6 mo Total· 0
		Month	January	February	March	April	May	June	6 mo. Total

Annual Boxes: (9) 5,247

Reviewed By / Date:

V. Carretti 7/03/2018

Data Disintegrator

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	18		
-WBLDG	TA/BLDG Work Order		Task Job Type	Task Title	Task Status	Actual Start Date	Completion Date
52/0011	00589389	-	OM	CM 520011 Replace Bag Filters at Shaker/baghouse unit	CLOSED	3/5/2018	5/17/2018
52/0011	00604872	~	M	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.

	Completion Date	
	Actual Start Date	
118	Task Status	
July - December 2018	Task Title	
	Task Job Type	
	Task	
	TA/BLDG Work Order	
	TA/BLDG	

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

A1207.B Data Disintegrator - Control Equipment Maintenance Performed

Facility: ADESH-18-050/LA-UR-18-20940

Proj:

Al856 / LANL 2018H1 Semi-Annual Monitoring Report

Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION

FACILITY-MAINT

W/O Type: CO W/O Group: 3J ROMER

Task Priority:

Planner: 090467

ROMERO

A J 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FAC

W/O Title:

Written To: (WO) GF 52-0011 MULTI-CRAFTS-DESTRUCTION

Task Dspln: M

Due Date: 08/03/2017



D-B Determination:

Hazard: MODERATE

NON-COVERED

D-B Date: 11/28/17

Tracking Number:

18-442

IWD Regmt: TASK SPECIFC

Component:

Work Order Task

00589389 01

MASTER

Date: 01/26/2018

Page: 1

Work Order Task Written To

Facility :

F07

Unit Area : 520011

Op Sys :

Sys/Cls:

Equipment :

Room

TA 52, BLDG 0011

Location : Job Type : CO

Tag 1 :

Tag 2:

Work Item :

Ops Review Read:

N

Authorization

Start Permission

Complete Notice

Start Date: Complete Date:

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

1346/1711

LANL ADESH-18-050 / LA-UR-18-26940 AI856 / LANL 2018H1 Semi-Annual Monitoring Report

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

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, FOR CORPER AND GRANDARDS	EDERAL AND LANL
CODES AND STANDARDS.	
ORIGINATOR: JOE ROMERO TELEPHONE#: 7 CONFIGURATION MANAGEMENT REVIEW REQUIRED] [] YES [X] N CHECK CRAFTS REQUIRED: [] CUSTODIAL [] ELECTRICIANS [] LABORERS [] TEAMSTERS [] OPERATING ENGINEERS [] PAINTERS [] FITTERS [] CEMENT MASONS [XX] CARPENTER [] ROOFERS [XX] IRON WORKERS [] INSULATOR [XX] SHEETMETAL [XX] MECHANICS [] ENGINEE [] OTHER (SPECIFY) :	o s s
AUTHORIZED FUNDING LEVEL:	
FUNDING APPROVED BY: Z# DATE:	
LOG-IN REQUIRED: [X] YES [] NO LOG-OUT REQUIRED: [X] LOCATION OF LOG-IN: TA-3-142 Weekly Schedule or Plan of the Day	YES [] NO

LANL ADESH-18-050 / LA-UR-18-26940 AI856 / LANL 2 Facility: F07 Unit: 52001 Proj:	18H1 Semi-Annual Monitoring Report
Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION	
FACILITY-MAINT	
W/O Type: CO W/O Group: 3J ROMER Task Priority: 3	Los Alamos
Planner: 090467 ROMERO A J	TT. 1443
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	Work Order Task
1 7 M M 1 7 M M 7	
	00589389 01
(1981) 8 891 8 918 1976 1878 1878 1797 (878 1981 881 177 1881 1881 1881 1881 188	MASTER
D-B Determination: NON-COVERED D-B Date: 11/28/17	MASIER
Tracking Number: 18-442	Date: 01/26/2018
Hazard: MODERATE IWD Regmt: TASK SPECIFC	Page: 3
THE ROYALET THEN BILLET	rage.
•	
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	
include carpenters to install scaffolding also requesting SI	
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	
00 Paris	
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	
	nift:
Comments:	

LANL ADESH-18-050/LA-UR-18-26940 AI856 Facility: F07 Unit: 520011 Proj:	67 LANL 2018H1 Semi-Annual Monitoring Report
Task Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION	
FACILITY-MAINT	
W/O Type: CO W/O Group: 3J ROMER Task Priority:	Los Alamos
Planner: 090467 ROMERO A J	NATIONAL LABORATORY
W/O Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FAC	
Written To: (WO) GF 52-0011 MULTI-CRAFTS-DESTRUCTION	
Task Dspln: M Due Date: 08/03/201	7 Work Order Task
	00589389 01
	MASTER
D-B Determination: NON-COVERED D-B Date: 11/28/17	
Tracking Number: 18-442	Date: 01/26/2018
Hazard: MODERATE IWD Reqmt: TASK SPECIFC	Page: 4
•	
Rework/Approval	1 1 1
	7
Deficiency Tag No.: Loc:	Tag Removed:
ReWork Job : N Comments:	
Trouble Found/Work Performed	
1 / 1	
Continued on Additional Sheets? :	
September 1980 Transfer and the september 1980 Transfer and th	
Work Delay Reason	(10)
	(Y/N)
A ACCESS	
Date: Hours: Crew:	Shift:
EQPT EQUIPMENT	01 + 01
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	and share
Date: Hours: Crew:	Shift:
W WEATHER	Shi sta
Date: Hours: Crew:	Shift:
Comments:	

LANL ADESH-18-050/LA-UR-18-26940 AI856/LANU 2 Facility: F07 Unit: 5200: Proj:	2018H1 Semi-Annual Monitoring Report
Fask Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT N/O Type: CO W/O Group: 3J ROMER Task Priority: 3 Planner: 090467 ROMERO A J	Los Alamos
/O Title: 3GF 52-0011 MULTI-CRAFTS-DESTRUCTION FAC ritten To: (WO) GF 52-0011 MULTI-CRAFTS-DESTRUCTION ask Dspln: M Due Date: 08/03/2017	Work Order Task
	00589389 01 MASTER
D-B Determination: NON-COVERED D-B Date: 11/28/17 Pracking Number: 18-442 Pazard: MODERATE IWD Reqmt: TASK SPECIFC	Date: 01/26/2018 Page: 5
Major Failure/Action Taken Major Failure :	Action Taken : Removed (Y/N):
Name Function/Dept. KRIC Terrarbar Mech Fon 7	Date # 2-18

 Cost Center:
 8K040A
 Activity:
 640CL000
 User Def:

 Percentage:
 100.000
 Acct No:
 WL2300
 00000000

	lamos Faci	lities Maintenanc	ce IWD – (Facility Maintenance Activity Specific Information)				
Revision	n #: 0		Activity/Task Title: TA-52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT				
Work D	ocument #:	(WO # / Task)	Planner/Preparer (Name/Z#/Date)				
589389-	01		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. p.D.J. 3/20/18 clark Convon, 117208 3/46/18

O02.15 Rev. 18, Approved: 08/30/2016

AP-WORK-002.15

1352/1711

APSWARK 1002 A Machine ne 165 ort

FORM 2100-WC

SATIONAL	lamos Faci	lities Maintenanc	e IWD – (Facility Maintenance Activity Specific Information)
Revision	n #: 0		Activity/Task Title: TA-52-0011 MULTI-CRAFTS-DESTRUCTION
			FACILITY-MAINT
Work D	ocument #:	(WO # / Task)	Planner/Preparer (Name/Z#/Date)
589389-	01		Ralph Dominguez, 100538 01-09-18
TA:	Building:	Room:	Additional Location Description:
52	0011		

6.

52	0011			
6	Work In	STRUCTION	is .	
	Carpenter Cra	ifts:		
		_	rection of scaffold competent person.	
	• Scaffoldi	ng must be erected,	, with top railing, mid railing and toe board for fall Protection.	V
			CTION FORM REQUIRED.	
	-	tent person must al scaffolding once we	so inspect the scaffold before each work shift. ork is completed.	V
	Mechanics:			
	6.3. LO/TO pov	wer to shaker/bag h	nouse unit.	
	6.4. VERIFY at	bsence of hazardou	is energy.	
	Sheet Metal:			
	6.5. APPLY LC	D/TO to shaker/bag	house unit.	
	6.6. VERIFY at	bsence of hazardou	s energy.	
	6.7. PERFORM	I removal of outer	side panels of the shaker/bag house unit.	
	Mechanics:			
	6.8. REPLACE	bag filters to shake	er/bag house unit.	
			r arm to shaker/bag house unit. Order arm part to shaker/bag hout th iron workers to fabricate an arm at iron workers shop.	use unit if
	Mechanics / She	eet Metal:		
	6.10. REMOVE	E LO/TOs.		
	Mechanics:			
	6.11. RE- ENE	RGIZE shaker/bag	house unit.	
7 .	Post Wo	RK ACTIVIT	ΓIES	
	Mechanics:			
	7.1. TEST shake	er/bag house unit fo	or proper operation.	V
8.	CLOSEOU	IT		
	8.1. CLEAN the	work area and dis	pose of all work generated debris.	LV

APSWONT 1002 Attackmierne 1950rt

FORM 2100-WC

material.	Alamos Faci	lities Maintenand	ce IWD – (Facility Maintenance Activity Specific Information)
Revisio	n#: 0		Activity/Task Title: TA-52-0011 MULTI-CRAFTS-DESTRUCTION FACILITY-MAINT
Work I	Document #:	(WO # / Task)	Planner/Preparer (Name/Z#/Date)
589389	-01		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	FOD or Representative (Signature/Z#/Date) If Required or Recommended by RLM ESO Review (Signature/Z#/Date) If Required
	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.	Safety Review (Signature/Z#/Datc) Required
	Date when RLM re-approval is require	d 1/31/19

IWD Type

☐ High-Hazard/Complex

(Print)

Name of Primary PIC

Name of Alternate PIC
Name of Alternate PIC

Moderate-Hazard

☐ Standing IWD

Any required classification

review completed,

Signature/Date

worker(s) or others.

Vork Area Hazards/Concerns

Jentify site hazards and concerns that could potentially affect the

ESH/S&S WORK AREA HAZARDS & CONTRO

Work Area
Hazard Present

Preventive Measures/

List permits, operating manuals, and other reference procedures

Training and Qualification
List training requirements
(P300, Integretated Work
Management, Section 6.1)

Reference Documents

Facility Controls/

Specify preventive

measures, controls and bounding conditions for each site hazard



IWD No./Work Request No:

Revision #:

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

Facility Operation Director (FOD) must determine the facility entry and coordination requirements and identify the Environment, Safety, Health (ESH)/Security and Safeguards (S&S)

Non-Tenant Activity Form

hazards and controls associated with the activity location.	d with the activity location.			
FOD 7	TA 52	Bidg. 0011	Room All	Other Location N/A
FOD Designated Facility Point-of-Contact	Name Bill Schleft	Phone 699-5790	Pager 664-3536	Email schleft@lanl.gov
ntry and Coordination Req	ntry and Coordination Requirements (Check one or more of the following)	of the following)		
No Entry/Coordination Requirements	quirements	FOD-designated facility Point-of-Contact must sign IWD Part 3	nt-of-Contact must sign IW	D Part 3
Neek (POTD/POTW)) Week (POTD/POTW)	Check in at Start of Work		ng Required
Security Clearance Requirements	ements	Mork must be Scheduled	Check in Daily	
Co-located Hazards/Concerns	erns	Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)	s (ex.: Cellphone, No Fore	ign Nationals, etc.)
Check out at End of Work		Quality Issues	Check out Daily	
Escort Required		Review under Authorization	Basis (AB)/Safety Basis/U	Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)
Other Bounding Conditions:	s:			
Additional Comments (refer	Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)	Tool Facility Notes)		
instructions: In the block below	w, identify work-area hazards tha	t could potentially affect the works	er(s) or others. Specify the	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) t	o protect against the site hazards	implemented by the worker(s) to protect against the site hazards as well as any special training required	guired.	

Specify Hazard:

work on or near radiation producing devices.

Work in posted radiological areas, work with radioactive materials, or

Yes

No No

Ionizing Radiation

No Work Area Hazards

Revision #:

ESH/S&	S WORK AREA	ESH/S&S WORK AREA HAZARDS & CONTROLS	3	The second second	1
Work Area Hazards/Concerns	Work Area	Facility Controls/		Training and Qualification	/171
worker(s) or others.		Bounding Conditions Specify preventive	manuals, and other reference procedures	(P300, Integretated Work Management, Section 6.1)	1359
		bounding conditions for each site hazard			
Worker Exposure Working near non-ionizing radiation, beryllium, noise, chemicals, was hazardous biological materials, lead, asbestos, temperature/humidity extremes, or high explosives. Specify Hazards:	☐ Yes ■ No				
Lorergized 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, storical/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.	area hazards and t	hat the IWM process has bee	en applied appropriately.		
FOD or Representative (Signature/Z #/Date) Approval Required Date Approval Expires: 12/31/18 SC	schleft@lanl.gov		Digitality signed by schler@juni garr DN: on-welska@juni garr Desc. 2014 1 0 20 17:50:23 -06'00'		

LOS Alamos NATIONAL LABORATORY EST. 1943

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

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.

	16	1374	All	N/A
OD Designated	Name	Phone	Pager	Email
Facility Point-of-Contact	Bill Schleft	699-5790	664-3536	schleft@lanl.gov
Entry and Coordination Requ	Entry and Coordination Requirements (Check one or more of the following)	re of the following)		
No Entry/Coordination Requirements	uirements	FOD-designated facility Point-of-Contact must sign IWD Part 3	int-of-Contact must sign IWI	D Part 3
$oldsymbol{\mathbb{N}}$ Plan of the Day/Plan of the Week (POTD/POTW)	Week (POTD/POTW)	Check in at Start of Work	Work-Area Training Required	ng Required
Security Clearance Requirements	ements	Work must be Scheduled	Check in Daily	
Co-located Hazards/Concerns	SULS	Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)	ıts (ex.: Cellphone, No Forei	gn Nationals, etc.)
Check out at End of Work		Quality Issues	Check out Daily	
Escort Required		Review under Authorization Basis (AB)/Safety Basis/U	า Basis (AB)/Safety Basis/Uı	Unreviewed Safety Question (USQ)
Other Bounding Conditions:	9.			
Additional Comments (refer	Additional Comments (refer to Job Hazard Analysis [JHA] Tool Facility Notes)] Tool Facility Notes)		
structions: In the block below	v, identify work-area hazards t	hat could potentially affect the work	er(s) or others. Specify the	istructions: 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

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

Form 2101

IWD No./Work Request No:

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	O WORN AREA	ESTINGS WORN AREA DALARDS & CONTROLS	O .	
Work Area Hazards/Concerns ldentify 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, 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			

Z#: 3/32/2 Date: 3/39/18	Mess in the state of the state	Signature:	126/18	Date:	Z#: 3/5		Signature:	
NA	28. Removal and Positioning verified by	28. Removal and	□ N/A			1	75: 10/10 velimed by.	
1 Date: 3-30-18	her the 1 2#: 102001 Date:	Signature:	3-26-18	le/ Date:	Z#:/07/c	1	Signature: The te	
ned:	peen Removed & Isolation Devices Positioned:	27. LO/TO has beg	nergy Checks Performed:	talled, and Zero E	(s) and Tag(s) ins	ositioned, Lock	21. Energy Isolation Devices Positioned, Lock(s) and Tag(s) installed, and Zero Energy Checks Performed:	
		if applicable)	page must also be signed	ces (continuation	gy Isolation Devi	additional Ener	See continuation page for additional Energy Isolation Devices (continuation page must also be signed if applicable	1
								_
11	11	11	11	11	47	I'mrel	CON-Y	
11	11	11	11	11	4/10	Tand	11 -(10)	-
A10	None	None	None	NOW	411	Fanel	000-6	7
	TOHOWING KETHOVAL	Sequence	- costation of present	Sequence	\ \ \	5		_
26. As-Left Position	25. Required Position/Alignment 26		20. Required LO/TO	19. LO/TO	of Energy	18. Location of Energy	17. Energy Isolation Device (use Specific ID)	
1#: ECICHET FLOTTO Removal / Return to Service	S-1 5	23. Approval to Remove Signature	Workers are notified prior to Authorized Workers performing LO/TO	Z#: Authorized Worke	Kinner:	-	Sgnature: NOTE: Approver must ensure Affected	
ervice	LO/TO Removal / Return to Service				O/TO Installation	1 10	17 Annound to Install 10/TO	$\overline{}$
	If yes, enter ID# of Lock Box:			omero	T	111	Name of Lead Authorized Worker:	_
YNO	☐ Yes				1	0	14. Group LO/TO? Yes	
1					I Details	on & Remova	Installat	-
							NIA	_
						Comments:	Equipment Owner/Operator Comments	
es attached?	13. LO/TO Orders Addendum with Operational Instructions/Procedures attached?	Orders Addendum	13. LO/TO ☐ Yes [quired)	N/A (Sequencing Not Required)	/TO devices req	2. Specific Sequencing of LO/TO devices required for: Installation Removal N/A (Sequencing	-
	nt 🗌 N/A	Ition Type: Independent	11. Verification Type:	quired)	N/A (Verification Not Required)	I N/A (Ve	Installation Removal	
	Gravity Other (specify):	Compressed Energy C	Capacitors Compre	c ☐ Steam ☐	apply): c Pneumatic	(check all that a		-
					HEIRS /	The th	8. Reason for LU/10: Temple	
				Consino	dut.	r/Operator:	7. Name of Equipment Owner/Operator:	
1000 Charlows	lumber): Simuel - C/C	y/Name/CMMS N	r rdonbuileiir bescribrioii (e.g. macilinery/name/cyiMs Num) - Edaibilielle	0		1	_
	the the transfer of			n Cariomant	/W/	Isolated	Location of Equipment to be Isolated	_
	ent) Record #: 13443	2. LO/TO (Parent)	-01	89389	5	i.e., Package/Pr	1. Work Document Number (i.e., Package/Procedure #):	
						ation	Section 1: General Information	
Phone #:	ator Name Z#:	Alternate Lock Coordinator Name	Alternati	Phone #:	1949	Tero Cz	Lock Coordinator/Name	

Continuation Page (print as needed)

Attachment B, LO/TO Orders (Cont.)	ont)						
1. Work Document Number (i.e., Package/Procedure #):	,, Package/Procedure #):			2. LO/TO (Parent) Record #:	nt) Record #:		
	LO/TO Installation				LO/TO Removal / Return to Service	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 Seguence	25. Required Position/Alignment following Removal	26. As-Left Position	
				900			
				-			
21. Energy Isolation Devices Positioned, Lock(s) and Tag(s) installed, and Zero Energy Checks Performed:	itioned, Lock(s) and Tag(s) ins	talled, and Zero E	nergy Checks Performed:	_	27. LO/TO has been Removed & Isolation Devices Positioned:	sitioned:	
Signature:	Z#:	Date:		Signature:	Z#:	Date:	
22. LO/TO verified by:			□ N/A	28. Removal and	nd Positioning verified by:		□ NA
Signature:	Z#:	Date:		Signature:	Z#:	Date	

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)

- Enter the Work Document Number. This will be the number from the IWD or the procedure number (i.e., TA88-DOP-0001)
- ? 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.
- 4 ယ Enter the TA where the equipment is located
- Enter the Building number where the equipment is located
- Enter the Room number where the equipment is located.

5

- NOTE: Responses to steps 3 through 5 need to match information, identically, within both the LO/TO Orders and the tag (Attachment A).
- 9 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.
- œ 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 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. followed for Installation and/or Removal, check the appropriate box(es) and subsequently identify the sequence order in column numbers 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.
- 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 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
- 16. The FOD-designated Equipment Owner/Operator signs and enters their Z#, authorizing the installation of the LO/TO. The Approver is responsible to or are affected by LO/TO activities) notify all Affected Workers prior to the Authorized Workers performing LO/TO ("Affected Workers" are those who either may work with the equipment

required to uniquely number and track lock boxes in their possession

- 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
- 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.
- . 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 to the Equipment Owner/Operator or FOD Designee. 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 Owner/Operator or FOD Designee. Once verbal authorization is given, the Lead Authorized Worker documents the authorization as "per telecom" and
- equipment/machine's return to service. **NOTE:** The Equipment Owner/Operator or FOD Designee is responsible to notify all Affected Workers after the LO/TO removal and of the
- 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.
- and 24 correspond with the energy isolation devices specified in Column #17. "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 NOTE: Often the sequence for removal is opposite the sequence for installation. For example, if the order specified for installation Column #19 is
- 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
- 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

589389-01

IWD # Revision #:	Work Release	701377-01
By signing below, I verify this activity is compatible with	current facility configur	ration and operating conditions.
FOD designated Operations Manager or other facili	ty point-of-contact for	work area
Signature/Z#/Date (If required by FOD):		
Note: For Standing IWD, release may be given concurr	rently with signatures or	ı Part 2.
By signing below, I have verified the following:		
 I have verified authorization by ensuring approval: 	signatures of the RLM a	ind FOD.
I have jointly conducted a validation walkdown with required initial conditions and other prerequisites a		: IWD can be performed as written, and that
 The assigned workers are authorized and are com responsible manner. 	petent to perform the w	ork in a safe, secure, and environmentally
 I have conducted the pre-job briefing, and all work 	ers (including support w	orkers) have been briefed.
 I have ensured coordination with any required FOL) work-area representat	tives (e.g., area work coordinators).
PIC (Signature/Z#/Date) Required:	- 3/92	42 3/22/18
Alternate PIC Signatures acknowledges PIC authority only once, but formal handoff includes conferring with p		
handoff.)	/ 111	2020 7/20/
Alternate PIC (Signature/Z#/Date) Required:	and I	70010 3/22/2018
Alternate PIC (Signature/Z#/Date) Required:	· Jenny 10	17061 3-26-18
Pre-Job Brief Content	(X	

- 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)

Form 2103 (7/17)

ture/Z#/Date)

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) 3-22-1 Worker (Signature/Z#/Date) nature/Z#/Date) 3-23-18 intana (Signature/Z#/Date) (Signature/Z#/Date) /Date Worker (Signature/Z#/Date)

Worker (Signature/Z#/Date)



Work Order/Task: 589389-0 1

Start Date:	15/18	Completion Date:
SUMMARIZ	ZE THE WORK PERFORMED	
Date	Sheer metal-	
3/5/18		ve panels and replace
	tabe filters, 3 gy	US 2 days
	Man lift preferred	insteal of scaffold.
	Man 1str already o	
3-22-18	Prep for mentorical and starte	ed building scafford; 2 arranters
3.28.18	Custome W/ sulfold and a	cumo veted bioliza: 3 conventors
3-26-18	Sheet Meral- MA Prejob, Pio	icked up goggles, dust mask and
FOR CURR	CITYE WORK = WHAT PAILS	ED AND WHAT WAS FIXED.
		eved the panal on the morth
	side of the shaker.	
4.03.18	Pisnuntle holdchamp Seal	AS LEFT CONDITIONS BELOW
		AS LEFT CONDITIONS BELOW
As found	Dawn	
As left	IN Operation	
Parts/Repairs	New Orltars a New	Fishel Drm For Shoken
7	All is Morling good,	
Read/meas.	/ /	
Post test info.		
 Problems Enc	ountered (delays, safety, etc.):	
		H to get locale from their
		masks, We had to get the package
		masks, goggles and typek, We had
	to wast for the stational	11 11 00
Lessons Learn	ed/Recommendations:	y weeks to go symmetry.
ame:	Signa	ature: Date:
tru ter	NAMBE	trute 1 4-2-18



Maint Ince and Site Services
Al856 / LANL 2018H1 Semi-Annual Monitoring Report
Work Completion Form

PIC/SUPT
PM has been completed in its entirety and ready for closure.
IF A PM COULD NOT BE COMPLETED: Percentage complete is
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

1378/1711

Facility: F07 Unit:

W/O Type : PM

of job or work day

Work Order Task

00604872 01

1379/1711

Planner: 185614 HARRIS JEANETTE S W/O Title : 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS MASTER Written To: CYCLONE SHAKER (SEPERATOR PARTICULATE) INDOOR/OUTDOOR) Task Dspln : MECH Due Date : 05/31/2018 Date: 03/30/2018 Superintendant : Hazard : MODERATE IWD Reqmt : TASK SPECIFC 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 [] FITTERS [] CEMENT MASONS [] CARPENTERS [] ROOFERS [] IRON WORKERS [] INSULATORS [] SHEETMETAL [] MECHANICS [] ENGINEERING [] OTHER (SPECIFY) : AUTHORIZED FUNDING LEVEL: FUNDING APPROVED BY: () N/A DATE: Ζ# 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

Proj :

Task Priority : 4

Task Title: 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS

W/O Group : 3PM MOD

Facility : F07 Unit : Proj: Work Order Task Task Title: 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS W/O Type : PM W/O Group : 3PM MOD Task Priority : 4 00604872 01 Planner: 185614 HARRIS JEANETTE S W/O Title: 520011 6M CYCLONE SEPERATOR/ SHAKER LUBE/INSP. - MECHANICS MASTER Written To : CYCLONE SHAKER (SEPERATOR PARTICULATE) INDOOR/OUTDOOR) Task Dspln : MECH Due Date : 05/31/2018 Date: 03/30/2018 Superintendant : Hazard : MODERATE IWD Reqmt : TASK SPECIFC QC Requirements / Comments Completion Signatures Comments

Cost Accounting

(rework?)

Cost Center: 8S010A Activity: 640CL000

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

1 4		Attac	chment B, LC	/TO Ord	ers		
ock Coord pater Na		Phone #:			dinator Name	Z #:	Phone #:
section 1: General Info	ormation						
Work Document Numbe	r (i.e., Package/Procedu	re #): ムハルの フ	2	2. LO/TO (Pa	rent) Record #:	LLA	
ocation of Equipment to	be Isolated	20701					
T/59 4. Bldg	5. Rm:	6. Equipment	Description (e.g. Machi	nery/Name/CMN	IS Number):	Ven	
7- "					-		
Name of Equipment Ow Reason for LO/TO:	ner/Operator:						
Reason for LOTIO.	m_						
. Inergy Type to be Isola	ted (check all that apply)						
Electrical Mechani			m Capacitors []	Compressed En	ergy Gravity C	ther (specify)	i e
Verification required for	r LO/TO:			ation Type:			
Installation Remo	IVA (Verificatio	n Not Dequired)	Peer		dent N/A	turations /Des	
Installation Remo	oval N/A (Sequenci	ng Not Required)	☐ Yes [rum with Operational Ins	itructions/Pro	cedures attached?
quipment Owner/Operato	r Comments:	ig	12,00				
NA	-, -			_	_		
ection 2: LO/TO Insta	Illation & Removal De	etails					1
4. Group LO/TO? 🔲 Ye	es No				15. Group Lock Box (es TNo
ame of Lead Authorized \					If yes, enter ID# of Lo		
	LO/TO Insta	lation			LO/TO Remov	al / Return to	
Approval to Install LO/1 gnature:	O Las Vanna		7#: @AMA'S	23 Approval t	o Remote LOATO		Call #:
OTE: Approver must ensur	re An cted Vorker hie n	otified prior to Authori	zed Workers performing	Signature	- Marie		7#: (1987) 14899
ОПО	# Acres 222			NOTE: Approv	er must insur. Affected	Workers are n	otified of LO/TO Remoral
7. Energy Isolation	18. Location of Energy	v 19. LO/TO	20. Required LO/TO	24. LO/TO	25 Required	12	26. As-Left Position
evice (use Specific ID)	Isolation Device	Installation	Position or	Removal	Position/Alignment fol		O AS LEICH OSIGOT
	1 1 1 1 1 1 1	Sequence	Alignment	Sequence	Removal		10
			n 1945				
XA Oha	62 11	A5/D4		AMA-	MA		OKPIAPES
KA oho	52 11	N/A	MAT	MA	NA		ONIOFF
K4 dhe	52 11	N/A	NA	MA	NA		ONJOFF
K4/ohi	52 11	N/A	MA	NA	NA		ONJOFF
XA dha	52 11	N/A	MA	NA	NA		ONJOFF
See continuation page	or additional Energy Isol	ation Devices (contin	nuation page must also b	N/A	NA*		ONJOFF
See continuation page (for additional Energy Isol	ation Devices (contin	nuation page must also b	e signed if appli	cable)	ation Devices	ON JOFF
. Energy Isolation Device	for additional Energy Isol	ation Devices (contin	nuation page must also b nd Zero Energy Checks	e signed if appli	cable) s been Removed & Isola	ation Devices	ON AFF
Energy Isolation (Percentage)	for additional Energy Isol es Positioned, Lock(s) ar	ation Devices (contin	nuation page must also b	e signed if appli	cable) s been Removed & Isola	ation Devices	
L Energy Isolation percenterformed: gnature:	for additional Energy Isol es Positioned, Lock(s) ar	ation Devices (continued Tag(s) installed, an	nuation page must also be not Zero Energy Shecks	27 D/TO	s been Removed & Isola	Z#:	
L. Energy Isolation Devoce erformed: gnature: 2. LO/TO verbed by:	for additional Energy Isol es Positioned, Lock(s) ar	ation Devices (contin nd Tag(s) installed, an	nuation page must also b nd Zero Energy Checks	27 D/TO	cable) s been Removed & Isola ar II Positioning verified	Z#:	
See continuation page to L. Energy Isolation Delice erformed: ignature: 2. LO/TO verted by:	for additional Energy Isol as Positioned, Lock(s) ar	ation Devices (contin nd Tag(s) installed, an	nuation page must also b nd Zero Energy Checks	27 D/TO	s been Removed & Isola	Z#:	
L Energy Isolation Description for the conference: gnature: L LO/TO vertical by:	for additional Energy Isol as Positioned, Lock(s) ar	ation Devices (continued Tag(s) installed, and the state of the state	nuation page must also b nd Zero Energy Checks	27 D/TO	s been Removed & Isola	Z#:	Date:

Attachment B, LO/TO Orders (Cont.)		2 LO/TO (Parent) Depart #:			
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 Worker Name(s)	Z#	30. Date worker's lock is	31. Date worker's lock is removed		
J. (V //78//	11701:16	hung	+		
Larry Karrero 112861-	1100004	- 6010			
Buther Madrid	22222	5-10-18			
Markey / ladrey	257/98				
<u>4′.</u>	,0				
5.					
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17.					
18.					
19.					
20.					
Section 4: Return of Lock(s)/Tag(s) and Locking De	evices				
All Lock(s)/Tag(s) and Locking Devices have been removed	and returned to the Lock		1		
Coordinator:		~	- 1		
		Z#: /2.51 17/	ate 6 100		
32. Signature of Lock Coordinator:		THE	JOTOL		

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

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Continuation Page (print as needed)

Attachment B, LO/TO Orders	(Cont.)					
1. Work Document Number (i				2. LO/TO (Pa	rent) 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 Performed: Signature: 22. LO/10 vp://fied by:		g(s) installed, an	nd Zero Energy Checks	Sign vre:	and Positioning verified by:	ces Positioned: Z#: Date:
Siggare:	mes z	1/D86	1501	NA Signature:		Z#: Date:
•		/	, ,			

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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).
- 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).

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- 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.

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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. <u>Examples</u> 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?	X
What hazards in the work area may not have been considered during planning of this job	

Ezic Eznamosz 107001 5-10-18 Long Panero 11284 5-10-18 Revision #:

Form 2103



IWD#

Integrated Work Document (IWD) Part 3, Validation and 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 apprequired FOIs wirk-area representatives (e.g., area wor) coordinators). Plo (Signature (7#/Deta) Required to
PIC (Signature/Z#/Date) Required: 4000 0000 0000 0000 0000 00000 0000 0
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:

Work Release

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

Norker (Strature/Z#/Date) 2864 5 R	Worker (Signature/Z#/Date)
vor / I (Signature/Z#/Date)	Worker (Signature/Z#/Date)
Worker (Signature/74/Date)	Worker (Signature/Z#/Date)
Norker (Signature/Z#/Date)	Worker (Signature/Z#/Date)
Norker (Signature/Z#/Date)	Worker (Signature/Z#/Date)
Norker (Signature/Z#/Date)	Worker (Signature/Z#/Date)
Worker (Signature/Z#/Date)	Worker (Signature/Z#/Date)

Form 2103 (7/17) Page 2 of 2

Los	Alamos Faci	lities Maintenand	ce IWD – (Facility Maintenance Activity Specific Information)
Revisio	on #: 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"

•

FORM 2100-WC

APROIDAY.	lamos Faci	lities Maintenanc	e IWD – (Facility Maintenance Activity Specific Information)
Revision	n #: 0		Activity/Task Title: TA-52-0011 6M CYCLONE SEPARATOR/
			SHAKER LUBE/INSP.
Work D	ocument #:	(WO # / Task)	Planner/Preparer (Name/Z#/Date)
			Ralph Dominguez, 100538 4-25-18
TA:	Building:	Room:	Additional Location Description:
52	0011		

- 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.





