13 STATE ENGINE/ALTERNATOR SET

JOB PACKAGE

SUMMARY OF KEY INFORMATION:

SITE CILLI CODE: _____

SITE GEO LOC:

SITE ADDRESS: _____

SITE INSPECTION DATE: _____

PROPOSAL DUE DATE: _____

INSTALLATION COMPLETE DATE: _____

POWER ENGINEER'S NAME: _____

POWER ENGINEER'S ADDRESS: _____

ENGINEER'S TELEPHONE NUMBER: _____

POWER MAINT. ENG. NAME: _____

CRE REPRESENATIVE'S NAME: _____

AUTHORIZATION DATA SHEET

INITIAL WALK-THRU

Date: _____

Attended By:

NAME	TITLE

Comments:

_____ _____

Power Engineer Authorization of Contents Date of Authorization

AUTHORIZATION OF ADDED OR AUGMENTED DATA

Additions/Augments dated _____

Submitted By: _____

Comments:

_____ _____

Power Engineer Authorization of Additions/Augments Date of Authorization

****

Additional/Augments dated _____

Submitted By: _____

Comments:

_____ _____

Power Engineer Authorization of Additions/Augments Date of Authorization

****

Additions/Augments dated _____

Submitted By: _____

Comments:

_____ _____

Power Engineer Authorization of Additions/Augments Date of Authorization

Engine/Alternator Set Data Sheet

1. SITE INFORMATION

Office CLLI: CON/PIP Number:

Geo Loc: Estimate/UT Number:

Office Address: Site Name:
Site Elevation (approx.): ft. above sea level
Seismic Zone:

On-Site Location:

Height of building: _____ Approximate Size of Property in Acres: _____

2. EXISTING SET REQUIREMENTS

Disposition of Existing Engine/Alternator: _____

☐ **Remove Existing Engine/Alternator Set**

Make: _____ Model: _____

Responsibility of removal: _____

☐ Sale ☐ Scrap ☐ Re-apply to another C.O. - Site: _____

☐ Re-apply as a portable ☐ Negotiable

☐ Building work required for remval - Details _____

☐ Fluid drainage and disposal required – Details _____

☐ Battery disposal required – Details _____

☐ Salvageable items – Details _____

Removal route: _____

Floor loading for removal route per sq. ft.

☐ **Parallel with new engine/alternator set**

☐ **Retire in Place**

☐ **Not Applicable**

Engine/Alternator Set Data Sheet

Comments:

3. ENGINE/ALTERNATOR SET SPECIFICATIONS

A. Engine/Alternator Scheme:

☐ Single ☐ Multiple

☐ Parallel – manual ☐ Parallel – auto

☐ Switchgear:

☐ Existing ☐ Provided by: _____

B. Transfer Switch:

☐ Existing

☐ Stand-alone ☐ Embedded ☐ Integrated

Size _____ Model _____

Manufacturer: _____ Accessories: _____

Location: _____ Provided by: _____

☐ Isolation/Maintenance bypass

☐ Integral

☐ External

Comments: _____

C. Engine/Alternator Set Information

Rating:

☐ Stand-by (SBC – Standard) ☐ Prime

_____ **kW** at ____ **volts**

_____ Phase, _____ wire, _____power factor

☐ Power Factor Meter Required

☐ Load Banks required – Details: _____

Approx. size – _____ W

Engine/Alternator Set Data Sheet

Comments: _____

C. Cooling System

☐ Water-cooled

☐ Set-mounted radiator ☐ Remote radiator – Location: _____

☐ Vertical ☐ Horizontal

Sound Level Limits: _____

☐ Remote radiator control panel

Location: _____

☐ Motor starter
☐ Feet/Head required (elevation differential)

☐ Heat exchanger required

☐ Water circulating pump required

☐ Engine/Alternator mounted and driven
☐ External – drive type: _____

Comments: _____

D. Control System Construction:

☐ Relay logic control panel
☐ Solid State controlled panel

☐ Program Logic Control (PLC) panel
☐ Manufacturer's default control panel that meets all specification requirements

Control Panel:

☐ On set

☐ Off set

Location of offset panel:_____

☐ Standard Gauges ☐ Upgraded Gauges – Details: _____

Engine/Alternator Set Data Sheet

☐ Additional auxiliary engine run contacts - Details: _____

☐ 12 – wire logic panel

Emergency Stop Buttons

Local – Location:_____

Remote – Location(s): _____

Engine Control Operating Software:

Proprietary Software required:

☐ No ☐ Yes – Details: __

Quantity: __

Interconnect/Interface devices required:

☐ No ☐ Yes - Details: __

Quantity: __

Software and/or interconnect/interface devices required to adjust, operate and/or monitor the engine/alternator shall be itemized within bid.

