APPENDIX A
VRU Preventative Maintenance Plan

JORDAN TECHNOLOGIES, INC.

(Z)

VRU PREVENTATIVE MAINTENANCE CHECK LIST

TERMINAL NAME: _____

ADDRESS: _____

_____

_____

SERVICE TECHNICIAN: _____

DATE THIS INSPECTION: _____

START TIME: _____ FINISH TIME: _____

**TERMINAL WAS NOTIFIED PRIOR TO THIS SCHEDULED INSPECTION AND ALL PROBLEMS WERE DISCUSSED WITH CUSTOMER BEFORE INSPECTION STARTED.

COMMENTS _____

_____

_____

Go through inspection with customer and explain completely.

Customer Signature _____

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OPERATING SET POINT
FROM THE ZINK MANUAL

		BOOK	FIELD
1.	Gas pressure to top of absorber PI-301	_____	_____
2.	Gas pressure to bottom of absorber PI-302	_____	_____
3.	Purge air pressure switch	_____	_____
4.	Minimum flow pressure switch	_____	_____
5.	Seal fluid setting to vacuum pump PI-402	_____	_____

		BED 1	BED 2
1.	Purge air setting inches Hg vacuum	_____	_____
2.	Are fumes visible from exhaust vent stacks?	_____	_____
3.	Minimum flow setting inches Hg vacuum	_____	_____
4.	Total vacuum time (regen. crack to regen. start to close)	_____	_____
5.	Total equalization time (regen. fully closed to regen. crack)	_____	_____

6. VESSEL 1 - Drop on vacuum pump on the 2 stages of opening the MOV-102 valve. (Make certain the vacuum gauge does not drop below 10")

   STAGE 1 _____ STAGE 2 _____

7. VESSEL 2 - Drop on vacuum pump on the 2 stages of opening the MOV-202 valve. (Make certain the vacuum gauge does not drop below 10")

   STAGE 1 _____ STAGE 2 _____

8. With both regeneration valves closed, give deepest vacuum observed on the vacuum pump gauge. _____

9. When VESSEL 1 equalizes, make certain MOV-101 opens slowly and dusting is not observed. Time required. _____

10. When VESSEL 2 equalizes, make certain MOV-201 opens slowly and dusting is not observed. Time required. _____

11. Check all indicator lights and lenses and replace faulty ones. _____

11A. Check area light. _____

12. Temperature of gasoline from heat exchanger. _____
    NOTE: For temperature readings use 1 probe.

13. Temperature of gasoline to heat exchanger. _____

14. Gasoline heat gain through heat exchanger. _____

15. Discharge temperature of Glycol at the vacuum pump. _____

COMMENTS_____

_____

16. Temperature of Glycol to the vacuum pump. _____

17. Heat gain through the vacuum pump. _____

18. Temperature differential between gasoline from heat exchanger and glycol from heat exchanger. IF NUMBER IS GREATER THAN FIVE, BRING TO TERMINAL MANAGER'S ATTENTION. IF AT TEN (10) DEGREES, FURTHER INVESTIGATION IS REQUIRED. ** _____

SHUTDOWNS

19. Pull drain on vapor tee before shut down and after shutdowns. Insure glycol not present. If it is, further investigation is needed.

20. High level gasoline _____

21. Low level gasoline _____

22. Seal fluid circulation (S) _____

23. Emergency Shutdown _____

24. Return pump. _____

25. Supply pump. _____

26. Seal pump (S) _____

27. Vacuum pump (S) _____

28. Check temperature switches TSH 101, 201, 202, 102, tripping any of these switches will close all absorber motor operated valves. _____

29. Turn control power off. Insure Failsafe closes and return line check valve is holding. _____

30. Insure gas level in the separator or absorber does not change during a shutdown. _____

31. On re-establishment of power, make sure that a level 3 shutdown has occurred; all indicator lights will be on, all valves closed, and all motors stopped. _____

COMMENTS_____

_____

_____

32. On Auto shutdown, insure that system works properly. _____

33. Clean Glycol strainer and/or replace filter element. _____

34. Check gasoline strainer if pressure is low further investigation is needed. _____

35. Clean Brooks strainer. _____

36. Record supply/return tank level. _____

37. Gas pressure to top of gas absorber PI-301 _____ Corrected To _____

38. Gas pressure to bottom absorber PI-302 _____ Corrected To _____

39. Seal fluid pressure pump PI-402 _____

40. Supply pump PI-701 4A discharge pressure _____

41. Return pump PI-601 discharge pressure _____

42. Leak check VESSEL 1 _____

43. Leak check VESSEL 2 _____

44. Are all gauges working properly? _____

45. Remove the Covers from all actuators. _____
    Check all wiring, brakes, micro switches, cam heaters, and thermostats.
    Clean and remove moisture and corrosion. Lubricate and reseal.