FORM 2100-WC

W(H)AU	Alamos Faci	ilities Maintenand	ce IWD – (Facility Maintenance Activity Specific Information)
Revision	on #: 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	The RLM, and FOD or FOD	RLM (Signature/Z#/Date) Required 9/26/18
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.	FOD or Representative (Signature/Z#/Date) Hequired Recommended by RLM ESO Review (Signature/Z#/Date) If Required Safety Review (Signature/Z#/Date) Required (Line Day 117, 106, 41, 1516
IWD Type ☑ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is required Other Conditions for Re-Approval (Print) Name of Primary PIC Name of Alternate PIC Name of Alternate PIC	Any required classification review completed,



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

Form 2101

Non-Tena	ın
Activity Fo	rn

WD No /Work Request No: _	Revision #:							
acility Operation Director (FC azards and controls associate	DD) must determine the facility en ed with the activity location	try and coordination requireme	ents and identify the Envir	onment, Safety, Health (ESH)/Security and Safeguards (S&S			
FOD 7	TA 52	Bldg 0011	Room All	Other Location N/A				
FOD Designated	Name Bill Schleft	Phone 699-5790	Pager 664-3536	Email schleft@lanl gov				
Intry and Coordination Re	quirements (Check one or more	e of the following)		0 2				
No Entry/Coordination Re	equirements	FOD-designated facility	Point-of-Contact must sid	ın IWD Part 3				
Plan of the Day/Plan of th	•	Check in at Start of Wor	`	Training Required				
Security Clearance Requ	irements	Work must be Schedule						
Co-located Hazards/Con-	cerns	Other Security Requirer	ments (ex.: Cellphone, No	•				
Check out at End of Worl	k	Quality Issues	Check out [Daily				
Escort Required		Review under Authorization Basis (AB)/Safety Basis/Unreviewed Safety Question (USQ)						
		I Review under Authoriza	ation basis (Ab)/Safety ba	isis/Unreviewed Safety Quesi	uon (uow)			
Other Bounding Condition	ns: r to Job Hazard Analysis [JHA]		alion basis (Ab)/Safety ba	Isis/Onreviewed Safety Quesi	uon (USQ)			
Other Bounding Condition Additional Comments (refe	r to Job Hazard Analysis [JHA] ow, identify work-area hazards the to protect against the site hazard	Tool Facility Notes) at could potentially affect the was a swell as any special training	vorker(s) or others. Specif ng required.	y the facility controls and prev				
Other Bounding Condition Additional Comments (reference) In the block being be	r to Job Hazard Analysis [JHA] ow, identify work-area hazards the to protect against the site hazard	Tool Facility Notes) at could potentially affect the was as well as any special training	vorker(s) or others. Specifing required. AZARDS & CONTROL	y the facility controls and prev	ventive measures that must be			
Other Bounding Condition Additional Comments (referent process) Instructions: In the block belonglemented by the worker(s) Work Area Hazards/Concer	r to Job Hazard Analysis [JHA] ow, identify work-area hazards the to protect against the site hazard	at could potentially affect the was as well as any special training ESH/S&S WORK AREA H Work Area Hazard Present	vorker(s) or others. Specif ng required.	y the facility controls and prev	ventive measures that must be			
Other Bounding Condition Additional Comments (referent control of the plants of the pl	r to Job Hazard Analysis [JHA] ow, identify work-area hazards the to protect against the site hazard	at could potentially affect the was as well as any special training ESH/S&S WORK AREA H Work Area Hazard Present	vorker(s) or others. Specifing required. AZARDS & CONTROL Facility Controls/ Preventive Measures/ Bounding Conditions Specify preventive measures, controls and bounding conditions for	y the facility controls and prevalence Reference Documents List permits, operating manuals, and other	ventive measures that must be Training and Qualification List training requirements (P300, Integretated Work			

Form 2101 (6/12)

Page 1

ONTROLS
Reference Documents List permits, operating manuals, and other reference procedures It is training and Qualification List training requirements (P300, Integretated Work Management, Section 6.1)
r ards th rotating
ess has been applied appropriately.
OCE

Form 2101 (6/12) Page 2

Al 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....."

Al 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



Source Name:			- CONTROL OF CONTROL O	ATTON FOR	-	ATITAL			
	-22	POWEY PI	nd Boiler #3	Observation		. 0	Start		End Time
Source Location:		() Well I la	ng Boiler # 3		1/20.	18	9	:18	9:28
TA - 3	- スコ			Min Sec	0	15	30	45	Comments
Type of Source Boiler # 6	3	Type of Con	trol Equipment	1	0	0	20	10	white smake
Describe Emission Po	int (Top of s	stack, etc.)		2	0	0	5	0	12 m & 57 m/4
Top of				3				-	
Height Above Ground	Level Feet	Height Relative	to Observer 160 Feet	1 4	0	0	0	0	
Distance From Observ	er Feet		urce From Observer		0	0	0	0	
200		NN.	W	5	0	0	0	0	
Description of Plume (Lofting Trapping No Plume Present	stack exit of	ng □Fanning	□ Coning	6	0	0	0	0	
Emission Color	Plume Typ			7	0	0	0	0	
Water Droplets Present		ous 🗆 Fugitiv	e Mulntermittent	8	0	0	0	0	
MNO □YES IFYES,	droplet plur		□Detached	9	0	0	0	0	
At what point in the plu 2-3 f	t. aho	ve stack		10	0	0	0	O	
Describe Background (i	i.e. blue sky.	trees, etc.)		11					
Blue Sty Background Color Blue, Some wh Wind Speed	PRITTY	Sky Conditions		12					TEST IN
Wind Speed	Wind Dire	elion	loudy	13			- 17	15	
5 mph	(provide fr	om/to, i.e. from N	North to South)	14	(N	17			
Ambient Temperature		M South we Relative Humidi		15					toron is a
40 °F Additional Comments/Ir	· Formanti		60 %	16			1		
		un train		17	10				
Fuel oil Boile	· No.	3 Burn	er 1	18					
				19	1		70	AC.	Creation to the
Stack SOI	JRCE L	AYOUT SK	ЕТСН	20			+		
Plume Sun \bigoplus	Emis Po	ssion int	Draw Arrow in North Direction	Average 10-M	9	. ,		ange of	Opacity Readings Max. 20
Wind —	Q	9					cktor	Title:	Env. Prof
				Signature	ish	tock	ton		Date 3/14/2018
				Observer Org		n			
/	140	OBSERVER'S	POSITION	Certified by Aeron	net				Certification Date
S	UN LOCAT	TION LINE		Form ENV-CP-Fo	orm-1004				04/2015



		TITORTOR		TREET	, x x j		
Source Name: TA-3-22 Boiler	No. 3	Observation E		8	Start 4	Time 56	End Time
Source Location:		and the second s		_	/ /	00	10.00
TA-3-22		Sec	0	15	30	45	Comments
Type of Source Boiler No. 3	Type of Control Equipment	1	0	0	0	0	Lit Burner 3
Describe Emission Point (Top of		2	0		_	0	
Pop of Stac		3	+	0	0		
Height Above Ground Level	Height Relative to Observer		0	0	0	0	
Distance From Observer	Direction of Source From Observer	4	0	0	0	0	
200 Feet	NNW	5	0	0	0	0	
Description of Plume (stack exit of Loop		6	0	0	0	0	
No Plume Present Emission Color Plume T		7	0	0	0	0	
NA □Contin		8	0	0	0	0	
Water Droplets Present? ■NO □YES If YES, droplet pl	ume is Attached Detached	9	0	0	0	0	
At what point in the plume was or 2-3 ft above		10	0	0	0	0	
Describe Background (i.e. blue sky, trees, etc.) Blue sky		11	MES.				
Background Color Sky Conditions		12		18		116	
Blue sky Wind Speed Wind Di	BINE SKY	13					
5 mph (provide	from/to, i.e. from North to South)	14	17-1		de la constitución de la constit		6,77
<i>j-r</i>	om sh)	15					
Ambient Temperature 41 °F	Relative Humidity 50 %	16				186	
Additional Comments/Information		1 - 1 - 1		5.70		3.5	
Fuel oil Start	Up training Boiler No.3	17				1.7	
OWNER 3	21	18			31.54	100K	
		19					
Stack SOURCE	LAYOUT SKETCH	20					
6 /11	nission Draw Arrow in Point North Direction	Average 10-N	Minute (Opacity	- 1	Range o Min,	of Opacity Readings O Max. O
Wind —		OBSERVER Name: Mar			ton	Title:	Env. Praf.
		Signature (Marjon	ie 1	toch	An		Date 3/14/18
		Observer Or	-	on			
	OBSERVER'S POSITION	Certified by					Certification Date
	140°	Aeron	net				10/26/2017
SUNTO	ATION LINE	Form ENV-CP-I	orm-100	14		-	04/2015

Lab Home | Phone | Search

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

Note »

he 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	<u>Metric</u>
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	-	U.E.	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).



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Los Alamos

Source Name:				Observation D		IATTIAL		Time	T-470	
TA-3-5	22 Pc	wer a Steam F	lant	3121		/	1	ime 기:고	End Time	
Source Location:				Sec				1	7.	34
Type of Source		Type of Control Equipment		Min	0	15	30	45	Commo	ents
Boiler S	tack.	None		1	0	0	0	25		
Describe Emission Point	(Top of stack	, etc.)		2						
		east Stack	,		0	0	0	0		
Height Above Ground L	evel He	eight Relative to Observer		3	0	25		0	BI Tr:	ppec
Distance From Observer	Di	rection of Source From Observer		4	0	0	25	0	BI Tr.	PPe
	eet	N-NW	- 11	5	0	0	0	0		
Description of Plume (standard)	ack exit only)	□Fanning □Coning		6	0	0	0	0		
No Plume Present	Plume Type	□No Plume Present		7	25	0	0	0	By Trip	ما
White	□Continuous	☐ Fugitive ☐ Intermittent		8	0	0	0	0		-
Water Droplets Present? ■NO □YES If YES, dr	oplet plume is	□Attached □Detached		9	0	0	0	0		-
at what point in the plum	e was opacity	determined?	$-$ I \dagger	10	0	0	0			-
escribe Background (i.e.	blue sky, tree	tack Height	5	11	- / 6	374.5	127	0		7 00
Bue	Sky		1		18.5	0.63				1330
ackground Color	sky	Conditions	<u> </u>	12	19					
ind Speed V	Vind Direction			13						
2 mpn		o, i.e. from North to South)	- 1	14		CAN		15.7	10 m	San San
mbient Temperature		tive Humidity	- 1	15	1.42	* 5	5 2 0	10 3 10 10 100 10 10		Name
44 °F		20 %	¥-	16	1.00	A STATE OF THE STA	37554	10,570	The second second	
dditional Comments/Info				100000000000000000000000000000000000000	Frage /	21003	all of		a des actions	in the man
Boiler#3				17						
Emission	only	occurred	1	18	1		el. 1	· 6/4		1.00
when	٥٥٢٨	r tripped.		19						
tack SOUR	RCE LAY	OUT SKETCH		20.						Side of
lume			A	verage 10-Mir	nute Or	acity	P	ngo of	Opacity Read	
ın 🕁 📗	Emission Point	Draw Arrow in North Direction	\mathcal{H}	2.5	. •		M	in.	Max.	ings 2 <
ind —	(X)	(1)	0	BSERVER (p	lease pr	rint)	-1-			
	T			ame-	_		טראב.	Γitle:	DE	~
	80		Si	gnature					Date	
				0	Su	pe	Su	ً ا ب	312,16	ا ک
-			Ot	server Organ	ization					
		CEDVEDIC DOCUMENT		DE	SH	5-	S	S		
		SERVER'S POSITION	Ce	rtified by				C	ertification D	ate
/	140°		10	E.	TA			1.	212,11	8
SUN	LOCATION	LÎNE	For	m ENV-CP-Form	n-1004		-011		04/2	015

Los Alamos NATIONAL LABORATORY The Warder Gradual Barne Profesting America

Source Name:		Observation D	ate		Start	Time	End Time
TA-3-22 Pou	wer + Steam Plant	3/21			1	1:34	
TA-3-22		Sec					
Type of Source	Type of Control Equipment	Min	0	15	30	45	Comments
Boiler Stack	None	1	0	25	0	0	Bi tripped
Describe Emission Point (Top of st.		2	0	0	0	0	B3 onlose
	Height Relative to Observer	3	0	0	0	0	leak on B3 fix gashet
Distance From Observer	145 Feet	4	0	0	0	0	+ 12 Gastel
200 Feet	Direction of Source From Observer N - N W	5	0	0	0	0	
Description of Plume (stack exit on DLofting Trapping Coopin	ly) g □Fanning □Coning	6	0	0	0	0	
□No Plume Present Emission Color Plume Typ		7	0	0	0	0	
white Continue	ous Fugitive Intermittent	8	0	0	0	0	
Water Droplets Present? ☑NO □YES If YES, droplet plum	ne is 🗆 Attached 🗆 Detached	9	0	0	0	0	
At what point in the plume was opa	city determined? 2 Stack height	10	0	0	0	0	•
Describe Background (i.e. blue sky,	trees, etc.)	11			3 3	A	WILLSAM W.
Background Color	1/White Coods Sky Conditions	12		40		6/2005 s.	
Bue White Wind Speed Wind Direct	Broken	13	5.2			N/r	
a mph (provide fro	om/to, i.e. from North to South)	14	184			A.S.	
	Relative Humidity	15	1		10.766		
45 °F	19 %	16	· 安全				
Additional Comments/Information:	#143 Burners	17	50 Or				
	ccurred only	18			1		English State Stat
	ner tripped.	19			14. A	11 A F 11 C	to a second seco
Stack SOURCE L	AYOUT SKETCH	- 1886 F-1844				ACTIVITY OF	
with O Plume	a consider	20 Average 10-M				lhia i	
Sun \bigoplus Emis	37 1 20	-	ک کے ک			ange of lin.	Opacity Readings Max. 25
Wind —		OBSERVER (
		Name: 57 U	liou	_ P	300	Title:	, DEP
		Signature	201		0		Date
	-	Observer Orga	nizatio	0	,		3/21/18
		DE			us		
	OBSERVER'S POSITION	Certified by	^			(Certification Date
140		ET	14				212118
SUN LOCAT	TION LINE	Form ENV-CP-Fo	rm-1004				04/2015

SUN LOCATION LINE

Source Name:		ATION FOR Observation		AVALL 1		rite	7 1 1 1 1	
TA-3-22 Po	ver + Steam Plant		11(6	,		Time	End Time	
Source Location:	- Create march				9	:54	10:00	
74-3-22 Type of Source		Min	0	15	30	45	Comments	
Boiler Stac	Type of Control Equipment	1	0	0	0	0	B3 lit	
Pescribe Emission Point (Top of	stack, etc.) East Stack	2	0	0	25	0	B3 tripped	
eight Above Ground Level	Height Relative to Observer	3	0	0	0	0		
SO Feet istance From Observer	Direction of Source From Observer	4	0	0	0	25	B3 lit trip	
200 Feet	N- NW	5	6	0	0	0		
escription of Plume (stack exit of Lofting Trapping Loop	nly) ing □Fanning □Coning	6	0	0	0	0	Bi lit	
No Plume Present mission Color Plume Ty		7	0	25	0	0	Bitripped	
ater Droplets Present?	uous Fugitive Intermittent	8	0	0	0	0		
NO □YES If YES, droplet plu		9	0	0	0	0		
what point in the plume was op	acity determined? Stack Height	10	0	0	0	0		
scribe Background (i.e. blue sk	y, trees, etc.)	11.			1	14.14		
ckground Color .	Sky Conditions	- 12	9 5 1 1 1 1 1 1 1 1 1	0	0		17 - 67 W W W W	
Blue (White and Speed Wind Dir	- Broken	13	100	674	J. Fa	100		
	rom/to, i.e. from North to South)	14		10.	7.4	len.		
nbient Temperature	Relative Humidity	15	and a					
ditional Comments/Information	21 %	16	1000				a seas	
	#3+1 Burners.	17	1	**************************************				
Stack with Plume Emission Draw Arrow in North Direction		18	17			79		
		19						
		20		(A)				
		Average 10-Minute Opacity Range of Opacity Readings						
Ψ 1	oint North Direction		75		10)	····· 4	> Max. 25	
		OBSERVER Name:			>	Title:	~~	
ind — (X)	Signature	Ma	_ 1	>U~	51	Date DEP		
		130	سع	Su	~	3/21/18		
		Observer Org			, \ ,	-		
	OBSERVER'S POSITION	Certified by	E 5th	3-	UL		Certification Date	
						Jointheamon Date		

Form ENV-CP-Form-1004

04/2015



Source Name:	Observation Da	ate		Start	Time	End Time
TA-3-22 Power & Steam Plant	3/21/	18		10	: 35	10:45
TA-3-22 Type of Source Type of Control Equipment	Min Sec	0	15	30	45	Comments
Boiler Stack NONE	1	0	0	0	0	B1 1:+
Describe Emission Point (Top of stack, etc.)	2	0		(
Top of East Stack	3		0	0	0	
Height Above Ground Level Height Relative to Observer Height	4	0	0	0	0	
Distance From Observer Direction of Source From Observer		0	0	0	0	
18 18 18	5	0	0	0	0	
Description of Plume (stack exit only) □Lofting □Trapping □Looping □Fanning □Coning □No Plume Present	6	0	0	0	0	
Emission Color Plume Type Plume Present	7	0	0	0	0	
Water Droplets Present? □Continuous □ Fugitive □Intermittent	8	0	0	0	0	
☐NO ☐YES If YES, droplet plume is ☐Attached ☐Detached	9	0	0	0	0	
At what point in the plume was opacity determined? Of above Stack height Describe Background (i.e. blue sky, trees, etc.)	10	0	0	0	0	
Describe Background (i.e. blue sky, trees, etc.)	11			3	27.30	100000000000000000000000000000000000000
Describe Background (i.e. blue sky, trees, etc.) Blue SKy I White Clouds Background Color	12			William S	(1) personal (1)	
Background Color White Sky Conditions Broken	1 - 1 - 1 - 1 - 1 - 1	257	000	The A	75.0	A Paris
wind Speed Wind Direction	13	1954	200			
(provide from/to, i.e. from North to South)	14					
Ambient Temperature Relative Humidity	15				1.30	100 mg
Additional Comments/Information:	16				V.	
Boiler # 3, #1 Burner	17					- A SA
	18	and the			4.4	7.40
	19					
Stack with SOURCE LAYOUT SKETCH	20			0		
Plume Emission Draw Arrow in	Average 10-Mi	nute O		R	ange of	Opacity Readings
Sun Point North Direction	-E	}		M	lin. Z	→ Max. ←
	OBSERVER (p	lease p	rint)		m'ul	
	Name: Jill	ion	L TE	JUE	Title:	SEC .
	Signature				I	Date
	JB0	w	à	u	4	3/21/18
	Observer Organ					
OBSERVER'S POSITION		ESt	ts-	- W		
140°	Certified by					Certification Date
140		TA				2121118
SUN LOCATION LINE	Form ENV-CP-Form	n-1004				04/2015

LOS ALAMOS NATIONAL LABORATORY (LANL) Los Alamos VISIBLE EMISSION OBSERVATION FORM (10 MINUTE) Source Name: TA-3-22 Power & Steam Plant Source Location: TA-3-22 Type of Source Type of Control Equipment Boiler NONE Describe Emission Point (Top of stack, etc.) JAB 04 East Stack Height Above Ground Level Height Relative to Observer 150 Feet 145 Feet Distance From Observer Direction of Source From Observer 200 Feet N- NW Description of Plume (stack exit only) □Lofting □Trapping □Looping □Fanning □ Coning Plume Present **Emission Color** Plume Type Mo Plume Present □Continuous MIA ☐ Fugitive □Intermittent Water Droplets Present? ☐NO □YES If YES, droplet plume is □Attached □Detached At what point in the plume was opacity determined? 2++ above Describe Background (i.e. blue sky, trees, etc.) Blue Sky 1 white Background Color Sky Conditions Blue 1 Wind Speed Wind Direction (provide from/to, i.e. from North to South) 4.9 ESE to WNW Ambient Temperature Relative Humidity 46 Additional Comments/Information: Boiler #3, Stack SOURCE LAYOUT SKETCH with Plume Draw Arrow in Emission Sun Point North Direction Wind OBSERVER'S POSITION

SUN LOCATION LINE

Observation D			Start	Time		End Tim	е
3/21	118		10	:53	3	11:0	3
Sec Min	0	15	30	45		Comm	ents
1	0	0	0	0	e	31 4 8	
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	Ó	0	0	0			
- 11		15. 1 1.00	A STATE OF THE STA		2.4		
12				187 N			
13		8	10.0		7 10		
14							
15		2011	Vas				7 7 7 7 7 7 7
16		246	1		1000		
17							X
18	14.7g. 5	100			Valida Valida		
19							
20		2007					
Average 10-Mi	nute Op	acity			Opa	ity Read	dings
€)		M	ın. ←	⋺	Max.	-
OBSERVER (p Name:	lease pi	rint)		Γitle:			
Signature	ارس	~ P		Sir	1	DEF	
originature C	Pa			1	Date	<u>عدار</u>	2
Observer Organ	ization		50			(-
		ESt	+5	-u	LS		
Certified by				(ication I	, 1
7	TA			1		21/1	_/

LOS ALAMOS NATIONAL LARGRATORS

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.

dd 21 21 21 21	99999 2018 2018 2018 2018	hh 8 8		15 30 45		m/s 0.9 1.3	_	deg 81 E to W 87 E to W 79 E to W	deg-C 6.7 7.4 7.6	F 44.06 45.32 45.68	%RH 20 19 19	
	2018 2018 2018 2018 2018		D W W W	15 30 45	80 80	0.9 1.3		81 E to W 87 E to W 79 E to W	6.7 7.4 7.6	44.06 45.32 45.68	20 19 19	
21 21 21	2018 2018 2018	10 M M	D W W	30 45	80 80	1.3		87 E to W 79 E to W	7.4 7.6	45.32 45.68	19 19	
21 21	2018 2018	~	D W	45	80	1.4		79 E to W	7.6	45.68	19	
21	2018		ט	>	2	ı L						
	1		•	C	ŏ	2,3		118 ESE to WNW	7.1	44.78	21	
21	2018	10	U	15	80	1.9		98 E to W	7.2	44.96	20	
21	2018		w	30	80	2.1		97 E to W	7.8	46.04	19	
21	2018		w	45	80	2.2		119 ESE to WNW	8.2	46.76	18	
21	2018			0	80	1.8		117 ESE to WNW	8.9	48.02	17	
21	2018		Ü	15	80	2.1	4.7	107 ESE to WNW	9.1	48.38	16	
	21 21 21 21 21 21		2018 2018 2018 2018 1 2018 1		2018 9 2018 9 2018 9 2018 10 2018 10	2018 9 30 2018 9 45 2018 10 0 2018 10 15	2018 9 30 80 2018 9 45 80 2018 10 0 80 2018 10 15 80	2018 9 30 80 2.1 2018 9 45 80 2.2 4 2018 10 0 80 1.8 4 2018 10 15 80 2.1	2018 9 30 80 2.1 4.7 97 2018 9 45 80 2.2 4.92 119 2018 10 0 80 1.8 4.03 117 2018 10 15 80 2.1 4.7 107	2018 9 30 80 2.1 4.7 97 Eto W 2018 9 45 80 2.2 4.92 119 ESE to WNW 2018 10 0 80 1.8 4.03 117 ESE to WNW 2018 10 15 80 2.1 4.7 107 ESE to WNW	2018 9 30 80 2.1 4.7 97 eto W 7.8 2018 9 45 80 2.2 4.92 119 ese to WNW 8.2 2018 10 0 80 1.8 4.03 117 ese to WNW 8.9 2018 10 15 80 2.1 4.7 107 ese to WNW 9.1	2018 9 30 80 2.1 4.7 97 eto W 7.8 46.04 2018 9 45 80 2.2 4.92 119 ese to wnw 8.2 46.76 2018 10 0 80 1.8 4.03 117 ese to wnw 8.9 48.02 2018 10 15 80 2.1 4.7 107 ese to wnw 9.1 48.38

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

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

				D	nit TA-	3-22-1	(Boiler	Jnit TA-3-22-1 (Boiler 1) pph					Allowable
	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Emissions ^(a)
NOX	3.69	3.78	3.05	2.44	00:00	0.00							10.2
SOx	0.04	0.04	0.03	0.03	00.0	0.00							1.1
PM	0.48	0.50	0.40	0.32	00.0	0.00							1.3
PM-10	0.48	0.50	0.40	0.32	00.0	0.00							1.3
PM-2.5	0.48	0.50	0.40	0.32	00.0	0.00							1.3
00	2.55	2.61	2.10	1.69	00.0	0.00							7.0
VOC	0.35	0.36	0.29	0.23	0.00	0.00							1.0

				\supset	nit TA-:	3-22-2	(Boile	Jnit TA-3-22-2 (Boiler 2) pph	_				Allowable
	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	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
00	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

				\supset	nit TA-	3-22-3	(Boile	Jnit TA-3-22-3 (Boiler 3) pph					Allowable
	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Ang	Sep	Oct	Nov	Dec	Emissions ^(a)
NOX	3.04	2.88	1.87	0.00	00.00	00.00							10.2
SOx	0.03	0.03	0.02	0.00	0.00	00.0							1.1
PM	0.40	0.38	0.24	00.0	00.0	00.0							1.3
PM-10	0.40	0.38	0.24	0.00	0.00	00.0							1.3
PM-2.5	0.40	0.38	0.24	0.00	0.00	00.0		×					1.3
00	2.09	1.98	1.29	0.00	0.00	0.00							7.0
NOC	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.

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 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 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 this spreadsheet. 1412/1711

Monthly Emission Calculation (Fuel Oil) 2018

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

					Unit T	Unit TA-3-22-1 (Boiler 1)	-1 (Boi	ler 1)					Allowable Emissions ^(a)
	Jan.	Feb.	Маг	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ĪŌ
NOX	00:0	00.0	00.00	00.0	0.00	0.00							11.3
SOx	00:00	00.0	00.00	00.0	0.00	0.00							9.6
PM	00.00	00.0	00.0	0.00	00.00	00.00							4.3
PM-10	00.0	00.00	00.00	0.00	0.00	00.00							3.0
PM-2.5	00.00	00.0	00.0	00.0	0.00	0.00							2.0
00	00.0	00.0	00.0	00.0	0.00	0.00							6.5
VOC	00.00	00.00	00.00	00.0	00.0	00.0							0.3
													Allowable
					Unit T,	Unit TA-3-22-2 (Boiler 2)	-2 (Boi	ler 2)					Emissions ^(a)
	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ΙΘ
NOX	00:0	00.0	00:0	00.0	0.00	0.00							11.3
SOx	00.00	00.0	00.0	00.0	0.00	00.00							9.6
PM	00.00	00.00	00.00	0.00	0.00	0.00							4.3
PM-10	00:00	00.00	00.0	0.00	0.00	0.00							3.0
PM-2.5	00.0	00.0	00.00	0.00	0.00	0.00							2.0
CO	00.0	00.0	00.0	0.00	0.00	0.00							6.5
VOC	00.00	00.00	00.00	0.00	00:00	00.00							0.3
													Allowable
					Unit T,	Unit TA-3-22-3 (Boiler 3)	-3 (Boi	ler 3)					Emissions ^(a)
	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Oil
NOX	00:0	00.00	10.23	00.0	00.0	0.00							11.3
SOx	00.0	00.00	8.74	0.00	0.00	0.00							9.6
PM	00.0	00.0	3.91	0.00	0.00	0.00							4.3
PM-10	00.0	00.0	2.72	00.0	0.00	0.00							3.0
PM-2.5	00.00	0.00	1.84	0.00	0.00	0.00							2.0
00	00.0	00.0	5.92	0.00	0.00	0.00							6.5
VOC	00.0	00.0	0.24	0.00	0.00	0.00				0			0.3

2018 TA-3 Power Plant

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

Pollutant	TSP	PM10	NOx	со	voc	SO₂
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	1					
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
Мау	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 P	ower Plant	Fuel Use 1	TA-3 Power Plant Fuel Use Totals 2018 (Data Entry)	(Data Entr	S	
			DATA ENTRY	ENTRY			(10m)	
	TA-3-22 Pc	TA-3-22 Power Plant ^b	TA-3-22 Pc	TA-3-22 Power Plant ^b	TA-3-22 Pc	TA-3-22 Power Plant ^b		
	Works, 210	Works, 210 mmBtu/hr)	Works, 210	Works, 210 mmBtu/hr)	210 mm	210 mmBtu/hr)	Monthly Totals	Totals
	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
Month	(mscf) ^a	(gallons) ^a	(mscf) ^a	(gallons) ^a	(mscf) ^a	(gallons) ^a	(mmscf) ^a	(gallons)
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	000'0	0

	12-Mo.	12-Mo.				Hours of	Hours of	Hours of	12-Month
	Rolling Total	Rolling Total	Hours of	Hours of	Hours of	Operation	Operation		Rolling Total
Month	Natural Gas (mmscf)	Fuel Oil (gallons)	Operation Nat Gas Boiler 1	Operation Nat Operation Nat Operation Nat Gas Boiler 1 Gas Boiler 2 Gas Boiler 3	Operation Nat Gas Boiler 3	Fuel Oil Boiler 1	Fuel Oil Boiler 2	Fuel Oil Boiler 3	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							

	De: 11 c. 1		2		Deile-4	
	Boller 1		Poller 2		Boller 3	
	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil	Natural Gas	Fuel Oil
	(mmscf)	(gal.)	(mmscf)	(gal.)	(mmscf)	(gal.)
Month						
January	98	0	168	0	82	1,469
February	105	0	146	0	98	1,469
March	141	0	117	0	98	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						

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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

	Dec	· 0	+																																					ر
-	_	Gas	╁	1																				1																MMscf
	Nov		+	-	1						L																													128.87
-		Gas	+	1							L																													
& nours or Operation	Oct		+	+	+					-																														Annual Gas Use:
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OSIN	Sept	Gas	2								-																												ŀ	Ani
	0)	-			1					L																										13		L		cf
das Ose,	Aug	, c	+	+	-																								- 1											MMscf
0a%		Gas	+	1																																				0.0
12 Month Rolling Lotal	July	Į	-	+	+																																	Y		e:
		Gas	+									L																							2			L		sas Us
	Jun	S T	+		00	0.0	0.0	0.0	0.0		+	0.0	0.0	0.1	0.0	0.0	0.1	1 0.5		0.0	0.0	0.1	0.0	5 1.5	0.0	0.0	0.0	0.0	0.0	0.0	8 7.0	0.0	0.0		7 13.5	145,870	145.9	599		Second Half Gas Use:
N Z	_	Gas	-	1	4	0	0 0	0 (2	60	⊢	0	0	10	0	0	3 29	111		0	0	21	0	345	0	0 0	0 (0 0	0	0	1458	0 (0 0		2 2937	14				Second
USE (MSCII),	Мау	E S	+	5 6	0.0	0.0	1 4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		6 19.2	148,493	148.5	609		•
2000	_	Gas	4	1	0.0	0	1041	0 (0					0 25	5 0	0	0 14	0 16	0 0		0	0 0	0 0	0 0	0 0.	0 0.	0 1337	0 0	0 0.	.5	0	0 (0	1773	16 4206	14			4	
	Apr	H		5 6	0.0	0	0.0	8.0	0.0	0.0	0.0	3 6.5															3 24.0			80	0.0	0.0			4	149,967	150.0	614	5	
I UI DIII G GAS		معا ا عدي				0	0	2193	0	0	0	1553	4610	5175	5341	6165	6093	5707	5647	5881	5985	6415	5595	5897	4912	5739	5823	5887	3966	2419	0	0	0		101003	148	Ť			
	Mar	Ţ	+	+	0.0	0.0	0.0	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	8.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	29	845	54.8	222		MMscf
CIZUIO DAIIN	2	Gas	2130	1		0	0	0	0	0	2057	0	0	0	0	0	0	837	0	0	0	0	0	0	1960	0	0	0	0	0	0	550	0		7543 29	54,	ζ	2	_	128.87
0717	Feb	I	2 0		0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.02	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				16.32	51,536	51.5	210	1	
	ŭ	Gas	2007			٥	0	0	0	0	2064	0	0	0	0	0	9	82	0	0	0	0	0	0	0	0	0	0	0	0	0				4159	51,	51	5,		s Use:
	ے	Į.	200		0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	3.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	35	.29	7	C		First Half Gas Use:
	Jan	Gas				٥	2106	0	0	0	0	0	0	2109	0	0	0	0	0	0	1982	0	0	0	763	0	0	2060	0	0	0	0	0	0	9020	51,729	51.7	210		First h
ľ	Day 📙		-	- (7 0	₂₀	4	5	9	7	80	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	56	27	28	29	30	31	SUM	Mscf	MMscf	rs.	Н	
	<u></u>				_	!		_	_	_	_		_	_	_	_		L				_											_		_	989 110		OURS	Н	

CGTG Hours of Operation and Gas Use

Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1-June 30, 2018

ATTACHMENT A1307.D.

