

WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

January 22, 2008

OK

TO: Internal File

THRU: Pamela Grubaugh-Littig, Permit Supervisor *PL*

FROM: *DD* Dana Dean, P.E., Senior Reclamation Hydrologist

RE: 2006 Second Quarter Water Monitoring, Canyon Fuel Company, LLC,
Skyline Mine, C/007/0005-WQ06-2, Task ID #2551

The Skyline Mine is an operating longwall mine. Current operations are in the North Lease area of the mine. Many mined-out areas of the mine have been sealed-off. Water monitoring requirements can be found in Section 2, especially pages 2-36, 2-36a, 2-36b, 2-37, 2-37a, and 2-39aa of the MRP.

There are 42 stream sampling sites in the North Lease where the Permittee will measure flow on a monthly basis for 12 months prior to, during and 12 months after longwall mining below each site. The Division will check this monitoring in conjunction with the Annual Report.

1. Was data submitted for all of the MRP required sites? YES NO

Springs

The MRP requires second quarter sampling at 25 springs (S10-1, S12-1, S13-2, S13-7, S14-4, S15-3, S17-2, S22-5, S22-11, S23-4, S24-1, S24-12, S26-13, S34-12, S35-8, S36-12, 2-413, 3-290, 8-253, WQ1-39, WQ3-6, WQ3-26, WQ3-41, WQ3-43, and WQ4-12).

The Permittee submitted all required samples for the spring sites.

Streams

The MRP requires second quarter sampling at 36 stream-sites (CS-3, CS-4, CS-6, CS-7, CS-8, CS-9, CS-10, CS-11, CS-12, CS-13, CS-14, CS-16, CS-17, CS-18, CS-19, CS-20, CS-21, CS-22, CS-23, MD-1, SRD-1, F-9, F-10, UP&L-10, VC-6, VC-9, VC-10, VC-11, VC-12, WRDS-1, WRDS-2, WRDS-3, WRDS-4, EL-1, and EL-2).

The Permittee submitted all required samples for the stream sites.

Wells

The MRP requires second quarter sampling at 18 wells (JC-1, JC-3, ELD-1, W79-10-1-B, W79-14-2A, W79-26-1, W79-35-1A, W79-35-1B, W2-1, W20-4-1, W20-4-2, W99-4-1, W99-21-1, W99-28-1, W20-28-1, 91-26-1, W91-35-1, and 92-91-03).

The Permittee submitted all required samples for the well sites.

UPDES

The UPDES Permit/MRP require **weekly** monitoring of 3 outfalls: 001, Sedimentation Pond Discharge to Eccles Creek at the Portal; 002, Sedimentation Pond Discharge to Eccles Creek at the Loadout; and 003, the Sedimentation Discharge at the Waste Rock Disposal Site. Well JC-3 is permitted as a UPDES point, but PacifiCorp is the Permittee, and JC-3 has not discharged since July of 2004.

The Permittee submitted all required samples for the UPDES sites. Only outfall 001 reported continuous flow, Outfall 002 flowed during the weeks of April 25 and May 4.

2. Were all required parameters reported for each site? YES NO

Tritium was not reported at EL-1, EL-2, S15-3, S24-1, or 8-253. The laboratory that provides the age dating data quite often takes a long time to report the data back to the Permittee. The Permittee has always been quite prompt at getting the data to the Division as soon as they receive it from the lab.

3. Were any irregularities found in the data? YES NO

Several parameters fell outside of two standard deviations from the mean encountered at the respective sites. They were:

Site	Parameter	Value	Standard Deviation s from Mean	Mean
CS-9	Nitrate + Nitrite	2.37 mg/L	2.07	1.12 mg/L
CS-16	Flow	543 gpm	2.33	189.31 gpm
CS-18	Flow	3110 gpm	2.98	990.27 gpm
CS-19	Total Suspended Solids	56 mg/L	2.22	19.69 mg/L
CS-20	Cation/Anion Balance	4.7 %	2.70	1.26 %
F-9	Flow	370 gpm	2.66	98.88 gpm
S35-8	Specific Conductivity	610 µmhos/cm	2.09	445.88 µmhos/cm
S22-5	Specific Conductivity	903 µmhos/cm	2.24	516.86 µmhos/cm
WQ3-6	Chloride	5 mg/L	2.01	3.92 mg/L
WQ3-26	Cation/Anion Balance	5.7 %	2.24	1.27 %
WQ3-43	Flow	13.8 gpm	2.38	2.79 gpm

WQ4-12	Flow	2.4 gpm	2.10	1.06 gpm
ELD-1 6/15	Flow	2139 gpm	2.92	3812.75 gpm
UT0023540-001 Apr 25	Total Iron	1.68 mg/L	2.00	0.43 mg/L

The cation/anion balance at CS-20 is not of concern, since it is within the expected range (<5%). The balance at WQ3-26 is outside two standard deviations, and above the 5% attention value. It is not clear why it is high, but as discussed below, it is something that the Permittee should be able to explain.

There is a no trend in chloride at WQ3-6. There are only 13 samples in the population, eleven of which are 4 mg/L, one is 3 mg/L, and this one is 5mg/L. This level is well below any water quality standards, and is not of concern.

Flows were higher than average at CS-16, CS-18, F-9, WQ3-43, and WQ4-12. Monitoring of these sites began in 2001 or 2002. Both the Palmer Hydrologic Drought Index (PHDI) and Surface Water Supply Index (SWSI) show 2001-2004 as "dry" years, and there is an upswing during this quarter. Flows at all sites track well with the indexes.