A. MOV-201 VENT	_____	E. MOV-102 REGEN	_____
B. MOV-202 REGEN	_____	F. MOV-103 INLET	_____
C. MOV-203 INLET	_____	G. MOV-701 GAS SUP	_____
D. MOV-101 VENT	_____	H. MOV-601 GAS RET	_____

46. Observe the valves for proper operation and switching and see that they are seated properly. _____

COMMENTS _____

_____

47. Open main control panel, tighten all wiring, clean box, check all switches and record timers:

PROCESS TIMERS

VENT VALVE RUN TR 101_____ TR 201_____

REGEN VALVE RUN TR 102_____ TR 202_____

48. Insure control panel thermostat and heater are working. Set at 75 degrees _____

49. First and Third quarterly inspections: Grease Pumps and Motors. _____

50. Second and Fourth quarterly inspections: Open all pump and breaker boxes. Tighten all wiring, clean boxes, clean and lubricate the switches, and reset buttons. Check heat tape

A. Supply pump box _____

_____ _____

B. Return pump box _____

_____ _____

C. Vacuum pump box _____

_____ _____

D. Seal pump box _____

_____ _____

E. Sump pump box _____

_____ _____

F. L1 to ground_____ L2 to ground_____ L3 to ground _____

L1 to L2 _____ L2 to L3 _____ L1 to L3 _____

COMMENTS_____

_____

_____

G. Rated amps to supply pump _____ Running amps _____ _____ _____

H. Rated amps to return pump _____ Running amps _____ _____ _____

I. Rated amps to seal pump _____ Running amps _____ _____ _____

J. Rated amps vacuum pump _____ Running amps _____ _____ _____

K. **Meg ohm Motors**

	L1 to GR	L2 to GR	L3 to GR
Supply Pump			
Return Pump			
Seal Pump			
Vacuum Pump			

COMMENTS_____

51. Check condition of all pump coupling and belts visually. _____

52. Supply pump and coupling OK. _____

_____ _____

Return pump and coupling OK. _____

_____ _____

Seal pump and coupling OK. _____

_____ _____

Vacuum pump and coupling OK. _____

_____ _____

53. Check Glycol concentration and pH. _____

54. Install biocide in unit and leave enough for monthly treatment. _____

55. Check gauge glasses, clean, lubricate and check for proper operation. _____

56. Level control valve has smooth operation. _____

57. Gas level in separator is stable. Record fluctuation. _____

58. Inches of Glycol is sight glass. _____

59. Inches of Gasoline in sight glass. _____

60. Check for any fluid leaks. _____

61. Check for abnormal noises. _____

62. How many drums of VR coolant does terminal have on hand? _____

COMMENTS_____

_____

_____

_____

1. Ambient Temp._____

2. BED PULL DOWN DATA

VESSEL 1		VESSEL 2	
TEMP AT START:			
TOP_____°F MID_____°F BOT_____°F		TOP_____°F MID_____°F BOT_____°F	
MINUTE	-in.Hg VAC	MINUTE	-in.Hg VAC
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
TEMP AT END:			
TOP_____°F MID_____°F BOT_____°F		TOP_____°F MID_____°F BOT_____°F	

Recommended Items to be done on an annual basis, additional time and materials may be required.

1. Check carbon levels. _____
2. Pull and inspect Phillips float assembly. Rebuild if needed. _____
3. Pull and calibrate carbon bed thermometers. _____
4. Pull and calibrate skid thermometers. _____
5. Pull and calibrate carbon bed temperature switches. _____
6. Rebuild level & flow control valves. _____
7. Change "O" rings in Hydraulic shut off valves. _____
8. Check all solenoids for proper operation. Rebuild if necessary. _____
9. Inspect motor starters. _____
10. Loading rack back pressure checks. _____
11. Clean flame arresters. _____
12. Clean gasoline supply strainer. _____

COMMENTS_____

_____

_____

_____

Customer's Signature_____

Print Name_____

DATE: _____

TERMINAL LOCATION: _____

COMMENTS: (Location of where parts are to be installed next P.M.I.)

_____

_____

_____

PARTS TO BE SHIPPED FOR THE NEXT INSPECTION:

TECHNICIAN:_____

QTY	COMPUTER #	DESCRIPTION	BIN #	DATE SHIPPED

For any parts or equipment to be ordered or shipped, a signature and purchase order number is required

Signature:_____ P.O.#_____

Print Name:_____

COMMENTS:_____

_____

APPENDIX B
VCU Preventative Maintenance Plan

SECTION IV

VCU PREVENTATIVE MAINTENANCE

1. The blower should be lubricated per the manufacturers recommended schedule.

2. The flame arrestors should be periodically checked every six months to verify that they are free from foreign matter, which could impede waste flow.

3. Check liquid seal level once a week.

4. Observe PI-201 to assure that staging valve is opening at correct settings for both high and low pressure switches every day.

5. All safeties should be tripped and verified at least every 3 months.

6. Refer to Vendor Data for specific maintenance requirements of various components.

JORDAN TECHNOLOGIES, INC.