TA-03 Power Plant

Turbine Operating Logs

120 50 Max 120 120 120 120 FUIL 80 50 Max 85 20% Not operational No No 1200 1200 1200	120 50 Max	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		104 (20 10 10 10 10 10 10 10

GAAS COMPRESSOR START TIME Combustible Gas Detector Packing Lube Oil Flow Indicator Left Side Liquid Level Coalescing Crankcase Bulls eye Oil Day Tank Level Lubricator Bulls eye	0620 AAH-303 FSL-1501B L LI-7721 L LC-1574 L LI-1562 L	Watto Watt	Low No C C BL BL EV 1/4 J 1/2 FI	Norm Max 0% 20% BLINK EMPTY ANY 1/2 FULL FULL	20% ANY FULL	2	ω	4 w	6	7	1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10 10 10 10 10 10 10 10 10 10 10 10 10 1	TI MENTILY	3 ZENNIZIT	2 2 6 4 5 2 to	9		12 12 12 12 12 12 12 12 12 12 12 12 12 1	14 15 16 16 16 16 16 16 16 16 16 16 16 16 16		14 15 16 16 16 16 16 16 16 16 16 16 16 16 16		14 15 16 17 18 19 20 MK VIII K Y Y	14 15 16 17 18 19 20 21 MA-MIT SS 173 SS 17	14 15 16 17 18 19 20 MK VIII K Y Y
Liquid Level r Liquid Level	LI-7416 L		_	EMPTY ANY	4 4			+		X		10	1 1	NW.	7 17	1 m		1 m							
Right Side	7	LHBIT	B	BLINK	- 1			-						00	30	7 T		7 P							
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2nd Stage Inlet Press		psig	2	-	8						2422	<	¥2 4	324424	324424428	3244344285283	32443442852413247	1126 ME SAT MENTER	324424 245 249 247241	3244241285 243 243261	124424 545 545 MILLER	124424 5HC 5HC 5HC 14542K	3244244245243243241	3244241285243247241	3241241285 243 243 26/1
2 rd Stage Disch. Press		Bisd	υį		ŏ			_			595	2	5	1 578 57	1 578 57 45%	1 578 57 45% 579	578 57 457 57 9529	1 578 57 454 87 9529578	576 574 578 57 95% 57 9529578	r 578 57 45% 87 8578578	r 578 57 45 1 87 8529578	1 579 57 45 1 87 95 295 78	1 578 57 95% 87 98 29578	1 578 57 45 1 87 95 29578	1 578 57 457 87 95 295 78
essure	L		+	575 600	8			H	H		5745	74	5	574575	574574574575475	745 545 545 BA	24578 518545hts	51.51 LSMED \$145LShLS	515465 545 516545	5134 65 469 5245 13415	51.54 L5 MAS 5155 L5 ALS	11.50 LS 148 545 LS 16.51	5184 LS 1485 ST45 LS 1418	5134 15418 \$1451 51451	11.54 L5 HAS \$14.51 54.55
Lube Oil Temp	PI-1572 TE-1584	deg 40	+	60 150 170	6				1		572 5757	50	14	-	27 28	17 28 8	17 28 8	27 28	17 28 8	17 28 8	17 28 8	17 28 8	17 28 8	17 28 8	17 28 8
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ch. Temperature A	TE-2054 A	deg	2:)7						107.6 2	10	2	206 207	206 207 208	207 208 2	206 207 208 209208	19208	206 207 208 209208 201	206 207 208 209208 207	206 207 208 209208 207	206 207 208 209208 201	206 207 208 209208 20)	206 207 206 209208 201	206 207 208 209208 201
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	TE-2054 B	deg	2:	226 297)7						2 50	80	0	204204	20420475	205 20920420425 206	20420425 200205	20420425 206205 205	20420425 206205 205	20420425-206205/205	20420425-206205/205	20420425206205205	20420425 206205 205	20420425 206205 205	20420425 206205 205
h. Temperature B	00	deg	2	258 283	23						205 2	150	20	20720	20/20922	20/20/2022/6	20/20/20 2/6 2/6	20120922216 21626	20/209 20 216 218216	20/20/20,216 2/1/21	20/20/20216 2/426	20/20/2022/6 2/42/6	20/209222/62/426	20/20/22/216/2/14/	20/10/22/2/6 2/62/
Motor Frame Vibration	VI-1015	Ž 3	+	0.25	ž U	I	1	+	+	I	65,03	10	0	10000	05,00,00,00	10	10	10 50 00 100 00 00	10	10	10	10	10	10	10
_oad		psig	_	Max psid		en the	differe	ntial p	ressure	ехсеє	ds Ma	ě	g:	sid the filt	sid the filter sha	2								0 1	
Natural Gas Comp.Discharge Press.				-							4	575													
Double Block and Bleed Pressure	A63FGDT 4	49-48-psid	ā	00	_								0	9	9	8	8	8	8	8	8	8	8	8	8
Fuel Gas Supply Pressure A	A63FTGST 5	50-49=psid	ď	20	-			-			557	133	-												
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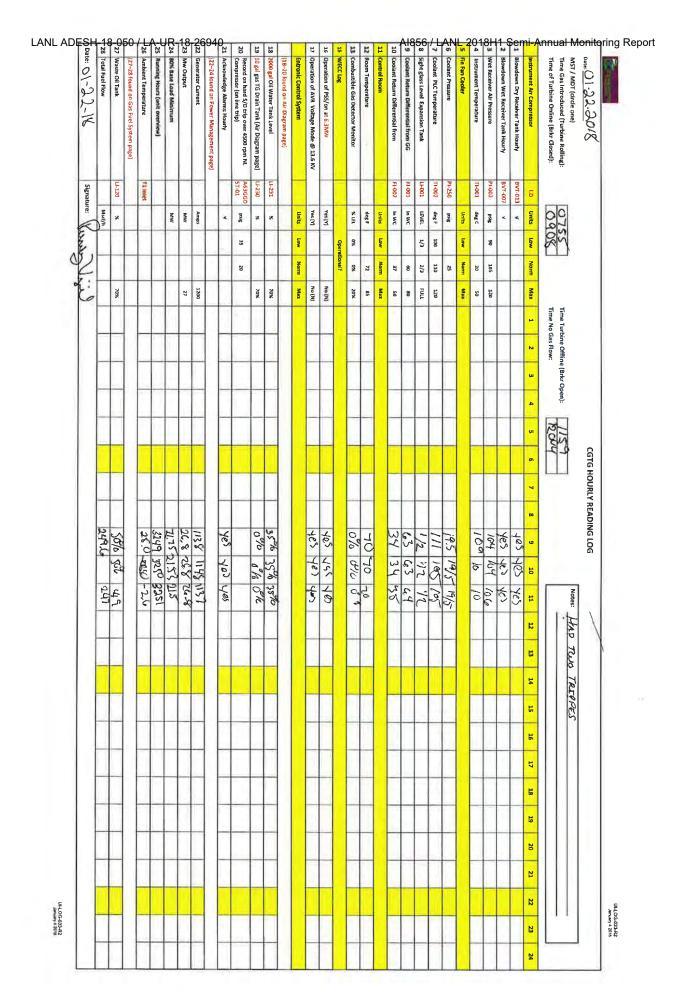
VERM	SHIPCIUM						2	GIGG	CGTG GAS TURBINE	I E		1,120	NII)	distance and the	E (II)			and s
	0642					Time Turbine Offline (Brkr Open):	ne Offline	e (Brkr C	<u>)pen):</u>	1	5	2				Notes:		
Time of Turbine Online (Brkr Closed):	6752					Time No Gas Flow:	s Flow:	- 1			0	S		12				
nstrument Air Compressor	1.5	Units	Low Norm	orm _	Max	1 2	w	<u>4</u>	о О	7	<mark>∞</mark>	10	1	11 12 13		14 15	5	16
Blowdown Dry Receiver Tank Hourly	E10-178	4						_		4	e) ic	Ķ	ž	7	10°	è	\$	
Blowdown Wet Receiver Tank Hourly	BV7-007	<								7	Cot of the say say to you	5	425	色	5	ं ।	5	
Wet Reciever Air Pressure	PI 002	psig	90	105	120					7	5015	3	3	100	5	K	103	
Instrument Temperature	11.00.11	deg C		20	50						11/	7	3	5	7	8	7	
長in Fan Cooler		Units	Low N	Norm	Max			1						Ì			t	
Goolant Pressure	Pt 250	Bisd		25				-		16	19.5 19.5 19.5 19.5 19.5 19.5 19.5 19.5	19.5	19	PS.	7	25	E	
Coolant PLC Temperature	11 002	deg F	100	110	120					>	109 106	109	164	3	2	25.07	20	
Sight glass Level Expansion Tank	100-12	LEVEL	-	2/3	FULL			-		1	1/2 1/2	1/2	13	7	T	7	7	
goolant Return Differential from GG	1001	In WC	-	8	88			4			260	10	S	8	60	ec .	0	
10 Coolant Return Differential from	FI-002	In WC		37	50					W	35 35	35 35 35 35 35 35 35	35	35	3	3	3	
Control Room		Units	Low N	Norm	Max													
12 Room Temperature		deg F		72	85					7	600	70	70	16	0	76	8	
Combustible Gas Detector monitor		% LEL	0%	0%	20%					90	0% 0% 0% 0% 86 0% 0% 0%	0%	60	36	200	80	0%	
WECC Log			품	onal?														
16 Operation of the PSS/::: a 5 28/9/		Yes (Y)			No (N)					4	के के कि देन राम राम राम राम	Yes	É	\$	Ē.	\$	ō	
Operation of the AVR Voltage Mode @13.6 KV		Yes (Y)			No (N)					40	yes C	Yes	74 Jes Jes 49	É	15	401 VS	2	
Entronic Control System		Units	Low N	Norm	Max	I		-		-	t	ı						
(18-20) found on "air diagram page"	es .																	
2000 g≢ Oil Water Tank Level	11-231	%		L	70%					7	JA 945	74 545 745 745 245 8458	245	3	1/e	348	49%	
10 🙉 Gas TG Drain Tank (air diagram page)	11 230	%			70%					Q e	30 20 000 000 000 000 000	200	0%	1/6	We	200	0%	
r 4500 rpm	463660 57-01	psig	35	20								\						
21 Acknowledge Alarms hourly		<								7	5	5	7	<	1	7	7	
122-24) found on "pawer management page	aged																	
Generator Current		Amps			1200					1103	Ē	- 1085 1087 101 101 1045	82	673	ತಿ	Del	3	
Nw Output		WW			27					26	201 125.8 15.6 Exe 125.8 25.7 25.1	3:5	3.2	15.5	S	7	2	
80% Base Load minimum		WW						-		2	21.1 20.93	320-696-56 2030 20-4 20-4 20-4	35.0	2070	5.0	20	6.	
Running Hours (Unit overview)										3,	W.08131	CLE POSTENCIA LOS CONTRACTOR SEGULATION SEGU	425	3	8	8	E	
	Fi intet			4				-		٧.	26. 24. 25. 17. 25. 17. 18. 18. 18. 18. 18. 18. 18. 18. 18. 18	37.4	25	<u>S</u>	هہ	50	23	
$\phi_{\rm c}$ = (27-28) found on "gas fuel system p	We.			4				+		-					1	4		
Waste Oil Tank	LI-120	%			70%					50	50% 49%	127 28 78 7.8 1 28 4 28 4 28 H	487	30	3	88	2	
		Mecf/h									045 1243	24 24 235 140 D8502	Ĭ	4	٤	200	1	

LANL ADESH-18-050 / Allie Shind Shin	Lube Final I 1 st Stat 2 nd Stat 1st St 2 nd Stat 2 nd Stat 1st St 2 nd Stat 2 nd Stat	Fina and a state of the state o	Semi-Annual Monitoring Report
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tural Gas Compressor		Units L	Low Norm	n Max	1 2 3	4 5	6 7	8 9 1	10 11 1	12 13 1	14 15	16 17 18	19	20 21	22 23 24
IS COMPRESSOR START TIME ()(4)()											-	1000			
mbustible Gas Detector	AAH 303	%	0%	20%			-	UK NIA NIA	3	3					
cking Lube Oil Flow Indicator Left Side	FSI-1501B	Пент	BLINK	~				BUS	13 8	7	2				
quid Level Coalescing	H 7721	LIQID	EMPT	EMPTY ANY				T T	(T)	77	[TI				
ankcase Bulls eye	10.1574		1/4 1/2	FULL				1/2 1/2 17	72 1/2 1/2	بح	1/2/1/2				
il Day Tank Level	11-1562		10	FULL			7	Sh Jh Sh	,	15	545				
oricator Bulls eye			1/2 FULL					7	7	+1	7				
t Stage Scrubber Liquid Level	11) 7416		=	Y ANY				FFE		47	T				
nd Stage Scrubber Liquid Level	LI 7466	LIQID	EMPT	EMPTY ANY				-	L	N					
acking Lube Oil Flow Indicator Right Side	FSL 1501A	Пент	BLINK					B B B	~ ∞ □		5				
Stage Inlet Press.	PJ 2100	gisq	88	140			8			2 13	38				
age Disch. Press	PF 2101	Bisd	238	-			25	1246 296 1247	17 247 24	8124824	8249				
d Stage Inlet Press	PF 2200	gisq	267				יכו	14212475A7	13 244 244 244	14/244 24	1 544 546 h		100		
Stage Disch, Press	PF 2201	psig	575	-			O.	578 578 579	5 645 6	1361361	A 579				
nal Discharge Pressure	Pt 2108	gisq	575				03	57457 57	5 243	2 hrs hrs	214212				
be Oil Pressure	Pl 1572		40 60	3			S	7 57 5	515	5 13 1	57 57				
ube Oil Temp	(F 1584	deg	150	170			1	11 OLT 671	1 17 17	Z.	170170				
hal Discharge Temp	11 2120	deg	110	150				70 71 7	3 75 7	777	821 6				
Stage Cylinder Disch. Temperature A	TE-2054 A	deg	226	297			2	or 800 80	8 2072	7 20720	138				
Stage Cylinder Disch. Temperature A	TF 2062 A	deg	258	-			2	05 205 30	7 60,21	221021	221				
t Stage Cylinder Disch. Temperature B	18 2054 B	deg	226	-			2	206 206 205 204 204 204 204 203	< 204 20	4 264 26	203				
Stage Cylinder Disch. Temperature B	TE 2062 B	deg	258	283			9	05 26 RO	10 100 Del 100	2/02	12/				
tor Frame Vibration	VI 1015	IPS		0.15			Į.	03 103 .03 .03 63	3 . 03 63	\$0,505	5 63				
mpresser Frame Vibration	VI-151Z	IPS		0.35				8 .00	05.05 05	5 65 65					
ke Once per Shift / at Full Load		gisq	Ma	Max psid	When the differential pressure exceeds Max psid the filter should	erential pres	sure excee	s Max psid	the filter s		changed o	be changed out. Notify System Engineer	System En	gineer	
tural Gas Comp.Discharge Press.							5	575							
uble Block and Bleed Pressure	A63FGD1	49-48=psid	sid	8			5	00							
el Gas Supply Pressure	A63FIGSI	50-49=psid	sid	20				550		1				E	-
1-11-18															
SNATURE (LAW York															
id Shift															
ys Shift															

	TAPOTORE				CGTG GAS TURBINE	BINE	!
me Gas Introduced (Turbine Rolling):	0623				Time Turbine Offline (Brkr Open):	Free	8
Hame of Turbine Online (Brkr Closed):	0756				Time No Gas Flow:		1 2101 2 10 10 10 10 10 10 10 10 10 10 10 10 10
Bistrument Air Compressor	3	linite I	Manuel			1	
lowdown Dry Receiver Tank Hourly	EVF-015		TOW MOLL	XBIAI	00 00 00 00 00 00 00	9 10 11	
Blowdown Wet Receiver Tank Hourly	EVT-397	1				1111	1
Wet Reciever Air Pressure	FF-902	gisq	90 105	120			
nstrument Temperature	1:001	-		50		011 211 011 181 1017 11301 491	110
In Fan Cooler	1		Low Norm	Max		1	
polant Pressure	§(-250	psig	25			10	-
Coolant PLC Temperature	1 002		100 110	120		2	7 (4)
ight glass Level Expansion Tank	1-001		1/3 2/3	FULL		7	100
Colant Return Differential from GG	1.001			88		1	12
Golant Return Differential from	FI-002	in WC	37	50		3575 75 75 35 75 75 75	200
Control Room			Low Norm	Max		100000000000000000000000000000000000000	36
Room Temperature	a	-	72	85		6769676976777	htt
Compustible Gas Detector monitor	20	%LEL C	0% 0%	20%		0000	
WECK LOG		op	Operational?				
Operation of the PSS/C 22 3 3 4 7 4	Y	Yes (M)		No (N)		YES YES USE YES VI WE	25.
KV	Y6	Yes (Y)		No (N)			
Entronic Control System	-	Units Lo	Low Norm	Max		col 26/ 10/ 10/ 10/ 10/ 10/	COL
118-20) found on "air diagram page							
ੀ ੂੜ Oil Water Tank Level	7.251	%		70%	1	PONT HE ME SE 35 35 35	had bah
ಗಿರಿ ಜ್ಞಾನ Gas TG Drain Tank (air diagram page)	15250	%		70%		0000	0
Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	10-13 10-13 10-13	psign 3	35 20				
Agknowledge Alarms hourly		1					
22-24) lound on lide well management	25.50					0	
Generator Current	Ar	Amps		1200		978 978 2702 470 970 970	919
New Output	2	WW		27		23,0 22,723,/25/23 23 /21	
80% Base Load minimum	~	WW				21 0 2 1 0 20 1 20 1 20 1 20 1 20 1 20	
Ranning Hours (Unit overview)						1.64 / 1.16 1.47 7.27 / 1.22 4.102 0.12	737
Agbient Temperature	TO PRICE					11-15 Shr 11-5 Ch 7511-Cill-C 22	320
(27-28) found on 368 fire system pa	-B					32 77 70 77 73 H 4950	6
	11-120	%		70%		1 50 HO LIE WILL OF 13	
8 Total fuel flow	Ms	Mscf/h				771 72 177 77 77	

CGTG TURBINE		9	ILITIES	UTILITIES AND INFRASTRUCTURE	NFRAS	KUCI	CZE									ľ									
Natural Gas Compressor GAS COMPRESSOR START TIME		Units	Low	Norm	Max	1 2	3	4	u	o	7 8	9	10	11	12 1	13 14	15	16	17	18	19	20	21	22	
Combustible Gas Detector	AAH-303	%	+	8	20%	+	1			1	VIA		4/4	111	+	1	1	1	N.					T	
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LIGHT	8	즤		-				4	2		2	3	7	12	Ø	1		10				T	
Liquid Level Coalescing	LI-7721	LIQID	9	_	ANY	-	+			4	M	1	7	,dk	3	7	6							1	
Crankcase Bulls eye	LC-1574		1/4	1/2	FULL	-					,,	1/2	1/2	1/2	×	1/2	2							1	- 1
Oil Day Tank Level	U-1562		10	_	FULL	4				_	ı	~ 1	5,4	エグ	5	7	表	+						7	
Lubricator Bulls eye		LEVEL :	1/2 F	FULL							7	0	7	11	-	11	7							1	
1st Stage Scrubber Liquid Level	LI-7416		_		ANY	-					M	N	M	10	1	N	3						П	T	
2nd Stage Scrubber Liquid Level	LI-7466	LIQID	9	EMPTY /	ANY						3	E	3	1	A Y	_									
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT	00	BLINK							B	\$	B	- 4	9		2		H						
1 st Stage Inlet Press.	PI-2100	DSig	-	8	140	-	-			-	57	52	18	82 8	2	~	2								
Stage Disch. Press	PI-2101	gisq		-	285						24	248 24 24 279242	24	2442	1/24	19 2 9	4925624								
2nd Stage Inlet Press	PI-2200	Bisd		-	285						24	1240	1742	3	2	1	248				1				
2 nd Stage Disch. Press	PI-2201	Bisd		-	600						57	5785786785785	845	3.5	7	3	578 57857		Ĩ						
Final Discharge Pressure	PI-2108	Bisd		575	8						571	1745571346141S	37.65	74	17	2	252								
Lube Oil Pressure	PI-1572	100	40	\dashv	_						5	2363	365	7		7	7 58 50								
Lube Oil Temp	TE-1584	deg		_	170						Z	1517	1201	17011105	2	2	37/0								
Final Discharge Temp	TE-2120	deg			150						7	7071	74	8 7	500	50	12 5 26								
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226 ;	297						10	105205206207562	206	070	2	920	7 209	Ĩ	Į,						
2 nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg	2		283						20	203 203 206 209 211 2	206	09 2	11 2/	12	14 27218								
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg	N.	226 ;	297	-					20	203	203	042	520	620	06206 206								
2 nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg	2	258 7	283						20	203 203 206 209 2112,	206	192	12/	143	8128125	ĺ							
Motor Frame Vibration	VT-1015	PS		0	0.15	25.					0.	04.03.03.03.03.	03	03 6	-	0,8	3,03.04								
Compresser Frame Vibration	VT-1512	PS		0	0.35	-					0,0	20.20	,05,06 05	2 90	P 1	6.5	30.20.3								
Take Once per Shift / at Full Load		Bisd		Max psid		When the differential pressure exceeds Max psid the filter should be changed out. Notify System Engineer	ne diffe	erentia	l pres	sure ex	ceeds	Max p	id the	filter	hould	be c	lange	d out.	Notif	y Syst	em E	ngine	er		
Natural Gas Comp.Discharge Press.			-	_								575		4	H										
Double Block and Bleed Pressure	A63FGDT	49-48=psid	sid	Н	00							250													
Fuel Gas Supply Pressure	A63FTGST	50-49=psid	sid		20	-	F				H	125		H	H	H	П						T	П	
DATE 1-18-2014																									
SIGNATURE	8																								
Mid Shift /																									
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LANL ADESH-18-050 LAND 18-18-18-18-18-18-18-18-18-18-18-18-18-1	The result of the second control of the seco
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GIG TUKBINE		<u>c</u>	CHIES	AND	NEKASI	UTICITIES AND INFRASTRUCTURE																
atural Gas Compressor		Units L	Low N	Norm N	Max	1 2 3	4 5	6 7	∞	9 10	11	12 1	13 14	15	16	17	18 1	19 20	0 21	1 22	2 23	3 24
AS COMPRESSOR START TIME	2			-						-	1		H	Ī			H	+	H	H	+	-
Sombustible Gas Detector		%	L	_	20%					-	+		-	T		1	ł	+	+	+	+	+
acking Lube Oil Flow Indicator Left Side	FSL-1501B	HEHT	В	BLINK						V	_		+	T		-	+	+	+	+	+	+
Liquid Level Coalescing	LI-7721	UQID	<u></u>	EMPTY ANY	ANY					+	N		-				-	-	H	-	+	-
Crankcase Bulls eye			1/4	1/2 F	FULL						ルケ		-					-	-	-	-	
Dil Day Tank Level			10	77	FULL		1			_								-	-	H	-	-
ubricator Bulls eye				£ E			J										-		-		-	-
Stst Stage Scrubber Liquid Level	LI-7416			-	ANY					च च							-	-	-			-
2nd Stage Scrubber Liquid Level	LI-7466	LIQID	Ξ.	EMPTY /	ANY					H K	4						-	H	-	-	-	-
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	HEHT	B	BLINK						B	Ø		H					-	-	H		
झ Stage Inlet Press.	PI-2100	psig		88	140					18 18	13						-	Н	-	-		
Stage Disch. Press	PI-2101	psig		-	285				-	244 20								H				-
and Stage Inlet Press	PI-2200	gisq		-	285					-	11 241								-	-	-	
Ž nd Stage Disch. Press	PI-2201	gisq		-	600					578 578 579	6533							-	-	-	-	-
inal Discharge Pressure	PI-2108	gisq		575	600					h15 h15 h15	h23 h							-	-	-	-	-
_ube Oil Pressure	PI-1572		6	60						22 23	7 53								-	-	-	
Lube Oil Temp	TE-1584	deg		150	170					169 16	169 169 1691						L	-	-	-	-	-
inal Discharge Temp	TE-2120	deg		110	150					70 71	67					_			-	-	-	-
Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226 :	297					208 20	268 205 203						-	-	-	H	-	-
2 nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283					20H DON 203	1 503					-		-	-	-	-	-
st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297					202 20	200								-	-		
2 nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283					OH 201	1703									-	-	-
Motor Frame Vibration	VT-1015	IPS			0.15					ho 40	1 04									-	-	-
Compresser Frame Vibration	VT-1512	IPS		0	0.35				,	05 05	8						-	-	-	-	-	-
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	rential pre	essure ex	ceeds N	lax psid	the filt	er shoul	d be c	angec	out.	Votify	Syster	n Eng	ineer	1	1	1
Natural Gas Comp.Discharge Press.									27		-						4	+		-	+	-
Double Block and Bleed Pressure	A63FGDT	49-48-psid	bisd		00				570								-	H	H	-	+	+
Suel Gas Supply Pressure	A63FTGST	50-49=psid	bsid	L	20	E	F	F	255	F	t		÷	I		_	-	-	-	-	-	-
DATE																						
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The control	Fig. 2 S S S S S S S S S	ESH	1-12	8-0	50	/ <u>P</u>	A.J.	R24 8	18	26	940	21 1	20 R	19 1	18 2			27 0	# 0	25 14	13 0	12 2	# 0		185									nnual	
		5-1	Total Fuel Flow	Waste Oil Tank	27–28 found on Gas Fuel System page)	Ambient Temperature	lunning Hours (unit overview)	30% Saze Load Minimum	Vinw Output	Generator Current	22-24 found on Power Management page)	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL	10 gaf gas TG Drain Tenk (Air Diagram page)	2000 gal Oil Water Tank Level	18-20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13 6 KV	Operation of PSS/on at 6.3MW	MECC LOB	Combustible Gas Detector Monitor	Soom Temperature	Control Room	Coolant Return Differential from	oolant Return Differential from GG	Sount PLC lemperature	coolant Pressure	In Fan Cooler	Instrument Temperature	Net Receiver Air Pressure	Slowdown Wet Receiver Tank Hourly	Howdown Dry Receiver Tank Hourly	nstrument Air Compressor	Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Clased):	/- 25-/ / MDT (drcle one)
		Signa		U-120	1	T1 inle				-			A53GG	LI-230	U-231						1			FI-002	FI-001	LI-001	P1-250		TH001	P1-002	BVT-00	BVT-01	10		
	Time the Continue (Info Cont.)	ture:	Msd/h	*		Ť		WW	WW	Amps				×	ж		undts	(A) SPA	Yes (Y)		×	deg F	Units	-	-	-	+	\vdash	-				-	20	
Then brokes Obtain (Place Death of Place) Then brokes as filtered 162 97 10 10 10 10 10 10 10 1	Time transac offine (lide Open):	K		T	T								35				Low			Open	1	-			+	1	+	+		96				25	
Transcollect Others (Belle Others) 1	Time trusteen Offices (Bask Open): 1	1	1										20				Norm			rtional?	0%	72	Norm	37	8 4	2/3	25	Norm	20	105			Norm		
15 0 5 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	COSTO HOURLY READING LOG 16:559	10	7	70%					27	1200				70%	70%		Mux	INJON	No (N)		20%	85	Max	æ	8	F E		Mex	8	120			Max		
16:00c 16:00c	COSTO HOURLY READING LOG 16:559	10				L										-																	1	Time Turb	
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Cotto House services Cotto House Services	AL TOIK	al Fuel Flow	ste Oil Tank	[27-28 found on Gas Fuel System page]	bient Temperature	Running Hours (unit overview)	6 Base Load Minimum	Output	nerator Current	(22-24 found on Power Management page)	Acknowledge Alarms Hourly	npressor (on line trip)	19 10 gal gas TG Drain Tank (Air Diagram page)	2000 gal Oli Water Tank Level	(18–20 found on Air Diagram page)	Entransic Control System	Operation of AVR Voltage Mode @ 13.6 KV	Operation of PSS/on at 6 3MW	WECC Log	Combustible Gas Detector Monitor	Room Temperature	Control Room	Coolant Return Differential from	Coalant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Fin Fan Cooler	Instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	MST / MDT (circle ane) Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):	:02.61-2018
Cotto House services Cotto House Services	Signature:		LF-120		T1 inlet							A63GGD 5T-01	U-230	U-231					i			i	FI-002	FH-001	U-001	TI-002	PI-250		L1-001	PI-002	BVT-007	BVT-013	1.D		
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AS COMPRESSOR START TIME	0625					1				L					
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Eacking Lube Oil Flow Indicator Left Side	FSU 15018	LIGHT	BLINK				3 3	0	15	5 15 13					
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ankcase Bulls eye	HC 1574	LEVEL 1/	1/4 1/2	FULL			1		(27)	774 (4	7				
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stage inlet Press.	PI 2100	psig	88	140			82 8	80 8	S 08 2	18 187)				
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2nd Stage Inlet Press	PI 2200	psig	267	285			245 24	725 25	245 25	57 747 75	8				
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inal Discharge Pressure	PH 2108	gisq	575	600			2745	XX XX 163 165	5415	2 57552	19				
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inal Discharge Temp	TF 2120	deg	110	150			80 87	50 81 87 80	7 20	13 CH 89	4				
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2 nd Stage Cylinder Disch. Temperature A	11 2062 V	deg	258	283			213 2	7 219 22	22 7.20 5	25 223 723	3				
Ist Stage Cylinder Disch. Temperature B	TE 2054 B	deg	226	297			207 207 207 108 600 209	207 207 108 200 209 209 208	200 50	2 209 20	08				
2 nd Stage Cylinder Disch. Temperature B	TF 2062 B	deg	258	283			213 21	7 29 2	2 221 2	24224 2	24				
Motor Frame Vibration	VT 1015	PS		0.15			20 8	5 03 6	3 PH 10.	0 hr. L	7				
Compresser Frame Vibration	VI-1512	묫		0.35			65 05	605 6	CS 05 10	2 .07 .02	7				
Take Once per Shift / at Full Load		gisq	Max	Max psid W	When the differential pressure exceeds Max psid the filter shou	pressure ex	ceeds Max	psid the fi		d be chang	ld be changed out. Notify System Engineer	otify Syste	em Engine	er	
Natural Gas Comp.Discharge Press.							\$13								
Double Block and Bleed Pressure	A63FGDT	49-48=psid	äd	8			27								
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c	Slate: 7-8-18	28 Total Fuel Flow	Waste Oll Tank	[27–28 found on Gas Fuel System page]	Ambient Temperature	Running Hours (unit overview)	24 80% Base Load Minimum	S3 MW Output	@2 Generator Current	122-24 found on Power Management page)	21 Acknowledge Alarms Hourly	20 Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	19 10 gal gas TG Drain Tank (Air Diagram page)	18 2000 gal Oil Water Tank Level	(18–20 found on Air Diagram page)	Entrossic Control System	17 Operation of AVR Voltage Mode @ 13.6 KV	16 Operation of PSS/on at 6.3MW	18 WECC Log	13 Combustible Gas Detector Monitor	12 Room Temperature	11 Control Room	Coolant Return Differential from	Cookant Raftum Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure		10 Instrument Temperature	1000			Instrument Air Compressor	Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):	1	nito Date: 2-8-18
	Signature:		U-120		l'1 inlet		_	-				A63GGD 5T-01	i) U-230	LF-231			<						FI-002	£1-001	U-001	F1-002	P1-250	-	71-001	PI-002	BVT-007	BVT-013	10	41		
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Combustible Gas Detector	AAH-303	%		8	20%	-				-	1/2	1/2	11/1	MA				3						
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Stage Disch. Press	PI-2101	psig		238	285						247	507.5	K.Sh.	1974	666	250	151	-					L	L
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Take Once per Shift / at Full Load		psig		Max	sid \	Max psid When the differential pressure exceeds Max psid the filter shoul	he diffi	erentia	press	ure ex	eeds N	/lax psi	d the f	ilter s	IQ.	e cha	nged o	ŭt. N	tify S	stem	be changed out. Notify System Engineer	eer		
Natural Gas Comp.Discharge Press.											1	575						-	-	T				
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	SH- 67-14-17	Total Fuel Flow		System page)		view)	124 20% Base Load Minimum	Mw Output	Generator Current	(72-24 found on Power Management page)	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	19 10gal gas TG Drain Tank (Air Diagram page)	18 2000 gal Oil Water Tank Level	(18-20 found on Air Diagram page)	Entronic Control System	17 Operation of AVR Voltage Mode @ 13.5 KV	16 Operation of PSS/on at 6.3MW	15 WECC LOS	13 Combustible Gas Detector Monitor	12 Room Temperature	Control Room	Coolant Return Differential from	Coolunt Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Fin Fan Cooler	Instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	MST / MDT (Girde one) Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):	8 1-151-80
	Signature:		U-120		11 inlet							463GGD 5T-01	U-230	11-231									F1-002	F1-001	TI-003	TH-002	PF-250		1100-11	PI-002	BVT-007	ETO-TVB	I,D		
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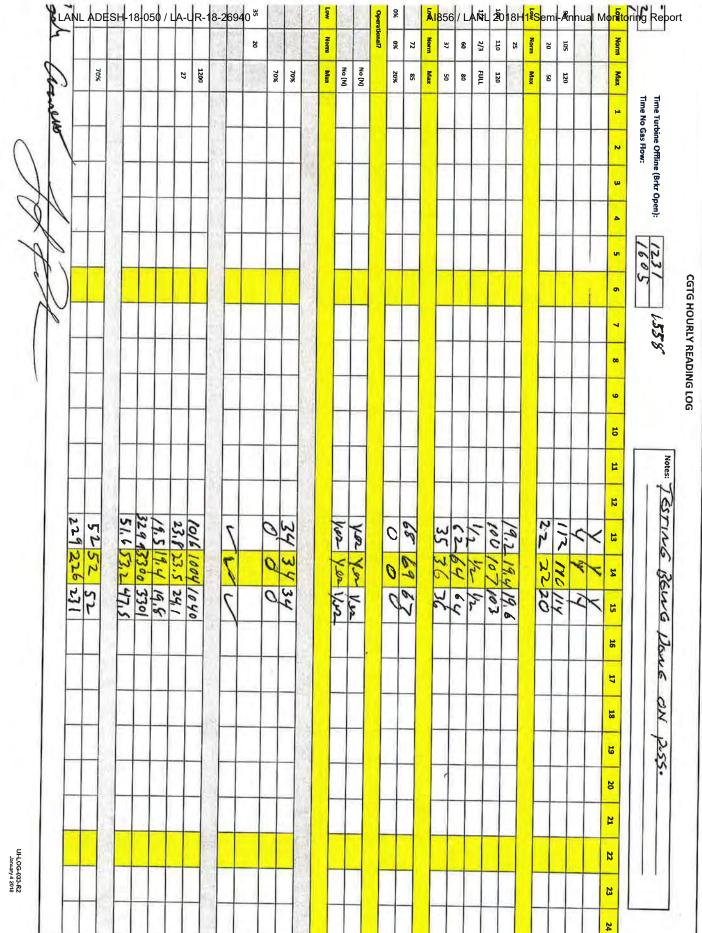
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E Date: UT-13 JUI 0	otal Fuel Flow	Vaste Oil Tank	(2)-28 found on Gas Fuel System page)	motent remperature	Phios Tompostus	Running Hours (unit overview)	0% Base Load Minimum	Nw Output	enerator Current	22-24 found on Power Management page)	21 Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	10 gal gas TG Drain Tank (Air Diagram page)	2000 gat Oil Water Tank Level	(18-20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.6 KV	Operation of PSS/on at 6 3MW	MECCTOR	Combustible Gas Detector Monitor	Room Temperature	Control Room	Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Fin Fan Cooler	strument Temperature	et Receiver Air Pressure	owdown Wet Receiver Tank Hourly	owdown Dry Receiver Tank Hourly	strument Air Compressor	MST / MDT (dirde one) Time Gas introduced [Turbine Rolling]: Time of Turbine Online (Brkr Closed):	8,75-75
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Kino 153	Double Block and Bleed Pressure	모	Compresser Frame Vibration	Motor Frame Vibration	2 nd Stage Cylinder Disch, Temperature B	2"Stage Cylinder Disch. Temperature A	1 Stage Cylinder Disch. Temperature A	Final Discharge Temp	Lube Oil Temp	Lube Oil Pressure	Final Discharge Pressure	2 nd Stage Disch. Press	2nd Stage Inlet Press	Stage Disch. Press	Packing Lube Oil Flow Indicator Right Side	N 2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level	Hubricator Bulls eye	Oil Day Tank Level	se Bulls eye	Liquid Level Coalescing	Lube Oil Flow Indicator	tible Gas Detector	MADDESCOP START	nitori
1+4		Take Once per Shift / at Full Load Natural Gas Comp. Discharge Press.	1		mperature B	mperature B	nperature A	norstino A							Right Side							Left Side		TIME	
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	49-48=psid 50-49=psid	psig	IPS	IPS :	deg	deg	OC.	deg	deg		gisq	gisq	gisq	psig	LIGHT	LIQID	LIQID				LIQID	LHDI	%	Onics	UI.
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55666	0000-655207	Notes experience of motor	Sugar Ad Mr	Days Shift	Mid Shift	SIGNATURE	DATE 3-1-18	Fuel Gas Supply Pressure	Double Block and Bleed Pressure	Natural Gas Comp.Discharge Press.	Take Once per Shift / at Full Load	Compresser Frame Vibration	Motor Frame Vibration	2 nd Stage Cylinder Disch. Temperature B	1st Stage Cylinder Disch. Temperature B	2 nd Stage Cylinder Disch. Temperature A	1 st Stage Cylinder Disch. Temperature A	Final Discharge Temp	չLube Oil Temp	Lube Oil Pressure	Final Discharge Pressure	2 nd Stage Disch. Press	2nd Stage Inlet Press	Stage Disch. Press	1 st Stage Inlet Press.	Packing Lube Oil Flow Indicator Right Side	2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level	Lubricator Bulls eye	Oil Day Tank Level	Crankcase Bulls eye	Liquid Level Coalescing	Packing Lube Oil Flow Indicator Left Side	Combustible Gas Detector	GAS COMPRESSOR START TIME	Natural Gas Compressor	CGTG TURBINE
		what he						A63FTGST	A63FGDT			VT-1512	VT-1015	TE-2062 B	TE-2054 B	TE-2062 A	TE-2054 A	TE-2120	TE-1584	Pi-1572	PI-2108	PI-2201	PI-2200	PI-2101	PI-2100	FSL-1501A	LI-7466	LI-7416		LI-1562	LC-1574	LI-7721	FSL-1501B	AAH-303			
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05 Dy /L	pays some /// word	Tana Sunt	SIGNATURE	BATE 3-22-16	940	Enel Gas Simply Pressing	Natural Gas Comp. Discharge Press.	Take Once per Shift / at Full Load	Compresser Frame Vibration	Motor Frame Vibration	2 nd Stage Cylinder Disch. Temperature B	1st Stage Cylinder Disch. Temperature B	2 nd Stage Cylinder Disch. Temperature A	1 st Stage Cylinder Disch. Temperature A	Final Discharge Temp	Lube Oil Temp	Lube Oil Pressure	Final Discharge Pressure	⊉ nd Stage Disch. Press	And Stage Inlet Press	Stage Disch. Press	☐ st Stage inlet Press.	Packing Lube Oil Flow Indicator Right Side	and Stage Scrubber Liquid Level	Olst Stage Scrubber Liquid Level	Libricator Bulls eye	Oni Day Tank Level	Erankcase Bulls eye	Cliquid Level Coalescing	Packing Lube Oil Flow Indicator Left Side	Combustible Gas Detector	SAS COMPRESSOR START TIME	Natural Gas Compressor
					700	AGSETGET			VT-1512	VT-1015	TE-2062 B	TE-2054 B	TE-2062 A	TE-2054 A	TE-2120	TE-1584	PI-1572	PI-2108	PI-2201	P4-2200	PI-2101	PI-2100	FSL-1501A	LI-7466	LI-7416		LJ-1562	LC-1574	L1-7721	FSL-15018	AAH-303	2190	
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Bate: 3-29-18	Total Fuel Flow	Waste Oil Tank	(27-28 found on Gas Fuel System page)	5 Ambient Temperature	25 Running Hours (unit overview)	174 80% Base Load Minimum	53 Mw Output	G2 Generator Current	(22–24 found on Power Management page)	21 Acknowledge Alarms Hourly	20 Compressor (on fine trip)	19 10 gal gas TG Drain Tank (Air Diagram page)	18 2000 gal Oਜੋ Water Tank Level	(18-20 found on Air Diagram page)	Entronic Control System	17 Operation of AVR Voltage Mode @ 13.6 KV	16 Operation of PSS/on at 6.3MW	15 WECC Log	13 Combustible Gas Detector Monitor	12 Room Temperature	11 Control Room	10 Coolant Return Differential from	Ooolant Return Differential from GG	Sight glass Level Expansion Tank	27 Coolant PLC Temperature	6 Coolant Pressure	15 Fin Fam Cooler	-4 Instrument Temperature	3 Wet Receiver Air Pressure	2 Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	Time of Turbine Online (Brkr Closed):	MST (MDT) (since one)
Signature:		U-120		Ti inlet				3			А63GGD 5Т-01		U-231			,		H				FI-002	FI-001	T00-11	TI-002	P1-250		100-LI	PH-002	BVT-007	ELO-1A8	1.0		
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のことによ	Total Fuel Flow	Waste Oil Tank	(27–28 found on Gas Fuel System page)	Ambient Temperature	Running Hours (unit overview)	80% Base Load Minimum	Mw Output	Generator Current	[22-24 found on Power Management page]	Acknowledge Alarms Hourly	Compressor (on line trip)	10 gal gas TG Drain Tank (Air Diagram page)	18 2000 gal Oil Water Tank Level	(18–20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.6 KV	Operation of PSS/on at 6.3MW	WECCLOG	Combustible Gas Detector Monitor	12 Room Temperature	Control Room	Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Fin Fan Cooler	Instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	MST (MDD)(circle one) Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):
Signature	0	U-120		T1 inlet		70		100		N/	A63GGD 5T-01	LI-230	U-231									FI-002	FI-001	U-001	TI-002	PI-250		TH-001	PH-002	BVT-007	ELO-1AB	(LD	
	Mscf/h	%				MW	ww	Amps		٨	psig	*	*		Units	Yes (Y)	Yes(Y)		* E	deg F	Units	In WC	In WC	TEVEL	deg F	Bisd	Units	deg C	PS	٧	4	Units	35.50
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Transfer	TE-2054 B	deg	2		97	+				-	2,2		2	22	213 25	2/3 2/3/2/3	213 252 (3 219	213 25213 219 214	2/3 2/3 2/9 2/9 2/4	2/3 2/3 2/9 2/9 2/4	2/3 2/3 2/9 2/9 2/4	2/3 2/3 2/9 2/9 2/4
VT-1015 IPS 0.15 0.15 n VT-1512 IPS 0.35 When the differential with the differential w	TE-2062 B	deg	2		83						H	ম	4	224	17 hzz	224 77 22	224 77 22 714	224 77 22 714	90 00 117 x 17 150	90 00 117 x 17 150	90 00 117 x 17 150	90 00 117 x 17 150
n VT-1512 IPS 0.35 Load Load psig Max psid When the differential when the differential	VT-1015	IPS		0	15	H					É	1	3	10 K	20	70 60 60	140.70 NO. 40	140.70 NO. 40	40 40, 40, 40 ho ho	40 40, 40, 40 ho ho	40 40, 40, 40 ho ho	40 40, 40, 40 ho ho
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e Press. A63FGDT 49-48=psid 8 A63FTGST 50-49=psid 20		Bisd	_	Max ps		hen t	ne diff	rentia		ure e	ceeds	إي	X	x psid th						filter should be changed out	filter should be changed out	filter should be changed out
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UHLOG-033-R2 January 4 2018