Discharge from JC-1 has been steady at around 4000 gpm since August of 2004. In August 2005, the monthly average dipped to below 2000 gpm when PacifiCorp shut the pump off for 15 days. The June average is just above 2000 gpm because the power line to the pump was being rebuilt, leaving no power to the pump for over a week. A steady discharge around 4000 gpm is projected for the foreseeable future, except in cases such as these.

There is no trend in nitrate+nitrite at CS-9 ($R^2 = 0.0096$). The combined nitrate/nitrate level is below the recommended limit of 10 mg/L.

There is a strong upward trend in the specific conductivity at S22-5 ($R^2 = 0.851$), and a weak upward trend in the specific conductivity at S35-8 ($R^2 = 0.2236$). There is no standard for specific conductivity, but it is closely related to total dissolved solids (TDS). The TDS at each of these sites is within the expected range.

The total iron at Outfall 001 has exceeded 1 mg/L four times since 2000, including the April 25 sample. The Division of Water Quality has not been alarmed at these rare spikes, and has seen no need to take enforcement action, nor has the Division. No ill effects to the stream have been observed due to the spike in iron concentration.

As expected during a runoff period, the TSS was up at many of the stream sites. The TSS at CS-19 does not have a strong upward trend ($R^2 = 0.2352$), and the site is well downstream of the mine.

Several routine Reliability Checks were outside of standard values. They were:

Site	Reliability Check	Value Should Be...	Value is...
CS-3	Na/(Na + Cl)	> 50%	21%
CS-4	Conductivity/Cations	>90 & < 110	79
CS-4	Na/(Na + Cl)	> 50%	43%
CS-6	Mg/(Ca + Mg)	< 40 %	53%
CS-6	Ca/ (Ca + SO4)	> 50 %	42%
CS-9	Conductivity/Cations	>90 & < 110	87
CS-11	Na/(Na + Cl)	> 50%	45%
CS-12	TDS/Conductivity	>0.55 & <0.75	0.81
CS-12	Conductivity/Cations	>90 & < 110	79
CS-12	Mg/(Ca + Mg)	< 40 %	52%
CS-12	Ca/ (Ca + SO4)	> 50 %	34%
CS-13	Na/(Na + Cl)	> 50%	48%
CS-14	Conductivity/Cations	>90 & < 110	83
CS-14	Mg/(Ca + Mg)	< 40 %	48%
CS-14	Ca/ (Ca + SO4)	> 50 %	47%
CS-19	Conductivity/Cations	>90 & < 110	89
CS-20	Cation/Anion Balance	< 5%	5.1%
CS-20	TDS/Conductivity	>0.55 & <0.75	0.51
CS-21	Conductivity/Cations	>90 & < 110	87
F-10 Jun 29	Conductivity/Cations	>90 & < 110	86
UPL-10	Na/(Na + Cl)	> 50%	39%
VC-6	Mg/(Ca + Mg)	< 40 %	51%
VC-6	Ca/ (Ca + SO4)	> 50 %	43%
VC-9	Mg/(Ca + Mg)	< 40 %	53%
VC-9	Ca/ (Ca + SO4)	> 50 %	42%
S10-1	TDS/Conductivity	>0.55 & <0.75	1.54
S10-1	Conductivity/Cations	>90 & < 110	45
S10-1	Na/(Na + Cl)	> 50%	35%
S12-1	TDS/Conductivity	>0.55 & <0.75	1.05
S12-1	Conductivity/Cations	>90 & < 110	64
S13-7	TDS/Conductivity	>0.55 & <0.75	1.18
S13-7	Conductivity/Cations	>90 & < 110	53
S13-7	Na/(Na + Cl)	> 50%	42%
S17-2	Na/(Na + Cl)	> 50%	43%
WQ1-39	TDS/Conductivity	>0.55 & <0.75	0.49
WQ1-39	Conductivity/Cations	>90 & < 110	115
WQ3-6	Conductivity/Cations	>90 & < 110	83
WQ3-26	Cation/Anion Balance	< 5%	5.3%
WQ3-26	TDS/Conductivity	>0.55 & <0.75	0.83
WQ3-26	K/(Na + K)	< 20%	27%
WQ3-41	Conductivity/Cations	>90 & < 110	87
WQ3-43	Conductivity/Cations	>90 & < 110	88

WQ4-12	K/(Na + K)	< 20%	21%
JC-1 Jun 1	TDS/Conductivity	>0.55 & <0.75	0.55
UT0023540-001 Apr 25	TDS/Conductivity	>0.55 & <0.75	0.77
UT0023540-001 Jun 7	Mg/(Ca + Mg)	< 40 %	48%
UT0023540-001 Jun 7	Ca/ (Ca + SO4)	> 50 %	50%

These inconsistencies do not necessarily mean that a sample is wrong, but it does indicate that something is unusual. An analysis and explanation of the inconsistencies by the Permittee would help to increase the Division's confidence in the samples. The Permittee should work with the lab to make sure that samples pass all quality checks so that the reliability of the samples does not come into question. The Permittee can learn more about these reliability checks and some of the geological and other factors that could influence them by reading Chapter 4 of *Water Quality Data: Analysis and Interpretation* by Arthur W. Hounslow. A geological influence is most likely here, since most samples have the same inconsistencies, and they recur each quarter.

The Utah Division of Water Quality (DWQ) issued the current UPDES permit on Nov. 23, 2004. It allows for a daily maximum of total dissolved solids discharged (TDS) of 1310 mg/l and a 30-day average of 500 mg/l. There is no tons per day (tpd) daily maximum, unless the 30-day average exceeds 500 mg/l; then a 7.1-tpd limit is imposed. The permit also states:

Upon determination by the Executive Secretary that the permittee is not able to meet the 500 mg/L 30-day average or the 7.1 tons per day loading limit, the permittee is required to participate in and/or fund a salinity offset project to include TDS offset credits, within six (6) months of the effective date of this permit.

