

APPENDIX 2-8
WATER BALANCE DIAGRAM AND ANALYSES

1.0 WATER BALANCE DIAGRAM

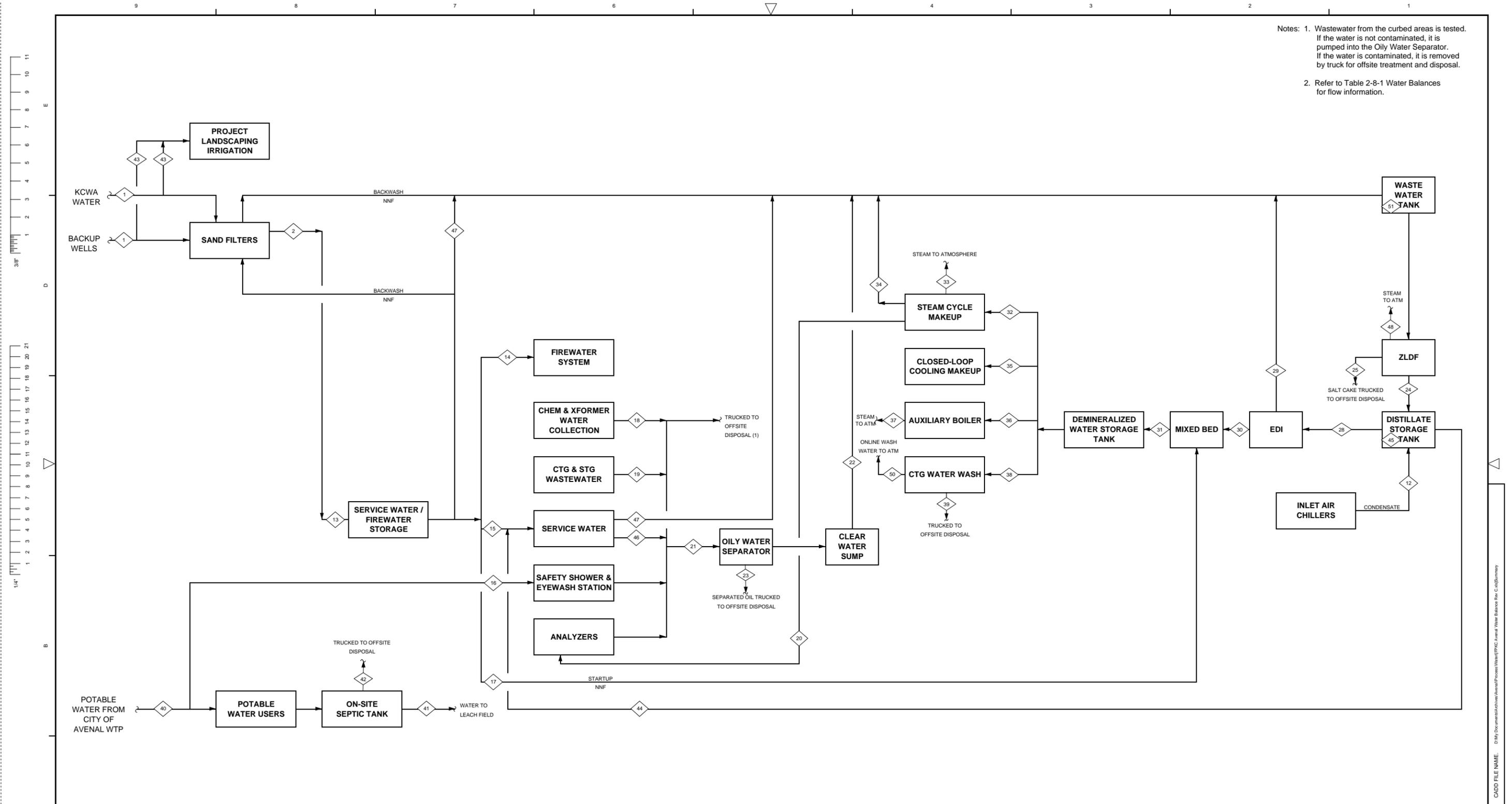
Water Balance Diagram A3DV00-1-ME-8-WB-01 depicts the conceptual water balance design for Avenal Energy.