24 (80% Base Load Minimum 25 (kunning Hours (unit overview) 26 (Ambient Temperature 27 (27-28 found on Gas Fuel System page) (11 injet)	80% Base Load Minimum Running Hours (unit overview)		Mw Output	22 Generator Current Amps	21 Acknowledge Alarms Hourly	20 Record on hard 5/D trip over 4500 rpm NL A63GGD psig	19 10 gal gas TG Drain Tank (Air Diagram page) LI-230 ×	1.8 2000 gal Oil Water Tank Level LI-231 ×	Entronic Control System Units	17 Operation of AVR Voltage Mode @ 13.5 KV Yes (Y)	14 Operation of PSS/on at 6.3MW Yes (Y)	15 WECC Log	13 Combustible Gas Detector Monitor %LEL	12 Room Temperature deg F	Control Room	10 Coolant Return Differential from H-002 In WC	9 Coolant Raturn Differential from GG FI-001 In WC	Coolant PLC Temperature 11-002	Coolant Pressure Ph250	S Fin Fan Cooler Units	4 Instrument Temperature TI-001 deg C	3 Wet Receiver Air Pressure PI-002 psig	Blowdown Wet Receiver Tank Hourly 8VT-007	nk Hourly BVT-013	Time of Turbine Online (Brkr Closed):	MST / MDT (circle one) Time Gas Introduced (Turbine Rolling):	81-6-1 American
70%			n	1200		35 20	70%	70%	Low Norm Max	No (M)	(M) ok	Operational?	0% 0% 20%	72 85	Low Norm Max	37 50	60	+	25	Low Norm Max	20 50	90 105 120			Norm Naz		
																									Time No Gas Flow:	Time Turbine Offline (Brkr Open):	cei
826 874 82% 828 839 1.800 810 412 226 826 832 831 1.800	525 550 550 567 576 392617	13.7 1.7 19.1 19.0 19.1 33.7 19.1 19.1 19.0 19.1 19.1 19.1 19.1 19.1	18 823 8 23 23 5 23 4 23 122 7	1772 186 0901 2 to 2 1973 001	Sep Sept CAL CAL CAL		0% 60 0% out , so 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7.45 1, pt 2 2h 3h 3h 3h 3h 3h 3h		(4) (3) (4) (4) (4) (4)	162 163 16) 160 100 100 100 100		00/6 00/6 04 1000 000 000 000 000 000 000 000 000	73.73 73 77 77 78 78 78 78 78 78 78 78 78 78 78	ŀ	200	(C) (3 (4 (5 (7 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4	103	19.5 1915 19.5 19.8		19 19 19 20 70	poy		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	7 8 9 10 11 17 13 14 15 15 17 19 19	Notes	CGTG HOURLY READING LOG

Natural Gas Compressor		Units L	Units Low Norm Max	n Max	Low Norm Max 1 2	w	4 5	6 7	7 8	9 10	11 1	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%					*	12								
Packing Lube Oil Flow Indicator Left Side	9 TOST 15 I	LHBIT	BLINK							30	S	3	B					
Liquid Level Coalescing	11-7721	LIQID	EMPTY	ANY						त	त्र	171	L.					
Crankcase Bulls eye	EC 1574	-	1/4 1/2							1)2 1/2	MY	1	71 17	r				
Oil Day Tank Level	H 1562	- 1							44	41 51	1 ht	44	hh hh					
Lubricator Bulls eye			1/2 FULL	-						7	41	7	7				3	
1st Stage Scrubber Liquid Level	B 7416			YANY						TT ET	17	rti	T T					
2nd Stage Scrubber Liquid Level	11-7456	LIQID	EMPTY	Y ANY	3					41	TI TI	7	7					
Packing Lube Oil Flow Indicator Right Side	FSE 1501A	LIGHT	BLINK	Î						<u>21</u>	रू द्र	₩	C)					
1st Stage Inlet Press.	PI 2100	psig	88	140					7.0	18 18	38 08	18	8	0				
Stage Disch. Press	PI 2101	psig	238	285						247 24	124724-		49 249					
2nd Stage Inlet Press	P3 2200	gisq	267	285					2	76 541 LAG 562	124474		482 Did 560					
2 rd Stage Disch, Press	PI 2201	gisq	575	600					2	78 518	57957		578 878 577					
Final Discharge Pressure	Pt 2108	psig	575	600					8	575 575	20 21	-1	579 875 875					
Lube Oil Pressure	PL 1572		40 60						1	1161	S8 50	53 8	59 59					
Lube Oil Temp	TE 1584	deg	150	170						161/101	16616	1/46/	1401166 14					
Final Discharge Temp	TE 2120	deg	110	150					A-0	13 13	93 97	3 44 6	2071					
1 st Stage Cylinder Disch. Temperature A	TE 2054 A	deg	226	297					2	Ò	18 218 21	90192	19219					
2 nd Stage Cylinder Disch. Temperature A	31 2062 A	deg	258	283					7	19 216	0	1 24 2	24 24 27 221					
1st Stage Cylinder Disch. Temperature B	TF 2054 B	deg	226	297					2	2002 772	1	72172	רע רע רע					
2 nd Stage Cylinder Disch. Temperature B	TF 2062 B	deg	258	283					2	550 50	225 22	Į,	122 (20) 221					
Motor Frame Vibration	VI 1015	IPS		0.15						05 67	03 04	09	OY 60	1				
Compresser Frame Vibration	VI-1512	IPS		0.35					6	8 05	07 05	S	5 50					
Take Once per Shift / at Full Load		psig	Max	Max psid	When th	ne differe	ential pre	ssure ex	ceeds M	When the differential pressure exceeds Max psid the filter sl	ne filter s		changed	out. Not	ify Syster	rould be changed out. Notify System Engineer	er	
Natural Gas Comp.Discharge Press.									5	75								
Double Block and Bleed Pressure	A63FGDT	49-48=psid	sīd	00					8	570								
Fuel Gas Supply Pressure	A63FTGST	50-49=psid	sid	20					~	659				-				
DATE 4-9-180					1													
MID SHIFT							1				X							
Days Shift																		
Notes																		

28 Total Fuel Flow		Waste Oil Tank	[27-28 found on Gas Fuel System page]	Ambient Temperature	Running Hours (unit overview)	24 80% Base Load Minimum	Mw Output	Generator Current	2-24 found on Powe	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	gas TG Drain Tai	2000 gai Oil Water Tank Level	(16-20 found on Air Diagram page)	Entronic Control System	peration of AVR Volt	Operation of PSS/on at 6.3N/W	WECCLOG	13 Combustible Gas Detector Monitor	12 Room Temperature	11 Control Room	Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Fin Fan Cooler	Instrument Temperature	Wet Receiver Air Pressura	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):	MST / MDT (circle one)
4-10-18			uel System page)		rerview)	'n			[22-24 found on Power Management page]	bourty	p over 4500 rpm NL (p)	10 gad gas TG Drain Tank (Air Diagram page)	k Level	agram page)	3	Operation of AVR Voltage Mode @ 13.6 KV	WINE.31		tor Monitor			ntial from	ntial from GG	Islan Tank	ure			rre	ura	er Tank Hourly	r Tank Hourly	SSOF	(Turbine Rolling): ne (Brkr Closed):	<u>.</u>
Signature:		0.110		TI inles						N	10-15 099690	U-230	U-231		Ī							FI-002	1001	T-001	71-002	84-250		11-001	P1-002	BVT-007	ELD-1AB	£,D		
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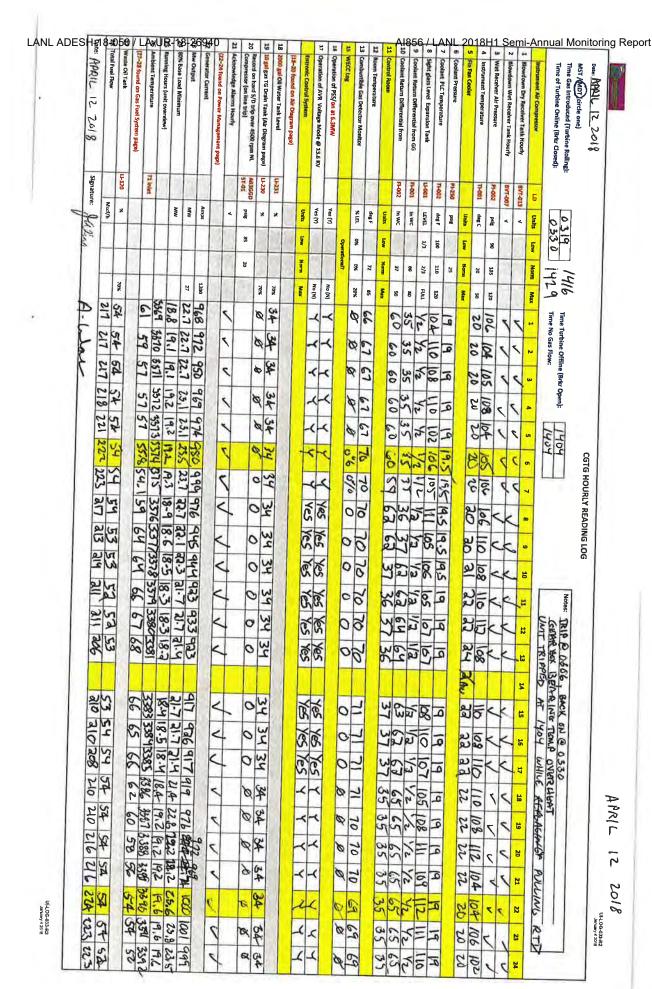
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ALIC I SUIS	I Fuel Flow	Waste Off Tank	(27-25 found on Gas Fuel System page)	26 Ambient Temperature	Running Hours funit overview)	80% Base Load Minimum	Mw Output	Generator Current	(22-24 found on Power Management page)	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	10 gal gas TG Drain Tank (Air Diagram page)	2000 gal Oil Water Tank Level	(18-30 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.5 KV	Operation of PSS/ on at 6.3MW	WECCLOG	Combustible Gas Detector Monitor	12 Room Temperature	Control Room	Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Rin Fan Cooler	Instrument Temperature	Wat Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	estrument Air Compressor	MST (MUT)(circle one) Time Gas introduced (Turbine Rolling): Time of Turbine Online (Bricr Gosed):	ATR 1 1 2018
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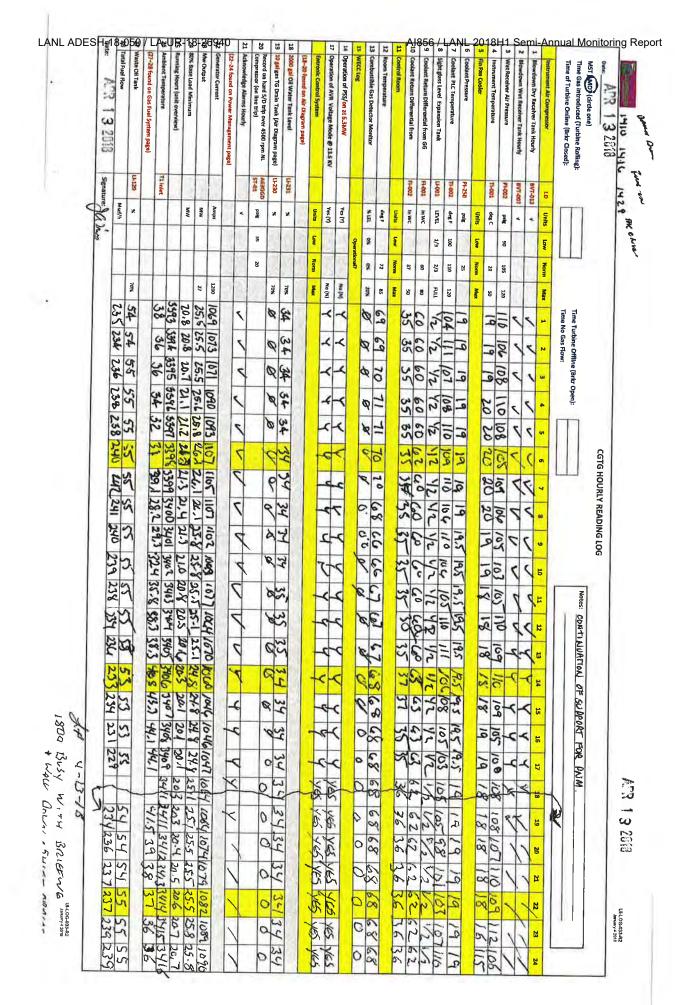
UH-DG-033-R2 January 4 2018

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Units Low Norm Max 1 2 3 4 5 6 7 8 0 10 11 12 12 14	19 20	1/ 1	72 79			-	-	I	-						0786	Combustible Gas Detector
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Fuel Gas Supply Pressure A63FIGST 50-49-psid DATE APRIL 12 2018 SIGNATURE Mid Shift A44 Days Shift A44 A45 A63FIGST 50-49-psid	ASSIPPLY PRESSURE ASSIFICATION	ASSUPPLY PRESSURE ASSIFICEST ASSI	ASSIGNT ASSIGNT ASSIGNT ASSIGNT ASSIGNT ASSIGNT ASSIGNT ASSIGNT ASSIGNMENT AS	A63FTGST	ABSFGDT	AbsFGDT	200000	Natural Gas Comp.Discharge Press.		VT-1512	VT-1015	h. Temperature B TE-2062 B	TE-2054 B	TE-2062 A	TE-2054 A	TE-2120	TE-1584 deg	PI-1572	essure PI-2108	PI-2201	PI-2200	PI-2101	1 Stage Inlet Press. PI-2100 psig	Packing Lube Oil Flow Indicator Right Side FSL-1501A LIGHT		U-7416 UQID	LEVEL	U-1562 GAL	LC-1574	scing LI-7721	Packing Lube Oil Flow Indicator Left Side FSL-1501B LIGHT	Combustible Gas Detector AAH-303 %	GAS COMPRESSOR START TIME	Units	
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Notes	Days Shift V	Mid Shift The	SIGNATURE	DATE R. X 1 3 ZUIS	Fuel Gas Supply Pressure	Double Block and Bleed Pressure	Natural Gas Comp.Discharge Press.	Take Once per Shift / at Full Load	Compresser Frame Vibration	Motor Frame Vibration	2 nd Stage Cylinder Disch. Temperature B	1st Stage Cylinder Disch. Temperature B	2 ^{ra} Stage Cylinder Disch. Temperature A	1stage Cylinder Disch. Temperature A	Final Discharge Temp	Lube Oil Temp	Lube Oil Pressure	Final Discharge Pressure	2 nd Stage Disch. Press	2nd Stage Inlet Press	Stage Disch. Press	1" Stage Inlet Press.	Packing Lube Oil Flow Indicator Right Side	2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level	Lubricator Bulls eye	Oil Day Tank Level	Crankcase Bulls eye	Liquid Level Coalescing	Packing Lube Oil Flow Indicator Left Side	Combustible Gas Detector	GAS COMPRESSOR START TIME CONTINUATION	Natural Gas Compressor	National Confession
					A63FTGST	A63FGDT			VT-1512	VT-1015	B TE-2062 B	Ŋ	A TE-2062 A	A TE-2054 A	TE-2120	TE-1584	PI-1572	PI-2108	PI-2201	PI-2200	PI-2101	PI-2100	FSL-1501A	LI-7466	U-7416		LI-1562	LC-1574	U-7721	FSL-15018	AAH-303	MOTANUALT		
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Be Treat Feet How	te Oil Tank	(27-28 found on Gas Fuel System page)	Ambient Temperature	Running Hours (unit overview)	80% Base Load Minimum	Mw Output	Generator Current	(22-24 found on Power Management page)	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpin NL Compressor (on line trip)	10 gal gas TG Drain Tank (Air Diagram page)	2000 gal Oil Water Tank Level	(15-20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.5 KV	Operation of PSS/on at 6.3MW	WECC LOS	13 Combustible Gas Detector Monitor	Room Temperature	Control Room	Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Cootant Pressure	Fin Fan Cooler	Instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	MST (MDT/circle one) Time GBS Introduced (Turbine Rolling) Time of Turbine Online (Brkr Closed):	APR 14 2018
Sign	U-120		11 15 14			110				ST-01	e) U-230	15231			5	-					21-002	E1-001	100-11	Ti-002	2		#	7	A S	Na.); (j.	व्
A E			E	-	MM	MM	Amps		4	T pole	×	*		Units	Yes (Y)	Y⇔(Y)		* LEI	deg F	-	-	-	-	+	P5-250	+	-	P1-002	8VT-007	ETO-1/48	TD U		
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218 Stage Scrubber Liquid Level L17416 LQQD EMPTY ANV E E E E E E E E E	Natural Gas Compressor GAS COMPRESSOR START TIME Combustible Gas Detector Packing Lube Oil Flow Indicator Left Side Liquid Level Coalescing Crankcase Bulls eye Oil Day Tank Level Lubricator Bulls eye
ube Oil Flow Indicator Right Side FSL-1501A LIGHT BLINK Inlet Press PI-2100 psig 238 140 sch. Press PI-2101 psig 238 285 plasch. Press PI-2200 psig 267 285 plasch. Press PI-2201 psig 575 600 Pressure PI-1572 psig 40 60 Pressure PI-1572 psig 40 60 Pharge Temp TE-1584 deg 150 170 harge Temp TE-2054 A deg 226 297 ylinder Disch. Temperature A TE-2054 A deg 226 297 ylinder Disch. Temperature B TE-2054 B deg 258 283 Cylinder Disch. Temperature B TE-2054 B deg 258 283 Temp TE-2054 B deg 258 283 20 TE-2054 B deg 258 283 20 TE-2054 B deg <t< td=""><td>2nd Stage Scrubber Liquid Level</td></t<>	2nd Stage Scrubber Liquid Level
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Hate: 4-16-18	watte Oil Tank	27-38 found on Gas Fuel System page)	26 Amhient Temperature	5 Running Hours (unit overview)	24 80% Base Load Minimum	Mw Output	O22 Generator Current	21 Acknowledge Alarms Hourly		19 10 pai gas TG Drain Tank (Air Diagram page)	18 2000 pol Oil Water Tank Level	(115-20 found on Air Diagram page)	Entronic Control System	17 Operation of AVR Voltage Mode @ 13.6 KV	16 Operation of PSS/on at 6.3MW	15 MECC 108		12 Room Temperature	11 Control Boom	3 4	8 Sight glass Level Expansion Tank	1	on	u	Instrument Temperature	3 Wet Roceiver Air Pressure	2	1 Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor		-	AP12 16
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Notes	Mid Shift A VA	I R	1	as supply Pressure	Find Car Swart Pressure	Double Block and Dr. 12	date of the per onit / at Full Load	Compresser Frame Vibration	motor right Vibration	Motor Employment Disch. Temperature B	ord charge cylinder Disch. Temperature B	of Stane College Discr. Temperature A	Stage Cylinder Disch. Temperature A	Stage Cylinder Direct Town	inal Discharge Ton	inho Oli Toni	Tithe Oil Brooming or Figure 2	inal Diochana Press	2nd Street Disch Brown	and Stars laint Branch	Character Press.	Packing Lube Oil Flow Indicator Right Side	and Stage Scrubber Liquid Level	ast stage Scrubber Liquid Level	Lubricator Bulls eye	Oir Day Tank Level	Crankcase Buils eye	Liquid Level Coalescing	Packing Lube Oil Flow Indicator Left Side	Combustible Gas Detector	GAS COMPRESSOR START TIME	200
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APR 18 2018	Total Fuel Flow	Waste Oil Tank	27-28 found on Gas Fuel System page)	Ambient Temperature	Running Hours (unit overview)	80% Sase Load Minimum	MAW Output	Generator Current	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	ingal gas TG Drain Tank (Air Diagram page)	2000 gal Off Water Tank Level	15-20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.6 KV	Operation of PSS/on at 6.3MW	MECC 108	Combustible Gas Detector Monitor	Room Temperature	Control Room	Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Fin Fan Copier	Instrument Temperature	Witt Receiver Air Pressure	Sico	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	MST / MDT) circle one) Time Gas introduced (Turbine Rolling) Time of Turbine Online (Brisr Gosed):
Signature		U-120		Table I						A63000	U-250	15231		-					V		FI-002	1001	11-001	71-002	052-14	+	17-001	TOO-LA	BV7-007	ETD-TVE	1.0	8
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Notes 0800 Com ruch	Days Shift Joh Rouge	Mid Shift C PACHECO		DATE 4PR 18 2018	ruei das aupply Pressure	Couple plock and pleed Pressure	Pouble Block and Block Programmer Tress.	Natural Gas Comp Discharge Broom	Toko Oppo and Shift of Fig.	Motor Frame Vibration	Z Stage Cylinder Disch, Temperature B	1st Stage Cylinder Disch. Temperature B	2"Stage Cylinder Disch. Temperature A	1" Stage Cylinder Disch. Temperature A	Final Discharge Temp	Lube Oil Temp	Lube Oil Pressure	Final Discharge Pressure	2 ^{na} Stage Disch. Press	2nd Stage Inlet Press	Stage Disch. Press	1" Stage Inlet Press.	Packing Lube Oil Flow Indicator Right Side	2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level	Lubricator Bulls eye	Oil Day Tank Level	Crankcase Bulls eye	Liquid Level Coalescing	Packing Lube Oil Flow Indicator Left Side	Combustible Gas Detector	GAS COMPRESSOR START TIME	Natural Gas Compressor	CGTG TURBINE
Tomas One	10	0			A63FTGST	A63FGDT			VT-1512	VT-1015	TE-2062 B	TE-2054 B	TE-2062 A	TE-2054 A	TE-2120	TE-1584	PI-1572	PI-2108	PI-2201	PI-2200	PI-2101	PI-2100	FSL-1501A	LI-7466	U-7416		U-1562	LC-1574	U-7721	FSL-1501B	AAH-303			
1		7	1		50-49=psid	49-48=psid		Bisd	PS	B	deg	deg	deg	deg	deg	deg	psig	psig	psig	DSig	DSig	DSig	пент	LIQID	LiQib	LEVEL	GAL	LEVEL	LIQID	LIGHT.	%		Units	
1	11	1	1	1	psid	psid											8									1/2	10	1/4					Low	
	П				F			Max			258	226	258	226	110	150	8	575	575	267	238	88	BLINK	EMPTY ANY	EMPTY ANY	FULL		1/2	EMPTY	BLINK	9%		Units Low Norm Max 1	UTILITIES AND INFRASTRUCTURE
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* APR-19-2018	Total Fuel Flow	27 Waste Oil Tank	27-25 frend on Gas Fuel System page)	Ambient Temperature	25 Running Hours (unit overview)	24 80% Base Load Minimum	23 MW Output	22 Generator Current	2-34 found on Power Management page)	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	10 gal gas TG Drain Tank (Air Diagram page)	2000 gal Oil Water Tank Level	11-20 found on Air Diagram page)	Entroolic Control System	Operation of AVR Voltage Mode @ 13.5 KV	Operation of PSS/on at 6-3MW	WECCIAS	Combustible Gas Detector Monitor	Room Temperature	Control Room	10 Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coclant PLCTemperature	Coolant Pressure	Fin Fan Cooler	Instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	instrument Air Compressor	Time of Turbine Online (Bric Closed):	MST (MD) (circle one) Time Gas introduced (Turbine Rolling):	81-31-1
Signature		U-126		THE PARTY				Bay		M	463GGD 57-01	U-270	162-11					Ī	i	- VI		51-002	H-001	11-001	11-002	D5254		11-001	E00-14	84T-007	ELO-1AS	6			
[5	Mscf/h	×				WW	WW	Amps		4	<u> </u>	ж	%	0	Units	Ke Si	Yes(Y)		#H	degF	Units	In WC	in WC	TEVEL	deg F	2rsd	Unita	deg C	N.	4		Units	П		
1	L		1								35				Low		19	Operati	0%	100	LOW			1/3	100		LOW		98		() ·	LOW			
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N	236					20	25.	1060		1	Ц	0	45	1			S-3X		-	66		36	53	100	106	12		1	201	1	1	1	Time No Gas Flow:	Time Turb	
Sam	231			44		20.1	25.1	1069		1		0	72	1	1	Yes	VES			70		3	54	1	801	19		7	50	1	1	2	as Flow:	ine Officia	
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3/1	240	56		39	245		25.5	1034		7		C	4			134	4		0	7	H	36	62	1/2	00	/9		ڌ	199	7	~	7		_	CGTG HOURLY READING LOG
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-	232			C15013	3844-2545-8546	19.6	25-124.8 24.43	18207 8401		7		0	34	100		£	10		0	2		75	63	42	107	19		19	10	0	7	Ħ		Notes:	
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CGTG TURBINE		_		UTILITIES AND INFRASTRUCTURE	INFR	ASTRU	CTUR	m								ŀ												
Natural Gas Compressor		Units	Low	Norm	Max	1	2	w	4	v	6	7	00	9 1	10 11	1 12		14	13 14 15	16	17	17 18 19 20	19	20	21	22	22 23 24	N
GAS COMPRESSOR START TIME			L			П							4	H		+		T		T	T	11				T	1	-
Packing Lube Oil Flow Indicator Left Side	FSL-15018	TEH1		BLINK	10,	Ø	O	a	22	٩	33	70	W Es	70	B	-	73	70	u	7	0	نتر	79	QC.	5	7	5	_
Liquid Level Coalescing	U-7721	Ligib		EMPTY ANY 1/8	ANY	1/8	co	72	1/2	à	-	18/14	-	m		171	171	771	M	711	M	TI.	CF)	a	8	A		
Crankcase Bulls eye	LC-1574		1/4	1/2	EUL Z	7	1	7	2	5	7	1/21/2	11/12	7	211	112	2/1/2			3	1/2	'n	1/2	7	1/2	37		
Oil Day Tank Level	U-1562		6	_	Ē	-41	2	5,	5	44 617	11	5	5	1 H7	147	14	4	f	47	47	5	47	1.9	47		47 47	47	~
யbricator Bulls eye			-	FULL		77	1	T,	3	4	J	1		-11	-11	7	+	7	70		+	'n	7	7		7	31	
1st Stage Scrubber Liquid Level	LI-7416		_		ANY		14			W	171	ŗ		er1	17	1	n	71	V	171	RI	10	D	H	6	0	9	
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY ANY	ANY	m	w	V	m	11	(L)	T		1			m	71	W	п	7	(9)	E		IM		W	
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	Пент		BLINK		Ç	25	>	20	<i>∞</i> ,	Ø	<u>2</u>	₽			u		ದ	B	Ġ	8	ফ	Ö	Ø	Q	B	Ø	
1st Stage inlet Press.	PI-2100	psig		88	140	18	W.	12	10	-	100	2	82 8	18	30	8	d	5	18	18	18	18	91	80	8	5	82 82	
Stage Disch. Press	PI-2101	Bisd		238	285	3250		<u>ک</u> ر تح	25/125/126/201250/250/250	3	150 2	502		245 251	1.1.	osu n	25	25	124 125 125 125 125 125 125 125 125 125 125	250	22	751	252	751	20	32	252.25	
2nd Stage Inlet Press	PI-2200	psig		267	285	24% 24	17.6	ř	746 246 247 246 3hr	77	75	346 2		245 25	67	£183	724	12	24	% 248	53	17/18	148	140	245	24	42k	
2 nd Stage Disch. Press	PI-2201	psig		575	600	578 578 179 573	57%	1.79	553	Ź.	PT3872 XX	19	5 1/5	578 5	SB	136	355	570	79 579 578 578 578 579 579 578 578 578 678 678	239	57	52	2	2	52	57	2	
Final Discharge Pressure	PI-2108	gisq	1.	575	600		574574574574574574574874	574	574	14	SHL	- 24	3 h	145113	15 K	55	357	5	518 518 118 113	3	2	57	57	5	67	2	676	
Lube Oil Pressure	PI-1572	psig	40	60		85	7	P & \(\(\delta\)	58	2	5	15	SILS	8 50	3 59	356	59	59		00000	8	60	60	3	53	50	60 60 59 59 59 60 60	
Lube Oil Temp	TE-1584	deg		150	170	170 168		175		176/	1701	170 1	1001	170 16	1/66	6/65	1	63164	16	163 K2162	11/11/2	162	12	166	164	165	160	
Final Discharge Temp	TE-2120	deg		110	150	55		76	79 80 77 77 78	77	77 7	8	3 84	88 88	16 8	194	9	8%	0	201	49	£	99	92	25	92	16 26 26 36 36 36 36 30 20 20	
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Motor Frame Vibration	VT-1015	IPS			0.15	:03	e	0.0	.63	04 63	63 03	3 0			03 03	3 03	0	ر د	97 03 03 W	C	9	0.3	0	. 03 . 03 . 03 . 03 . 03	.0		22,03	
Compresser Frame Vibration	VT-1512	IPS			0.35	20	R	102-01	101	7		0 30	on The	1	or or	3	5	_	06 06	101	06 06	_	36.06	ż	26,06,05	105	20	
Take Once per Shift I at Full Load		psig		Max psid	psid	Whe	When the differential pressure exceeds Max psid the filter shou	diffe	rentia	pres	sure	ехсее	ds Ma	x psic	the	ilters	hould	be c	d be changed out. Notify System Engineer	d out	Not	fy Sy	stem	Engir	eer		1	
Natural Gas Comp.Discharge Press.		11.00				575							L		-	-			-		Г							
Double Block and Bleed Pressure	A63FGDT	49-48=psid	psid		œ	570				Y					-	-	-	Ĥ	-		7				-		-	
Fuel Gas Supply Pressure	A63FTGST	50-49=psid	psid		20	358									-	-	H		Н	Н	-	Т				H		
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LANL ADESH-18-050/i	Days Shift	SIGNATURE	4 94 95	Double Block and Bleed Pressure	Natural Gas Comp.Discharge Press.	Take Once per Shift / at Full Load	Compresser Frame Vibration	2. Stage Cylinder Disch. Temperature B	1st Stage Cylinder Disch. Temperature B		1 st Stage Cylinder Disch. Temperature A	Final Discharge Temp	Lube Oil Temp	Lube Oil Pressure		op2nd Stage Inlet Press	Stage Disch. Press	1st Stage Inlet Press.	Packing Lube Oil Flow Indicator Right Side	2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level	Tubricator Buils eye	Connects built eye		1 7	Combustible Gas Detector	GAS COMPRESSOR START TIME	toring Report	
			A63FTGST	A63FGDT			VT-1512	TE-2062 B	TE-2054 B	TE-2062 A	TE-2054 A	100	TE-1584	PI-2108	PI-2201	PI-2200	PI-2101	PI-2100	FSL-1501A	LI-7466	LI-7416	79C1-II	LC-15/4	12//-11	HT051-164	AAH-303			