(Z)

ZTOF and LH COMBUSTION UNIT

SAFETY INSPECTION SERVICE

Terminal Name: _____

Address: _____

_____

Service Technician: _____

Date This Inspection: _____

Arrival Time: _____ Departure Time: _____

**Terminal was notified prior to this scheduled inspection and all problems were discussed with terminal manager before inspection started.

Comments: _____

_____

_____

Customer Signature: _____

P.M.I. #1

1. Pull and clean each Anti-Flash back burner.

P.M.I. #2

1. Notify terminal to pull and clean each Flame Arrestor or we can to it.
2. Replace liquid seal in V-201 with 50/50 glycol water, refill to plug line.
3. Remove 8" inspection opening. Insure liquid seal holes are covered and cone is in good condition.

CONTROL SET POINTS

FLAME ARRESTORS First & second stage High temperature switch	_____
HI STACK TEMPERATURE SHUTDOWN	_____
LSHH 201 Optional	_____
LSH 201 Optional	_____
LSL 201 Optional	_____
LSLL-201	_____
PSH-201	_____
PSL-201	_____
PI-303	_____
PSH-303	_____
PSL-303	_____

1. Check area light. _____

2. Check all indicator lights & lenses. Replace faulty ones. _____

3. Check condition of each anti-flash back burners. _____

4. Check and calibrated each flame arrestor, temp probe safety TSH-201 & TSH-202. _____

5. Inspect blower BL-301 fan, insuring fan is locked on and not loose. _____

6. Inspect and grease blower motor. _____

Meg Ohm L1 to ground _____

L2 to ground _____

L3 to ground _____

Line voltage L1 to ground _____

L2 to ground _____

L3 to ground _____

L1 to L2 _____ L2 to L3 _____ L1 to L3 _____

Amp rating_____ L1_____ L2_____ L3_____

7. Inspected and clean Stage 1 MOV _____

Stage 2 MOV _____

Assist gas MOV_____

Vapor inlet MOV_____

8. Install pressure monitor and insure PSH-201 inlet pressure monitor trips at set point to open

MOV-201_____ after 2 second delay

MOV-202_____ after 2 second delay

9. Install pressure monitor and insure PSL-201 inlet pressure monitor trips at set point to close

MOV-202_____ after 15 second delay

MOV-201_____ after 15 second delay

10. Open all boxes and tighten wiring-check heaters for proper operation. Clean out moisture & corrosion and reseal. _____

11. If unit is down on fault, make sure permissive switch will not allow loading. _____

12. Check sump tank high level switch - should shut down combustion unit if made. _____

13. Inspect spark ignition system. _____

13A. Pull and clean pilot gas strainer by the air aspirator(optional) _____

13B. Inspect air aspirator clean if needed _____

13C. Lubricate Louver controls. _____

14. Disconnect transformer wire and meg out ignition circuit. _____

15. Pilot flame shut down - insure burner scanner element BE-302 is operating properly by blocking scanner & starting unit. Unit should shut down on pilot flame failure. For the LH model, check to insure the THS-301 thermocouple is made. _____

16. Check pilot gas valve pressure BV-300

3 psig propane _____

7 psig natural gas _____

16A. Check Assist gas pressure. _____

17. Check complete start-up procedure -

a. Turn pilot gas off manually _____

b. Blower turns on for one minute. _____

c. Automatic pilot gas valve then opens _____

d. Pilot will then ignite for 10 seconds _____

e. If pilot fails, pilot gas valve closes and purge will continue for 60 seconds _____

f. Pilot gas valve opens, pilot will then ignite again for 10 seconds. _____

g. After 3rd pilot light failure, flame failure fault will occur and blower will turn off. _____

h. If pilot light permissive switch makes, the loading can then be started.

COMMENTS_____

_____

18. Normal shutdown - insure blower and pilot operate for designated time after last truck loads and MOV-201 and MOV-202 remain closed for post load. After post load purge, pilot gas solenoid valve will close. Blower will stop, power light stays on and all other lights will be out. _____

19. Fault related shut-down - All MOV's will close, the blower will stop, and the pilot gas solenoid valve closes. _____

20. Shut down high stack temperature at two settings (1800°F) TISH-302 Ambient _____

200° F _____

21. Check blower failure shutdown. _____

22. a. Check PSL-303(optional)

Low pilot gas pressure _____

22. b. Check PSH-303(optional)

High pilot gas pressure _____

23. Liquid seal low level LSLL-201 _____

23A. Liquid seal high level(optional)LSHH-201 _____

23B. Check operation of automatic level seal control

LSL-201(optional) _____

LSH-201(optional) _____

24. Check to see if terminal has an emergency shut down switch in the office. If so, does it shut down the flare and loading rack _____

25. Emergency shutdown local _____

26. Pull and clean pilot gas strainer. _____

26A. Pull and clean Assist gas strainer. _____

27. Check gauge glass, clean, lubricate, & check for proper operation. _____

28. Inches of glycol in sight glass. _____

29. Check glycol concentration and P.H. _____

30. How many drums of V.R. coolant is at terminal _____

COMMENTS _____

_____

_____

_____

TERMINAL MANAGER'S SIGNATURE _____