The Division of Water Quality approved a Salinity Offset Plan for the Skyline Mine on January 5, 2005. A copy of the agreement can be found in the Division's Incoming files, and at:

<https://fs.ogm.utah.gov/FILES/COAL/PERMITS/007/C0070005/2005/INCOMING/0006.pdf>

For the second quarter of 2006, the Permittee has not exceeded the daily max of 1310 mg/L for TDS. However, at Outfall 001 the 30-day average has remained above 500 mg/l and the tons per day are much greater than 7.1. Because of these exceedences, Canyon Fuel Company continues to participate in the salinity-offset program.

The Permittee reported total iron to be 1.68 mg/L at Outfall 001 on April 25. A one-time exceedence is generally not thought to be a problem, especially when it shows as an outlier on the graph. The Permittee reported this value to the Division of Water Quality on May 8th as required. The Division of Water Quality did not feel that it warranted any action on their part, nor does the Division.

4. On what date does the MRP require a five-year re-sampling of baseline water data.

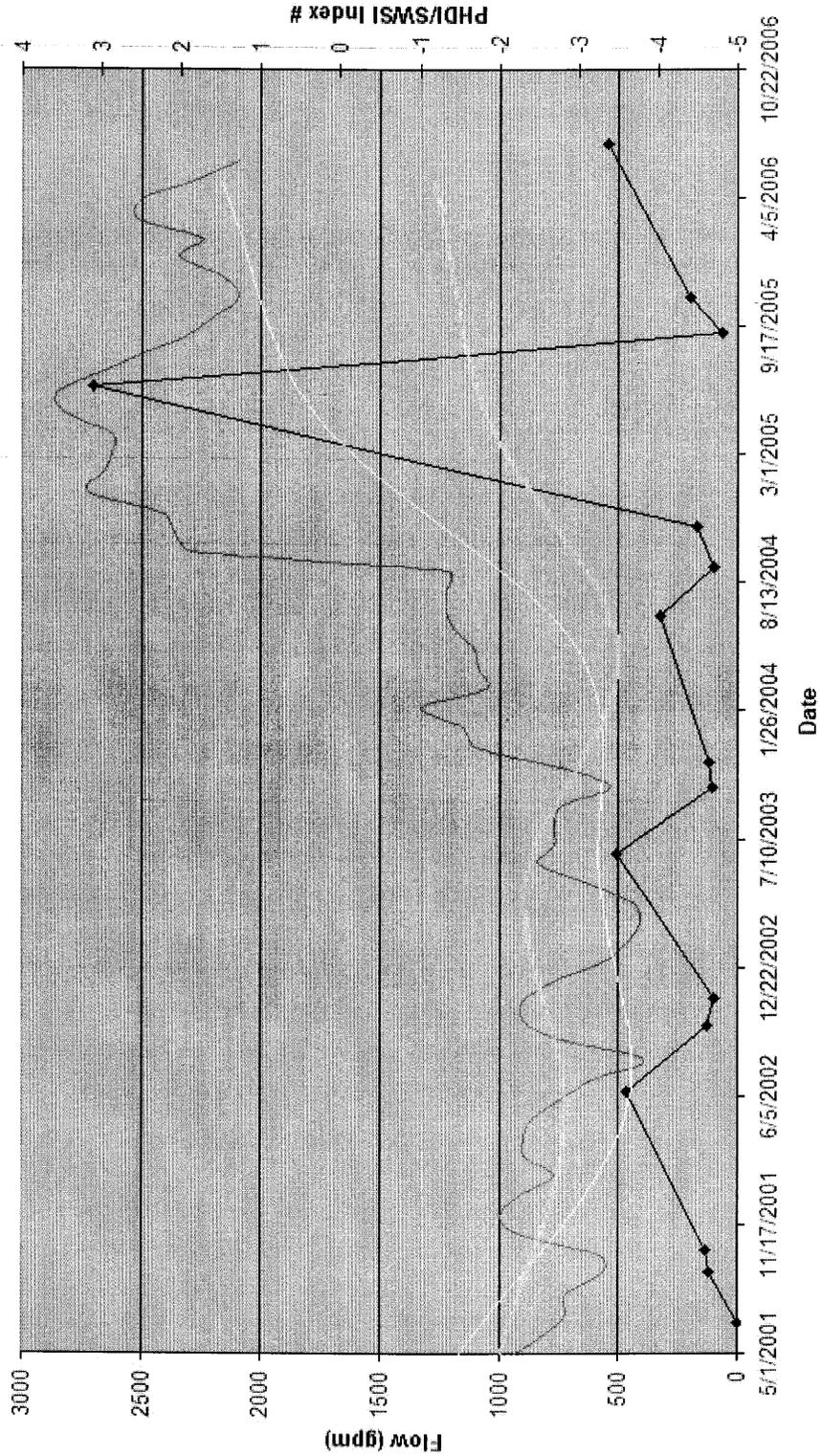
There is no commitment in the MRP to resample for baseline parameters. However, they are required to monitor 8 stream sites (CS-1, CS-7, CS-8, CS-10, CS-16, CS-17, CS-18, and VC-10) and 13 springs (S13-2, S14-4, S15-3, S22-5, S22-11, S23-4, S24-12, S26-13, S34-12, S35-8, S36-12, 2-413, and 3-290) for all operational parameters at high and low flow (where accessible) once every five years (2010, 2015, etc.), and whenever abrupt changes in flow occur.

5. Based on your review, what further actions, if any, do you recommend?

No further actions are necessary at this time.

