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DRAWING NOTES:

12 Feb 09	1p	Revised for mast changes with PRV's AAV moved from top of mast. Vent & drain lines added. Ig
28 Oct 08	0p	Preliminary Release
DATE	REV.	DESCRIPTION

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DESIGNER	T. Graham	DATE	2008-10-28
DRAFT APPR.		ENG. APPR.	
CUST. APPR.			

MATERIAL		3RD ANGLE PROJ	
FINISH			

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES			
DECIMAL TOLERANCE	ANGLES	SURFACE	
.X +/-	XX +/-	XXX +/-	▽

OWNER: MENOVA ENERGY

PROJECT: PS-35 PV-T Array

TITLE: PV-Thermal Array Liquid-Only Cooling System

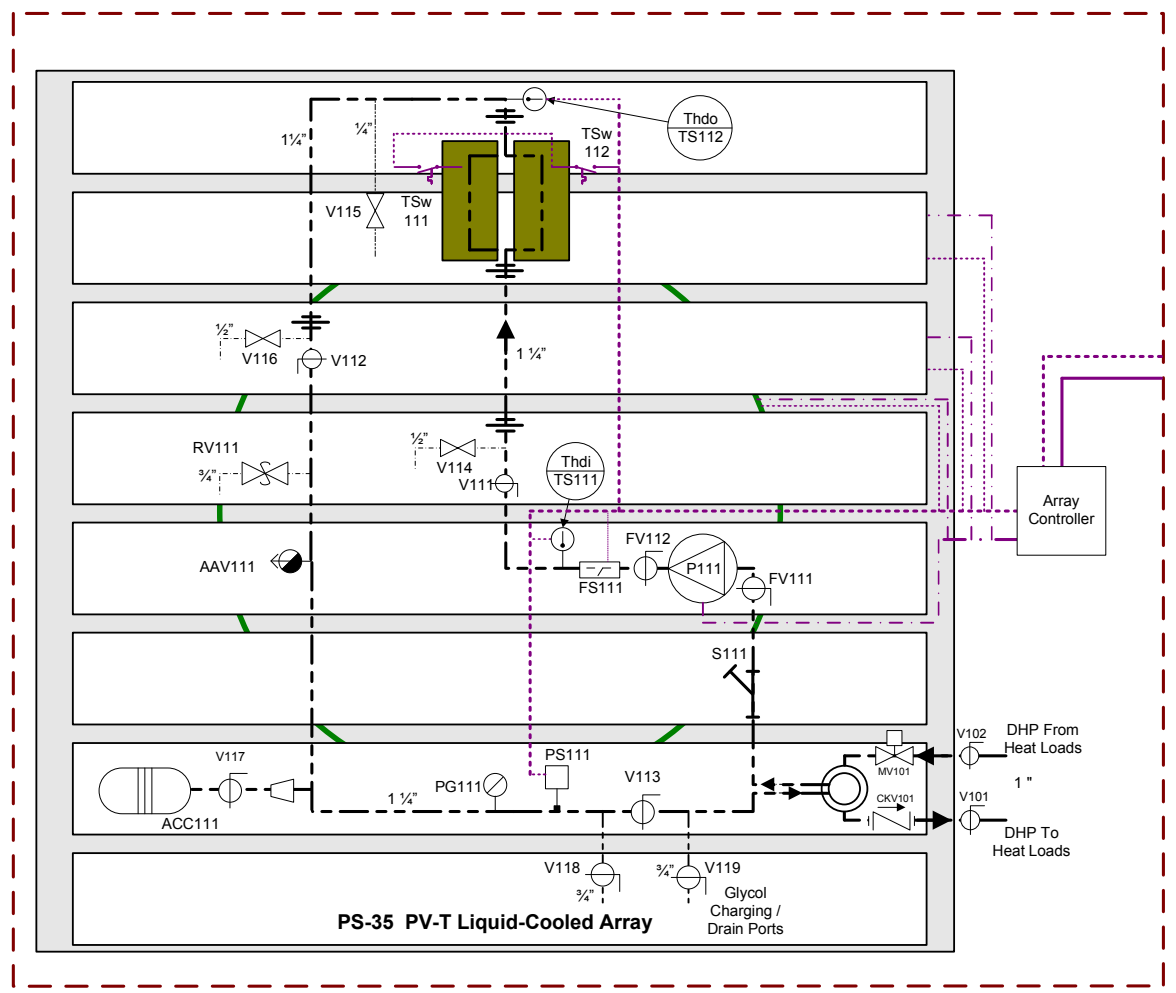
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SIZE	D	RFP-80104	REV	
SCALE	NTS	SHEET 1	OF 2	

Sample only. Subject to change.