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Time Gas introduced frurbine Rollin

Time of Turbine Online (Bric Closed)

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1 stowdown Dry Receiver Tank Hourly

0 2 sillowdown Wet Receiver Tank Hourly LANL ADE STEE APALL 22 Generator Current
23 New Output
24 SIXX Base Load Minimum
25 Running Hours (unit overvie 11 20 ti 15 10 Coolant Return Differential from [27-25 found on Gas Fuel System page] Record on hard S/D trip over 4500 rpm NL Compressor (on line trin) Ambient Temperature Acknowledge Alarms Hourly 10 gal gas TG Drain Tank (Air Diagram page) Operation of AVR Voltage Mode @ 13.6 KV Operation of PSS/on at 6.3MW Combustible Gas Detector Monitor Room Temperature Sight glass Level Expansion Tank Running Hours (unit overview) (22-24 found on Power Management page) 2000 gal Oil Weter Tank Level (15-20 found on Air Diagram page) Coobart PLC Temperature Coolant Return Differential from GG Instrument Temperature Wet Receiver Air Pressure Time Gas Introduced (Turbine Rolling) APRIL Time of Turbine Online (Brkr Closed) essor (on line trip) 2018 TI inlet DES-U Signature: HEE-II 1001 510-1AS 1-002 8 7002 7750 PH-002 Mscf/h Yes (Y) WW WW Amps Yes [Y] In WC × PSig. × Units E1% deg F TEVEL deg F deg C psq × Units Units Psd Į, 2 100 6 LOW ä 8 1/3 Norm Nom 3 20 8 110 105 72 37 2/3 Di. 20 No (N) 70% Max No (N) Max 1200 70% 70% g FULL 120 120 27 20% 85 80 Max æ 240 **KES** 12 70 9 35 Time No Gas How: Time Turbine Offline (Brkr Open): 34 10 106 102 Ø 8 240 100 | 1 | 102 | 100 | 39 | 1 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 1/2 | 33 70 94 DO 70 18 18 9 4 \$ 6 58 108 19 多种多 100 58 \$ S 8 69 81 104 7 238 40 34 19 d 106 18 18 070 à 8 ļq CGTG HOURLY READING LOG yes yes 16 10 242 84 19 7 87 1/2 110 108 169 241 235 69 172 200 19 4 < 40) 250 3755 1708 0 % 1/2 1/2 V2 V7 10 2 232 230 070 35 103 35 109 18 50 19 19 6 00 35 00 01 30 21 d (Notes Ë 9. C. 25 12 1/2 1/2 00 19 19 3 105 011 401 7 K 34 90 19 110 7 Ħ 70 34 19 C 9 201 900 25 20 9 19 15 20 165 19 207 7 16 62 19 000 17 की डम डम दम्भ (में इम डम डम डम्) yes Yes ટ 33 110 110 102 9 H 20 20 226 225 132 Ø & 11 108 < 9 15 106 102 Y2 Y2 65 65 35 35 20 20 \$ 80 000 9 20 84 \$ 20 102 0 11 235 90 102 34 de 00 8 7 22 233 67 163 YES 90 25.50 19 8 104 \$ 2 23 282 57 97 20 五岁 19 53 \$ 80 24

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LANL ADESH-18-050/LADIS 18-26940 DRIP ON TON THE FIRST STREET AND 2018 HE SURF STREET AND 2018 HE SURF STREET AND STREET	Mobitoring Report

Notes	LA	<	Mid Shift	SIGNATURE	MATE APRIL 7	94	Fuel Gas Supply Pressure	Double Block and Bleed Pressure	Natural Gas Comp.Discharge Press	Take Once per Shift / at Full Load	Compresser Frame Vibration	Motor Frame Vibration	2 nd Stage Cylinder Disch. Temperature B	1st Stage Cylinder Disch. Temperature B	2 nd Stage Cylinder Disch. Temperature A	1 st Stage Cylinder Disch. Temperature A	Final Discharge Temp	Lube Oil Temp	Lube Oil Pressure	Final Discharge Pressure	√2 nd Stage Disch. Press	and Stage Inlet Press	Stage Disch. Press	ິ່ງ ^{ຮເ} Stage Inlet Press.	Packing Lube Oil Flow Indicator Right Side	2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level	Tubricator Bulls eye	Ooil Day Tank Level	Ecrankcase Bulls eye	Liquid Level Coalescing	Packing Lube Oil Flow Indicator Left Side	Combustible Gas Detector	SAS COMPRESSOR START TIME	Natural Gas Compressor
					21 2018			ressure	ge Press.	II Load	on		emperature B	emperature B	emperature A	emperature A									or Right Side	vel	e					ਮ Left Side		TIME	
							A63FTGST	A63FGDT			VT-1512	VT-1015	TE-2062 B	TE-2054 B	TE-2062 A	TE-2054 A	TE-2120	TE-1584	PI-1572	PI-2108	PI-2201	PI-2200	PI-2101	PI-2100	FSL-1501A	LI-7466	LI-7416		LI-1562	LC-1574	LI-7721	FSL-1501B	AAH-303		
							504	494		Bisd	IPS	IPS	deg	deg	deg	deg	deg	deg	gisq	gisq	gisq	psig	psig	Bisd	пент	ПQID	ПQID	LEVEL	GAL	LEVEL	LIQID	UGHT	%		Units
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					Ŋ		20	00		Max psid	0.35	0.15	_		-	-	150	170		600	600	285	285	140	=	EMPTY ANY	EMPTY ANY		2	2 FULL	EMPTY ANY	×	20%	N.	Norm Max
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LING LICAN	E mai Plant	27 Waste Oil Tank	27-28 found on Gas Fuel System page)	26 Ambient Temperature	25 Running Hours (unit overview)	24 80% Base Load Minimum	Dutput	22 Generator Current	22-24 found on Power Mac	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	gas TG Drain Tani	2000 gail Oll Water Tank Level	(18-20 found on Air Diagram page)	Entronic Control System	ation of AVR Volta	Operation of PSS/on at 6.3MW	AAECC TOB	13 Combustible Gas Detector Monitor	Room Temperature	11 Coctrol Room	10 Coolant Return Offerential from	Coolant Return Offerential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	fis Fan Cooler	Instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	instrument Air Compressor	MST (MD) (dirde one) Time Gas Introduced (Turbène Rolling) Time of Turbine Online (Briar Gosed):	APRIL 22
			al System page)		rview)	_			Magagement page)	urdy	over 4500 rpm NL)	19 10 gal gas TG Drain Tank (Air Diagram page)	Level	gram page)		Operation of AVR Voltage Mode @ 13.6 KV	WWE 9		or Monttor			tial from	tial from GG	ion Tank	æ			e	78	r Tank Hourly	Tank Hourly	30r	e) (Turbine Rolling); ne (Britr Cased);	2 2018
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A Patter APRIL 23 Al856 / LANL 2018H1 Semi-Annual Monitoring Report 21 20 15 18 11 12 123-28 found on Gas Fuel System page) 11 15 9 00 Running Hours (unit overview) Adinowledge Alarms Hourly 10 pai gas TG Drain Tank (Air Dłagram page) 22-24 found on Fower Management page 2000 gai Oli Water Tank Level (13-20 found on Air Diagram page) Operation of AVR Voltage Mode @ 13.5 KV Combustible Gas Detector Monitor ecord on hard 5/0 trip over 4500 rpm NL ompressor (on line trip) Operation of PSS/on at 6.3MW Coolant Return Differential from Coolunt Return Differential from GG Sight glass Level Expansion Tank Coolant PLC Temperature Instrument Temperature Wet Receiver Air Pressure Blowdown Wet Receiver Tank Hourly Blowdown Dry Receiver Tank Hourty Time of Turbine Online (Brier Closed): Time Gas Introduced (Turbine Rolling) MST (MDT) circle one) remperature APRIL 23 2018 TI inlet DET-11 DE2-11 U-231 FI-002 FI-001 T0001 11-002 Service of the servic 100-1 PI-002 BVT-007 UAL-013 Msd/h ж WW WW Amps Brsd × Units Yes (Y) Yes (Y) × % LE In WC DW 64 deg F Units TEVEL deg F I Units deg C psg Units 4 35 ş 5 100 Low B 3 Norm 72 37 Non 8 š Norm Ho tr 20 5 70% 1200 27 No (N) No (N) ğ 70% Max 200 Мах 21 8 8 ğ Men 56 B EM 232 233 233 3630 363 | 3632 3633 3434 48 48 48 47 47 24.4 24.4 24.8 24.8 1.8 19.8 19.8 10.1 1035 1036 1030 WST 1059 60 60 60 34 Ø उत्र <u>इत्र रक्त रक्त रक्त</u> 70 35 Time No Gas Flow: Time Turbine Offline (Briz Open): 9 04 7 Ø 80 35 35 70 ф 102 0 8 110 80 \$ K 101 19 8 106 236 \$ 8 8 8 5 4 0 25 UP 97 8 1 106 9 0 84 057 70 CGTG HOURLY READING LOG 355 27 yen you you you you 30,5 19 1 23) 27 58 031 30,00,00,00,00,00 D < 0 Š 0 102 19 10 yes yes yes 7 2/ 22 15 Notes: Ħ 2625 404 Yes 200 2 Ħ < 7 2 200 802 ti 234 70 3 24 c 126 ¥ 24 23 京京 35 Co No o 000 25 25 24 26 011801 ti 08 0 33 12 No. 120 120 120 120 120 1 35 35 37 1 16 25 40213216220 Ci 色色 08 108 3 27 02 KIN THE Tes 000 To 18 33 08 VES 1155 3 10 200 0 Q 2 15 190709 2 106 08 108 0 20 8 YES 465 K165 22 000 10% 105 0 P M 33 New 185 185 22 22 21 0 UI-LOG-033-R2 0 00 22 6 UH-LOG-033-R2 January 4 2018 3434 36 363 102 10 19 19 0 0 23

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	Days Shift V	Mid Shift Allows		DATE RAPHL 23 2018	A63F IGST		Double Block and Bleed Pressure A63FGDT	Natural Gas Comp.Discharge Press.	Take Once per Shift / at Full Load	Compresser Frame Vibration VT-1512	Motor Frame Vibration VT-1015	h. Temperature B		2"Stage Cylinder Disch. Temperature A TE-2062 A	1" Stage Cylinder Disch. Temperature A TE-2054 A	Final Discharge Temp TE-2120	Lube Oil Temp TE-1584	e.	essure		2nd Stage Infet Press PI-2200		1 Stage Inlet Press. PI-2100	Packing Lube Oil Flow Indicator Right Side FSL-1501A	2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level LI-7416	Lubricator Bulls eye	Oil Day Tank Level U-1562	Crankcase Bulls eye LC-1574	scing	Packing Lube Oil Flow Indicator Left Side FSL-1501B	Combustible Gas Detector AAH-303	GAS COMPRESSOR START TIME	Natural Gas Compressor
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E 0900 long security			Cate trust System page)	ature	nit overview)	24 30% base Lord Minimum	Mw Output	Generator Current	(22-24 found on Power Management page)	Acknowledge Alarms Hourty	Record on hard 5/D trip over 4500 rpm NL Compressor (on line trip)	10 gal gas TG Drain Tank (Air Olagram page)	2000 gal OB Water Tank Level	(15-20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.6 KV	Operation of PSS/on at 6.3MW	WECCLOR	Combustible Gas Detector Monitor	Room Temperature	Control Room	Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure			-	-	Mowdown Dry Receiver Tank Hourly	Instrument Air Compressor	Time of Turbine Online (Brkr Closed):	Time Ges Introduced (Turbine Rolling):	MT MODIFICATION 2018
Signature:		D-135		11 inlet				T		0	ASSESD ASSESD	U-Z30	U-231	-								200-15	F-001	1001	71-002	725		77-001	P1-002	00-T007	ETP-TVB	5			
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Notes	Days Shift	Mid Shift L PACHECO	SIGNATURE	DATE 4-24-2018	Fuel Gas Supply Pressure	Double Block and Bleed Pressure	Natural Gas Comp.Discharge Press.	Take Once per Shift / at Full Load	Compresser Frame Vibration	Motor Frame Vibration	2 nd Stage Cylinder Disch, Temperature B	1st Stage Cylinder Disch. Temperature B	2 ^{rn} Stage Cylinder Disch. Temperature A	1" Stage Cylinder Disch. Temperature A	Final Discharge Temp	Lube Oil Temp	Lube Oil Pressure	Final Discharge Pressure	2 rd Stage Disch. Press	2nd Stage Inlet Press	Stage Disch. Press	1 st Stage inlet Press.	Packing Lube Oil Flow Indicator Right Side	2nd Stage Scrubber Liquid Level	1st Stage Scrubber Liquid Level	Lubricator Bulls eye	Oil Day Tank Level	Crankcase Bulls eye	Liquid Level Coalescing	Packing Lube Oil Flow Indicator Left Side	Combustible Gas Detector	GAS COMPRESSOR START TIME	Natural Gas Compressor
may have	Jun Carl	X	0		A63FTGST	A63FGDT			VT-1512	VT-1015	TE-2062 B	TE-2054 B	TE-2062 A	TE-2054 A	TE-2120	TE-1584	PI-1572	PI-2108	PI-2201	PI-2200	PI-2101	PI-2100	FSL-1501A	U-7466	LJ-7416		U-1562	LC-1574	U-7721	FSL-1501B	AAH-303		
	4	MI			50-49=psid	49-48=psid	100	psig	IPS	2	deg	deg	deg	deg	deg	deg	psig 40	psig	psig	Bisd	psig	Bisd	Пент	DOID	ПОІВ	LEVEL 1/2		LEVEL 1/4	ugip	LHBU	%		Units Low Norm Max
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25 Renning Hours (unit overview) 26 Anhient Temperature (27-28 found on Gas Fuel System page) 27 Wasse Oil Tank 28 Total Fuel Flow	unning Hours (unit overviews) unblent Temperature 27-28 found on Gas Fuel Sy: Waste Oil Tank	unning Hourt (unit overview unbient Temperature 27–28 found on Gas Fuel Syr	unning Hours (unit overview	tunning Hours (unit overvio	Can chair Creat Internation	munimim hear sees ares	Mw Output	Generator Current	found on Power Management page	Azimowiedge Alarms Hourly	Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	10 gal gas TG Drain Tank (Air Diagram page)	2000 gal Oil Water Tank Level	(15-20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.6 KV	16 Operation of PSS/ on at 6-3N/N/	WECCLOS	13 Combustible Gas Detector Monitor	Room Temperature	Central Room	10 Coolant Return Differential from	Coolant Return Differential from GG	Sight glass lavel Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Fin Fan Cooler	instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):	MST / MDT (drcle one)	
		L	tem page)	17	3				agement page)					n page)		#ode @ 13.6 KV	W		Aonitor			from	from GG	Tank						ank Hourly	nk Hourly	,	urbine Rolling): (Brkr Cased):	00	
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Packing Lube Oil Flow Indicator Left Side	FSL-1501B	Пент	m	즤		70	A B	70	a	a	2	Ø	>	8	1	2	1	B	2	A	2	B	œ	Ø	13	B	20
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Crankcase Buils eye	LC-1574	LEVEL	1/4	1/2	FULL)	1/2	-	-	1	12	1	1/2	5	1/2	1/2	7	1/2	4	1/2	1/2	1/1	1	3	3	パル	100	1
Oil Day Tank Level	П-1562		10	-	FULL 2	اه	29 2	9 2	9 29	7 29	17	20	79	79	2	292	2	V.	979	36	28	77	7	27	27		12
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1st Stage Scrubber Liquid Level	LI-7416	LIQID	m	EMPTY ANY	ANY		CII	lle.	W.		F	W	1	1	3	1	2	7	4	14	_		ĺμ	ij	6	TT.	170
2nd Stage Scrubber Liquid Level	LI-7466	LIQID	Е	EMPTY ANY	ANY	T)	H	Ш		W	M	R	1	8	1	1		1	1			11/	L	U	17		1
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	Пент	œ	BLINK			Λ -	بر چ	~ ~	-	2	Ø	8	Ø	8	B	B	9	20	_	α	æ	Œ	Ø	20	S	æ
1 st Stage inlet Press.	PI-2100	Bisd		88	140	82	8	8	3	287	10	3	13	13	13/18	0	\geq	-		13/8	13	8	80	8181818	8 18	-	18
Stage Disch. Press	PI-2101	Bisd		-	285	250 249 249 249 250 250 250 27 7249 244 279 260 24 25	49 2	Ġ	25	000	324	1240	244	249	250			20	5/2	523	8 3	125	252	159	156	120120120125125125125125125125025	3
2nd Stage Inlet Press	PI-2200	Bisd		267	285	246 245 245 246 246 246 246 2442 45 246 246 246 246 2	5	47	4620	1157	624	21/5	241	245	296	· Jus		172	17.7	18 24	42 3	8426	7110	Sno	250	(124) 24/148 248 248 248 248 248 247 247 247	57
2 rd Stage Disch. Press	PI-2201	Bisd				5795	795	795	79 52	579579579 578 529 578579579579579579	555	22.5	579	126	76 5	795		566	7957	457	900	84.5	2	579	579 5	9679579579679679639578579579579579579578	8
Final Discharge Pressure	PI-2108	psig		575	600	575 575 57 5 575 574 575	755	36	25 25	57	5776	57457857857	570	575	575 875	15 5	.554	35.7	153	457	55.5	575	574	35.5	363	525 (7) 5574/575 (575 575 574 575 576 575 579	74
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2 nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283 215 214 213 24 200 216 2,2 2/8 2/6/22 0 2222 1/22	257	1412	122	72	1720	1	7	7	220	2222	21/2		2	2927	2 27	122	230	727	505	1350	5228 22922 271 271 270 230 227 205 27 227 223	22
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	297 207 206 206 205 206 206 20 7208 208 209 210 217 2	062	26 20	5 20	620	620	302	208	209	10	7	422	122/3 21		5214	124	214	2/2	214	215	215214 24214 213 213 213 212 212	12
2 nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283	215/213/213 211/210 210/2121 21/9/21/21/21/22/22/22	132	13 2	121	0 21	2/2	12/1	216	29	22	23/2		28 7	28 22	223	123	230	727	7.50	7.0	5 228 228 222 27 27 27 230 227 22 22 223	2
Motor Frame Vibration	VT-1015	IPS			0.15.04.04.04.04.04.04.04.04.04.04.04.04.04.	. 4o	04 .	04 .0	4.0	10-14	1 00	1.04	104	.04	04.	04.	250	20 20	0	5	6.0	20.5	05 06 00.05 OK	ġ	04-09	.09	100
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Take Once per Shift / at Full Load		Bisd		Max psid		When the differential pressure exceeds Max psid the filter should	the d	iffere	ntial p	ressui	re exc	eeds I	Max p	sid the	filter	shou	_	hang	ed ou	t. Not	ify Sy:	stem	be changed out. Notify System Engineer	Ш,			1
Natural Gas Comp.Discharge Press.		100				505				-	575	-	5					26									
Double Block and Bleed Pressure	A63FGDT	49-48=psid	sid		00	570		_	-		570	3					5	17				-3					
Fuel Gas Supply Pressure	A63FTGST	50-49=psid	sid		20	558		-	Н	H	256						858	8		H				A			
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Date: APR 26	28 Total Fuel Flow			26 Ambient Temperature		24 80% 8 to Load Minimum	23 Mw Output	22 Generator Current	(22-24 found on Power Management page)	21 Acienowiedge Alarms Hourly	20 Record on hard S/D trip over 4500 rpm NL Compressor (on the trip)	19 👪 🚰 gas TG Drain Tank (Air Diagram page)	18 2000 gal Oil Water Tank Level	(128-20 found on Air Diagram page)	Entronic Control System	17 Operation of AVR Voltage Mode @ 13.5 KV	16 Operation of PSS/on at 6.3MW	IS WECCLOS	13 Combustible Gas Detector Monitor	12 Room Temperature	11 Control Room	10 Coolant Return Differential from	9 Coolant Return Differential from GG	8 Sight glass Level Expansion Tank	7 Coolant PLC Temperature	6 Coolant Pressure	5 Fin Fan Cooler	4 Instrument Temperature	3 Wet Receiver Air Pressure	2 Blowdown Wet Receiver Tank Hourly	1 Blowdown Dry Receiver Tank Hourly	Instrument Air Compresso	Time of Turbine Online (Brkr Closed):	Time Gas introduced (Turbine Rolling):	MST Completed to 26
2018		-	System page)		view)				Management page)	Why	1			gram page)		ge Mode @ 13.6 KV	6.3MW		tor Monitor			otial from	ntial from GG	rsion Tank	ure			ure	SUITE .	er Tank Hourly	er Tank Hourly	ressor	line (Brkr Closed):	d (Turbine Rolling):	8107-9
Signature:	N.	14-110		#1 trilet							44364D 51-01	DEZ-11	TEM									FI-002	FI-001	100-0	11-001	PH250		100t	PI-002	500-1VB	ELO-1AB	D			
	Mscd/h	*				WW	WW	Amps		*	Bred	*	×		Units	(A) THE	YEA		<u>P</u>	deg £	Units	In WC	in WC	TEMEL	de la	-	-	degC	R	•	4	Units			
6	H					+	-		-	-	35	+	-		Low N			Operational?	9%		Low N			+	8	-	Low		8			MO			
0	-	70%	-		-	1	27	1200	-	-	8	70%	70%		Norm Max	20	No	917	0% 2	72	Norm A	-	+	2/3 F	+	+	-	+	105	1		Norm			
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Natural Gas Compressor		Units	Low	Norm	Max	1	2	w	4	UI	6 7	00	9	10	1	12	13 1	14 15	5 16	17	18	19	20	21 :	22 2	23
GAS COMPRESSOR START TIME									_	-		1				-	-	-	-	-			-	-	-	
Combustible Gas Detector	AAH-303	%		%	20%				4	-	+	7				_	+	+	+	Ī				-	+	
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LHBI		BLINK	_	_	R	2	SC.	7	2	2	N	Z	1	9	B	13	1	2	2	×	-	2	22	
Liquid Level Coalescing	LI-7721	шдів		EMPTY ANY	ANY	U	W	ILI			0	7	7	1	1	7	7	100	7	7	-	- 1	מוי	m m	-1	1. 15
Crankcase Bulls eye	LC-1574	TEVEL	1/4	1/2	FULL	1	2	40	10	2	3	17	1/2	1/2	1	7	2		1	7	7	12	-		- 1	16
Oil Day Tank Level	U-1562	€AL	10		E	27	26	26 0	1	7	J	7	74	27	7.5	1	7	がた	-1		2	120	7	2	J .	C-1
Lubricator Bulls eye		LEVEL	1/2			71	_	T	7	77	m	N	17	70	1	7	1	4	7	7	71	m	7	7	0	* M.
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY	ANY	TT.	W	U.	17)	ווו	7	M	M	W	V	7	4	-	1	4	1		-		m T	4.1
2nd Stage Scrubber Liquid Level	U-7466	UQID		EMPTY			W	Ţ	(J)		7	7	N	7	K	1	M	~	17	de	1				-	11/19
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	ПСНТ		BUNK		9	R	20	2	70	7	7	8	a	9	Q A	0	2	2	2	α	-		22	-	Ia
1 st Stage Inlet Press.	PI-2100	psig		88	140	22	20	27	2	27		- 1	3	3	18	10	12	18	_	0	13				0	-1
Stage Disch. Press	PI-2101	gisq		238	285	7 1	かんな かんな かんな	926	200	25.70	2.1	22/	250 251	250	20	250 251 9 51 9	2	22	22	2	725	5) 20 25) 26, 70 25/ 35 25	2	- [2000	20
2nd Stage Inlet Press	PI-2200	DSig		267	285		911	2440	3	20	K	140	14	747	277	1000	3	2		1246	246	8/00	100	5	200	< ¢
2 nd Stage Disch. Press	PI-2201	gisq		575	600	4515 86 1965365 X14565 543 663 668 869 000	579	366	25	227	6.5 ×	50	5	575	2	7	7	3	2	35	7	17.	700	195	862) 868969 664 865 865 86 3 865 865 865 865 865 865 865 865 865 865	and.
Final Discharge Pressure	PI-2108	Bisd	Į	575	600	574505 575	32%	3.50	35	5	575 875 574874874874576 578575576	1	3	53	225	27.	7	5	16.5	?	3	575	35	22	750 500 500 400 500 500 500 500 500 500 5	ا ء
Lube Oil Pressure	PI-1572	Bisd	8	69		85	88	88	N	\$ 5 V	5	3	50	65	595	200		2	2 20 20 20	2	0	6	0	0	60 50 50 50 CC	T
Lube Oil Temp	TE-1584	deg		150	170	83/	1 59		1 691	221891	11/2	1/4	13	13%	-	17/16	2		19/10/10/10/10	2	7	17.77	3	12	871 271 171 177	~t
Final Discharge Temp	TE-2120	deg		110	150	88	78		_		4	4	20	84			1	17	2		200	26 no 1 60 1 20 1 60 1 30 1 40 1		52	88	1
1stage Cylinder Disch, Temperature A	TE-2054 A	deg		226	297 21		2100		12		2	2	2,2	2	2/62	2182/	20	2	2	7	2	275	70.	2	220 22/1 22/12/22 9217/214 7/3 213 2/3 2/1	VI
2 nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283	283 249 2-17 216	272		P	516 81	2	21/ 1/20	224	214.15	29	2 10	39	5	7	~	22	227	2	22	274 275 257 256 27477 276 279	× 1
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297	297 209 208 207 207 208 207 207 21/ 213 214	08	1972	27 20	100	72	25	21/	2/3			200	彩	577	5	217	212 512 812 612 820 6 50 50	2	2	211 216 210	VF
2 nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg	1	258	283 2/5	1977	17	2/6/2	72	18 21	PUT 216 RIG 218 215 215 219 228 228 23023	2/9	22%	225	128	200	2	25	77	13	23	1777	77/7	797	271 274 774 777 220	01
Motor Frame Vibration	VT-1015	PS			0.15	0.15 04 04 09 04 04 04 04 04 04 04 04	140	1- 10	2 20	5	0	000	100	200	200	040,000	0	0,0	50, 20, 40	0	2	104 DC 100	0.0	2	40 04	21
Compresser Frame Vibration	VT-1512	IPS			0.35	Ŕ	R	2.00	0.150	-05-06-05-06-06	0	2	00 06 06	2	90	020	4	2	16 10 106 106	2	20	8	8	20	50 00 00 00 00 00 00	M
Take Once per Shift / at Full Load		psig		Max psid	psid		the o	differe	ntial	pressu	ге ехс	eeds	Max p	sid the	filter	shoul.		hang	d out	Noti	fy Sys	be changed out. Notify System Engineer	nginee	٦		
Natural Gas Comp.Discharge Press.						27.3	Ė		-	7	2 2	4	3				-	-	273					-	-	- 1
Double Block and Bleed Pressure	A63FGDT	49-48=psid	psid		00	175			-		57	Ì				-	3		5					+		- 1
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4-27-18		#Tank	(27-28 found on Gas Fuel System page)	Ambient Temperature	Running Hours (unit overview)	80% Base Load Minimum	tput	Generator Current	(22-24 found on Power Management page)	Compressor (on line trip)	Record on hard S/D Irin over 4500	Con Cil Water Tank Level	(15-40 found on Air Diagram page)	A CONTROL SYSTEM	Entire Council	Operation of AVR Voltage Mode	tion of Bee /	MECC TOS	noom temperature	Tomorra	11 Control Room	10 Coolant Neturn Differential from GG	Codess Section Day	Count PC Temperature	5 Coolant Pressure	an Cooler	4 Instrument Tamperature	3 Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	Time of Turbine Online (Brkr Closed):	MST AMD)(drde one) Time Gas introduced (Turbine Rolling):	17 2141
<u> </u>		F	(88						ot page)						9 13.6 RV							96							Apmo	nurty		Closed):	e Rolling):	2018
Signature:	Msd/h	N-120		Til lailet	-	WW	z 2	-	-	10-15			-15	-	5	4			2		F-002	-	-	+	F1.250		77-001	P5-002	BVT-007	ETO-174	ь	_		
1	4/3				+	¥	WW Auntos			psig 35	36	×		Units Low	Yes (Y)	Yes(Y)	1	% E3 0%	deg F	Units Low	In WC	In WC	\vdash	deg F	Bed	Units L	degc	Best	4	4	Units			
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LC-1574	LEVEL	-		7	7	27		1	3	7	7	+		4	1	+	+	+	+
U-1562	GAL.		-	36	17.	1	3	- 1	2 5		1	+		1	+	+	+	+	+
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PI-2101	DSig	22 9	+		20	5 >	10	K	NA.	2002	+	t		1	+	+	ł	+	-
PI-2200	DSig	26	+		-		XA74	E	2 1		10	1			+	+	+	+	-
PI-2201	psig	57	-	15 S		2 2		2	22	2	-6	1		1	+	+	+	+	+
PI-2108	Bisd	57	-	57.5	27.7	*		Y		1	1	1		1	+	+	+	+	1
PI-1572	7	+	-	22	28.5				200	* a	-	1		1	+	+	+	+	+
TE-1584	1	+	-	271	-	30		-	1/9/	90	1	T		1	+	+	+	+	+
TE-2120	deg	11	-	2	- 1	9 2	3	-	20	200		1		1	+	+	+	+	+
TE-2054 A	deg	22	-			20.00	200	200		200	0	1		1	+	+	+	+	1
TE-2062 A	deg	25	_	3776	2752	اري دور	277	2 6		1621	9	Ī	I	1	+	+	+	+	4
TE-2054 B	deg	22		7008	2072	2		200		6	7	1		1	+	+	+	+	1
TE-2062 B	deg	25		3 226	252	15		2/1	70	1601	0	1		4	+	+	+	+	1
VT-1015	IPS		0.1	5 . 64	DO .	4.00	_	2		5	-			4	+	+	+	+	4
VT-1512	IPS		0.3	500	202	2		2	3	7	-			1	+	+	+	+	-
	gisq	×	ax psid		the di	fferen	tial pre	SSure	excee	ds Max	psid t	he filt	er sho	uld be	chans	ed o	N N	7	SY .
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A63FGDT	49-48=ps	E.	00		27				4	+		1		+	+	+	+	+	_
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				W 0% 1/2 1	W	W	% 0% 20% % 0% 20% UGHT BLINK UQID EMPTY ANY LEVEL 1/4 1/2 FULL UQID EMPTY ANY DSig 238 238 249 60 Dsig 40 60 Dsig 40 60 Dsig 275 600 Dsig 275 297 deg 210 170 deg 226 297 deg 258 283 deg 258 283 PS 0.15 Dsig 258 283 DSig 25	W	W	W	W	% 0% 20%	8 LIGHT BLINK N	S	S	10010 EMPTY ANY	100 100	S	S