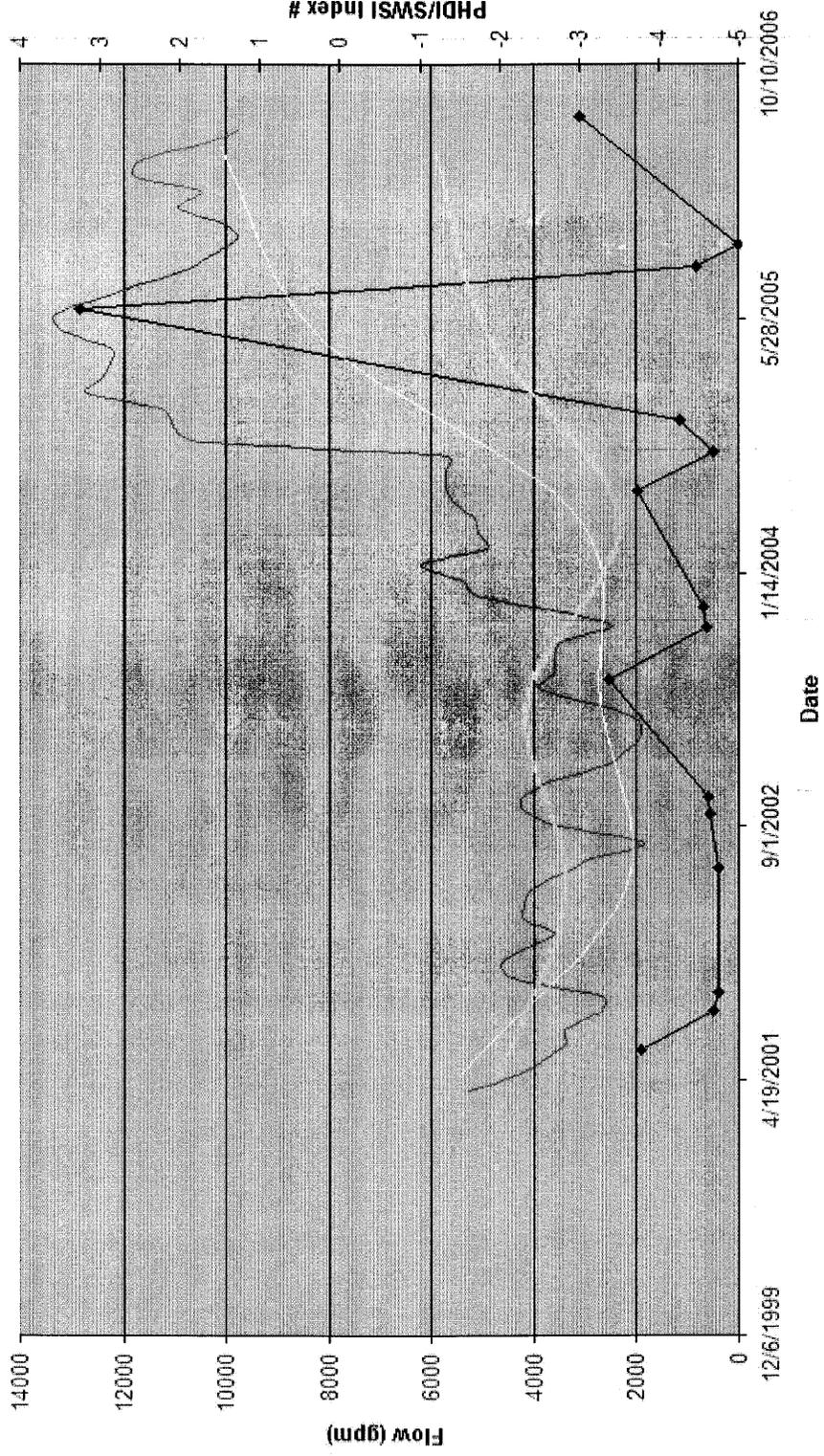
an
O:\007005.SKY\WATER QUALITY\DDWQ06-2_2551.DOC