Alarm Panel Requirements:

☐ Remote Annunciator Panel

☐ Alarm Interface Panel

Location:

E. Engine Starting System:

☐ Start push-button ☐ Dual starters

_____ Volts

Batteries:

Make _____

Model _____

Quantity _____

Charger: ☐ Existing ☐ New

Make _____

Model _____

Quantity _____ Location _____

Engine/Alternator Set Data Sheet

Battery Type:

- ☐ NiCd
- ☐ Flooded Lead Acid
- ☐ VRLA

F. Remote Monitoring Interface:

- ☐ Intelligent Power Interface
- ☐ Power Plant Interface (DGU, Galaxy, PCP, etc.)
- ☐ Other – description:

4. FUEL SYSTEM REQUIREMENTS

A. Fuel and Oil Operating Requirements:

- ☐ 72 hours continuous unattended operation
- ☐ Other: _____ hours

Fuel Type: __ Heat content of fuel: _____

% Sulfur content by weight of fuel: _____

- ☐ Engine High Lift Fuel Pump

B. Primary/Main Tank:

☐ UST (Underground storage tank) ☐ AST (Aboveground storage tank)

Tank Location:_____

Tank Size: _____gallons

Elevation differential (lift or head) of approximately __ feet.

Exterior fuel fill alarm horn and silence: ☐ Existing ☐ New – Details _____

- ☐ Anti-syphon solenoid valve required on fuel supply from main tank to day tank
- ☐ Ball isolation valve on fuel supply from main tank to day tank required
- ☐ Check valve on overfill line from day tank to main tank required
- ☐ Remote fuel oil cooler required

Engine/Alternator Set Data Sheet

☐ Fuel filter at engine required - ☐ floor mounted ☐ engine mounted

☐ Fuel filter on fuel supply piping from main tank to day tank required

☐ Fusible-link fire valves required:

Location: _____ Size: _____

Quantity: _____ Supplier: _____

C. Day Tank:

☐ No Yes: ☐ New ☐ Re-use

Location:_____

Tank Size:_____ gallons

Details:_____

☐ Heading exhaust system

D. Spill Containment:

☐ No

☐ Yes – Details:

Floor sealant: ☐ No ☐ Yes – description _____

Containment curb: ☐ No ☐ Yes – description _____

Containment basin: ☐ No ☐ Yes – description _____

E. Fuel Return System

☐ Return to main tank

☐ Return to day tank

☐ Both with selector valves

☐ Fuel cooler

F. Fuel Transfer System

☐ No ☐ Yes – description:_____

☐ Single Pump

☐ Dual Pump

☐ Return Transfer Pump Required – Details _____

Engine/Alternator Set Data Sheet

G. Remote Fuel Monitoring System

☐ Vendor provided ☐ SBC Provided

☐ Primary Tank Monitoring - System required:_____

☐ Day Tank Monitoring - System required:_____

☐ Main Tank Alarms: ☐ Existing ☐ New – Details _____

☐ Main Tank Monitoring Control System Panel Location: _____

☐ Day Tank Alarms: ☐ Existing ☐ New – Details _____

☐ Day Tank Monitoring Control System Panel Location: _____

5. BUILDING AND CONSTRUCTION REQUIREMENTS

A. Environmental/Ambient Conditions

Outside Ambient Air: Annual High – ___ °F Annual Low – ___ °F

Site Specific Conditions: _____

Acoustic Requirements:

A maximum of ___dB at _____

☐ Sound attenuation housing required – Details _____

B. Portable Engine/Alternator back up

☐ Not required

☐ Required – Details:

☐ Auto – Start ☐ Manual - Start (with instruction)

Size: _____ kW Provided by: _____

Duration required: _____ Fuel reserve: _____hrs.

Sleeve route: _____

Cable Details: _____

Shore power receptacles: _____

Security/Safety Arraignments: _____

Engine/Alternator Set Data Sheet

Sound Attenuation Required: ☐ No ☐ Yes – _____ dB at _____ft.