**Legend**

	Propylene-Glycol Loop	AAV	Automatic Air Vent		Accumulator		Rotary Fluid Joint
	Control Input Signals	ACC	Accumulator		Diverting/Mixing Valve		Flange
	Multi-Input Signals	CF	In-Line Forced Air Fan		Motorized or Solenoid Valve		Ball Valve
	Control Output Signals	FS	Flow Switch		Pressure Switch		Drain Valve
	Multi-Output Signals	HX	Heat Exchanger		Relief Valve		Automatic Air Vent
	AC Power Line	MV	Motorized Valve		Pressure Gauge		Reducer
	Spar Array Equipment	MX	Mixing Valve		Heat Exchanger		Pump
	Air Cooling System	P	Pump		Temperature Switch		Strainer
		PG	Pressure Gauge		Temperature Sensor		Flow Switch
		PS	Low-Pressure Switch		Fin-Tube Heat Exchanger		Union
		RV	Relief Valve		Centrifugal Fan		Temperature Inputs
		S	Strainer				
		TSW	Temperature Switch				
		TS	Temperature Sensor				



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**Glycol Loop Array Part Designations**

- AAV111 Automatic Air Vent
- ACC111 Accumulator
- CKV101 DHP Return Line Check Valve
- FS111 Glycol Loop Flow Switch
- FV111 P111 Inlet Flange Valve
- FV112 P111 Outlet Flange Valve
- MV101 DHP Loop Motorized Valve
- P111 Glycol Circulating Pump
- PG101 Pressure Gauge
- PS101 Low-Pressure Switch
- RV101 Pressure Relief Valve
- S101 Glycol Loop Strainer
- TS111 Spar Array Inlet Temperature
- TS112 Absorber Head Outlet Temperature
- TSW111 Absorber 1a Temperature Switch
- TSW112 Absorber 1b Temperature Switch
- V101 Array Outlet to DHP - Isolating Valve
- V102 Array Inlet from DHP - Isolating Valve
- V111 Mast Inlet Isolating Valve
- V112 Mast Outlet Isolating Valve
- V113 Glycol Fill Flow-Splitting Valve
- V114 Mast Inlet Line Drain Valve
- V115 Absorber Vent Valve
- V116 Mast Outlet Line Drain Valve
- V117 Accumulator Isolating Valve
- V118 Glycol Fill / Drain Valve
- V119 Glycol Fill / Drain Valve

**Piping and Hose Schedule**

All Glycol piping Type L copper with expansion joints every 80ft.

Pipe insulation for lines 1" and under to be 1" closed cell foam >100C rated. Insulation covered with 6 mil white PVC cladding.

Pipe Supports are XXX type every 8 ft minimum.

All flexible hose reinforced EPDM rubber rated at 200psi 85C minimum.

Hose insulation for lines 1" and under to be 1" closed cell foam >100C rated. Insulation cover: Urethane coated 1050 ballistic nylon, resealable.

**Glycol Schedule**

All Glycol heat transfer fluid to be 50/50 solution of Propylene Glycol: Freezing Point -34C, Burst Point -70C, Maximum Operating Temperature 135C. Recochem RecoFreeze PG50 or equivalent.

**Power-Spar Cooling Unit**

Entering Glycol Temperature: 10C min, 80C max  
 Leaving Glycol Temperature: 10C min 80C max, Normal 25C winter, 35C Summer

Array-Cooling Mode  
 Entering Air Temperature: -35C min, 45C max  
 Leaving Air Temperature: 10C min 55C max  
 Max Air Flow: 3000 cfm

DRAWING NOTES:



12 Feb 09	1p	Revised for mast changes with PRV & AAV moved from top of mast. Vent & drain lines added. lg
17 DEC 08	0pa	Renumbered from 10# to 11# removed all parts not related to array. Renamed to RFP-80104g LH
28 Oct 08	0p	Preliminary Release - lg
DDMMYY	1	PRELIMINARY RELEASE

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DESIGNER	DATE
T. Graham	2008-10-28

DRAFT APPR.	ENG. APPR.	CUST. APPR.
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MATERIAL	3RD ANGLE PROJ.
FINISH	

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES			
DECIMAL TOLERANCE	ANGLES	SURFACE	
XX	XXX	6.3	
+/-	+/-	+/-	

OWNER MENOVA ENERGY

PROJECT PS 35 PVT Liquid-Cooled Array

TITLE PV-Thermal Array Liquid-Only Cooling System

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SIZE	REV
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RFP-80104	
SHEET 2 OF 2	

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