Flow vs. Palmer Hydrologic Drought Index and Surface Water Supply Index
 CS-16



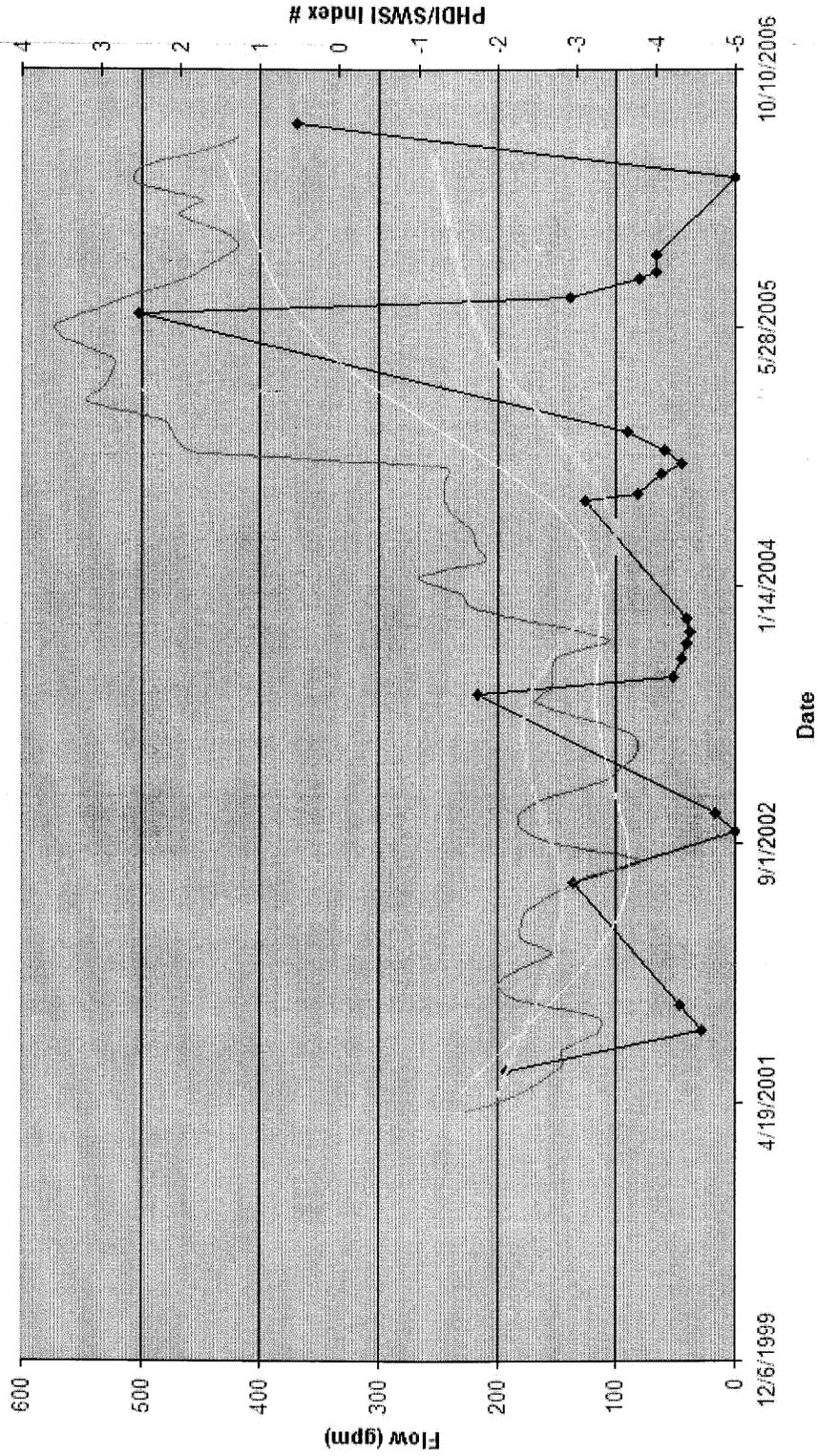
—◆— CS_16 — PHDI Region 5 - - - SWSI San Rafael SWSI Price