Location: _____

C. Air Requirements

Intake for combustion: _____cfm

Cooling: _____ cfm

Exhaust: _____ cfm at _____ psi (at full rated capacity)

D. Exhaust System

☐ Existing ☐ New

☐ Single ☐ Double

☐ Roof penetrations required – Details: _____

☐ Exhaust fans required – Details: _____

☐ Ventilation thimble required

System Anchor:

☐ Top of roof deck ☐ Bottom of roof deck

☐ Intermediate floors ☐ Hung form Basement ceiling

☐ Deadman to floor

Stack Dimensions:

Orientation of exhaust vents: ☐ Horizontal ☐ Vertical

Height above ground: _____ Inner Diameter: _____

Height above roof system: _____

Shaft Material:

Material of shaft: _____ Insulation Material: _____

Insulation wrapping material: _____ insulation thickness: _____ in.

Performance Requirements:

Average exhaust gas temperature for new engine/alternator set: _____

Maximum exhaust gas temperature for new engine/alternator set: _____

Engine/Alternator Set Data Sheet

Average exhaust gas flow for new engine/alternator set: _____

Maximum exhaust gas flow for new engine/alternator set: _____

E. Louvers/Dampers

Intake Damper:

Number: _____

Location: _____ Size: _____

Exhaust Louver:

Number: _____

Location: _____ Size: _____

Re-circulation Damper and Ductwork:

Number: _____

Location: _____ Size: _____

F. Grounding

☐ Re-use

☐ Re-use

☐ New – Details: _____

G. Output Breaker

Location: _____ Trip/Frame Settings: _____

Type: _____ Mounting: _____

☐ Header Box required Rating: ☐ 80% ☐ 100%

Conduit Entry:

Quantity: _____ Size: _____ Location: _____

H. Structural Analysis

Engine/Alternator room

☐ Existing room adequate for new Engine/Alternator Set:

Height: _____ Length: _____ Width: _____

Engine/Alternator Set Data Sheet

Beam Height: _____ (Depth = _____)

Floor loading: _____ per sq. ft.

☐ Floor Reinforcement required – Details _____

☐ Floor sealant required – Details _____

☐ Housekeeping Pad – Details _____

☐ Concrete Mounting Pad for Engine/Alternator Set required – Details _____

Exhaust System

☐ Re-use ☐ New

Size: height _____ width _____ _____ S.F.

Route: _____

I. Fire Rating

Engine/alternator room fire rating required: _____

☐ Additional fire protection required – description _____

J. Access requirements for new Engine/Alternator

Access route for new Engine/Alternator Set: _____

Floor loading for access route _____ per sq. ft.

☐ Building alterations required for the delivery of new engine/alternator

Description: _____

K. Tank Requirements

Main Tank:

☐ Use Existing tank

☐ Install New Fuel Tank

☐ Site modifications – Details _____

Day Tank:

☐ Site modifications for new day tank – Details _____

K. Remote Radiator

☐ Remote radiator:

Engine/Alternator Set Data Sheet

Location: _____

Cage: ☐ Reuse – modifications required: _____

☐ New – Details: _____

☐ Vehicle protection for cage required – Details _____

☐ Concrete Mounting Pad for Remote Radiator required – Details _____

☐ Ladder required for access to level switch

Under-voltage/phase loss relay: ☐ inside fused disconnect enclosure

☐ Wall-mounted cabinet

L. AC Requirements

Feeder from Engine/Alternator Set to AC switchgear or remote transfer switch:

Size: _____ Route: _____

AC Commercial Breaker:

☐ Re-use ☐ New - Details

Size _____, voltage_____

AC Emergency Breaker:

☐ Re-use ☐ New - Details

Size _____, voltage _____

☐ AC Switchboard surge arrestor – Details _____

Generator Breaker:

Location _____ Face Direction _____

_____ Conduit(s) of _____ size

_____ Feeder(s) of _____ size

AC Switchboard modifications:

☐ Not required

☐ Required – Details _____

Engine/Alternator Set Data Sheet

Portable Engine/Alternator connections:

☐ Permanent Tap Box - description

☐ Cam-Lock – description _____

Connection Plan Update:

Date updated:_____

Building Electrical Data Sheet Updated:

Date updated:

Engine/Alternator room PDSC panel:

☐ Existing

☐ New

Feeder size: _____ Feeder routing: _____

New DC Emergency Lighting:

☐ -48 V ☐ Battery Pack

Locations Required:

☐ Main AC Disconnect ☐ Automated Transfer System

☐ House Service Board ☐ Fuel Transfer Pump

☐ Day Tank ☐ Engine/Alternator

☐ Tap box/ Generator Plug ☐ Building Entrance

☐ Engine/alternator start battery stand and rectifier

☐ Engine/Alternator Remote control panel

☐ Other: _____

M. Switchgear Testing

☐ No ☐ Yes – Responsible Contractor:

Engine/Alternator Set Data Sheet

Additional Information/Notes

Engine/Alternator Set Data Sheet

6. ALARMS AND STATUS INDICATORS

Alarm termination block:

☐ Existing

☐ New – location _____

Alarm wiring:

At the MDF: ☐ reuse ☐ New – Details: _____

From Engine/Alternator control cabinet to termination block:

☐ reuse ☐ New – Details: _____

Alarm Requirements

Y/N	ALARM	Indicator / Color	Location of Indicator	Extended As
	Control Power Fail			
	Commercial Power Fail			
	Engine Fail			
	Start/Control Battery System Fail			
	Low Coolant Temp			
	Engine Run			
	Proper Operation			
	Switch Off Auto			
	Low Fuel			
	Fuel Leak			
	Low Oil Pressure			
	Over-crank			
	Over-speed			
	Over-voltage			
	Under-speed			
	ACB Trip			
	ACB Open			
	Under-voltage			
	High Coolant Temperature			
	Low Water Level			
	Engine Control Panel Power Fail Alarm			
	Emergency Stop			
	Engine Fail			
	Remote Fan Fail			
	Tank Leak			
	Alternator Over-Temp			
	Low Engine Temp / Engine Heater Fail			

Engine/Alternator Set Data Sheet

	Engine Run			
	Charger Fail			
	High/Low Fuel Day Tank			
	High/Low Battery Voltage			
	Low Fuel Main Tank			
	Open Door			
	Pre-High Temp			
	Pre-Low Oil Pressure			
	Day Tank rupture			
	Day Tank monitoring System trouble alarm			

Shop Test Procedures and Check Sheet

Date _____ Customer ID# _____ Location _____

Vendor _____ SBC Engineer _____ Vendor Rep. _____

ENGINE INFORMATION

Manufacturer _____ Model _____

Displacement _____ Cylinders _____ RPM Rating _____ HP Rating _____

Serial # _____ Turbo-charged? Yes☐ No☐

Warranty Period: Overall _____ Parts _____ Labor _____

Fuel Type _____ Full Load Consumption _____ GPH/cfm

Fuel Filter Type _____ Lube Oil Filter Type _____

Lube Oil Type _____ Wt. _____ Mfg. _____

Cooling System Cap. _____ Gal. Inhibitor _____ Coolant _____

Water Jacket Heater Mfg. _____ Model _____ Serial # _____

GENERATOR INFORMATION

Manufacturer _____ Type _____ Serial # _____

Voltage _____ Ph/w _____ kW _____ KVA _____ RPM _____

CONTROL PANEL INFORMATION

Manufacturer _____ Model _____ W.O. # _____

Voltage _____ Phase _____ Trip Setting _____ Output Breaker Size _____

LOAD BANK INFORMATION

Manufacturer _____ Serial # _____ kW Rating _____

Voltage _____ Phase _____ Steps _____

Shop Test Procedures and Check Sheet

Estimated Test Time: 5 to 6 hours

Purpose:
1. Relieve the communication problem during an engine test.
2. Provide a procedure for observers and tester to follow.
3. Make best use of available time.

	Step	
☐	1.	Review test procedures with observers and tester.
☐	2.	Check controls.
☐	3.	Check instruments.
☐	4.	Check fuel system.
☐	5.	Check lube system.
☐	6.	Check start system
☐	7.	Check cooling system.
☐	8.	Check safety guards.
☐	9.	Test minor alarms.
☐	10.	Cold engine start.
☐	11.	Load engine to bring it up to operating temperature.
☐	12.	Verify voltage adjust range.
☐	13.	Verify frequency adjust range.
☐	14.	Test shutdown features and major alarms.
☐	15.	Discuss the transient response and load test requirements.
☐	16.	Transient response test.
☐	17.	Tester (Vendor) shall prepare an engine test run log.
☐	18.	Load test at 110%, 0.8 PF, for 1 hour.
☐	19.	Load test at 100%, 0.8 PF, for 3 hours.
☐	20.	Review results with Vendor.

