

Selenium Research for
NDEP 319 Grant

Lake Mead Water Quality Forum
September 16, 2008
Peggy Roefer

NDEP Research Grant

- Selenium research part of larger grant
- Cooperative effort – COH, CLV, CCWRD
- Gather data to determine existing Se removal of existing wastewater treatment plants
- Conduct bench scale Se treatment optimization studies

City of Henderson Se Removal

- COH removes 48% of total Se entering treatment plant
- COH removes 39% of the dissolved Se
- COH treatment process consists of biological removal followed by chemical removal. All Se removed in the biological process.
- All Se in the effluent is dissolved

City of Las Vegas Se Removal

- CLV removes 53% of total Se entering treatment plant
- CLV removes 35% of the dissolved Se
- Nitrification removes 29% of the Se
- BNR removes 44% of the Se
- All Se in the effluent is dissolved

Clark County Se Removal

- CCWRD removes 54% of the total Se
- CCWRD removes 44% of the dissolved Se
- Primary Clarification removes 19% of the total Se
- Activated Sludge removes 45.4% of the total Se
- Filtration with alum removes 16% of the total Se
- All Se in the effluent is dissolved

NDEP Research Grant

- Conduct bench scale Se treatment optimization studies
 - Duck Creek
 - Whitney Mesa
 - Primary Clarifier Influent
 - Secondary Clarifier Influent
 - Blend Secondary Clarifier Influent with Return Activated Sludge
 - Secondary Clarifier Effluent