Flow vs. Palmer Hydrologic Drought Index and Surface Water Supply Index CS-18



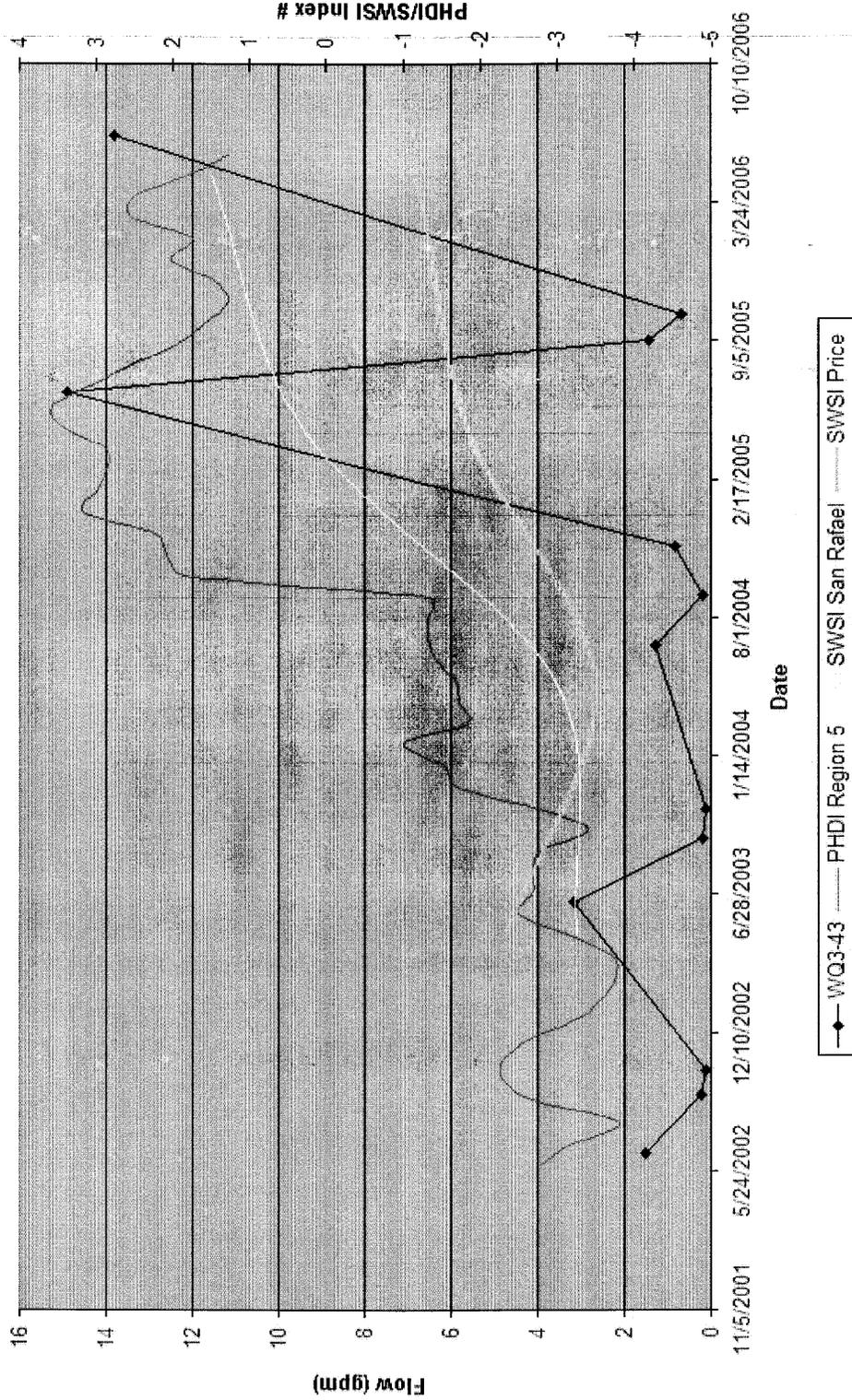
CS_18 PHDI Region 5 SWSI San Rafael SWSI Price