Shop Test Procedures and Check Sheet

Conducted by: _____ Date: _____

Observed by: Power Equip Engineering: _____
Power Maint Engineering: _____

kW: _____ VOLTS: _____ PHASE: _____

TEST LOAD = Resistive _____ Reactive _____Both _____ (preferred)
Cold Start (4.1.1.) _____ Hot Start (4.1.2.a) _____
Volts Adj Range (3.2.2.1) ±10% L= _____ H= _____
Freq Adj Range (3.2.2.1) 57-63 L= _____ H= _____
Readings: Volts=_____ Freq=____ Temp=_____ Oil Press=_____ Amb.Temp=_____

Load Run
110% @0.8 PF, 1hr (4.1.2.h) ___
100% @0.8 PF, 3hrs(4.1.2.i) ___

MAJOR ALARMS ********Will be Updated based upon the final alarm Matrix**********

	Alarm	Shut Down	Air Damper	Shunt Trip CB
Low Oil Press	_____	_____	_____	_____
Low Fuel	_____	_____	_____	_____
Over Crank	_____	_____	_____	_____
Over Speed	_____	_____	_____	_____
Under Speed	_____	_____	_____	_____
Over Voltage	_____	_____	_____	_____
Under Voltage	_____	_____	_____	_____
ACB Trip	_____	_____	_____	_____
Eng Cntl Brkr	_____	_____	_____	_____
Hi Coolant Temp	_____	_____	_____	_____
Emerg Stop	_____	_____	_____	_____
Mech Low Water	_____	_____	_____	_____
Start Batt. Sys Fail	_____	_____	_____	_____
OSS Off Normal	_____	_____	_____	_____

Shop Test Procedures and Check Sheet

One Step & Transient Response Performance Data Sheet

@ VAC 25%=_____ ( ) KW 50%=_____ ( ) KW 75%=_____ ( ) KW

% Load	ACV Max	ACV Min		Hz Max	Hz Min	Time (S) to 60Hz
0-100						
100-0						
0-100						
100-0						
0-25						
25-0						
0-50						
50-0						
0-75						
75-0						
0-100						
100-0						
0-25						
25-50						
50-75						
75-100						
100-75						
75-50						
50-25						
25-0						
0-50						
50-25						
25-75						
75-50						
50-100						
100-50						
50-75						
75-25						
25-50						
50-0						
0-75						
75-25						
25-100						
100-25						
25-75						
75-0						
0-100						
100-0						

Shop Test Procedures and Check Sheet

Date / Time	Eng Hours	Temperature			Press.	Freq.	Load	Voltage Phase - to - Phase			Amperes			Fuel Reading (Gal)	
		Room		Coolant	Lube Oil	(Hz)	(kW)	A - B	B - C	C - A	ϕ A	ϕ B	ϕ C	Day Tank	Main Tank
ARTIFICIAL LOAD ACCEPTANCE TEST															
ARTIFICIAL LOAD ACCEPTANCE TEST															

Shop Test Procedures and Check Sheet

MINOR ALARMS (3.5.4.4)

- ☐ Low Fuel
- ☐ Low Eng Temp
- ☐ Prelim HCT
- ☐ Prop Oper

CONTROLS (3.5.2)

- ☐ Select Switch
- ☐ Start Switch
- ☐ Emerg Stop
- ☐ Freq R/L
- ☐ Volt R/L
- ☐ Al Lmp Tst
- ☐ VM Switch (3ph)
- ☐ AM Switch (3ph)

INSTRUMENTS (3.5.3)

- ☐ Voltmeter
- ☐ Ammeter
- ☐ Freq Meter
- ☐ Hour Meter
- ☐ kW Meter
- ☐ Oil Press
- ☐ Water Temp
- ☐ Power Fact

FUEL SYSTEM (3.6.2)

- ☐ Man Prime Pump
- ☐ High Lift Pump

LUBE SYSTEM (3.6.3)

- ☐ Filter By-Pass

START SYSTEM (3.6.4)

- ☐ 24V Battery
- ☐ Charger

COOLING SYS (3.6.6)

- ☐ Block Heater

SAFETY (3.7 & 2.1)

- ☐ Rot. Guards
- ☐ Temp Guards

On-Site Test Procedures and Check Sheet

Estimated Test Time: 3 to 4 hours

Purpose:
1. Relieve the communication problem during an engine test.
2. Provide a procedure for observers and tester to follow.
3. Make best use of available time.