2.0 WATER BALANCES

Table 2-8-1 Water Balances provides estimated daily, continuous water flow rates in gallons per minute corresponding to the heat & material balance case description presented in Table 2.3-5 for the Hot Summer Day, Yearly Average and Cold Winter Day cases at 100% CTG load. The stream numbers on the water balances correspond to numbered diamonds on the water balance diagram.

Notes: 1. Wastewater from the curbed areas is tested. If the water is not contaminated, it is pumped into the Oily Water Separator. If the water is contaminated, it is removed by truck for offsite treatment and disposal.

2. Refer to Table 2-8-1 Water Balances for flow information.



REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED	REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED	DWG. NO.	REFERENCED DRAWINGS	DESIGNED BY	FEDERAL POWER KINGS COUNTY, LLC		
A	9/18/07	ISSUED FOR AFC	GW									G. WADMAN	AVENAL ENERGY PROJECT		
B	9/20/07	ISSUED FOR AFC	MW									M. WEBER	AVENAL, CALIFORNIA		
C	09/21/07	ISSUED FOR AFC	GW										CONCEPTUAL WATER BALANCE DIAGRAM		
			MW												
											NOTICE: THIS DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF FLUOR AND IS LENT TO THE BORROWER FOR THEIR CONFIDENTIAL USE ONLY, AND IN CONSIDERATION OF THE LOAN OF THIS DRAWING, THE BORROWER PROMISES AND AGREES TO RETURN IT UPON REQUEST AND AGREES THAT IT WILL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS FURNISHED.				
											CLIENT	APP. DATE	SCALE	DRAWING NUMBER	REV.
													N/A	A3DV00-1-ME-8-WB-01	C

CADD FILE NAME: D:\My Documents\Projects\Avenal\Process\Water\EPIC Avenal Water Balance Rev. C.rjb\summary WRC.PKG. 004

Client: Federal Power Kings County, LLC
 Location: City of Avenal, Kings County, CA
 Project: Avenal Energy Project
 Unit: 1
 Equipment: 2-7FAs, 2-HRSGs, 1-STG w/RH, Chiller, DB
 Case / Configuration: _____

Contract : 00A3DV000000
 Revision : C
 Date : 21-Sep-07
 By: G. Wadman
 Chk: MW App'd: AM

Table 2-8-1 Water Balances

Y:\000_General\Proposal\Avenal\Process\Water\FPKC Avenal Water Balance Rev C with Salt Cake Calcs.xls\Summary