Flow vs. Palmer Hydrologic Drought Index and Surface Water Supply Index
F-9

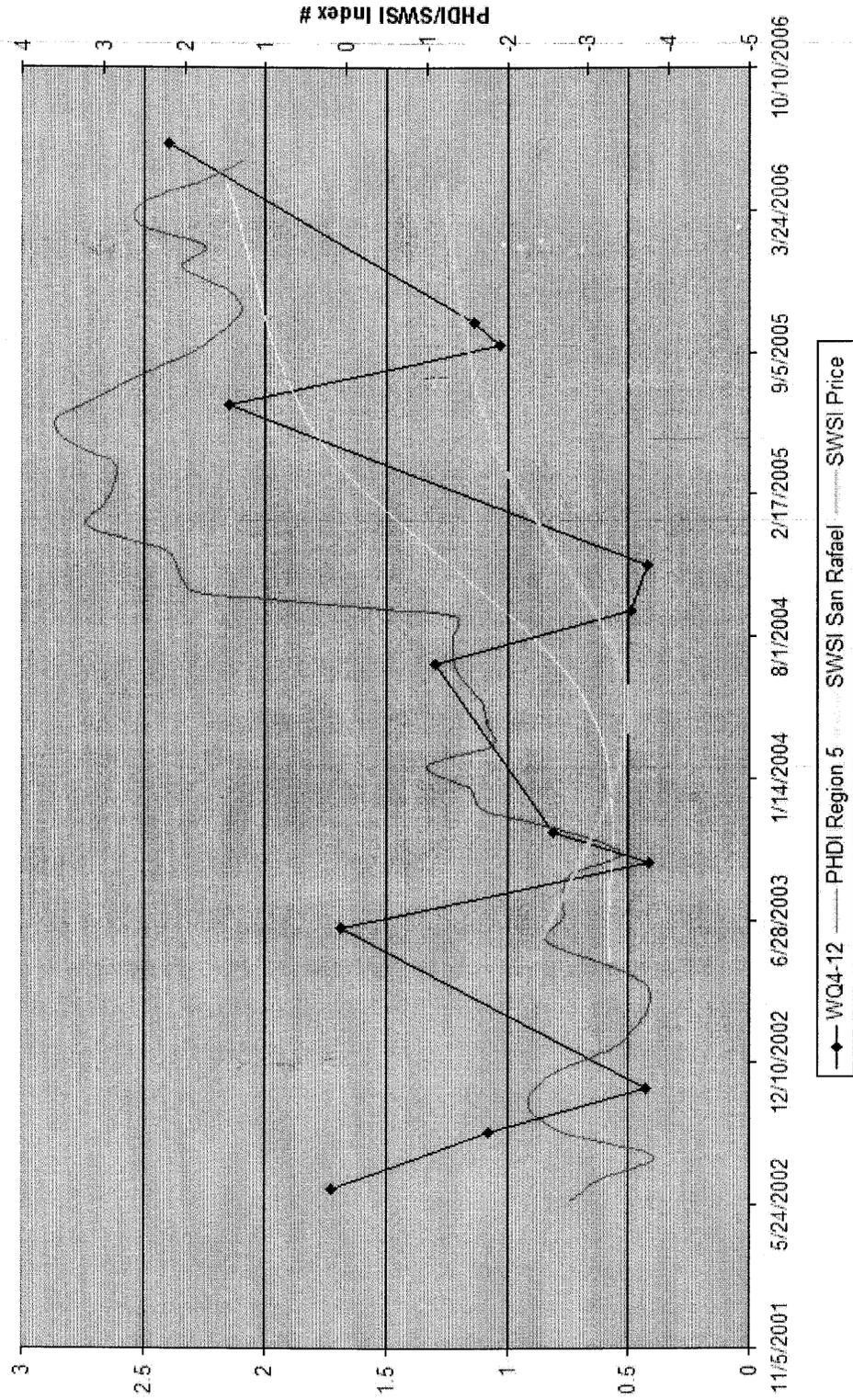


Legend:
—◆— F-9
— PHDI Region 5
— SWSI San Rafael
— SWSI Price

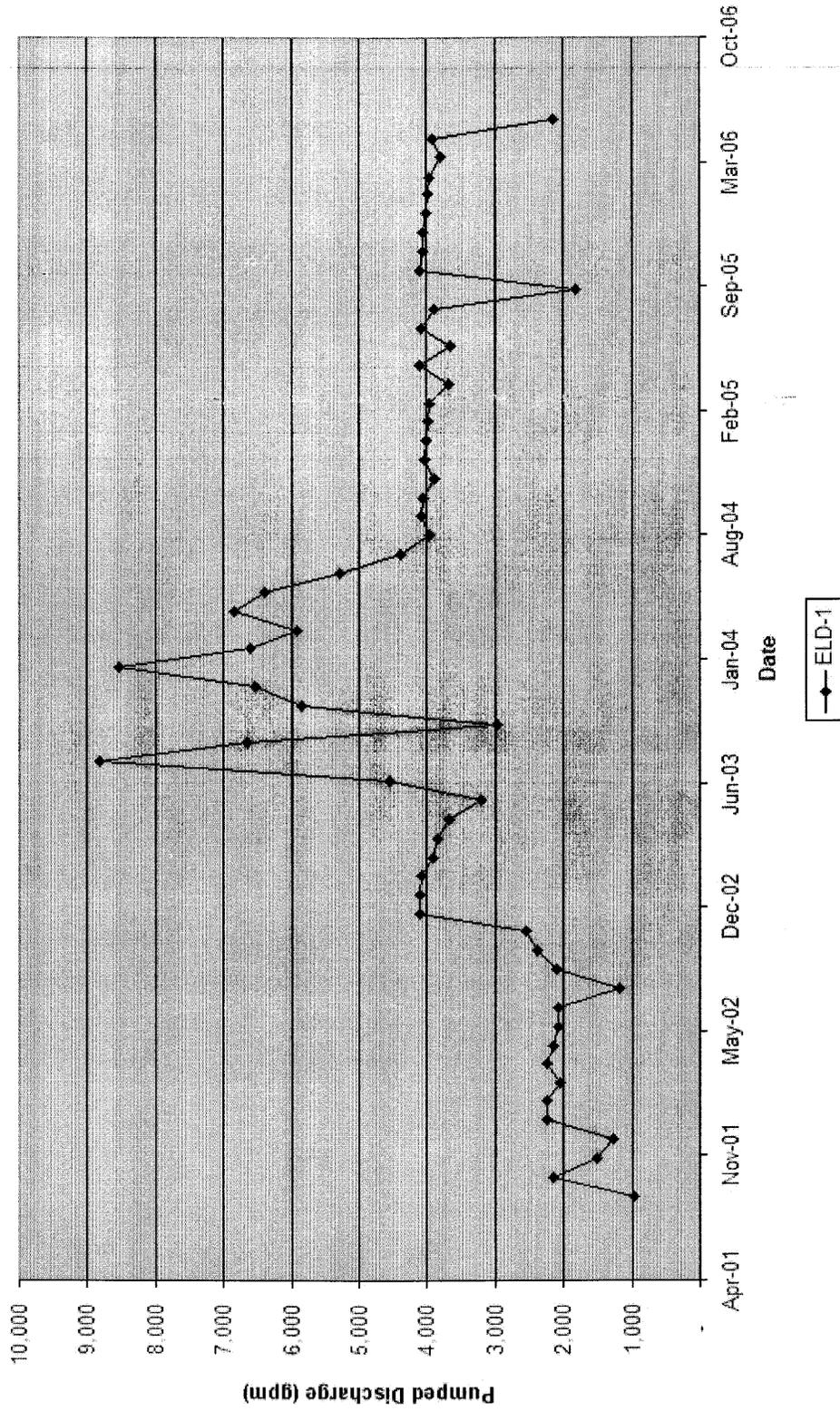
Flow vs. Palmer Hydrologic Drought Index and Surface Water Supply Index
WQ3-43