Step

- ☐ 1. Review test procedures with observers and tester.
- ☐ 2. Check start system
- ☐ 3. Check exhaust system.
- ☐ 4. Check cooling system.
- ☐ 5. Check safety guards.
- ☐ 6. Check fuel system.
- ☐ 7. Test minor alarms, both local and remote, as appropriate.
- ☐ 8. Start and load engine to bring it up to operating temperature.
- ☐ 9. Check instruments.
- ☐ 10. Test shutdown features and major alarms, both local and remote, as appropriate.
- ☐ 11. Test auto-start and auto-transfer features with full building load.
- ☐ 12. Power Maintenance Technician shall prepare an engine test run log.
- ☐ 13. Load test at 100% for 2 hours.
- ☐ 14. Check turnover items.
- ☐ 15. Review results with Vendor.

On-Site Test Procedures and Check Sheet

Conducted by: _____ Date: _____

Observed by: Power Equipment Engineering: _____
Power Maintenance Engineering: _____
Operations representative: _____

kW: _____ VOLTS: _____ PHASE: _____

TEST LOAD: ☐ Resistive ☐ Reactive ☐ Both (preferred)

☐ FULL LOAD TEST: _____ hrs

MAJOR ALARMS

	Alarm	Shut Down	Air Damper	Shunt Trip CB
Low Oil Press	_____	_____	_____	_____
Low Fuel	_____	_____	_____	_____
Over Crank	_____	_____	_____	_____
Over Speed	_____	_____	_____	_____
Under Speed	_____	_____	_____	_____
Over Voltage	_____	_____	_____	_____
Under Voltage	_____	_____	_____	_____
ACB trip	_____	_____	_____	_____
Eng Cntl Brkr	_____	_____	_____	_____
Hi Coolant Temp	_____	_____	_____	_____
Emerg Stop	_____	_____	_____	_____
Mech Low Water	_____	_____	_____	_____
Start Batt. Sys Fail	_____	_____	_____	_____
OSS Off Normal	_____	_____	_____	_____

On-Site Test Procedures and Check Sheet

Exhaust System Check List:

- ☐ Exhaust Stack is at least 9 inches above and below the roof system
- ☐ There are no combustibles in direct contact with un-insulated pipe
- ☐ There are no combustibles within 9 inches of the exhaust pipe
- ☐ Exhaust pipe has a ventilated thimble protecting the roof
- ☐ Flash/Counter Flash allows for heat expansion of exhaust pipe
- ☐ There are no conditions that will trap heat and/or cause melt or bubble on roof
- ☐ There is no evidence of roof bubbling or discoloration of roofing around the exhaust stack
- ☐ Exhaust pipe is a minimum of 3 ft. above the roof deck
- ☐ Exhaust pipe is a minimum of 3 ft. above the roof parapet
- ☐ Exhaust is not pointed at any roof projection
- ☐ Exhaust pipe support system does not allow metal to concrete contact that could effect the concrete roof deck, wall, or column
- ☐ Metal ventilation thimbles protect all combustibles and are no less than 12 in. larger in diameter than the exhaust pipe or ducts
- ☐ Support system allows for vertical and horizontal thermal expansion
- ☐ Exhaust system is sleeved at each floor and only anchored at one point in the horizontal and vertical planes
- ☐ There are no exposed areas of the exhaust system that could cause burns to people

ALL OF THE ABOVE CONDITIONS SHALL BE MET FOR EXHAUST SYSTEM ACCEPTANCE

☐ Exhaust System Accepted By: _____ Date: _____

☐ Exhaust System Failed – Inspected By: _____

Detailed Repairs Required: _____

Repairs Due By: _____

On-Site Test Procedures and Check Sheet

MINOR ALARMS (3.5.4.4)

- ☐ Low Eng Temp
- ☐ Prelim HCT
- ☐ Prop Oper

CONTROLS (3.5.2)

- ☐ Select Switch
- ☐ Start Switch
- ☐ Emerg Stop
- ☐ Freq R/L
- ☐ Volt R/L
- ☐ Al Lmp Tst
- ☐ VM Switch (3ph)
- ☐ AM Switch (3ph)