		Case 1 101 °F 22.5% RH	Case 2 101 °F 22.5% RH	Case 3 63 °F 53% RH	Case 4 63 °F 53% RH	Case 5 32 °F 79% RH	Case 6 32 °F 79% RH	Case 7 63 °F 53% RH
	CTG Load:	100%	100%	100%	100%	100%	100%	100%
	Duct Burner Status:	On	Off	On	Off	On	Off	On
	Chillers' Status:	On	On	On	On	Off	Off	On
								ZLDF down
Stream Number	Stream Description	Flow gpm	Flow gpm	Flow gpm	Flow gpm	Flow gpm	Flow gpm	Flow gpm
1	Raw Water From KCWA or Backup Wells	0.9	0.9	16.2	13.1	15.8	13.2	66.9
2	Filtered Water	0.0	0.0	15.3	12.1	14.8	12.2	65.9
12	Modular Chiller Condensate off Chilling Coils	32.9	32.9	0.0	0.0	0.0	0.0	0.0
13	Filtered Water To Demin, Service & Fire Water Storage	0.0	0.0	15.3	12.1	14.8	12.2	65.9
14	Firewater Water To Fire Protection System	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	Service Water to Service Water Distribution	0.0	0.0	15.3	12.1	14.8	12.2	65.9
16	Potable Water to Safety Shower & Eyewash Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	Service Water to Mixed Bed Polisher	0.0	0.0	0.0	0.0	0.0	0.0	40.9
18	Chemical and Transformer Area Water Collection Areas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	CTG and STG Waste Water to Oily Water Separator	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	Steam/Water from HRSGs to Analyzers	4.0	4.0	4.0	4.0	4.0	4.0	4.0
21	Oily Water to Oily Water Separator	29.0	29.0	29.0	29.0	29.0	29.0	29.0
22	Clear Water from Clear Water Sump	29.0	29.0	29.0	29.0	29.0	29.0	29.0
23	Water in Oil to Offsite Disposal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	ZLDF Evaporator Distillate	54.6	44.9	52.7	44.9	51.5	45.1	0.0
25	Water in ZLDF Salt Cake to Off Site Disposal	0.01	0.00	0.04	0.03	0.04	0.03	0.00
28	ZLDF Evaporator Distillate to EDI Unit	45.7	32.0	43.0	32.0	41.4	32.3	0.0
29	EDI Waste to Waste Water Tank	2.2	1.5	2.0	1.5	2.0	1.5	0.0
30	EDI Distillate to Mixed-Bed Polisher	43.5	30.5	40.9	30.5	39.4	30.8	0.0
31	Demineralized Water from Mixed Bed Polisher to Storage Tank	43.5	30.5	40.9	30.5	39.4	30.8	40.9
32	Demineralized Water to Steam / BFW Cycle Make-Up	43.3	30.3	40.7	30.3	39.2	30.6	40.7
33	Steam to Atmosphere (Notes 7,8)	14.7	10.8	13.9	10.8	13.5	10.9	13.9
34	Boiler Blowdown to Waste Water Tank (Note 7)	24.6	15.5	22.8	15.5	21.7	15.7	22.8
35	Demineralized Water to Closed-Loop Cooling Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	Demineralized Water to Auxiliary Boiler	0.04	0.04	0.04	0.04	0.04	0.04	0.04
37	Aux Steam to Atmosphere	0.04	0.04	0.04	0.04	0.04	0.04	0.04
38	Demineralized Water to CTG Water Washes	0.18	0.18	0.18	0.18	0.18	0.18	0.18
39	CTG Water Wash to Offsite Disposal	0.03	0.03	0.03	0.03	0.03	0.03	0.03
40	Potable Water from City of Avenal Water Treatment Plant (5)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
41	Sanitary Wastewater to Leach Field (5)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
42	Water in Sanitary Sludge to Off Site Disposal	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43	Project Landscaping Irrigation (6)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
44	Distillate Recycle to Service Water Distribution	25.0	25.0	9.7	12.9	10.2	12.8	0.0
45	Distillate Tank Accumulation	16.9	20.8	0.0	0.0	0.0	0.0	0.0
46	Service Water Drainage	25.0	25.0	25.0	25.0	25.0	25.0	25.0
47	Service Water to Waste Water Tank	0.0	0.0	0.0	0.0	0.0	0.0	0.0
48	ZLDF Vent Steam	1.1	1.1	1.1	1.1	1.1	1.1	0.0
49	Waste Water to ZLDF	55.8	46.0	53.8	46.0	52.7	46.2	0.0
50	Online wash water to atmosphere	0.15	0.15	0.15	0.15	0.15	0.15	0.15
45	Waste Water Tank Accumulation	0.0	0.0	0.0	0.0	0.0	0.0	51.8

- Notes:
- Please refer to water balance diagram.
 - Flow rates may not add due to differences in stream temperatures.
 - Flow rates reflect continuous flows at normal conditions. Intermittent or negligible flows are not included unless noted.
 - All numbers are estimated.
 - Deleted.**
 - Landscaping water is estimated at 1.5 acre-ft/yr (provided by EDAW on 20Sep07). Daily use varies depending upon seasonal weather conditions.**
 - Includes an estimate for 1 HP and 1 IP intermittent blowdown per 8 hour shift.**
 - Includes an estimate for steam losses associated with 52 startups per year.**