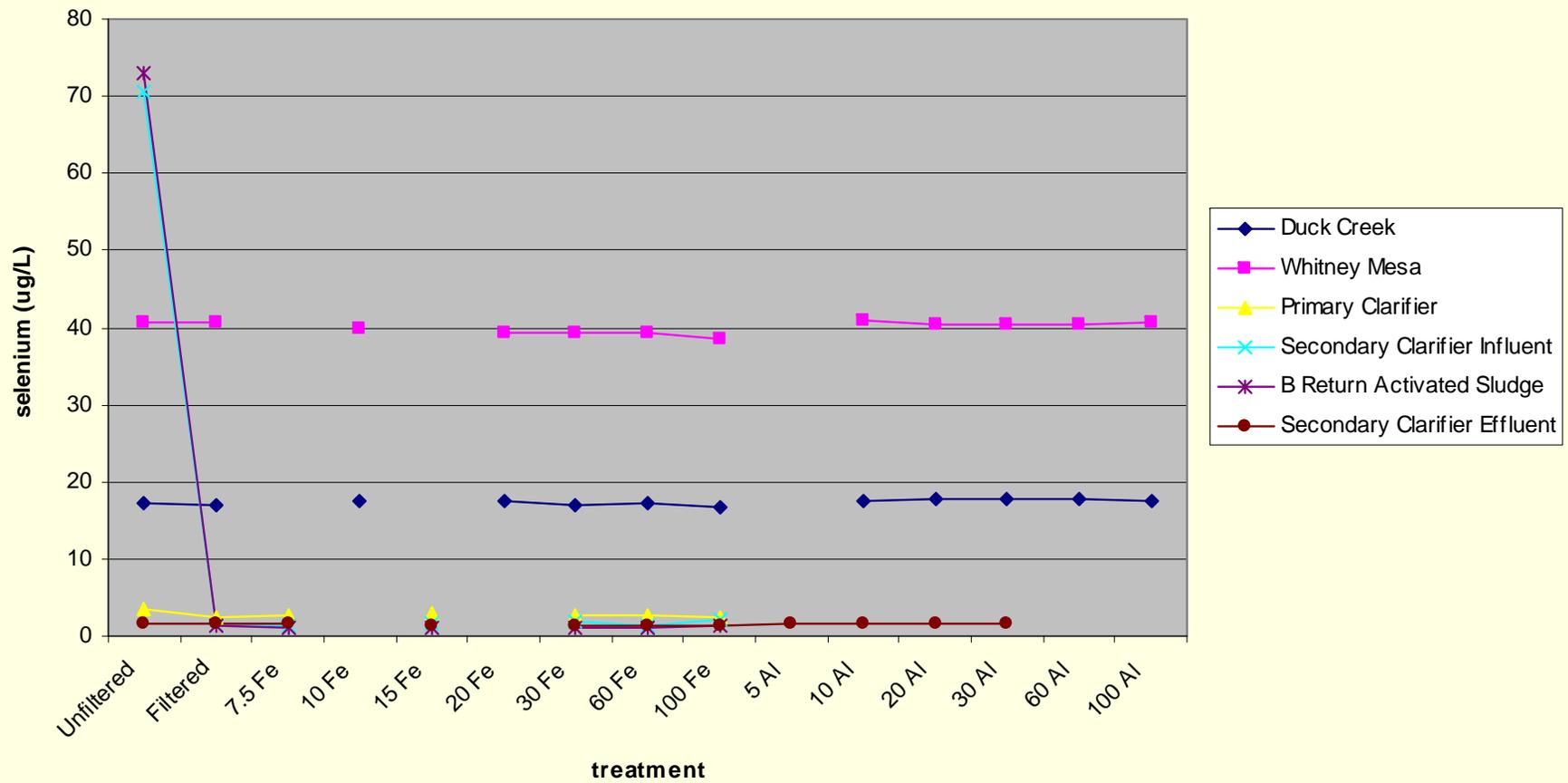
Se Treatment Optimization

Water Source	Ferric Chloride Dose (mg/L)	Alum Dose (mg/L)
Duck Creek	0, 10, 20, 30, 60, 100	10, 20, 30, 60, 100
Whitney Mesa	0, 10, 20, 30, 60, 100	10, 20, 30, 60, 100
Primary Clarifier Influent	0,7.5, 15, 30, 60, 100	
Secondary Clarifier Influent	0,7.5, 15, 30, 60, 100	
Blend Secondary Clarifier Influent with Return Activated Sludge	0,7.5, 15, 30, 60, 100	
Secondary Clarifier Effluent	0,7.5, 15, 30, 60, 100	5, 10, 20, 30