INSTRUMENTS (3.5.3)

- ☐ Voltmeter
- ☐ Ammeter
- ☐ Freq Meter
- ☐ Hour Meter
- ☐ kW Meter
- ☐ Oil Press
- ☐ Water Temp
- ☐ Power Factor

START SYSTEM (3.6.4)

- ☐ 24V Battery
- ☐ Charger

EXHAUST SYS (3.6.5)

- ☐ Insulated
- ☐ Non-asbestos

COOLING SYSTEM (3.6.6)

- ☐ Block Heater

SAFETY (3.7 & 2.1)

- ☐ Rot. Guards
- ☐ Temp Guards

FUEL SYSTEM (3.6.2)

- ☐ Man Prime Pump
- ☐ Plumbing
- ☐ Electrical

TURN OVER (3.8)

- ☐ Manuals (3)
- ☐ Drawings (3)

SPARES:

- ☐ Oil Filter
- ☐ Belts
- ☐ Lamps
- ☐ Fuel Filter
- ☐ Ckt.Boards
- ☐ Touch-Up Paint
- ☐ Air Filter
- ☐ Fuses
- ☐ Relays

On-Site Test Procedures and Check Sheet

Circuit Breaker – Low Voltage Air Frame

Mechanical Test

- ☐ The breaker shall be closed and tripped several times to check for smooth operation.
- ☐ The cubicle shall be vacuumed and the draw-out mechanism alignment shall be checked and lubricated.

a. The cubicle interlock shall be checked for proper operation.

b. The breaker shall be cleaned and inspected for cracked or broken fingers, springs or retainers.

c. Arc chutes shall be removed, blown out and inspected for signs of heating, cracks or broken parts.

d. Main and arcing contacts shall be inspected for wear.

e. Main and arcing contacts shall be checked against the manufacturer's tolerance for wipe, closing sequence, open gap and alignment.

f. Controlled wiring shall be inspected and connections shall be checked for tightness.

Electrical tests

g. Minimum pickup current shall be determined, according to the manufacturer's specifications.

h. The long-time delay shall be measured at 300% of the trip coil rating.

i. Short-time pickup and delay shall be measured at settings, according to the manufacturer's specifications.

j. Instantaneous pickup must be measured.

k. Ground fault pickup and delay shall be measured at settings.

l. A millivolt drop test shall be conducted at the rated coil current as a measure of the contact resistance, or the contact resistance shall be measured with a low resistance ohmmeter.

m. Breaker insulation resistance shall be measured with a 1000 volt DC mega-ohmmeter.

1. Phase to phase ---------- Breaker closed
2. Phase to ground ---------- Breaker closed
3. Across contacts ---------- Breaker open

Engine Exhaust System Inspection List

Date of Inspection: _____

Is exhaust pipe insulated 9 inches above and below the roof system?

☐ Yes
☐ No

If no,
To top of deck? ☐ To bottom of deck? ☐

On-Site Test Procedures and Check Sheet

Are combustibles in direct contact with or in close proximity to un-insulated pipe?
☐ Yes ☐ No

Does exhaust pipe have ventilated thimble protecting roof?
☐ Yes ☐ No

Are there any combustibles within 9 inches of the exhaust pipe?
☐ Yes ☐ No

Does flashing/counter flashing allow for heat expansion of exhaust pipe? (Approximately 4-5 in for basement and 1 story, approximately 5-6 in for basement and 2 story).
☐ Yes ☐ No

Does flashing/counter flashing hood assembly trap heat and melt or bubble roof?
☐ Yes ☐ No

Is exhaust pipe a minimum of 3 ft above roof deck, or higher than any roof parapet, whichever is higher?
☐ Yes ☐ No

Is there any evidence of roof bubbling or discoloration of roofing around the exhaust pipe? If so, roof must be cored for inspection by roofer.
☐ Yes ☐ No

Is exhaust pointed at any roof projection, wall vent pipe, etc?
☐ Yes ☐ No

Does exhaust pipe support system allow metal to concrete contact that could effect concrete roof deck?
☐ Yes ☐ No

Floor and Wall Penetrations

Are combustibles in direct contact with or close proximity to un-insulated pipe?
☐ Yes ☐ No