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Natural Gas Compressor		Units	LOW	Low Norm Max 1 2	Max	1	2 3	4	G	6	7	8	10	11	1	13	14 15	16	17	60	19 2	20 21	1 22	23	24
GAS COMPRESSOR START TIME	2880						-	1	+			+	-	-		-	-	-	ŀ	-	-	-	-	-	1
Combustible Gas Detector	AAH-303	%		%	20%		-	1	1		1	+	4/2		1	+	+	1		+	+	+	+	1	
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	HBH		BLINK	1		+	+	1		1	+	7	N	p	7	+	+	I	+	+	+	+	-	
Liquid Level Coalescing	U-7721	Fige		EMPTY	ANY		+	+	1		1	+	M	77.5	II C	11 6	+	1		1	+	+	+	1	1
Crankcase Bulls eye	LC-1574		1/4	1/2	Ē		+	+	1		1	+	3	5/	5	3	+	1		1	+	+	+	1	
Oil Day Tank Level	LI-1562	GAL	6		Ë		+	+	1		1	+	2	5	3	1	+	+		1	+	+	+		
Lubricator Bulls eye			1/2	F			+	+			1	+	n	4	18	1	+	+		1	+	+	+		1
1st Stage Scrubber Liquid Level	LI-7416	E E		EMPTY	ANY		+	+	1		-	+	7	_	11	1	+	1		-	+	+	+		
2nd Stage Scrubber Liquid Level	LI-7466	LQID		EMPTY			+	+	1		-	+	W	गा		7 13	+			1	+	+	1/		
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	LIGHT		BLINK				-				+	70	ದ	,	~	+	1		-	+	-	1		
1st Stage Inlet Press.	PI-2100	DSig		88	140		+	+	1		-	+	0	0	2	-	+	1		+	1	+	+	1	
Stage Disch. Press	PI-2101	psig		238	285		+	+	1		1	+	200	TO PING DIAG	2000	٤.	+	1		1	+	+	+		
2nd Stage inlet Press	PI-2200	gisq		267	285		+	1			-	+	200	7	250.300	8	+	1		+	+	+	+	1	
2 nd Stage Disch. Press	PI-2201	gisq		575	8	-	+	1				-	<u>ک</u>		ĮŞ Į	d	+	1		1	+	+	+		
Final Discharge Pressure	PI-2108	psig		575	600		-				-	+	35		5050	7	+	1		1	-		+		
Lube Oil Pressure	PI-1572	Bisd	46	69			-	1				1	4	3	3	S	+	1		-	+	+	1		
Lube Oil Temp	TE-1584	deg		150	170		+	1	1		-	+	/80	Ĉ,	1 //	5	+	1		+	+	+	+		
Final Discharge Temp	TE-2120	deg		110	150		+	1			4	+	200	96	2	هُ.	+	1		+	+	1			
1st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297		+				4	-	3	B	22	6	+			1	+	1	1	1	
2 ^{re} Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283		-				-	1	222	228 229 779	28	3	+			-	1	1	1		
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297		-						3	3	3	8	+	1		1	+	+	1		
2 th Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283		-						228	228 229 21	2 23	S	+			-	+	1	1		
Motor Frame Vibration	VT-1015	PS			0.15		-						B	64	40	X	+			4	+		1	1	
Compresser Frame Vibration	VT-1512	IPS			0.35								30		2	3	1			+	+	+	1		
Take Once per Shift / at Full Load		gisq		Max psid		When	When the differential pressure exceeds Max psid the filter should	ferent	ial pre	ssure	ехсеес	xeM s	psid t	in file	shou	ld be	hange	be changed out. Notify System Engineer	Notifo	Sweep	m Fng	near	-		
Natural Gas Comp.Discharge Press.						_	-				4	+	575			-	-		1	1	6	-			
Double Block and Bleed Pressure	A63FGDT	49-48=psid	psid		00	1	+				+		2		1	+	+	1	1	+	+	+	1		
Fuel Gas Supply Pressure	A63FTGST	50-49=psid	psid:		20	Н	H	H	П			-	855			-	H	T	6	4	+	+			
DATE () S-04.2018																									
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Days Shift 🦯						1				H							1			1	1				
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CGTG TURBINE		UTIL	UTILITIES AND INFRASTRUCTURE	D INFR	STRUC	TURE																		
Natural Gas Compressor		Units Low Norm Max	W Norm	Max	1	2 3	4	u	0	7 8	9	5		12 13	14	5	16	17	18 19	9 20	21	22	23	24
GAS COMPRESSOR START TIME	5001					-	+		-	+	-		_		_			-	-	-	-	-	1	1
Combustible Gas Detector	AAH-303	%	0%	20%						+	1		4	+				4	-	+	1	1		
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LHBIT	BLINK	$\overline{}$		-	1			+	1			+	1			-	+	+	1			
Liquid Level Coalescing	LI-7721	LIQID	EMPT	EMPTY ANY		+			4	+	1		-	+	1			4	+	+	1	1		
Crankcase Bulls eye	LC-1574	LEVEL 1/4	_	E E		-			4	+	1		-	+	1			+	+	+	1			
Oil Day Tank Level	LI-1562		-			+	1		-	+	1		4	+	+			4	+	+	+	1		
Lubricator Bulls eye			2 FULL	-		1			1	+	1		1	+	1				+	+	+			1
1st Stage Scrubber Liquid Level	LI-7416	- 1	_	EMPTY ANY		+			4	+	1		1	+	1			1	1	+	1	1		
2nd Stage Scrubber Liquid Level	LI-7466	LiQID	EMPT	EMPTY ANY		-			-	+					1			4	+	+	1	1		
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	пент	BLINK															-	-	-				
1st Stage Inlet Press.	PI-2100	DSig	88	140		-	1			+	1		-	+	1			-	-	+	+	1		
Stage Disch. Press	PI-2101	gisq	238	285		-				-	1		4	+	1			4	+	+	+	1		
2nd Stage Inlet Press	PI-2200	gisq	267	285		-				-	1			+	1			-	+	+	+	1		
2 nd Stage Disch. Press	PI-2201	psig	575	600		-							4	+	1			-	-	+	1			
Final Discharge Pressure	PI-2108	gisq	575	600						-			4	+				4	-	+	1			
Lube Oil Pressure	PI-1572	psig 40	-	Ī		-				-					1			4	-		1			
Lube Oil Temp	TE-1584	deg	150	170					-					-				-	-	-				
Final Discharge Temp	TE-2120	deg	110							-				-				-	-	-	1			
1 st Stage Cylinder Disch. Temperature A	TE-2054 A	deg	226							+				-				_	+	-	1			
2 nd Stage Cylinder Disch. Temperature A	TE-2062 A	deg	258	283						-				-					-	+				
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg	226	297										-				-	-					
2 nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg	258	283						-				-				-						
Motor Frame Vibration	VT-1015	몽		0.15						-			Ц	+				4	-	+				
Compresser Frame Vibration	VT-1512	S		0.35						-								_	-	1			j,	
Take Once per Shift / at Full Load		psig	Max	Max psid	When the differential pressure exceeds Max psid the filter shoul	the diff	erenti	al pres	sure e	ceeds	Max p	sid the	filter	should	be	changed out. Notify System Engineer	0LF. \	otify	Syster	n Engi	neer			
Natural Gas Comp.Discharge Press.		The same of				1-1				+			4	4				4	-	-	1			
Double Block and Bleed Pressure	A63FGDT	49-48=psid	a	00		-			-	+			4	-				-	+		1			
Fuel Gas Supply Pressure	A63FTGST	50-49=psid	۵	20									Н	Н		M			Н	Н				
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Date: 5-14-2018	Total Fuel Flow	27 Waste Oil Tank	(27-28 found on Gas Fuel System page)	Ambient Temperature	25 Running Hours (unit overview)	24 80% Base Load Minimum	23 Mw Output	22 Generator Current	(22-24 found on Power Management page)	Acknowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm Nt. Compressor (on line trip)	19 10 23 gas TG Drain Tank (Air Diagram page)	2000 gal Oil Water Tank Level	(18–20 found on Air Diagram page)	Entronic Control System	Operation of AVR Voltage Mode @ 13.5 KV	16 Operation of PSS/on at 6.3MW	15 WECCLOG	13 Combustible Gas Detector Monitor	12 Room Temperature	11 Centrel Room	10 Coolant Return Differential from	Coolant Return Differential from GG	Sight glass Level Expansion Tank	Coclant PLC Temperature	6 Coolant Pressure	5 Fin Fan Cooler	4 Instrument Temperature	3 Was Receiver Air Pressure	2 Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	MST / MDT (circle one) Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):	05-14-2018
Signature:		15-120		T1 injet							A63GGD 57-01	0.230	11.53.1									FI-002	FH-001	LI-001	TI-002	PI-250		11-001	P1-002	BVT-007	BVT-013	LD		
	Mscf/h	*				WW	ww	Amps		4	By.	ж	×		Units	YES (Y)	Yes (Y)		* E	deg F	Units	In WC	In WC	TEVEL	deg F	B/SE	Units	deg C	psig	4	٧	Units	1327	
											8				Low			Operational?	0%		Low			1/3	100		low .		96			Low	1	
											20				Norm			onal?	9%	72	Norm	37	8	2/3	110	25	Norm	20	105			Norm		
	Ц	70%					27	1200				70%	70%		Max	NO (N)	No (N)		20%	85	Max	50	8	FULL	120		Max	ß	120			Max	a a	
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ato:	28 Total Fuel Flow	27 Waste Oil Tank	(27-21 found on Gas Fuel System page)	26 Ambient Temperature	25 Running Hours (unit overview)	24 80% Base Load Minimum	23 Mw Output	22 Generator Current	(22-24 found on Power Management page)	21 Acthowledge Alarms Hourly	Record on hard \$/D trip over 4500 rpm NL Compressor (on line trip)	19 10 gal gas TG Drain Tank (Air Diagram page)	8 2000 gal Oil Water Tank Level	(19-20 found on Air Diagram page)	Entronic Control System	17 Operation of AVR Voltage Mode @ 13.6 KV	to Operation of PSS/ on at 6.3MW	15 MECCIOS	13 Combustible Gas Detector Monitor	12 Room Temperature	11 Centrel Room	10 Coolint Return Differential from	9 Coolant Return Differential from GG	8 Sght glass Level Expansion Tank	7 Coolant PLC Temperature	6 Coolant Pressure	5 Fin Fan Cooler	4 Instrument Temperature	3 Wat Receiver Air Pressure	2 Blowdown Wet Receiver Tank Hourly	1 Blowdown Dry Receiver Tank Hourly	Instrument Air Compressor	MST / MDT (circle one) Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Bchr Closed):	Date: 5-15-5018
Cignoture		U-120		Ta inlet							463GGD 5T-01	LI-230	U-231									F1-002	FI-001	11001	11-002	PI-250		TI-001	P1-002	BVT-007	BVT-013	II.D		
ņ	Msd/h	×				ww	MW	Amps		4	Brid	×	ж		Units	Yes (Y)	YE (Y)		% LEI	deg F	Units	In WC	In WC	TEVEL	deg F	psig	Umits	D Sap	psig	٧	*	Units	13	
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											20				Norm			mai?	0%	72	Norm	37	60	2/3	110	25	Norm	20	10S			Norm	/	
		70%					27	1200				70%	70%		Max	No (N)	No (N)		20%	85	Max	50	80	FULL	120		Max	50	120			Max	– –	
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28 Total Fuel Flow Msd/h	27 Waste Oil Tank U-120 %	(Z7-28 found on Gas Fuel System page)	26 Ambient Temperature T1 Inlet	25 Running Hours (unit overview)	24 80% Base Load Minimum MW	23 MW Output MW	22 Generator Current Amps	(22-24 found on Power Management page)	21 Arknowledge Alarms Hourly	20 Record on hard S/D trip over 4500 rpm NL ASSIGED PAG 35 20 Compressor (on line trip)	19 10 gal gas TG Drain Tank (Air Diagram page) U-230 x	18 1000 gal Oii Water Tank Level U-231 %	(18-20 found on Air Diagram page)	Entronic Control System Units Low Norm	17 Operation of AVR Voltage Mode @ 13.6 KV Yes (Y)	15 Operation of PSS/on at 6.3MW Yes (Y)	IS WECC Log Operational?	13 Combustible Gas Detector Monitor % LEL 0% 0%	12 Room Temperature deg F 72	11 Control Room Units Low Norm	10 Coolant Return Differential from FI-002 In WC 37	9 Coolant Return Differential from GG FI-001 In WC 60	8 Sept glass level Expansion Tank LL-001 LEVEL 1/3 2/3	Coolant PLC Temperature 11-002 deg F 100	6 Coolant Pressure PI-250 psig 25	5 Fin Fan Cooler Units Low Norm	4 Instrument Temperature T-001 deg C 20	3 Wet Receiver Air Pressure PI-002 psig 90 105	2 Blowdown Wet Receiver Tank Hourly BVT-007 v	1 Blowdown Dry Receiver Tank Hourly BVT-013 v	Instrument Air Compressor I,D Units Low Norm	Time Gas Introduced (Turbine Rolling): 2700 Time of Turbine Online (8/dx dozed): 0954	MST (MD)(circle one) 0903
	70%					27	1200			20	70%	70%		mm Mex	No (N)	No (M)	P	3402 %d	72 85	mm Max	37 50	8	1/3 FULL	10 120	G	Man Man	20 50	05 120			лт Мах 1 2 3 4	Time Turbine Offline (Brkr Open): Time No Gas Flaw:	
, 6 213.32.9,9 208.8 206.4	69 70 70 70 70 70		70.972.574.876,676.7 79.2	CALS THES SALS TAIS TAIS	18.0) 17.94 17.73 17.53 17.37	اب	909 421 901 883 886 876		1 4 4 1 V V V V V V V V V V V V V V V V	2		35 35 34 34 39			405	4es yes yes yes yes yes		000000000000000000000000000000000000000	71.5 70.0 70.0 71.5 72.5 72.5		36 36 36	60000000000000000000000000000000000000	1/2 5/4 5/4 S/4	18/18/18/18/18/18/18/18/18/18/18/18/18/1			76 26 27	201 401 201 201 0	7 7 7 7	7777	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22		CGTG HOURLY READING LOG

CGTG TURBINE		_	TILITE	UTILITIES AND INFRASTRUCTURE	INFRAS	STRUC	몺																			
Natural Gas Compressor		Units	Low	Norm	Max	_	2 3	4	ű	ტ	7	8 9	10	11 12	12	13	14	15	16	17	18	19	20	21	22	23 24
GAS COMPRESSOR START TIME 6639	5480																	Ш						4		
Combustible Gas Detector	AAH-303	Ж		20%	20%		*						1/1	580	005 0	500500		500								
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LHÐI		BLINK			-					-	B	3	3	B	_	3								
Liquid Level Coalescing	LI-7721	LIQID		EMPTY ANY	ANY		-						71		D		10	(1)		-					ηÚ	
Crankcase Bulls eye	LC-1574	LEVEL	1/4	1/2	핕		-					-	3/6	1/2	1/2 1/2 1/	1/2 1/2	1/2	1/2								
Oil Day Tank Level	LI-1562	GAL	6		E		-					-	2	2	アシス	5	E.	€,				Н				
Lubricator Bulls eye			1/2	FULL								-	3/4	15/13/13/13/13/1	3/4	7	3/4	2/3					. ī.		-	
1st Stage Scrubber Liquid Level	LI-7416	LIQID		EMPTY ANY	ANY							-	ini	E	E	10	D	be					4	Ц		
2nd Stage Scrubber Liquid Level	LI-7466	LIQID		EMPTY ANY	ANY				Ī	1		-	to.	W	u	(J)	E	m								
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	HBH.		BLINK								-	C)	Ø	\approx	に	\Box	ひ							Ц	
1* Stage Inlet Press.	PI-2100	psig		88	140		-					-	00	8).9	22	72	2	ç							4	
Stage Disch. Press	PI-2101	psig		238	285								255	550 580 182 523 183 585	252	2	727	25.								
2nd Stage Inlet Press	PI-2200	gisq		267	285		-						2	142	248	249	246:	PA ST								
2 nd Stage Disch. Press	PI-2201	psig		575	600		_					Ц	578	2 18 2 19 279 2	579	579	79 579 579	76					L			
Final Discharge Pressure	PI-2108	psig		575	600		-						55	572 513 515	363)[518 818	35			J.					
Lube Oil Pressure	PI-1572	psig	6	60	K							-	.65	52.698.656.65	69.8	-0	[7.7] 5%5	24.5								
Lube Oil Temp	TE-1584	deg		150	170							4	164	14	164	63	113/14	14					Щ			
Final Discharge Temp	TE-2120			110	150		-						110	10 112	115	119	119 120	20								
1 st Stage Cylinder Disch. Temperature A	TE-2054 A	deg		226	297		_					-	23;	57 50 50	133	4	54 285 178	3	Ц		J					
2 rd Stage Cylinder Disch. Temperature A	TE-2062 A	deg		258	283		-					-	24	24 142 244 24	244	3	47 248 248	148		1						
1st Stage Cylinder Disch. Temperature B	TE-2054 B	deg		226	297		-			I			23/	230	250	230	50 231 232	132								
2 nd Stage Cylinder Disch. Temperature B	TE-2062 B	deg		258	283		_	-				_	24	D WY	244	247	1247247	147					_		L	
Motor Frame Vibration	VT-1015	IPS			0.15		-		T				101	40. 40. 40. 50. 50. 50. 50.	Š	000	10	94	Į							
Compresser Frame Vibration	VT-1512	IPS			0.35		-				Ц		-01	.05 .01 .05	ż	90.	36,06,06	06					_			
Take Once per Shift / at Full Load		gisq		Max	Max psid	When the differential pressure exceeds Max psid the filter shou	the dif	ferent	ial pre	SSure	ехсее	ds Max	psid 1	he filt	er sho	uld b	e cha	ld be changed out. Notify System Engineer	out. N	lotify	Syste	E.	gine	4		
Natural Gas Comp.Discharge Press.														216										7		
Double Block and Bleed Pressure	A63FGDT	49-48=psid	psid		00							_		57)												
Fuel Gas Supply Pressure	A63FTGST	50-49=psid	psid		20		-	H				H		56)					L	L	L		-	-		
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Natural Gas Compressor																			
GAS COMPRESSOR START TIME		Onits	CUITS LOW NORM MAX	Max	1 2	w	4 5	6 7	00	9 10	11 12	2 13	14 15	16	17 18	19	20	21 22	2 23
Combustible Gas Detector	AAH-303	R	2	2000	1	1		849					V.						
Packing Lube Oil Flow Indicator Left Side	FSL-1501B	LHBH	BIN	2000	1	ļ	İ	+	5	1			-						
Liquid Level Coalescing	11-7777	5 5	EMPTY		1	I	-	+	-	B	8 6	0	80						
Crankcase Bulls eye	LC-1574		1/4 1/2				t			LI.	6 6	N	B						
Oil Day Tank Level	LI-1562	-	10 4			1		H	'r'	1/2	124	1/1	12/2						
Lubricator Bulls eye			1/2 FIII	-	-	1		+	1	T	23	1	23						
1st Stage Scrubber Liquid Level	LI-7416		_	EMPTY ANY	1	1		+	+	Sirl MA	While	19/4	11/1/11/11		-				
2nd Stage Scrubber Liquid Level	LI-7466	LIQID	EMPTY	ANY	1		1	+	n/r		33	14	100		+			-	
Packing Lube Oil Flow Indicator Right Side	FSL-1501A	Пент	BLINK			-		18	+	ם מ	2 6	0 0	X		+	Ŋ		+	+
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lake Once per Shift / at Full Load		psig	Max psid		When the differential pressure exceeds May not the filter should	different	ia press	ure exce	eds Ma	neid th	filter cha	103	501 60		-		-	-	
Natural Gas Comp.Discharge Press.							-		145	Daid Circ	iller at	ad bino	change	de changed out. Notify System Engineer	tilly Sys	tem Er	ngineer	-	
Double Block and Bleed Prossure	A63FGDT	49-48=psid	<u>a.</u>	00		1	1	1	270		+	1	35		t	I	-	+	
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123-M found on Power Managem
69.22 Genterator Current
72.23 May Output
89.24 490% Sase Load Minimum
72.25 Running Hours (unit overview)
72.64 Ambient Temperature
73.64 Ambient Temperature
73.72 Waste Oil Tank
75.72 Waste Oil Tank
75.72 Waste Oil Tank
75.73 Total Fuel Row
75.74 Darte (10.44 AI856 / LANL 2018H1 Semi-Annual Monitoring Report 19 10 grd gas TG Drain Tank (Air Diagram page) 10 Coolant Return Differential from 13 Combustible Gas Detector Monitor Acknowledge Alarms Hourly Operation of AVR Voltage Mode @ 13.6 KV (22-24 found on Power Management page) Record on hard S/D trip over 4500 rpm NL Compressor (on line trip) 2000 pi Oil Water Tank Level 17-28 found on Gas Fuel System page) Operation of PSS/on at 6.3MW (15-20 found on Air Diagram page) Sight glass Level Expansion Tank Coclant Return Differential from GG Coolant PLC Temperature Coolant Pressure Instrument Temperature Blowdown Wet Receiver Tank Hourly Wet Receiver Air Pressure Blowdown Dry Receiver Tank Hourly Dan 5: 7.2018 Time of Turbine Online (Brkr Closed): MST / MDT (circle one) ime Gas Introduced (Turbine Rolling): ament Air Compressor 71 inlet Signature: D-120 DE2-11 U-231 FI-001 P1-002 11-002 11-002 P1-250 11001 BVT-007 STO-TVE I.D Units Low Mscf/h Yes(Y) deg C WM W Amps Units Yes (Y) In WC In WC 1750 Bisd ж % LEL deg F TEVEL N₂sq deg F psig Units 4 < 쌇 98 £/1 Norm 3 20 7 37 8 2/3 i 25 20 105 70% No (N) 1200 No DKI 27 70% Max 莫 를 Max 20% æ Max 55 8 120 Max 50 170 Time Turbine Offline (Britr Open): Time No Gas Flow: THERE WERE 5155 CGTG HOURLY READING LOG 0 FAILED 9 STARTS OF UNIT 10 Notes: 11 TO BE ON LEVE STIFFELY WILL TO MAN : SEE BECOME ONLY OF BUTTON POSHED. 12 13 14 FUEL 5 545 16 17 800 18 LESS THON ONE MINUTE ATOTIT 3760 3161 5762 17.0 17.2 17.5 17.0 17.2 17.5 15 15 15 15 15 15 99 35 72 03 74 501 52 te 20 108 7 72 73 74 20 107 B 53 20 3,6 12 90 30 6 23 73 35 20 8 21 22 UI-LOG-033-R2 January 4 2016 UH_DG-033-R2 January 4 2018 23

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Natural Gas Compressor GAS COMPRESSOR START TIME	Mass.	Units	Low Norm Max 1 2	Units Low Norm Max 1	Max	1	2	w	4 5	6	7	60	o	11 00	12	ᇥ	14 15		16 1	17 18		19 2	102	20 21
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essure	PI-2108	psig		575	600			-	1	1			-	+	1			1	+	+	57	77		いたかなんか
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Natural Gas Comp.Discharge Press.													-				-	- 000	-	-	-	- 5	IV.	- 500
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Date: 6-8-18	28 Yotsi Fuel Flow	27 Waste Oil Tank	(27-28 found on Gas Fuel System page)	26 Ambient Temperature	25 Running Hours (unit overview)	24 80% Base Load Minimum	23 Mw Output	22 Generator Current	[22-24 found on Power Management page]	21 Addrowledge Alarms Hourly	20 Record on hard S/D trip over 4500 rpm NL Compressor (on line trip)	19 10 pail gas TG Drain Tank (Air Diagram page)	18 2000 gal Oil Water Tank Level	(15-20 found on Air Diagram page)	Entronic Control System	17 Operation of AVR Voltage Mode @ 13.6 KV	16 Operation of PSS/on at 6.3MW	12 MECCIPB	13 Combustible Gas Detector Monitor	12 Room Temperature	11 Control Room	10 Coolant Return Differential from	9 Coolant Return Differential from GG	8 Sight glass Level Expansion Tank	7 Coolant PLC Temperature	6 Coolant Pressure	5 Fin Fan Cooler	4 Instrument Temperature	3 Wet Receiver Air Pressure	2 Blowdown Wet Receiver Tank Hourly	1 Blowdown Dry Receiver Tank Hourty	Instrument Nir Compressor	Time Gas Introduced (Turbine Rolling): Time of Turbine Online (Brkr Closed):	MST / MDZ/dricke one)	1
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Ó	21-18			(27-28 found on Gas Final System page)	26 Ambient Temperature	Punning Hours (unit overview)	80% Base Load Minimum	23 Mw Output	Generator Current	(22-24 found on Power Management page)	Admowledge Alarms Hourly	Record on hard S/D trip over 4500 rpm NE. Compresser (on line trip)	19 to gal gas TG Drain Tank (Air Diagram page)	18 2000 gal Oil Water Tank Level	13-35 found on Air Diagram page]	Entronic Courtral System	Operation of AVR Voltage Mode @ 13.6 KV	Operation of PSS/on at 6.3MW	WECCLOS	13 Combustible Gas Detector Monitor	Room Temperature	Control Room	Coolant Return Differential from	Coolant Return Differential from 6G	Sight glass Level Expansion Tank	Coolant PLC Temperature	Coolant Pressure	Plo Fan Cooler	Instrument Temperature	Wet Receiver Air Pressure	Blowdown Wet Receiver Tank Hourly	Blowdown Dry Receiver Tank Hourly	instrument Air Compressor	Time Gas Introduced (Turbine Rossing)	Date: 6-21-2018
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UI-LDG-033-R2

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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 :

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

Component :

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

- 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.

Facility : F08	Unit :	Proj :	
	TA3-22 FGR BEARINGS		Work Order Task
W/O Type : PM	W/O Group : UTIL	Task Priority : 4	The second second
Planner : 189099	LOPEZ THERESA M		00595731 01
W/O Title : PP 1M	TA3-22 FGR BEARINGS,	LUBRICATE	
Written To : TA03- FGR-003)	0022 FAN, FLUE GAS R	RECIRCULING (FGR-001, FGR-002,	MASTER
Task Dspln :	Due Date : 01/31	/2018	Date: 10/17/2017
Superintendant :			10, 11, 101
Hazard : LOW	IWD Reqmt : N/A	LOW HZRD	
			_

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

Cost Accounting

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



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

Form 2101

Non-Tenant Activity Form

EST.1943		ana rippi	railor anay ana r		Activity I offin
IWD No./Work Request No:	Revision #:				
Facility Operation Director (FC hazards and controls associate	DD) must determine the facility entry and ed with the activity location.	coordination requirer	ments and identify the Envir	onment, Safety, Health (ESH)/Security and Safeguards (S&S)
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	made
Entry and Coordination Rec	quirements (Check one or more of the	following)			
☐ No Entry/Coordination Re	quirements	OD-designated facili	ty Point-of-Contact must sig	n IWD Part 3	
Plan of the Day/Plan of th	e Week (POTD/POTW)	heck in at Start of W	ork Work-Area	Training Required	
Security Clearance Requi	irements 🛛 v	ork must be Schedu			
Co-located Hazards/Cond	cerns 🔲 O	ther Security Require	ements (ex.: Cellphone, No	Foreign Nationals, etc.)	
Check out at End of Work	· 🗀 a	uality Issues	Check out [Daily	
Escort Required	□ R	eview under Authoria	zation Basis (AB)/Safety Ba	isis/Unreviewed Safety Quest	tion (USQ)
Other Bounding Condition					
PIC is responsible to conduc	t a pre-job brief for work activities to ensu	ire that work condition	ons and worker communical	tions are adequate. A pre job	briefing shall be conducted at the
job site. UI-OPS will determin	e if onsite ESH representation is required	during work activities	es		
Additional Comments (refer	r to Job Hazard Analysis [JHA] Tool Fa	icility Notes)			
All work must be approved by	the Utilities FOD or UI-OPS_POD/POTV with activities_Check in with Plant Operat	V-contact Facility PC	OC. No Smoking around Na	tural Gas Systems Evaluate	inside floor and housekeeping
	es. Inspect for leaks before beginning an				
the site specific training video	in room 116 (Boiler Control Room), one	time requirement. Of	bserve safety signs and floo	or markings in all buildings an	d areas No safety shoes required
for visitors if escorted by Ope	rations or UI Engineering personnel. The	West end front lobb	y and office areas of Bldg 2	2 are considered a no hazaro	area.
instructions: In the block belo	ow, identify work-area hazards that could to protect against the site hazards as we	potentially affect the	worker(s) or others. Specif	y the facility controls and pre-	ventive measures that must be
implemented by the worker(s)			HAZARDS & CONTROL	S	
Work Area Hazards/Concer		Work Area	Facility Controls/	Reference Documents	Training and Qualification
	erns that could potentially affect the	Hazard Present	Preventive Measures/ Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	List permits, operating manuals, and other reference procedures	List training requirements (P300, Integretated Work Management, Section 6.1)
No Work Area Hazards					

Form 2101 (6/12) Page 1

Nonizing 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 #:	S WORK AREA I	HAZARDS & CONTROL	S	
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)
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

Form 2101 (6/12) Page 2

			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		D.
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			

Form 2101 (6/12)

Page 3

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 FOD or Representative (Signature/Z #/Date) Approval Required P				Pebio F. CdeVeca deVaca, o=LANS, ou=UI, email=pfc@lanl.gov, c=US	

Date Approval Expires: 09/30/2020

Form 2101 (6/12)

Page 4



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. <u>Examples</u> 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.

FGR Ima 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?	χ
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 2# 202847

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

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 Regd:

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: Work Order Task Task Title: PP (E) 1M TA3-22 VID/VFD/FGR FILTERS W/O Type : PM W/O Group : UTIL Task Priority : 4 00595745 01 Planner: 189099 LOPEZ THERESA M W/O Title : PP (E) 1M TA3-22 VID/VFD/FGR FILTERS MASTER Written To : TA03-0022 VARIABLE FREQUENCY DRIVES VID/VFD/FGR Task Dspln : **Due Date :** 01/31/2018 Date: 10/17/2017 Superintendant : Hazard : MODERATE IWD Reqmt : TASK SPECIFC

And the second of the second of		
C Requirements / Comments		

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

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



Form 2103 (3/14)

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

IWD# REVISION #: WORK	RELEASE
By signing below, I verify this activity is compatible with curren	t 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 w	ith signatures on Part 2.
By signing below, I have verified the following:	
 I have verified authorization by ensuring approval signature 	
conditions and other prerequisites are in-place.	ers to confirm the IWD can be performed as written, required initial
 The assigned workers are authorized and are qualified to responsible manner. 	
 I have conducted the pre-job briefing, and all workers (inc 	
 I have ensured coordination with any required FOD work 	
Primary PIC (Signature/Z#/Date) Required:	de Chair 12895/ 1718
Alternate PIC Signatures acknowledges PIC authority is assured only once, but formal handoff includes conferring with previous handoff)	umed for the first time (Note: Alternate PICs are required to sign s PIC to obtain all required information associated with the
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 controls.	conditions are needed?
What work permits are required and how will we mee	
What are the handoffs and coordination requirements	·
Are there hold-points including those that require sign	- · · · · · · · · · · · · · · · · · · ·
· -	xpectations (e.g. for unanticipated conditions or hazards)?
A	
·	
·	a safe, secure, and environmentally responsible manner?
Does everyone agree to the work tasks/steps, hazard	as, and controls and commit to follow them?
Dec Joh Drief	Attendance Boston
By signing below as required, I agree to the following:	Attendance Roster
	controls as written as applicable to my work assignments.
	order as whiten as applicable to my work assignments. I encounter unexpected conditions during the
execution of work, or when work cannot be perform	ed as written, or instructions become unclear during execution.
I confirm that I am authorized, qualified, and fit to per Markey (Signature (7#/Data))	Worker (Signature/Z#/Date)
Worker (Signature/Z#/Date)	305362 Munio
Worker (Signature/Z#/Date)	Worker (Signature/Z#/Date)
Worker (Signature/Z#/Date)	Worker (Signature/Z#/Date)
(Worker (Signature/Z#/Date)	Worker (Signature/Z#/Date) D. ~ 4/

Page 1 of 1

Lock Coordinat	tor Name/Z#	Phone # A			nate Loc	ck Coordinator Name/	Z#	Phone #	
Section 1: Gener	al Information								/
 Work Document I 	Number (i.e., Package	/Procedure #):		2_ LO/TO (P	arent) Reco	ord #	Date:		
Location									
I. TA: 5. Bld		/ Equipme	ent/Machinery/Name	e/Number:			_		
Reason for LO/TO	J:								
. Name of Equipme	ent Owner/Operator:								
	be isolated (check all	that apply)	I = 2. Tr.				1	1.74	
☐ Electrical ☐ M	lechanical Hydrai	ulic Pneu	matic Steam	Capacitors	☐ Compr	essed Energy Gravity	Other (spec	cify):	
11. Group LO/TO:						12. Group Lock Box used:	☐ Yes ☐ I	No If yes, enter ID	# of Lock Box
r Yes, Name or Lea	d Authorized Worker:					Lock Box ID:			
If Yes, enter the req below. ☐ Yes ☐ No		umn 20 below.	If No, place N/A in o	column 20	If Yes, ento below.	ncing Required for LO/TO Release the required sequence in a No		low. If No, place N/	A in column 2
Section 2: LO/TO	Installation & Re		1201						
IE Approval to locate	all LO/TO (signature &	O/TO Installati	on			24. Approval to Remove Lo	The second second	eturn to Service	
.s. Approval to insta	all LOTTO (Signature &	. 24)				— Approval to Remove Li	Ji i O (signatt	ire & Z#). Call #	
	ired for LO/TO Installa		Contine W. CT			25. Verification required fo		oval	
☐ No ☐ Peer C	Concurrent Dual	Independent	Verification			☐ No ☐ Peer Concurr	ent Dual [Independent Ve	rification
 Verification Determine OD/Designee (signate) 		Z#	Date			26. Verification Determination	Approved by	Z#	Date
18. Specific Energy	19. Location of	20. LO/TO	21 Required	22 LO/TO Inst	tallation	27. Required	28. LO/TO	29. LO/TO	30 As-Left
solation Device/ID	locking Device	Installation	Position/Alignment	verified By:		Position/Alignment following	Removal	Removal Verified	Position
		Sequence	for LO/TO		-	Removal	Sequence	Ву:	
	-	-		-1-			-	-	
23. LO/TO Points Posi	tioned and First Lock	Z#	Date			31 LO/TO Removed, Position	ned and	Z# [Date
nstalled by Signature						Verified by Signature			

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Attachment B, LO/TO Orders (Cont.)			
Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Reco	rd # 3. Date:	
32. Zero Energy Checks have been completed Yes No			
	33. Completed by 5		Z# Date
Section 3: Lead Authorized Worker and Authorized Workers			
34. Authorized Workers Name(s)	Z#	35. Date workers lock is hung	36. Date workers lock is removed
1,			
2.			
3.			
4.			
5.			
6.	- 4		
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	ed to the Lock Coordinator or De	signee	
37. Signature of Lock Coordinator or Designee	Z#	D	ate

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^{*}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.

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
				7	_	T -	Ť T	
	1	-						
	VI.							
		-						
23 LO/TO Points Posit	ioned and First Lock	Z#	Date		31 LO/TO Removed, Position Verified by Signature	ned and	Z# C	Date

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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.

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- 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 preauthorize 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.