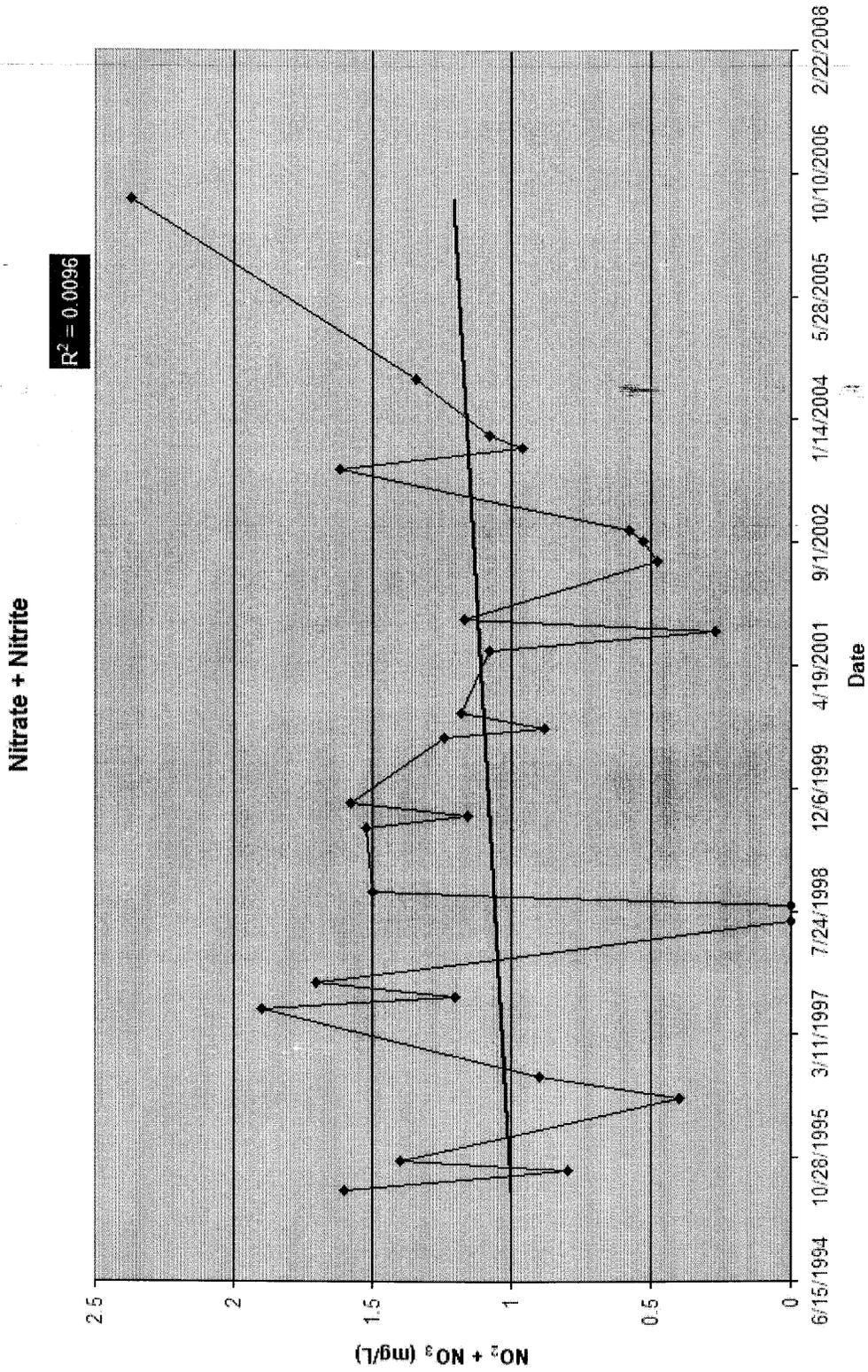


Flow vs. Palmer Hydrologic Drought Index and Surface Water Supply Index
 WQ4-12



Monthly Average Discharge to Electric Lake
ELD-1 (combination of all JC wells)

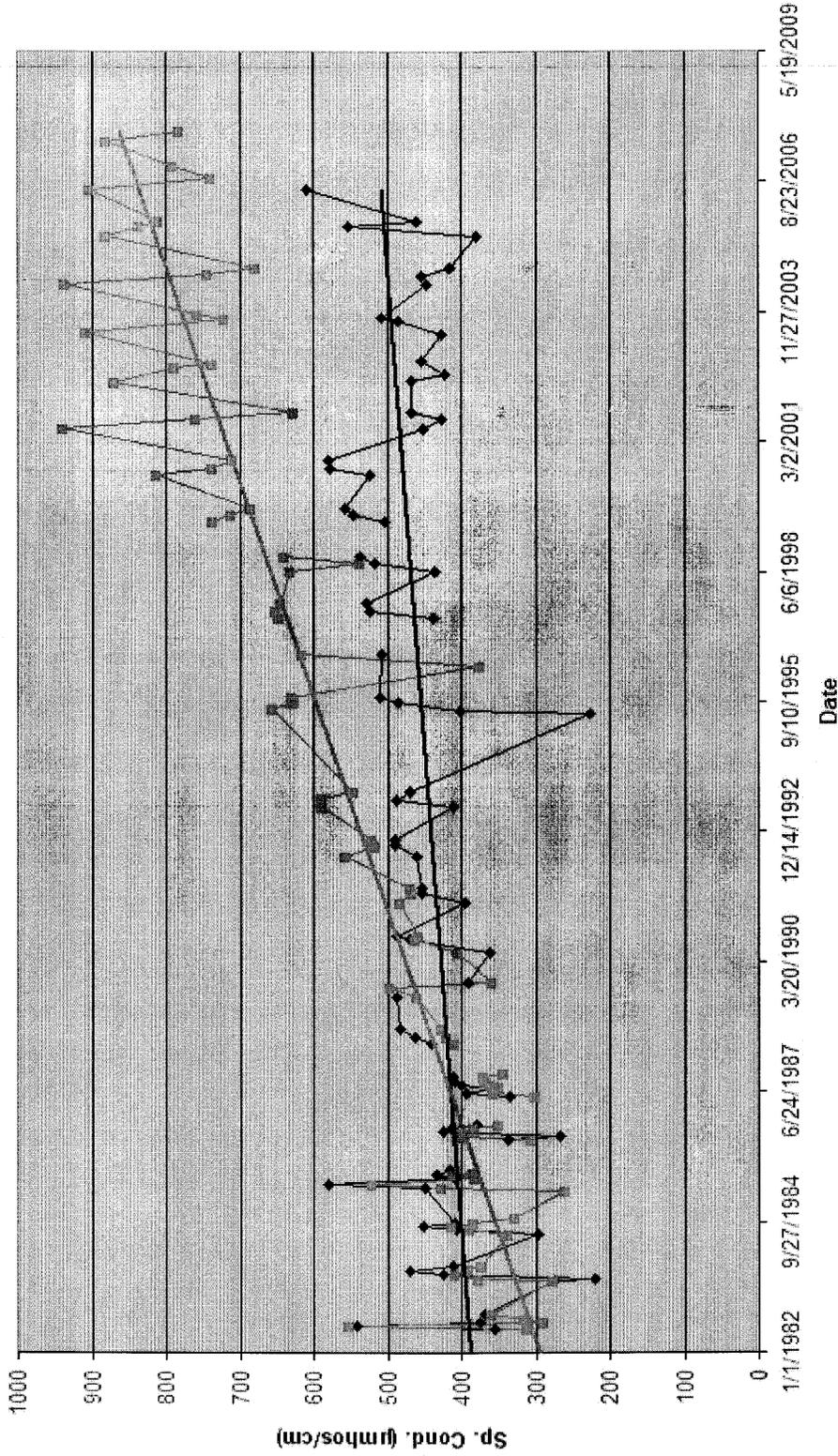




Specific Conductivity

$R^2 = 0.2236$

$R^2 = 0.257$



—◆— S35-8 Cond. - - - ■ - - - S22-5 Cond. — Linear (S35-8 Cond.) - - - Linear (S22-5 Cond.)