Are combustibles protected by metal ventilated thimbles not less than 12 in. larger in diameter than the exhaust pipe or ducts
☐ Yes ☐ No

Are combustibles within 9 inches of the exhaust pipe?
☐ Yes ☐ No

On-Site Test Procedures and Check Sheet

Is there any evidence of bubbling or discoloration of materials around the exhaust pipe?
☐ Yes ☐ No

Shafts

Shaft material, note all that apply:
- ☐ Firebrick
- ☐ CMU
- ☐ Drywall
- ☐ Plaster
- ☐ Not Enclosed

Insulation Material, note all that apply:
- ☐ Calcium Silicate
- ☐ Fiberglass
- ☐ Asbestos
- ☐ Un-insulated

Insulation wrapping material, note all that apply:
- ☐ Aluminum – Reflective
- ☐ Aluminum – Non-Reflective
- ☐ Paper/Tyvek

Insulation System Manufacturer: _____

Amount of insulation:
☐ 1in ☐ 2in ☐ 3in ☐ 4in ☐ 5in other: _____

Boiler flue condition:
- ☐ Not applicable
- ☐ Good, intact, no missing bricks
- ☐ Poor, bricks missing

Are combustibles in direct contact or close proximity to un-insulated pipe?
☐ Yes ☐ No

Are there any combustibles within 9 inches of the exhaust pipe?
☐ Yes ☐ No

Support Conditions

System is anchored, check all that apply:
- ☐ Top of roof deck
- ☐ Bottom of roof deck
- ☐ Intermediate floors
- ☐ Dead-man to floor
- ☐ Hung from Basement ceiling

Does exhaust pipe support system allow metal to concrete contact that could effect concrete deck/wall/column?
☐ Yes ☐ No

On-Site Test Procedures and Check Sheet

Does support system allow for vertical thermal expansion? Sleeved at each floor not anchored at, only anchored at one point in horizontal and vertical planes.
☐ Yes ☐ No

Does support system allow for horizontal thermal expansion? This is normally in form of bellows before and after engine silencer.
☐ Yes ☐ No

Could support system cause burns to people?
☐ Yes ☐ No

Other Conditions

Liquid alarm present in engine room?
☐ Yes ☐ No

Battery room adequately ventilated? (H&V unit running w/ relief air venting or hydrogen and temperature sensors tied into ventilation system).
☐ Yes ☐ No

Instructions for Actions Required

☐ Approved Date: _____
Signature: _____
Name printed: _____
Title: _____

☐ Inspection failed
Action required for approval: _____
Due date for repairs: _____

Formulas

3 Phase Sets

$$I = \frac{kW \times 1000}{(E \times 1.73 \times PF)} = \frac{(\qquad\qquad)}{(\qquad\qquad)}$$ I = _____ Amps

$$kW = \frac{I \times (E \times 1.73 \times PF)}{1000} = \frac{(\qquad\qquad)}{1000}$$ kW = _____

$$E = \frac{kW \times 1000}{I \times 1.73 \times PF} = \frac{(\qquad\qquad)}{(\qquad\qquad)}$$ E = _____ Volts

$$PF = \frac{kW \times 1000}{I \times E \times 1.73} = \frac{(\qquad\qquad)}{(\qquad\qquad)}$$ PF = _____

1 Phase Sets

$$I = \frac{kW \times 1000}{(E \times PF)} = \frac{(\qquad\qquad)}{(\qquad\qquad)}$$ I = _____ Amps

$$kW = \frac{I \times (E \times PF)}{1000} = \frac{(\qquad\qquad)}{1000}$$ kW = _____

$$E = \frac{kW \times 1000}{I \times PF} = \frac{(\qquad\qquad)}{(\qquad\qquad)}$$ E = _____ Volts

$$PF = \frac{kW \times 1000}{I \times E} = \frac{(\qquad\qquad)}{(\qquad\qquad)}$$ PF = _____

Where:
- E is Voltage
- kW is power in kilowatts
- I is current in Amps
- PF is the Power Factor

For 3 Phase Sets and PF of 0.8:
(E x 1.73 x PF) ⇨
For 208 V ⇨ 287.87
For 240 V ⇨ 332.16
For 480 V ⇨ 664.32

For 1 Phase Sets and PF of 0.8:
(E x PF) ⇨
For 208 V ⇨ 166.4
For 240 V ⇨ 192.0
For 480 V ⇨ 384.0