*Dissolved Se and Se Speciation will be performed on each sample

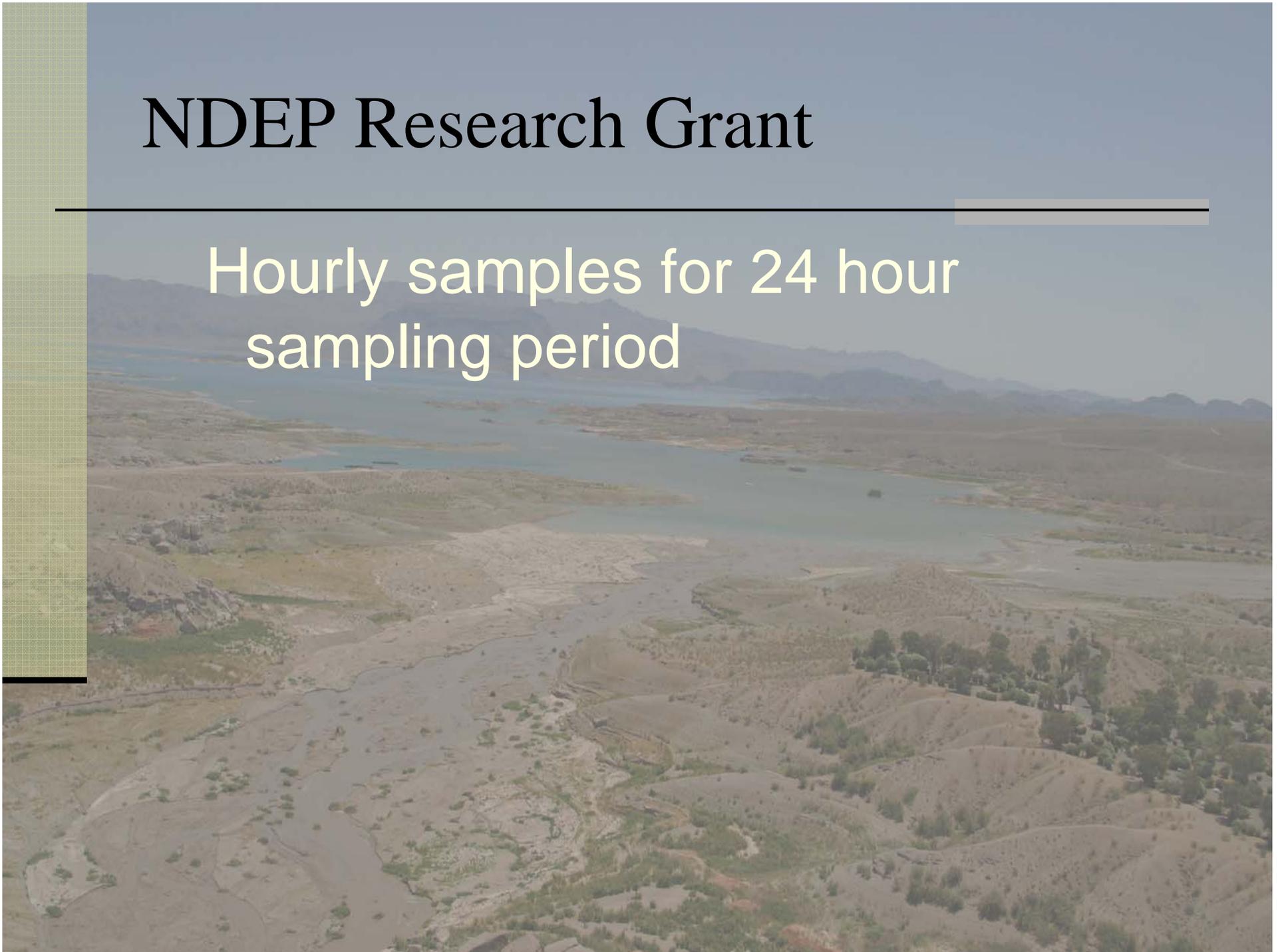
Se Treatment Optimization Study

Selenium Treatment Optimization Study



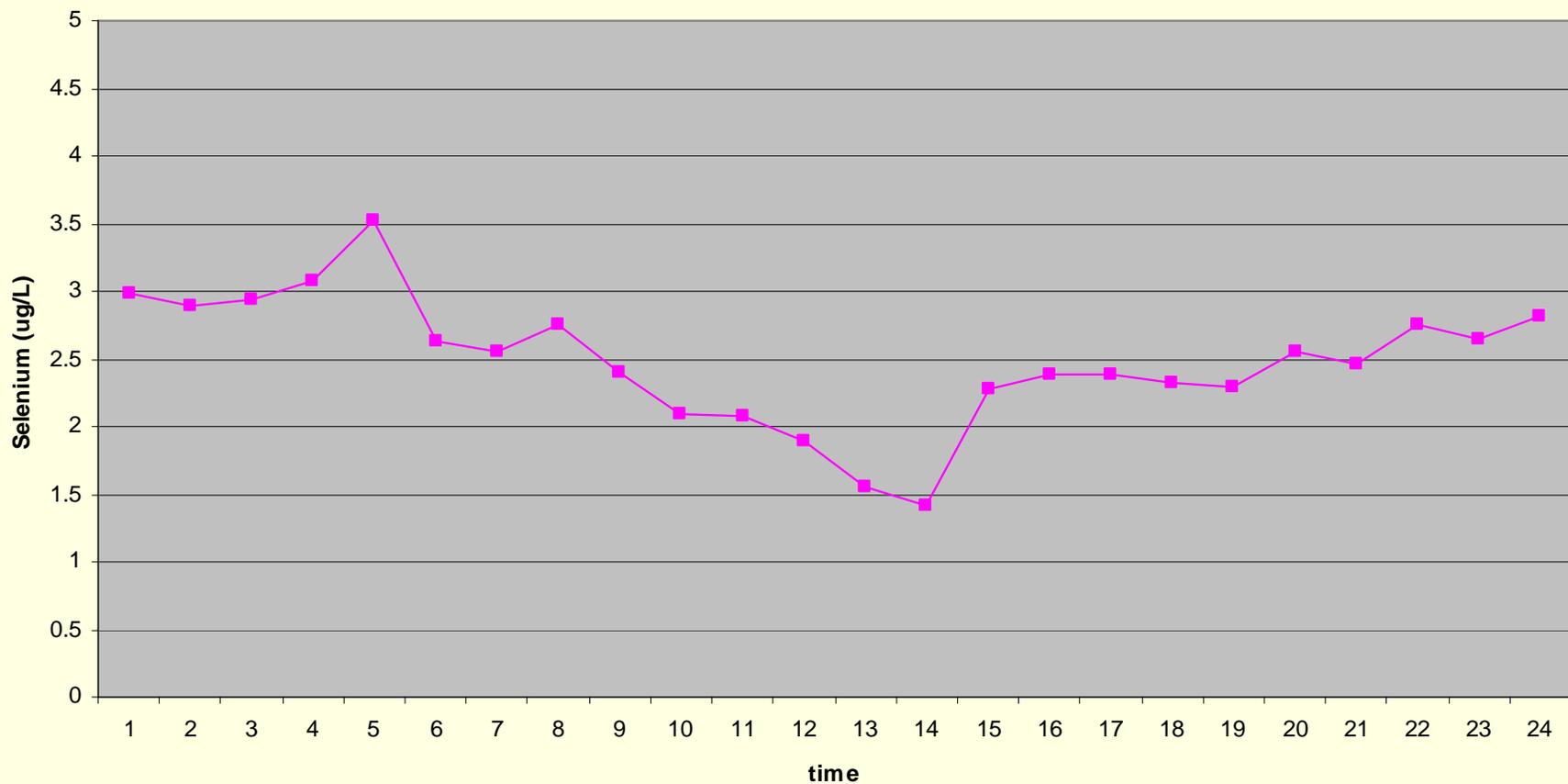
NDEP Research Grant