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Form 2101

NATIONAL LABORATO	_	•	Vork Document (IW val for Entry and A	D) Part 2, rea Hazards and Cor	Non-Tenant Activity Form
IWD No /Work Request No:	Revision #:				
Facility Operation Director (FC hazards and controls associate	DD) must determine the facility entry and ed with the activity location.	coordination requiren	nents and identify the Envir	onment, Safety, Health (ESH))/Security and Safeguards (S&S)
FOD 8	TA 3	Bldg. 22	Room N/A	Other Location 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 Rec	quirements (Check one or more of the	following)			
No Entry/Coordination Re	· <u></u>	•	y Point-of-Contact must sig		
Plan of the Day/Plan of th	` :	Check in at Start of W	=	Training Required	
Security Clearance Requ	irements 🔯 🕻	Nork must be Schedu	led 🔀 Check in Da	aily	
Co-located Hazards/Cond	cerns	Other Security Require	ements (ex : Cellphone, No	Foreign Nationals, etc.)	
Check out at End of Worl	k 🔲 🤆	Quality Issues	Check out [Daily	
Escort Required	I	Review under Authoria	ation Basis (AB)/Safety Ba	asis/Unreviewed Safety Quest	tion (USQ)
Other Bounding Condition	ns:				
	ct a pre-job brief for work activities to ens ne if onsite ESH representation is require			tions are adequate. A pre job	briefing shall be conducted at the
All work must be approved by conditions to safely proceed plant chemical pumps and lin the site specific training video	r to Job Hazard Analysis [JHA] Tool F y the Utilities FOD or UI-OPS POD/POT with activities. Check in with Plant Opera les. Inspect for leaks before beginning all to in room 116 (Boiler Control Room), one pratitions or UI Engineering personnel. The	W-contact Facility PC tions Manager/Specia ny work task and pause time requirement. Of	alist or Operations Shift Hea se work and report if a leak oserve safety signs and floo	ad for final approval to procee is found to operations. All per or markings in all buildings an	d with tasks. Work around power rsonnel entering area must view id areas No safety shoes required
	ow, identify work-area hazards that could				
implemented by the worker(s)	to protect against the site hazards as we				
			HAZARDS & CONTROL		
Work Area Hazards/Concer Identify site hazards and con worker(s) or others	rns cerns that could potentially affect the	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					

Form 2101 (6/12) Page 1 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& Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	S WORK AREA Work Area Hazard Present	HAZARDS & CONTROL Facility Controls/ Preventive Measures/ Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	S Reference Documents List permits, operating manuals, and other reference procedures	Training and Qualification List training requirements (P300, Integretated Work Management, Section 6.1)
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
Form 2101 (6/12)				Page 2

1540/1711

			access Call Serf Operators 667-8982 or by Radio Lan! 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			

Form 2101 (6/12) Page 3

	T	_			
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 a	and ti	nat the IWM process has be	en applied appropriately.	
FOD or Representative (Signature/Z #/Date) Approval Required Pa	blo F. CdeV	'aca	Digitally signed by DN: cn=Pablo F. Cd Date: 2017.06.26 11	eVaca, o=LANS_ou=UL email=pfc@lanl.gov, c=US	_ ,
D. I. A					

I have verified that the hazards identified above adequately identify	the area hazards and that the IWM proc	ess 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=U, email=pfc@fanl.gov, c=US Date: 2017.06.26 1 L58:41 - 06'00'	
Date Approval Expires: 09/30/2020			~

Form 2101 (6/12)



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. <u>Examples</u> 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?	1
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?	

FORM 2100-WC

NATIONA	Alamos LARORALIDAT Faci	lities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)
Revisio	n # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work l	Document #:	(WO # /	Planner/Preparer (Name/Z#/Date)
Task			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

FORM 2100-WC

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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.

MATIONA	lamos Facil	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)	
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Task			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"	

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Work	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16	
Task				
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.

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Los	Alamos Faci	lities Mainto	enance IWD – (Facility Maintenance Activity Specific Information)
Revisio	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)
Task	Task		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 by efing has been performed for all affected personnel including 2101 hazards

PIC:

- 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):

F

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 : Z#:_

O

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 :	NA	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.

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Date:

Los	Alamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)	
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Work Task	Document #:	(WO # /	Planner/Preparer (Name/Z#/Date) Justin Maestas 177550 3/28/16	
TA: Building: Room: 03 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
 - o 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.

PIC: Z#: 1209 7 Date: 19

- 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

Carlos Chacon
Operations: 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 Alamos Facilities Mainten	ance IWD – (Facility Maintenance Activity Specific Information)
Revision # 0	Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO #/	Planner/Preparer (Name/Z#/Date)
Task) UPPS-FY17-001	Justin Maestas 177550 3/28/16
TA: Building: Room: 03 0022	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	FOD or Representation of Particle Parti	re/Z#/Date) Required // 105008 4/1/16 resentative (Signature/Z#/Date) blo F. Objuilty signed by Pablo F Colviera on the consults on the consult of consults on the consult of consults on the consult of consults on the consult of consults on the consult of consults on the consult of consults of consults on the consult of consults of consults on the consult of consults of con
IWD Type ☑ Moderate-Hazard ☐ High-Hazard/Complex	Date when RLM re-approval is rec Other Conditions for RE-Approva scope or additional hazards identif	l <u>Change in</u> ĭed	Classification review completed, if required. N/A
Standing IWD	Name of Primary PIC Carlos Ch Name of Alternate PIC Greg Do Name of Alternate PIC	nnelly	Reviewer Signature/Z#/Date

Revision	n # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE	
10011310	JI 17 V		HAZARD STANDING IWD	
Work	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)	
Task			Ked rick Mendez 180622 9/30/16	
TA: 03	Building: 0022	Room:	Add itional 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 Rob ert 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:

B %

- Wear long sleeve shirts or An sell sleeves when working near hot surfaces.
- Utilize insulating blankets to protect against hot surfaces.

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	lities Mainte	enance IVVD (Facility Maintenance Activity Specific Information)
# 0	*****	Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document#: (WO#/		Planner/Preparer (Name/Z#/Date)
		Kedrick Mendez 180622 9/30/16
Building: 0022	Room:	Additional Location Description:
	# 0 ocument #: Building:	Facilities Mainte # 0 ocument #: (WO # / Building: Room;

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 sæfety standards. Inspect cords / batteries prior to use. GFCl 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 awar eness

12. Asbestos Abatement Pipe and Equipment Insulation:

- Reference MSS Procedure 41-55-001-R1
- Area regulated to OSHA stand ards(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 usin g 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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Los Alamos Facilities Mainte			enance IWD – (Facility Maintenance Activity Specific Information)		
Revision # 0 Work Document #: (WO # / Task			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD		
			Planner/Prepa rer (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

MATIONAL	lamos Faci	lities Main t	enance IWD - (Facility Maintenance Activity Specific Information)
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Task			Kedrick Mendez 180622 9/30/16
TA:	Building:	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)

HOLTAN	Alamos Faci	lities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)
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Task			Kedrick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Additional Location Description:

4.0 Work Execution

L.

- 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.

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 a.nd 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 communic ated
 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 lookalike equipment.

Work Document #: (WO #/

Building:

0022

Room:

	FORM 2100-WC
Facilities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)
	Activity/Task Title: POWER PLANT COMPLEX-MODERATE
	HAZARD STANDING IWD
nt#: (WO#/	Planner/Preparer (Name/Z#/Date)
	Kedrick Mendez 180622 9/30/16

Execution

Task

TA:

03

Los Alamos

Revision # 0

- 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.

Additional Location Description:

- 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.

1. Complete closeout of	f the work activity in accordance w	th 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/7#/Date) Required 190419 7-1/-17 FOD or Representative (Signature/2#/Date) Required 90206 118 SReview (Signature/7#/Date)

Los	Alamos KARONANIANI Faci	lities M	ainten	ance IWD – (Facility Maint	tenance Activity	y Specific Information)			
Revision # 0				Activity/Task Title: POV HAZARD STANDING I	Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD				
Work I Task	Document #:	(WO #	1	Planner/Preparer (Name Kedrick Mendez 180622					
TA: Building: Room: 03 0022			:	Additional Location Desc	cription:				
	and:		colle appi haza ackr	s, aggregate hazards, and ocated hazards were ropriately included in the ard analysis and nowledges completion of a review	Not Required	v (Signature/Z#/Date) If Required v (Signature/Z#/Date) If Required			
 ✓ Moderate-Hazard ✓ High-Hazard/Complex ✓ Standing IWD Othe change (Pring Name Name Name Name Name Name Name Name		when RLM re-approval is reconditions for RE-Approval to reconditions for RE-Approval to reconditional hazards identify and reconditional hazards identify and reconditional hazards identify and reconditional formation of Alternate PIC	l: Scope	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.

Facility : F08	Unit :	Proj :	
Task Title : PP 1M	TA3-22 FGR BEARINGS	S, LUBRICATE	Work Order Tasi
W/O Type : PM	W/O Group : UTIL	Task Priority : 4	
Planner : 189099	LOPEZ THERESA M		00597795 01
W/O Title : PP 1M	TA3-22 FGR BEARINGS,	LUBRICATE	
Written To : TA03- FGR-003)	0022 FAN, FLUE GAS F	RECIRCULING (FGR-001, FGR-002,	MASTER
Task Dspln :	Due Date : 02/28	/2018	Date: 11/08/201
Superintendant :			1200. 117,007,001
Hazard : LOW	IWD Reqmt : N/A	LOW HZRD	

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

Cost Accounting

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



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

Form 2101

Non-Tenant Activity Form

EST. 1943	_	• • • • • • • • • • • • • • • • • • • •	•		-	
IWD No /Work Request No:	Revision #:					
Facility Operation Director (FOI	D) must determine the facility entry and c	oordination requiren	nents and identify the Enviro	onment, Safety, Health (ESH)/	/Security and Safeguards (S&S)	
hazards and controls associate	d with the activity location.	· ·		. ,	, , ,	
FOD	1					
8	3	22	N/A	Downs Blant Blds	Innida	
FOD Designated	Name	Phone	Pager	Power Plant Bldg - I Email	nside	
FOD Designated Facility Point-of-Contact		699-8226	N/A	pfc@lanl.gov		
	uirements (Check one or more of the f	ollowing)				
No Entry/Coordination Reg	·		y Point-of-Contact must sig	n IWD Part 3		
Plan of the Day/Plan of the	. —	neck in at Start of W		raining Required		
Security Clearance Require	` ' '	ork must be Schedu				
Co-located Hazards/Conce	=		ements (ex.: Celiphone, No	•		
Check out at End of Work		ality Issues	Check out D	•		
Escort Required		-	_	sis/Unreviewed Safety Questi	on (USQ)	
Other Bounding Conditions			, , , , , , , , , , , , , , , , , , ,		(,	
	a pre-job brief for work activities to ensur			ons are adequate. A pre job b	priefing shall be conducted at the	
	if onsite ESH representation is required		<u>s</u>			
	to Job Hazard Analysis [JHA] Tool Fac					
	the Utilities FOD or UI-OPS, POD/POTW ith activities. Check in with Plant Operation					
	s. Inspect for leaks before beginning any					
the site specific training video i	in room 116 (Boiler Control Room), one t	ime requirement. Ot	serve safety signs and floo	r markings in all buildings and	d areas No safety shoes required	
	ations or UI Engineering personnel. The \					
	w, identify work-area hazards that could populate or protect against the site hazards as well			y the facility controls and preven	entive measures that must be	
implemented by the worker(s) to	- A		HAZARDS & CONTROL	.S	Act of the second	
Work Area Hazards/Concern		Work Area	Facility Controls/	Reference Documents	Training and Qualification	
	erns that could potentially affect the	Hazard Present	Preventive Measures/	List permits, operating	List training requirements	
worker(s) or others			Bounding Conditions Specify preventive	manuals, and other reference procedures	(P300, Integretated Work Management, Section 6.1)	
			measures, controls and	reference procedures	management, decipit of 1	
			bounding conditions for			
			each site hazard			
No Work Area Hazards						

Form 2101 (6/12) Page 1

Form 2101 (6/12)

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 #:	C IN/ODIV ADEA	UAZABBS & CONTROL	c	
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	S WORK AREA Work Area Hazard Present	HAZARDS & CONTROL 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)
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/rigmts if PACM identified outside containment. Be aware of chemical 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

1565/1711

			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			

Form 2101 (6/12)

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 Displays upned by Fabor F. Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked by Explored To Celebra Obc. marked To Celebra							

Date Approval Expires: 09/30/2020

Form 2101 (6/12)

Specify Hazards:



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. <u>Examples</u> 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.

Imp FGR Fan Lube 2-1-18	Completed (X)
What permits, permissions, or support are required to safely start this work?	χ
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. Salgan 2#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

Tato min	Order	Theak

00597794 01

MASTER

Date: 11/08/2017

C Requirements / Comments		

Name	Function/Dept.	Date
Carlos Chacon	UPES Electricians	2-28-18
	1.4	

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

00597794 01

Work Order Task

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

Date: 11/08/2017

MASTER

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 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 epresentatives (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

WORK RELEASE

- 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?

Pre-Job Brief Attendance Roster

Does everyone agree to the work tasks/steps, hazards, and controls and commit to follow them?

By signing below as required, I agree to the following:	
 I agree to follow the work steps and implement the contract. 	ontrols as written as applicable to my work assignments.
I agree to pause/stop work when conditions or hazar execution of work, or when work cannot be performe	ds change or when I encounter unexpected conditions during the d as written, or instructions become unclear during execution
I confirm that I am authorized, qualified, and fit to per	form the work.
Worker (Signature/Z#/Cate)	Worker (Signature/Z#/Date) 5382 BJUW
Worker (Signature/Z#/Date) 49 23 18	Worker (Signature/Z#/Date)
Worker (Signature/Z#/Date)	Worker (Signature/Z#/Date)
Worker (Signature/Z#/Date)	Worker (Signature/7#/Date)

Page 1 of 1

Lock Coordinat	or Name/Z#	Р	hone #	Alterr	nate Lock C	Coordinator Name/	Z#	Phone #	
Section 1: Gener	al Information								
1. Work Document I	Number (i.e., Package	e/Procedure #):		2. LO/TO (Pa	rent) Record #	1 :	3. Date:		
Location									
4. TA: 5. Bld	g: 6, Rm:	7. Equipme	ent/Machinery/Name	e/Number					
8. Reason for LO/TO	O:								
9. Name of Equipme	ent Owner/Operator:								
10. Energy Type to	be Isolated (check all echanical Hydro	that apply)	matic Steam	☐ Capacitors	☐ Compresse	ed Energy Gravity [Other (spe	cify):	
11. Group LO/TO: If Yes, Name of Lea	Yes No d Authorized Worker:					2. Group Lock Box used: ock Box ID:	☐ Yes ☐	No If yes, enter ID	# of Lock Box
If Yes, enter the required below. Yes No		umn 20 below.	If No, place N/A in o	column 20	f Yes, enter th	g Required for LO/TO <u>R</u> e e required sequence in o No		low. If No, place N/	A in column 28
Section 2: LO/TO	Installation & Re								
		O/TO Installat	ion			LO/TO Removal / Return to Service			
15. Approval to Insta	all LO/TO (signature &	& Z#)			24	Approval to Remove L	O/⊤O (signatı	ure & Z#). Call #	
	ired for LO/TO Install		Verification			25. Verification required for LO/TO Removal ☐ No ☐ Peer Concurrent Dual ☐ Independent Verification			
	Jonean English	д пасрепоста	vermeanor			The Ediconean	CHI DUM [тисцион
17. Verification Determ		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 Insta verified By:	Po	Required sition/Alignment following moval	28. LO/TO Removal Sequence	29. LO/TO Removal Verified By:	30. As-Left Position
								-	
23 LO/TO Points Positinstalled by Signature	tioned and First Lock	Z#	Date			L LO/TO Removed, Position erified by Signature	ned and	Z# [Date

Rev 1. Page 1 of 5

Attachment B, LO/TO Orders (Cont.)			
Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Record	# 3. Date:	
32. Zero Energy Checks have been completed Yes No			
	Completed by Sig		Z# Date
Section 3: Lead Authorized Worker and Authorized Workers			
34. Authorized Workers Name(s)	Z#	35. Date workers lock is hung	36. Date workers lock is removed
1,			10
2.		4	
3,			
4.		9	
5.			
6.			
7.			
8.			
9.		I.	
10.			
Section 4: Return of Lock(s)/Tag(s) and Locking Devices			
All Lock(s)/Tag(s) and Locking Devices have been removed and return	ed to the Lock Coordinator or Desig	nee	
37. Signature of Lock Coordinator or Designee	Z#	D	ate

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^{*}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.

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
	1							
	1							
	1		0 = 1					
B. LO/TO Points Posit stalled by Signature	ioned and First Lock	Z#	Date		31. LO/TO Removed, Position Verified by Signature	ned and	Z# D	ate

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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.

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- 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 preauthorize 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.

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Form 2101

NATIONAL LABORATO			Vork Document (IW val for Entry and A	D) Part 2, rea Hazards and Cor	Non-Tenant Activity Form
IWD No /Work Request No:	Revision #:				
Facility Operation Director (FC hazards and controls associat	DD) must determine the facility entry and o ed with the activity location	coordination requiren	nents and identify the Envir	onment, Safety, Health (ESH))/Security and Safeguards (S&S)
FOD 8	TA 3	Bldg 22	Room N/A	Other Location 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	
No Entry/Coordination Re Plan of the Day/Plan of th Security Clearance Requ Co-located Hazards/Con Check out at End of Worl Escort Required Other Bounding Conditio PIC is responsible to conduct job site. UI-OPS will determine Additional Comments (refe All work must be approved by conditions to safely proceed plant chemical pumps and lir the site specific training video for visitors if escorted by Ope Instructions: In the block bel	ie Week (POTD/POTW) irements cems cems R	OD-designated facilities of Work must be Schedu other Security Require that work condition during work activities acility Notes) N-contact Facility PC tions Manager/Species by work task and paus time requirement. Of West end front lobb potentially affect the	led Check in Da ements (ex : Cellphone, No Check out D zation Basis (AB)/Safety Ba uns and worker communicat es OC No Smoking around Na alist or Operations Shift Hea se work and report if a leak beerve safety signs and flod y and office areas of Bldg 2 worker(s) or others Specif	Fraining Required filly Foreign Nationals, etc.) faily sis/Unreviewed Safety Quest fions are adequate. A pre job foreign Gas Systems Evaluate for final approval to procee for markings in all buildings an formarkings in all buildings an formarkings in all buildings an formarkings in all buildings an formarkings in all buildings an	inside floor and housekeeping dwith tasks. Work around power resonnel entering area must view d areas. No safety shoes required area.
			HAZARDS & CONTROL		
Work Area Hazards/Concer Identify site hazards and con worker(s) or others	rns cerns that could potentially affect the	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					

Form 2101 (6/12)

Page 1

Ionizing Radiation

Form 2101 (6/12)

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

Page 2

					7
			access. Call Serf Operators 657-8982 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			

Form 2101 (6/12) Page 3

Specify Hazards:				
Security Requirements Specify:	☐ Yes ☒ N	0		
Other Hazards Specify: Look-alike Equipment in the vicinity of work site may contain un-controlled hazardous energy	⊠ Yes ⊠ N	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 an	·		
FOD or Representative (Signature/Z #/Date) Approval Required Pa	blo F. CdeVa	Ogstally agened by DN cn=PabloF CC Date 2017 0626 1	deVaca, o=1.ANS_ou=UI_email=pfc@lanl.gov, c=US	-

Form 2101 (6/12)

Page 4

FO	RM	2.1	ሰሴ.	WC	

HATION	Alarnos Faci	lities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)
Revisi	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # /		(WO#/	Plan ner/Preparer (Name/Z#/Date) Ked rick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Add itional 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 Rob ert 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:

85 95

- Wear long sleeve shirts or An sell sleeves when working near hot surfaces.
- Utilize insulating blankets to protect against hot surfaces.

WATIONAL	Alamos Fac	Facilities Maintenance IVVD - (Facility Maintenance Activity Specific Information)					
Revisio	n # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD				
Work I	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)				
Task			Kedrick Mendez 180622 9/30/16				
TA:	Building:	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 sæfety 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 awar eness

12. Asbestos Abatement Pipe and Equipment Insulation:

- Reference MSS Procedure 41-55-001-R1
- Area regulated to OSHA stand ards(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 usin g 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

AN DITAM	lamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)
Revisio	n # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work I	Oocument #:	(WO#/	Planner/Preparer (Name/Z#/Date)
Task			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

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FORM 2100-WC

			A CARRA MAZOC .
AMOITAP	Alamos I IAGOAATONY Faci	lities Main t	enance IWD – (Facility Maintenance Activity Specific Information)
Revisio	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work l	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)
Task		•:	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)

HATION	Alamos AL LABORATOAY Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)
Revision # 0			Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # / Task		(WO#/	Planner/P reparer (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.

Il. 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 communic ated
 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 lookalike equipment.

MATTONA	Alamos Faci	lities Maint	enance IWD - (Facility Maintenance Activity Specific Information)
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Task			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.

Complete closeout of	of the work activity in accordance wi	th 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 // // // // // // // // // // // // //

LOS	Alamos Faci	lities Mainte	mance IWD - (Facility Maintenance Activity Specific Information)		
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Work Document #: (WO # / Task		(WO#/	Planner/Preparer (Name/Z#/Date) Kedrick Mendez 180622 9/30/16		
TA: Building: Room: 03 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 Revi	iew (Signature/Z#/Date) If Required red	
		ESO Revi	ew (Signature/Z#/Date) If Required	
IWD Type ☑ Moderate-Hazard ☐ High-Hazard/Complex	Date when RLM re-approval is required Other Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC		Classification review completed if required.	
Standing IWD	Name of Alternate PIC Name of Alternate PIC		Reviewer Signature/Z#/Date	

	damos LAIDMAIDM Faci	lities Mainte	nance IWD – (Facility Maintenance Activity Specific Information)
Revision	n # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
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Task			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.

· LOS	Alamos Facil	ities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)
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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

- Los	Alamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)
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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.

• LOS /	Facility Facility	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)
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TA: Building: Room: 03 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"	

MATHON	Alamos Faci	lities Mainto	enance IWD – (Facility Maintenance Activity Specific Information)
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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.

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TA: Building: Room: 03 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:	1 1 2 0 7 1	- 7 91 10
PIC: MACON	Z#:[2012]	Date: 2-24-18

- 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):

E E

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/AC	Z#:	Date:	

IF aerial platform/lift

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 bersonnel are qualified to operate aerial lift device assigned to activity.

	1 /0		3	
PIC:	NA	Z#:	Date:	
	/ V			

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.

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Task			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
 - o INSPECT scaffold daily by competent person only
 - WEAR hard hats when working on / near scaffold
- 2. **PERFORM** LO/TO when required to perform maintenance

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

Z#: 12043 (Date: 2248

- 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

Los Ala	mos Faci	lities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)
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Task) U	PPS-FY1	7-001	Justin Maestas 177550 3/28/16
	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	FOD or Representation of Required Packer Review N/A ESO Review Peer RLM /W Manager/Mai	re/Z#/Date) Required Sand 105008 4/11/16 Sesentative (Signature/Z#/Date) blo F.
IWD Type ☑ Moderate-Hazard ☐ High-Hazard/Complex	Date when RLM re-approval is rec Other Conditions for RE-Approva scope or additional hazards identif	Change in	Classification review completed, if required.
Standing IWD	Name of Primary PIC Carlos Chacon Name of Alternate PIC Greg Donnelly Name of Alternate PIC		Reviewer Signature/Z#/Date



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. <u>Examples</u> 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 Regmt : 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.

Facility: F08 Unit: Proj: Work Order Task Task Title : PP 1M TA3-22 FGR BEARINGS, LUBRICATE W/O Type : PM W/O Group : UTIL Task Priority : 4 00600283 01 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, MASTER FGR-003) Task Dspln : **Due Date :** 03/31/2018 Date: 12/13/2017 Superintendant : Hazard : LOW IWD Reqmt : N/A LOW HZRD

Name	Function/Dept.	Date
Chris Salazar	LOG-CS/PP maint,	03/01/2018

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



Integrated Work Document (IWD) Part 2,

FOD Requirements and Approval for Entry and Area Hazards and Controls

Form 2101

Non-Tenant Activity Form

NATIONAL LABORATO EST. 1943	FOD Requirem	ents and Appro	val for Entry and A	rea Hazards and Cor	ntrols Activity Form	
IWD No /Work Request No:	Revision #:					
Facility Operation Director (FO hazards and controls associate	 D) must determine the facility entry and ad with the activity location 	coordination requirer	nents and identify the Envir	ronment, Safety, Health (ESH)/Security and Safeguards (S&S)	
FOD 8	TA 3	Bidg 22	Room N/A	Other Location Power Plant Bldg -	Other Location 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 Req	uirements (Check one or more of the	following)				
□ No Entry/Coordination Requirements □ FOD-designated facility Point-of-Contact must sign IWD Part 3						
☐ Plan of the Day/Plan of the Week (POTD/POTW) ☐ Check in at Start of Work ☐ Work-Area Training Required						
⊠ Security Clearance Requirements						
Co-located Hazards/Conc	Co-located Hazards/Concerns Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)					
Check out at End of Work	☑ Check out at End of Work ☐ Quality Issues ☑ Check out Daily					
Escort Required		Review under Authoria	zation Basis (AB)/Safety Ba	asis/Unreviewed Safety Quest	tion (USQ)	
Other Bounding Condition	s:					
PIC is responsible to conduct job site. UI-OPS will determine	a pre-job brief for work activities to ense if onsite ESH representation is require	sure that work conditioned during work activities	ns and worker communical	tions are adequate. A pre job	briefing shall be conducted at the	
Additional Comments (refer	to Job Hazard Analysis [JHA] Tool F	acility Notes)				
All work must be approved by	the Utilities FOD or UI-OPS_POD/POT	W-contact Facility PC	C No Smoking around Na	tural Gas Systems Evaluate	inside floor and housekeeping	
	rith activities. Check in with Plant Opera es Inspect for leaks before beginning a					
	in room 116 (Boiler Control Room), one					
	ations or UI Engineering personnel. The					
	w, identify work-area hazards that could to protect against the site hazards as we			fy the facility controls and pre-	ventive measures that must be	
implemented by the worker(s) t			HAZARDS & CONTROL	S		
Work Area Hazards/Concern		Work Area	Facility Controls/	Reference Documents	Training and Qualification	
	erns that could potentially affect the	Hazard Present	Preventive Measures/	List permits, operating	List training requirements	
worker(s) or others			Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	manuals, and other reference procedures	(P300, Integretated Work Management, Section 6.1)	
No Work Area Hazards						

Form 2101 (6/12) Page 1

lonizing 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 #:	10 100 100 100 100 100 100 100 100 100	WATER & CONTROL		
Work Area Hazards/Concerns Identify site hazards and concerns that could potentially affect the worker(s) or others.	WORK AREA Work Area Hazard Present	HAZARDS & CONTROL 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)
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	P101-6 PPE P101-23 Asbestos P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent • Hearing protection • Site specific training • Asbestos awareness

Form 2101 (6/12) Page 2

			access Call Serf Operators 667-6982 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.	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			

Form 2101 (6/12)

Page 3

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 IV	VM process has been applied appropriately.	
FOD or Representative (Signature/Z #/Date) Approval Required Pablo F. CdeVaca	Digitally signed by Pablo F. Cdellaca Discounting the Cdellaca Discounting the Cdellaca of U.M.S. our U. email-pf:@lanl.gov, c=US Discounting the Cdellaca of U.M.S. our U. email-pf:@lanl.gov, c=US	
Date Approval Expires: 09/30/2020		

Form 2101 (6/12)

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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. <u>Examples</u> 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.

personner.	2/1/19
TIMO. FGR BENEAUG LUBRICATION	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?	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		

Name	Function/Dept.	Date
Carlos Chacon	UPES Controls Electricians	3-21-18
	_	

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 : 03/31/2018

Superintendant :

Hazard : MODERATE IWD Reqmt : TASK SPECIFC

Work Order Task

00600268 01

MASTER

Date: 12/14/2017

Form 2103



Worker (Signature/Z#/Date)

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

IWD # REVISION #: WORK R	ELEASE
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	or work area
Signature/Z#/Date (If required by FOD)	
Note: For Standing IWD, release may be given concurrently wit	h signatures on Part 2.
By signing below, I have verified the following:	
 I have verified authorization by ensuring approval signature 	
 I have jointly conducted a validation walkdown with workers conditions and other prerequisites are in-place. 	s to confirm the IWD can be performed as written, required initial
 The assigned workers are authorized and are qualified to p responsible manner. 	erform the work in a safe, secure, and environmentally
 I have conducted the pre-job briefing, and all workers (included) 	iding support workers) have been briefed.
 I have ensured coordination with any required FOD work-a 	rea representatives (e.g., area work coordinators).
Primary PIC (Signature/Z#/Date) Required	(new 2023 32018
Alternate PIC Signatures acknowledges PIC authority is assured only once, but formal handoff includes conferring with previous handoff)	PIC to obtain all required information associated with the
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 co 	nditions 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 exp 	ectations (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 	a safe, secure, and environmentally responsible manner?
 Does everyone agree to the work tasks/steps, hazards 	s, and controls and commit to follow them?
	ttendance Roster
By signing below as required, I agree to the following:	
	ontrols as written as applicable to my work assignments
	ds change or when I encounter unexpected conditions during the d as written, or instructions become unclear during execution
I confirm that I am authorized qualified and fit to per	
Worker (Signature 12#/Date)	Worker (Signature/Z#/Date)
Worker (Signature/Z#/Date)	Worker (Signature/Z#/Dete)
Marker (Signature/7#/Date)	Worker (Signature/7#/Date)

Worker (Signature/Z#/Date) .

Lock Coordinat	or Name/Z#	Name/Z# Phone # Alternate Lock Coordinator Name/Z#						Phone #		
Section 1: Gener	al Information									
1. Work Document N	lumber (i.e., Package	e/Procedure #):		2. LO/TO (Pa	rent) Reco	rd#	3. Date:			
Location					***************************************					
4. TA: 5. Bldg		7. Equipme	nt/Machinery/Name	/Number:						
8. Reason for LO/TO	D:									
9. Name of Equipme	ent Owner/Operator:					/				
	ne Isolated (check all	that apply)								
	echanical 🔲 Hydra		matic 🔲 Steam	☐ Capacitors	☐ Compre	essed Energy Gravity	Other (spec	cify):		
			/							
11. Group LO/TO:						12. Group Lock Box used:	☐ Yes ☐ I	No If yes, enter ID	# of Lock Box	
If Yes, Name of Lear	d Authorized Worker:					Lock Box ID:				
10.0				-						
	uired for LO/TO Inst.		If No. place N/A in a			ncing Required for LO/TO <u>Re</u> or the required sequence in a		law If No. place N/	A in column 20	
below.	aireo sequence in coi	umm zo below.	II NO, place N/A III C		n Yes, ente below	er the required sequence in t	column 28 be	low. II No, place N/	A in column 28	
☐ Yes ☐ No						ΠNo				
Section 2: LO/TO	Installation & Re	moval								
	L	O/TO Installat	on			LO/TO	Removal / Re	eturn to Service		
15. Approval to Insta	all LO/TO (signature &	& Z#)			- 100	24. Approval to Remove L	O/TO (signatu	ature & Z#). Call #		
						_				
1C Modification requi	ired for LO/TO Install	ation				OF Marification required to	- LO/TO D			
		Independent	Verification			25, Verification required for LO/TO Removal No Peer Concurrent Dual Independent Verification				
LINO LITCOIC	Concurrent Dual	1 macpendern	Verification			reer concur	en buai	independent ver	Incadori	
17. Verification Determ	instian Approved by	Z#	Date		_	26. Verification Determination	Approved by	Z#	Date	
FOD/Designee (signate		2#	Date			26 Verincation Determination	Approved by	2#	Date	
18, Specific Energy	19. Location of	20. LO/TO	21 Required	22 LO/TO Insta	allation	27. Required	28. LO/TO	29 LO/TO	30 As-Left	
Isolation Device/ID	locking Device	Installation	Position/Alignment for LO/TO	verified By:		Position/Alignment following	Removal	Removal Verified	Position	
		Sequence	101 LU/10			Removal	Sequence	By:		
					- 1		1			
	1			1			1	-		
23. LO/TO Points Posit	ioned and Eiret Lock	7#	Date			31. LO/TO Removed. Position	and and	Z# [Date	
installed by Signature	ioneu anu First LOCK	∠#	Date			Verified by Signature	ieu anu	Z# L	ale	

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Attachment B, LO/TO Orders (Cont.)				
Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parer	nt) Record #	3. Date:	
32. Zero Energy Checks have been completed. Yes No				
		ed by Signature		Z# Date
Section 3: Lead Authorized Worker and Authorized Workers	s (anyone applying a			
34. Authorized Workers Name(s)	Z#	35. Date hung	workers lock is	36. Date workers lock is removed
1.				
2.				
3.				
4.				
5.				
6.				
7.8				
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 return	ned to the Lock Coordinat	or or Designee		
37. Signature of Lock Coordinator or Designee		Z#	Da	te

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^{*}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.

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:	 Required Position/Alignment following Removal 	28 LO/TO Removal Sequence	29_LO/TO Removal Verified By:	30. As-Left Position
			<u></u>					
	1							
	41							
	1							
3. LO/TO Points Posit stalled by Signature	ioned and First Lock	Z#	Date		31- LO/TO Removed, Position Verified by Signature	ned and	Z# C	ate

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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.

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- 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 preauthorize 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.

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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. <u>Examples</u> 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?	V
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?	V

Los	Alamos Faci	lities Mainto	enance 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.

MATIN NA	Alamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)
Revision	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # /		(WO#/	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
- 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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WATER	Alamos Faci	lities Mainto	enance IWD – (Facility Maintenance Activity Specific Information)
Revisi	on # 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

Page 3 of 7

sal Owa	Alamos Faci	lities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)			
Revisio	n#0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD			
Work I	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)			
Task			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)

	Alamos Faci	lities Mainto	enance IWD - (Facility Maintenance Activity Specific Information)		
Revisi	on # 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

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- 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.
 - 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:

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.

11. 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 lookalike equipment.

MATION	Alamos Faci	lities Mainto	enance IWD – (Facility Maintenance Activity Specific Information)
Revision	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Document #: (WO # /			Planuer/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.