Hourly samples for 24 hour
sampling period



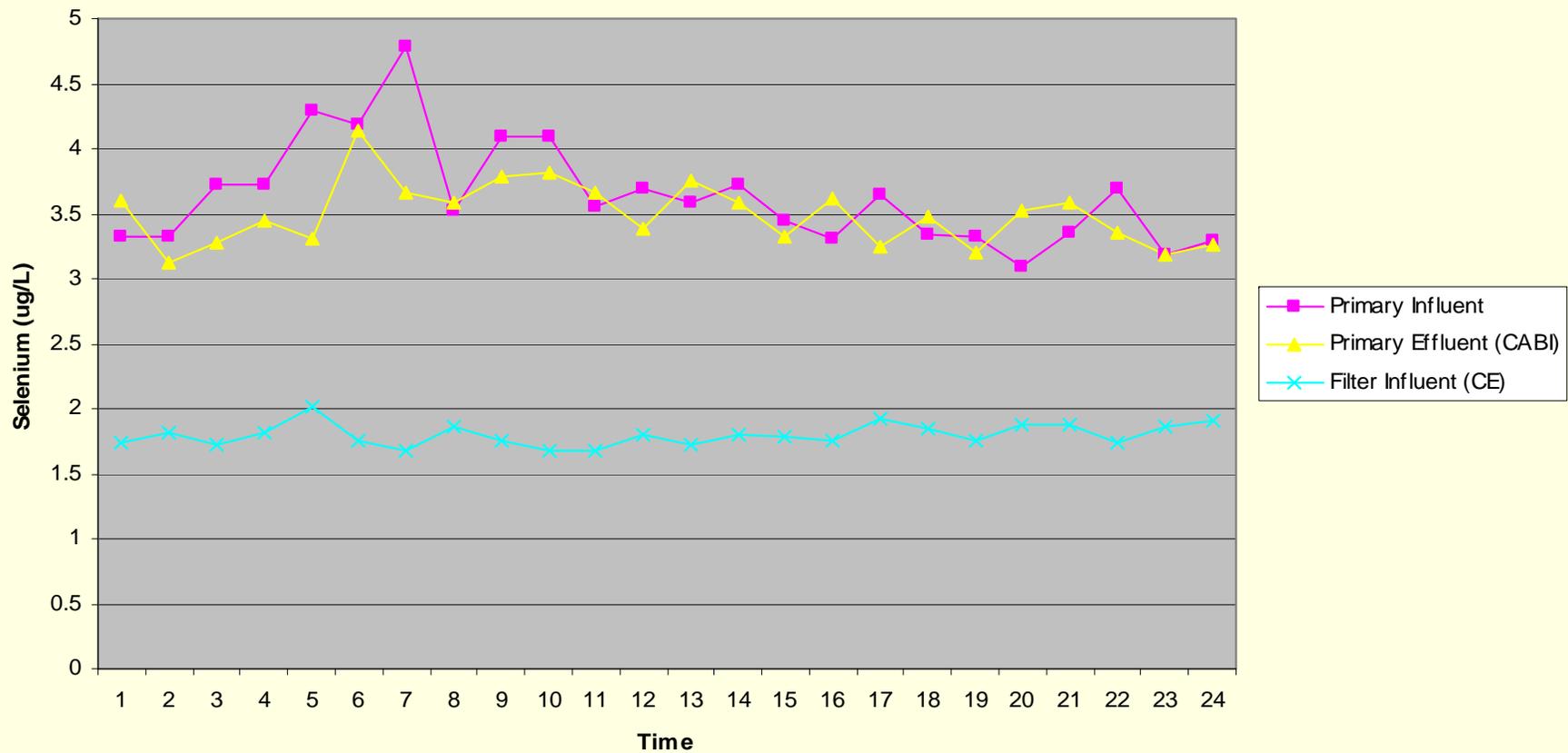
24 Hour Selenium Study - COH

COH Influent Selenium Concentrations - 24 hour study - July 22 and 23, 2008



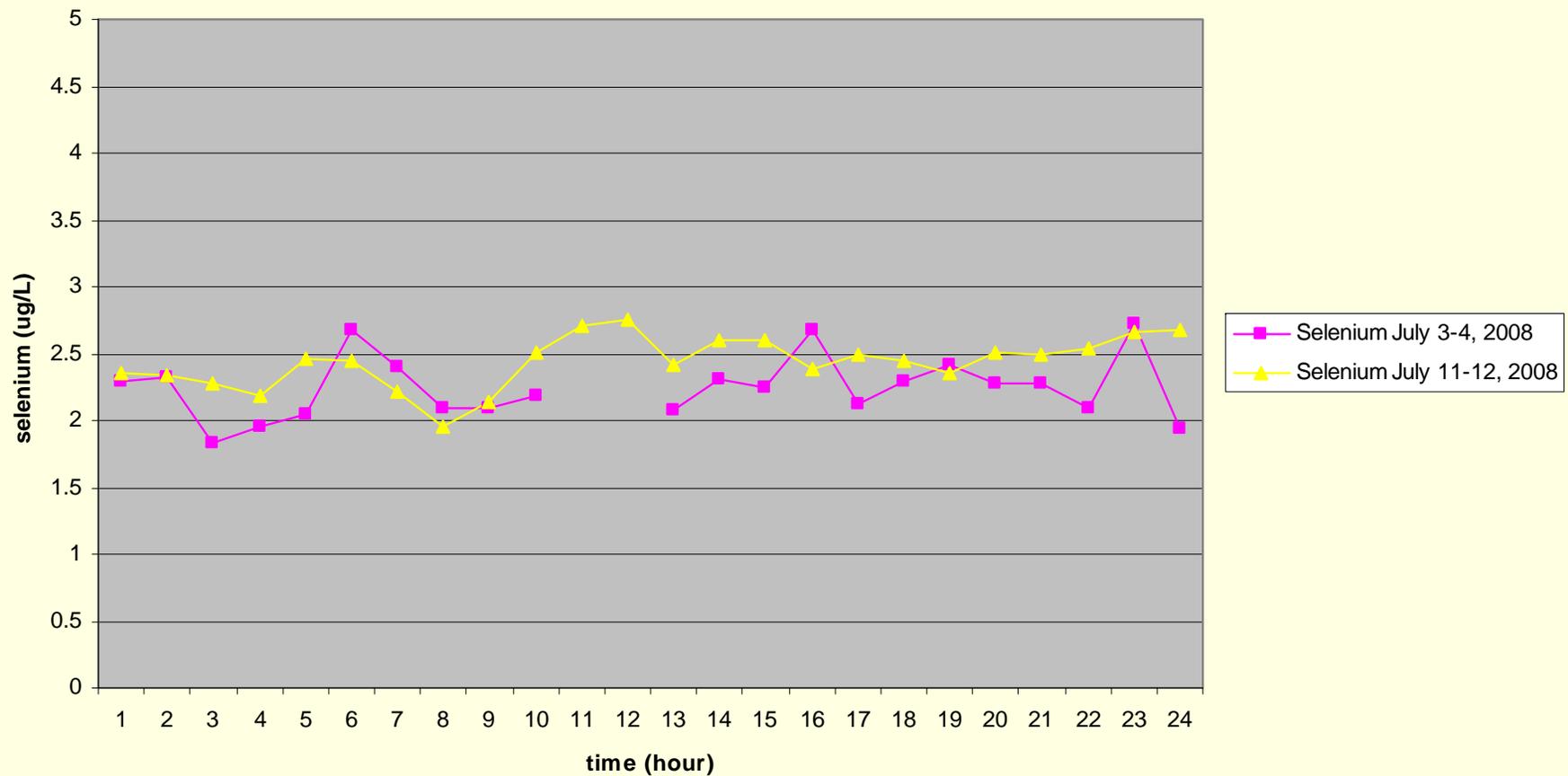
24 Hour Selenium Study - CCWRD

Diurnal Selenium Study - Clark County Water Reclamation District - May 8, 2008



24 Hour Selenium Study – CLV

24 Hour Selenium Study - City of Las Vegas



NDEP Research Grant

- Sampling is complete
- Gather data from labs
- Write final report