 Complete closeout of 	of the work activity in accordance w	ith 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 190419 7-11-17 FOD or Representative (Signature/Z#/Date) Required 090206 116 4 CQ 7-12-17 IH&S Review (Signature/Z#/Date)

Los	Mamos Faci	lities M	ainten	ance IWD – (Facility Maint	enance Activity S	Specific Information)	
Revision # 0				Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD			
Work l Task	Work Document #: (WO # / Planner/Preparer (Name/Z#/Date)						
TA: Building: Room: 03 0022			:	Additional Location Desc	ription:		
			coll app haza acki	is, aggregate hazards, and ocated hazards were ropriately included in the ard analysis and nowledges completion of a rreview	Not Required ESO Review (Signature/Z#/Date) If Required Signature/Z#/Date) If Required pson 240725 1/8/2018	
✓ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD Othe chan (Prin Nam Nam			Other chaus (Print Name Name	when RLM re-approval is requested to Conditions for RE-Approval ge or additional hazards identity Carlos Control of Alternate PIC - Greg Documents of Alternate PIC - Greg Docu	: <u>Scope</u> fied. hacon	Classification review completed, if required. N/A Reviewer Signature/Z#/Date	

Los Alamos NATIONAL LABORATORY

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

Form 2101

Non-Tenant

Activity Form

WD No./Work Request No: ____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: _____ Revision #: ______ Revision #: ______ Revision #: ______ Revision #: ______ Revision #: ______ Revision #: ______ Revision #: _______ Revision #: ______ Revision #: ______ Revision #: ______ Revision #: _______ Revi

FOD 8	TA 3	Bldg 22	Room N/A	Other Location 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 Req	uirements (Check one or more	of the following)				
No Entry/Coordination Re	quirements	FOD-designated facili	ty Point-of-Contact must s	ign IWD Part 3		
Plan of the Day/Plan of the	e Week (POTD/POTW)	Check in at Start of W	ork 🛛 Work-Area	Training Required		
Security Clearance Requi	rements	Work must be Schedu	ıled 🔀 Check in 🛭	Daily		
Co-located Hazards/Cond	ems	Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)				
Check out at End of Work		Quality Issues Check out Daily				
Escort Required		Review under Authori	zation Basis (AB)/Safety B	Basis/Unreviewed Safety Question (USQ)		
Other Bounding Condition	s:					
				ations are adequate. A pre job briefing shall be conducted at the		
job site. UI-OPS will determine	e if onsite ESH representation is r	equired during work activities	es			
	to Job Hazard Analysis [JHA]					
				atural Gas Systems, Evaluate inside floor and housekeeping		
				ead for final approval to proceed with tasks. Work around power k is found to operations. All personnel entering area must view		
				por markings in all buildings and areas No safety shoes required		
				22 are considered a no hazard area		
netructions: In the block held	w identify work-area hazards tha	could potentially affect the	worker(s) or others. Spec	rify 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.

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				

Form 2101 (6/12) Page 1

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 #:									
Work Area Hazards/Concerns ESH/S&S WORK AREA HAZARDS & CONTROLS Work Area Hazards/Concerns Work Area Hazards/Concerns Training and Qualification									
Identify site hazards and concerns that could potentially affect the worker(s) or others.	Hazard Present	Preventive Measures/ Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	List permits, operating manuals, and other reference procedures	Training and Qualification List training requirements (P300, Integretated Work Management, Section 6.1)					
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/rgmts 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					
Form 2101 (6/12)				Page 2					

		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			

Form 2101 (6/12) Page 3

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	ama haza	rde and t	nat the IMM process has be	on applied appropriately	
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 December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Required December 5.00% on Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval Representative (Signature/Z #/Date) Papproval					
B. I. SERVERSE					ļ

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 Oft con-Pablo F. CdeVaca. on A.N.S., ou u-U, emxilio pf cgifani gov, cold 5 Date: 2017 06 de 11 3-3341 - do 007
Date Approval Expires: 09/30/2020		

Form 2101 (6/12)

Specify Hazards:

Page 4

HATION	Alamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)
Revisi	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)
Task			Ked rick Mendez 180622 9/30/16
TA: 03	Building: 0022	Room:	Add itional 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 Rob ert 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 packag es 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:

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- · Wear long sleeve shirts or An sell sleeves when working near hot surfaces.
- Utilize insulating blankets to protect against hot surfaces.

Page 1 of 7

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

MATION	Alamos Faci	lities Mainte	enance IVVD - (Facility Maintenance Activity Specific Information)
Revision	on # 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 sho wer 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 sæfety 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 awar eness

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 usin g 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

Page 2 of 7

FORM 2100-WC

- Los Alar	mos Faci	lities Mainte	nance IWD – (Facility Maintenance Activity Specific Information)
Revision #	¥ 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Doo	cument #:	(WO#/	Planner/Prepa rer (Name/Z#/Date)
Task			Kedrick Mendez 180622 9/30/16
	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

Page 3 of 7

Los Alamos	Facilities Main	enance IWD - (Facility Maintenance Activity Specific Information)
Revision # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Docum	nt#: (WO#/	Planner/Preparer (Name/Z#/Date)
Task		Kedrick Mendez 180622 9/30/16
TA: Build 0022	ing: 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)

FORM 2100-WC

HATIONA	Alamos Faci	lities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)
Revision	on # 0	14-11-	Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work	Document #:	(WO#/	Planner/P reparer (Name/Z#/Date)
Task			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).

. 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 communic ated
 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.
- 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 lookalike equipment.

FORM 2100-WC

Revisi	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE
			HAZARD STANDING IWD
Work	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)
Task			Kedrick Mendez 180622 9/30/16
TA:	Building:	Room:	Additional Location Description:
03	0022		` `

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	- Market						
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 190419 7-1/-17 FOD or Representative (Signature/Z#/Date) Required					

- Los	Alamos Faci	lities Mainte	enance IWD - (Facility Maintenance Activity Specific Information)			
Revisi	on # 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 Revie	ew (Signature/Z#/Date) If Required
IWD Type	Date when RLM re-approval is requiredOther Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC Name of Alternate PICName of Alternate PICName of Alternate PICName of Alternate PICName of Alternate PIC		Classification review completed, if required.
Standing IWD			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

1638/1711

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 : 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.

Facility: F08 U	Init :	Proj :	
Task Title : PP 1M TA3-			Work Order Task
W/O Type : PM W		Task Priority :	
Planner: 189099 LOP			00602515 01
W/O Title : PP 1M TA3-2			
Written To : TA03-0022 FGR-003)	FAN, FLUE GAS RECIR	CULING (FGR-001, FGR-	-002, MASTER
Task Dspln : D	Oue Date : 04/30/2018	8	Date: 01/10/2018
Superintendant :			
Hazard : LOW I	WD Reqmt : N/A LOW H	HZRD	
Work Completion Signatu	ures		
Name	Func	tion/Dept.	Date
Dennis Gutierrez	LOGCS	S/Maintenance	04/02/2018
Comments			
Commencs			

Cost Accounting

(rework?)

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 : 04/30/2018

Superintendant :

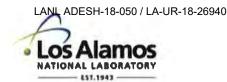
Hazard : LOW IWD Reqmt : N/A LOW HZRD

Work Order Task

00602515 01

MASTER

Date: 01/10/2018



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. <u>Examples</u> 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.

Ima FGR Fans luhe 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	
Jennis Gutierrez	



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

Form 2101

NATIONAL LABORATO		_	Work Document (IV oval for Entry and A	WD) Part 2, Area Hazards and Controls	Non-Tenant Activity Form
IWD No Work Request No: _	Revision #:	_			
Facility Operation Director (Financial hazards and controls associal		ntry and coordination require	ements and identify the Env	rironment, Safety, Health (ESH)/Security and S	afeguards (S&S)
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 Re	equirements (Check one or mor	e of the following)			
☐ No Entry/Coordination R	equirements	FOD-designated fac	ility Point-of-Contact must s	sign IWD Part 3	
Plan of the Day/Plan of t	he Week (POTD/POTW)	Check in at Start of \	Nork 🛛 Work-Area	Training Required	
Security Clearance Requ	uirements	Work must be Sched	luled 🛛 Check in [Daily	
Co-located Hazards/Cor	ncems	Other Security Requ	irements (ex.: Cellphone, N	lo Foreign Nationals, etc)	
Check out at End of Wor	rk	Quality Issues	Check out	Daily	
Escort Required		Review under Autho	rization Basis (AB)/Safety E	Basis/Unreviewed Safety Question (USQ)	
Other Bounding Condition	ons:				
	ct a pre-job brief for work activitie ne if onsite ESH representation is			ations are adequate. A pre job briefing shall be	conducted at the
Additional Comments (refe	er to Job Hazard Analysis [JHA] Tool Facility Notes)			
				latural Gas Systems Evaluate inside floor and	
				ead for final approval to proceed with tasks W	
				k is found to operations. All personnel entering oor markings in all buildings and areas No safe	
				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								

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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/S8	S WORK AREA	HAZARDS & CONTROL	S	
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)
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
Form 2101 (6/12)				Page 2

			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 IVID 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.	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			

Form 2101 (6/12)

Page 3

Specify Hazards:				
Security Requirements Specify:	☐ Yes ⊠ No		<u>*</u>	
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 t	hat the IWM process has be	en applied appropriately.	
FOD or Representative (Signature/Z #/Date) Approval Required Pa	blo F. CdeVaca	Orgitally signed by DN: cn=Pablo F Cd Date: 2017 06:26 11	eVaca, o=LANS, ou=UL email=pfc@lanl.gov, c=US	_

Date Approval Expires: 09/30/2020

Form 2101 (6/12)

Page 4

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:

<u>Authorization</u>

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 Proj : Unit : Work Order Task 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

00602501 01

MASTER

Date: 01/10/2018

Requirements / Comments	

Name	Function/Dept.	Date
Carlos Chacon	UPES Controls Electricians	4-26-18
	(K)	
comments	None	
(rework?)	No	

Cost Accounting

Cost Center : P2030A Activity: 640CL000

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

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

REVISION #:

Form 2103



IWD#

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

WORK RELEASE

- 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 execu-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) Form 2103 (3/14) Page 1 of 1

Lock Coordinat	ock Coordinator Name/Z#		hone #	Alternate	Lock Coordinator Namel	Z#	Phone #	
Section 1: Gener	al Information							
1. Work Document N	lumber (i.e., Package	e/Procedure #):		2. LO/TO (Parent)	Record #	3. Date:		
Location								725
4. TA: 5. Bldg	g: 6, Rm:	7. Equipme	ent/Machinery/Name	/Number:				
3. Reason for LO/TO):							
	ent Owner/Operator:							
	oe Isolated (check all echanical		matic	☐ Capacitors ☐ Co	mpressed Energy Gravity	Affer (spe	cify):	
L1. Group LO/TO:					12 C an Lock Box used	Yes 🔲	No If yes, enter ID	# of Lock Box
f Yes, Name of Lea	d Authorized Worker:				Lock Box ID:			
	uired for LO/TO Inst				quencing Required for LO/TO R			
	uired sequence in co	umn 20 below.	If No, place NA		enter the required sequence in	column 28 be	low. If No, place N/	A in column 2
elow				below				
Yes No				☐ Ye	s 🗌 No			
section 2: LO/TO	Installation &		00		Lowe			
E. Americal to Joseph		O/TO Installat	on				eturn to Service	
5. Approval to Insta	(signature	≨ Z#)			24 Approval to Remove L	.O/TO (signati	ire & Z#). Call #	
6 Verification regul	ired for LO/TO Install	ation			25. Verification required for	VIOTO Pam	oval	
		Independent	Verification		□ No □ Peer Concur		Independent Ve	rification
	John Community C	1 macpendone	T C I I I C C C C C C C C C C C C C C C			Circ Baca	_ macpendent ve	moduon
7. Verification Determ	ination Approved by	Z#	Date		26 Verification Determination	Approved by	Z#	Date
OD/Designee (signati	ıre)							
18. Specific Energy	19. Location of	20 LO/TO	21. Required	22. LO/TO Installation		28. LO/TO	29. LO/TO	30 As-Left
solation Device/ID	locking Device	Installation Sequence	Position/Alignment for LO/TO	verified By:	Position/Alignment following Removal	Removal Sequence	Removal Verified	Position
		Coquente	20,70			Judgeting		
								-
	-	_				1		
				1	-			
3 LO/TO Points Posi	ioned and First Lock	Z#	Date		31 LO/TO Removed, Position	ned and	Z# [Date
stalled by Signature					Verified by Signature			

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Attachment B, LO/TO Orders (Cont.)				
Work Document Number (i.e., Package/Procedure #):	2. LO/TO (Parent) Red	cord# 3. Dat	e	
32. Zero Energy Checks have been completed Yes No				
	Completed by	Signature	Z#	Date
Section 3: Lead Authorized Worker and Authorized Workers (ar	nyone applying a lock f	or this activity)		
34. Authorized Workers Name(s)	Z#	35. Date workers lock hung	is 36. Date v	vorkers lock is removed
1.				
2.				
3.				
4.				
5.				
6.				
7,4				
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 D	esignee		
		149		
37. Signature of Lock Coordinator or Designee	Z#		Date	

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^{*}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.

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
		-			-		7	
					-			
		-						
	-	+				-		
	'							
3 LO/TO Points Posit stalled by Signature	ioned and First Lock	Z#	Date		31. LO/TO Removed, Position Verified by Signature	ned and	Z# C	Date

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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.

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- 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 preauthorize 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.

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Los Alamos NATIONAL LABORATORY

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

Form 2101

Non-Tenant Activity Form

EST.1943					,,,		
WD No /Work Request No:	Revision #:						
Facility Operation Director (FC	DD) must determine the facility entry and ded with the activity location	coordination requiren	nents and identify the Envir	onment, Safety, Health (ESH)/Security and Safeguards (S&S)		
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 Rec	quirements (Check one or more of the	following)					
No Entry/Coordination Re	equirements F	OD-designated facilit	ty Point-of-Contact must sig	n IWD Part 3			
Plan of the Day/Plan of th	ie Week (POTD/POTW)	heck in at Start of W	ork Work-Area	Training Required			
Security Clearance Requ	irements 🔀 V	ork must be Schedu	ied 🛛 Check in Da	aily			
Co-located Hazards/Cone	cerns C	Other Security Requirements (ex.: Cellphone, No Foreign Nationals, etc.)					
Check out at End of Work	、 □ □	Quality Issues Check out Daily					
Escort Required	□R	eview under Authoria	zation Basis (AB)/Safety Ba	sis/Unreviewed Safety Ques	tion (USQ)		
Other Bounding Condition	ns:						
	t a pre-job brief for work activities to ensu			ions are adequate. A pre job	briefing shall be conducted at the		
•	e if onsite ESH representation is required		es e e e e e e e e e e e e e e e e e e		77.00		
	r to Job Hazard Analysis [JHA] Tool Fa						
	y the Utilities FOD or UI-OPS_POD/POT\ with activities_Check in with Plant Operat						
	es. Inspect for leaks before beginning an						
the site specific training video	in room 116 (Boiler Control Room), one	time requirement. Of	bserve safety signs and floo	or markings in all buildings an	nd areas No safety shoes required		
	erations or UI Engineering personnel. The						
	ow, identify work-area hazards that could to protect against the site hazards as we			y the facility controls and pre-	ventive measures that must be		
mpontones of the monte (c)			HAZARDS & CONTROL	.S			
Work Area Hazards/Concer		Work Area	Facility Controls/	Reference Documents	Training and Qualification		
Identify site hazards and con worker(s) or others.	cerns that could potentially affect the	Hazard Present	Preventive Measures/ Bounding Conditions Specify preventive measures, controls and bounding conditions for each site hazard	List permits, operating manuals, and other reference procedures	List training requirements (P300, Integretated Work Management, Section 6.1)		
No Work Area Hazards							

Form 2101 (6/12) Page 1

lonizing 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 Work Area Hazard Present	Facility Controls/ 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)					
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					
Form 2101 (6/12)				Page 2					

1658/1711

		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			

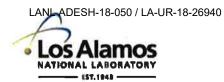
Form 2101 (6/12) Page 3

Specify Hazards:					
Specify nazarus.					
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 hazai	rds and t	nat the IWM process has be	en applied appropriately.	
FOD or Representative (Signature/Z #/Date) Approval Required Pa	blo F. Co	deVaca	Digitally signed by I DN cn=Pablo F, Cd Date: 2017 06 26 11	eVaca, p=LANS_qu=UI_email=pfc@lanl.gov, c=US	-

I have verified that the hazards identified above adequately identify the area	nazards and that the IV	VM process has been applied appropriately.
FOD or Representative (Signature/Z #/Date) Approval Required Pablo F	. CdeVaca	Dig tally signed by Paldo F. Celviaca ON: con Paldo F. Celviaca, or LANA, sout-II, email-pricelatel gov, ce-US Date: 2010 06:61-31:41-46:809
Date Approval Expires: 09/30/2020		

Form 2101 (6/12)

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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. <u>Examples</u> 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?	V
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?	/

NATIONA	Alamos Facili	ities Mainto	enance IWD – (Facility Maintenance Activity Specific Information)		
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Work	Document #: ((WO # /	Planner/Preparer (Name/Z#/Date)		
Task			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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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

FORM 2100-WC

NATION	Alamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)			
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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.

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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"

Los	Alamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)		
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Task			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.

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LOS	Alamos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)	
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- 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 :	4.	z#:\799\ Date	4.11	0.18
1 10		Duto	-	262

- 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);

VERIEV workers Indevetord foll protection plan

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

• VERI	r y workers understand	i fail protection plan		
PIC :	NIT	Z#:	Date:	

IF aerial platform/lift is to be used:

IF fall protection 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 ,

. \	/ERIFY all pe	ersonnel are	qualified to oper	ate aerial lift dev	rice assigned to	activity.
-----	---------------	--------------	-------------------	---------------------	------------------	-----------

1 = 1 th . Th . Th	Pin all all all all all all all all all al			
PIC:	11/	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.

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FORM 2100-WC

- Los A	lamos Faci	lities Mainte	nance IWD – (Facility Maintenance Activity Specific Information)
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Task			Justin Maestas 177550 3/28/16
TA:	Building:	Room:	Additional Location Description:
03	0022		

4.3 Execution

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

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VFD:(/4	1)'5	accor	inted y	Avr. Our	th ?	Zero V	thing	e
9			FD within this					
	stored en	ergy that could	d be present in a and within system	VFD.		KA	240	775
•	IF VFD is	present or fou	ınd within systen	n to be worked	. DO NO	T proceed with	any	ice

4/18/18 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.
- 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

	Carlos Chacon	7#. 120931	4-26-18
Operations:		Z#: 120331	Date: 4-20-10

- 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	Facilities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)	
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Work Docume	ent #: (WO #/	Planner/Preparer (Name/Z#/Date)	
Task) UPPS	-FY17-001	Justin Maestas 177550 3/28/16	
TA: Build 03 0022	~	Additional Location Description:	

Innert Dame of an fam.	The DI M and FOD . FOD	DIM (C)	1741D) B
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	FOD or Reprint Required Part SME Review N/A ESO Review ESH Safett I Peer RLM /V Manager/Ma	resentative (Signature/Z#/Date) ablo F. ablo F. Digitally signed by Pable F. CdeVaca DN complable F. CdeVaca, on-LANS, deVaca (Signature/Z#/Date) If Required (Signature/Z#/Date) If Required (Signature/Z#/Date) If Required (Signature/Z#/Date) If Required (Signature/Z#/Date) If Required (Signature/Z#/Date) If Required (Signature/Z#/Date) If Required (Signature/Z#/Date) (Signature/Z#/Date) (Signature/Z#/Date) (Signature/Z#/Date)
IWD Type ☑ Moderate-Hazard ☐ High-Hazard/Complex ☐ Standing IWD	Date when RLM re-approval is rec Other Conditions for RE-Approval scope or additional hazards identif (Print) Name of Primary PIC Carlos Ch	l <u>Change in</u> ied	Classification review completed, if required.
Gunding 111 D	Name of Alternate PIC Greg Do	nnelly	Reviewer Signature/Z#/Date

1	F()R	M	210	0-W	C

NATION	Alarnos Faci	lities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)	
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Work Document #: (WO #/		(WO#/	Planner/Preparer (Name/Z#/Date)	
Task			Ked rick Mendez 180622 9/30/16	
TA: 03	Building: 0022	Room:	Add itional 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 Rob ert 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 bazards 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 An sell sleeves when working near hot surfaces.
- Utilize insulating blankets to protect against hot surfaces.

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Los Ala	mos Faci	lities Mainto	enance 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 sæfety standards. Inspect cords / batteries prior to use. GFCl 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 awar eness

12. Asbestos Abatement Pipe and Equipment Insulation:

- Reference MSS Procedure 41–55-001-R1
- Area regulated to OSHA stand ards(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 usin g 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

Page 2 of 7

MARION	Alamos Faci	lities Mainte	nance IWD – (Facility Maintenance Activity Specific Information)
Revisi	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
	Document #:	(WO#/	Planner/Preparer (Name/Z#/Date)
Task			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

Page 3 of 7

Los	Alamos Al IAAGRAIGAY Faci	ilities Main te	enance IWD – (Facility Maintenance Activity Specific Information)
Revisio	on # 0	1900	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)

	Facil	ities Mainte	enance IWD – (Facility Maintenance Activity Specific Information)
Revisi	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work	Document #: ((WO#/	Planner/P reparer (Name/Z#/Date)
Task			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).

l. Fall Protection:

- Verify that a safety system is in place (where workers understand hazard controls a.nd 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 compone nts
 has occurred and their impact to the activity has been accounted for and communic ated
 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 lookalike equipment.

	mar Facili	ities iviaimi	enance IWD – (Facility Maintenance Activity Specific Information)	
Revisio	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD	
Work Document #: (WO #/		(WO#/	Planner/Preparer (Name/Z#/Date)	
ask			Kedrick Mendez 180622 9/30/16	
Γ A : 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.

I. Complete closeout of the work activity in accordance with Insert Rows above for additional Tasks/Steps or Representative (if required or	th AP-WORK requirements.
attach pages to clearly communicate ESH&Q/S&S hazards and associated controls. 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	RLM (Signature/Z#/Date) Required /// // // // // // // // // // // // /
the IWD, and facility safety	Page 6 of 7

			FGKIII 2100-11C
MATION	Alamos Faci	ilities Mainte	enance IWD (Facility Maintenance Activity Specific Information)
Revisi	on # 0		Activity/Task Title: POWER PLANT COMPLEX-MODERATE HAZARD STANDING IWD
Work Task	Document #:	(WO # /	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 Revio	ew (Signature/Z#/Date) If Required	
IWD Type ☑ Moderate-Hazard ☐ High-Hazard/Complex	Date when RLM re-approval is requiredOther Conditions for RE-Approval: Scope change or additional hazards identified. (Print) Name of Primary PIC		Classification review completed, if required.	
Standing IWD	Name of Alternate PICName of Alternate PIC		Reviewer Signature/Z#/Date	

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

1678/1711

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 Regmt : 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.

Facility : F08	Unit : Proj :	
Task Title : PP 1M '	TA3-22 FGR BEARINGS, LUBRICATE	Work Order Task
W/O Type : PM	W/O Group : UTIL Task Priority :	4
Planner : 189099	LOPEZ THERESA M	00605131 01
W/O Title : PP 1M TA	A3-22 FGR BEARINGS, LUBRICATE	
Written To : TA03-0	022 FAN, FLUE GAS RECIRCULING (FGR-001, FG	R-002, MASTER
Task Dspln :	Due Date : 05/31/2018	Date: 02/15/2018
Superintendant :		32, 10, 201
Hazard : LOW	IWD Regmt : N/A LOW HZRD	
Work Completion Sign	natures	
Work Completion Siqu	natures Function/Dept.	Date
	Function/Dept.	Date 05/01/2018
Name	Function/Dept.	

Cost Accounting

Comments

(rework?)

Cost Center: P2030A Activity: 640CL000

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

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



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

Form 2101

Non-Tenant Activity Form

	TA	Bldg	Room	Other Location	
FOD 8	3	22	N/A	Other Location	
				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 Requ	uirements (Check one or more of the	following)			
■ No Entry/Coordination Req	uirements	FOD-designated facility	y Point-of-Contact must sig	n IWD Part 3	
Plan of the Day/Plan of the	Week (POTD/POTW)	Check in at Start of Wo	ork Work-Area	Training Required	
Security Clearance Require	ements 🖂 '	Nork must be Schedule	ed 🛛 Check in Da	aily	
Co-located Hazards/Conce	erns	Other Security Require	ments (ex.: Cellphone, No	Foreign Nationals, etc.)	
Check out at End of Work		Quality Issues	Check out [Daily	
Escort Required		Review under Authoriz	ation Basis (AB)/Safety Ba	asis/Unreviewed Safety Quest	ion (USQ)
Other Bounding Conditions	3:				
PIC is responsible to conduct a	a pre-job brief for work activities to ens	ure that work condition	an and worker communica		
job site. UI-OPS will determine	if onsite ESH representation is require	ed during work activities	s and worker communica	tions are adequate. A pre job	briefing shall be conducted at I
iob site. UI-OPS will determine Additional Comments (refer that a work must be approved by toonditions to safely proceed with a plant chemical pumps and lines the site specific training video in the site specific video in the site specific video	to Job Hazard Analysis [JHA] Tool Fi the Utilities FOD or UI-OPS POD/POT ith activities Check in with Plant Operas. In Inspect for leaks before beginning a in room 116 (Boiler Control Room), on	ad during work activities Facility Notes) W-contact Facility POt ations Manager/Special ny work task and pause to time requirement. Ob	S C. No Smoking around Na list or Operations Shift Hei- e work and report if a leak serve safety signs and flor	tural Gas Systems Evaluate and for final approval to procee is found to operations. All peror markings in all buildings an	inside floor and housekeeping d with tasks, Work around pow sonnel entering area must view d areas. No safety shoes requi
ob site, UI-OPS will determine Additional Comments (refer that work must be approved by the conditions to safely proceed with oliant chemical pumps and lines the site specific training video it for visitors if escorted by Operatestructions: In the block below	to Job Hazard Analysis [JHA] Tool F the Utilities FOD or UI-OPS POD/POT ith activities Check in with Plant Opers s. Inspect for leaks before beginning a in room 116 (Boiler Control Room), on- ations or UI Engineering personnel. The v, identify work-area hazards that coul-	ad during work activities Facility Notes) W-contact Facility PO(ations Manager/Special ny work task and pause time requirement. Ob West end front lobby d potentially affect the v	S C. No Smoking around Na list or Operations Shift Hei- e work and report if a leak serve safety signs and flor and office areas of Bldg 2 worker(s) or others. Specif	tural Gas Systems Evaluate and for final approval to procee is found to operations. All peror markings in all buildings an 2 are considered a no hazard	inside floor and housekeeping d with tasks, Work around pow sonnel entering area must view d areas, No safety shoes requir l area,
job site. UI-OPS will determine Additional Comments (refer that All work must be approved by the conditions to safely proceed with plant chemical pumps and lines the site specific training video in for visitors if escorted by Operanstructions: In the block below	to Job Hazard Analysis [JHA] Tool Fithe Utilities FOD or UI-OPS POD/POT it activities Check in with Plant Opers. Inspect for leaks before beginning a in room 116 (Boiler Control Room), one ations or UI Engineering personnel. The v, identify work-area hazards that could protect against the site hazards as we	ad during work activities Facility Notes) W-contact Facility POC ations Manager/Special ny work task and pause time requirement. Ob West end front lobby d potentially affect the elf as any special traini	S C No Smoking around Na list or Operations Shift Hei e work and report if a leak serve safety signs and flor and office areas of Bldg 2 worker(s) or others. Specifing required.	tural Gas Systems, Evaluate ad for final approval to procee is found to operations. All peror markings in all buildings an 2 are considered a no hazard by the facility controls and previous and previo	inside floor and housekeeping d with tasks, Work around pow sonnel entering area must view d areas, No safety shoes requir l area,
job site. UI-OPS will determine Additional Comments (refer that All work must be approved by to conditions to safely proceed with plant chemical pumps and lines the site specific training video it for visitors if escorted by Opera metructions: In the block below mplemented by the worker(s) to Work Area Hazards/Concerns	to Job Hazard Analysis [JHA] Tool Fithe Utilities FOD or UI-OPS POD/POT ith activities Check in with Plant Opers. Inspect for leaks before beginning a in room 116 (Boiler Control Room), on ations or UI Engineering personnel. The w, identify work-area hazards that could be protect against the site hazards as w	ad during work activities Facility Notes) W-contact Facility POO strong Manager/Special my work task and pause time requirement. Obe West end front lobby d potentially affect the elf as any special traini S&S WORK AREA F Work Area Hazard Present	S C. No Smoking around Na list or Operations Shift Hei- e work and report if a leak serve safety signs and floi and office areas of Bldg 2 worker(s) or others. Specif	tural Gas Systems, Evaluate ad for final approval to procee is found to operations. All peror markings in all buildings an 2 are considered a no hazard by the facility controls and previous and previo	inside floor and housekeeping d with tasks, Work around pow sonnel entering area must view d areas, No safety shoes requir l area,

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)			
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	P101-6 PPE P101-23 Asbestos P101-31 Hearing Conservations/Noise Program	LANL PPE or equivalent - Hearing protection - Site specific training - Asbestos awareness			

1683/1711

			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			

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

I have verified that the hazards identified above adequately identify	the area hazards and that the IV	VM process has been applied appropriately.	
FOD or Representative (Signature/Z #/Date) Approval Required	Pablo F. CdeVaca	Digitally agreed by Pablo F. CdeVaca Unit on Pablo F. CdeVaca Unit on Pablo F. CdeVaca Unit of P	40
Date Approval Expires: 09/30/2020			



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. <u>Examples</u> 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.

FGR BEARINGS LUBRICATE	Completed (X)
What permits, permissions, or support are required to safely start this work?	K
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?	χ

AP-WORK-004.1

Rev. 15, Approved 11/14/2016

Page 1 of 1

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

- 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

1688/1711

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 Regmt : 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.

Facility: F08 Un	_	Work Order Task
	22 FGR BEARINGS, LUBRICATE	
	O Group : UTIL Task Priority :	00607483 01
Planner: 189099 LOPEZ		00607463 01
	PAN, FLUE GAS RECIRCULING (FGR-001, FGR-	-002, MASTER
FGR-003)		-002, MASTER
Task Dspln : Du	e Date : 06/30/2018	Date: 03/07/201
Superintendant :		
Hazard : LOW IW.	D Reqmt : N/A LOW HZRD	
		1
		Date
Work Completion Signatur Name	Function/Dept.	Date
		Date 6/4/18
Name	Function/Dept.	
Name	Function/Dept.	
Name	Function/Dept.	
Name	Function/Dept.	
Name	Function/Dept.	

Cost Accounting

(rework?)

Cost Center: P2030A Activity: 640CL000

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

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



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. <u>Examples</u> 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

Tonic 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

Los Alamos NATIONAL LABORATORY

Work Area Hazards/Concerns

No Work Area Hazards

worker(s) or others

Identify site hazards and concerns that could potentially affect the

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

Form 2101

Non-Tenant

Activity Form

FOD 8	TA 3	Bldg 22	Room N/A	Other Location 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 Rec	quirements (Check one or more of	the following)		*
	e Week (POTD/POTW) irements cerns C	Check in at Start of V Work must be Sched Other Security Requi Quality Issues Review under Autho	uled Check in E irements (ex : Cellphone, N Check out rization Basis (AB)/Safety B	Training Required Daily to Foreign Nationals, etc.)
All work must be approved by conditions to safely proceed of plant chemical pumps and lin the site specific training video	with activities. Check in with Plant Op es. Inspect for leaks before beginning o in room 116 (Boiler Control Room),	OTW-contact Facility P erations Manager/Spec g any work task and pa one time requirement. (ialist or Operations Shift He use work and report if a lea Observe safety signs and fle	atural Gas Systems. Evaluate inside floor and housekeeping ead for final approval to proceed with tasks. Work around power k is found to operations. All personnel entering area must view oor markings in all buildings and areas. No safety shoes required 22 are considered a no hazard area.

Form 2101 (6/12) Page 1

ESH/S&S WORK AREA HAZARDS & CONTROLS

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)

WD No /Work Request No: Revision #:				
		HAZARDS & CONTROL		
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 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 667-6982 or by Radio Lani 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.	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			

Form 2101 (6/12) Page 3

Security Requirements Specify:	Yes 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 Ogudy-upwed-photo-CodWas Otto subject Cod					

Specify Hazards:

Al 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).

Al 856 | Los Alamos National Laboratory

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.

Al 856 | Los Alamos National Laboratory

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.

Al 856 | Los Alamos National Laboratory

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	Evap Sprayer #1 (SN 0053)	Evap Sprayer	Evap Sprayer #2 (SN 0054)	Evap Sprayer	Evap Sprayer #3 (SN 0055)	Evap Sprayer 4 (not installed)	Evap Sprayer 4 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	7			
Feb	374	134,402	147	88,946	•			
Mar	536	193,376	304	109,614	i			
Apr	620	227,150	383	139,812	*			
May	704	267,490	442	168,198	1/42			
Jun	711	306,734	397	147,074				
luf								
Aug								
Sep								
Oct			I E E					
Nov		Total Section						
Dec								
Annual Totals	3,256	1,241,326	1,969	724,052	É			

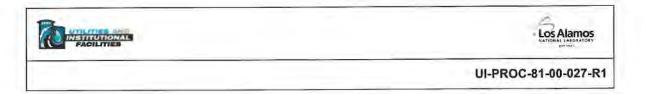
Operating Permit P100-R2M1 & P100-R2M2

Monitoring Period January 1-June 30, 2018

ATTACHMENT A1507.B.

Evaporative Sprayers

Work Practice Standards-Maintenance and Repair Requirements



Operations Procedure

SERF Lead Opera Z-# 281223	1 - 5 T / 6 T / 1
Z-# 281223	
The state of	Date 6/13/18
SERF System Eng	jineer
Z-# 304395	Date 6/13/3019
ESH Manager	, , ,
A Tradition	Date 6/14/20
	67.11
Operations Manag	jer
Z-# 186199 090208	Date 6-18-18
	Z-# 304395 ESH Manager Z-# 117365

Utilities & Institutional Facilities Operations Procedure SERF Sigma Basin SMI 120F Evaporator Inspections

UI-PROC-81-00-027-R1

History of Revisions

Document Number	Issue Date	Action
UI-PROC- 81-00-027- R1	Glislis	Review and reissue. Minor changes.
UI-PROC- 81-00-027- R0	06/01/18	New procedure.

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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.

- Equipment, tools, instruments:
 - Pressure washer
 - Power generator
 - Pump
 - Flat and/or combination screwdriver
 - Hand tools
 - Flashlight

6 Responsibilities

- 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	n, or 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