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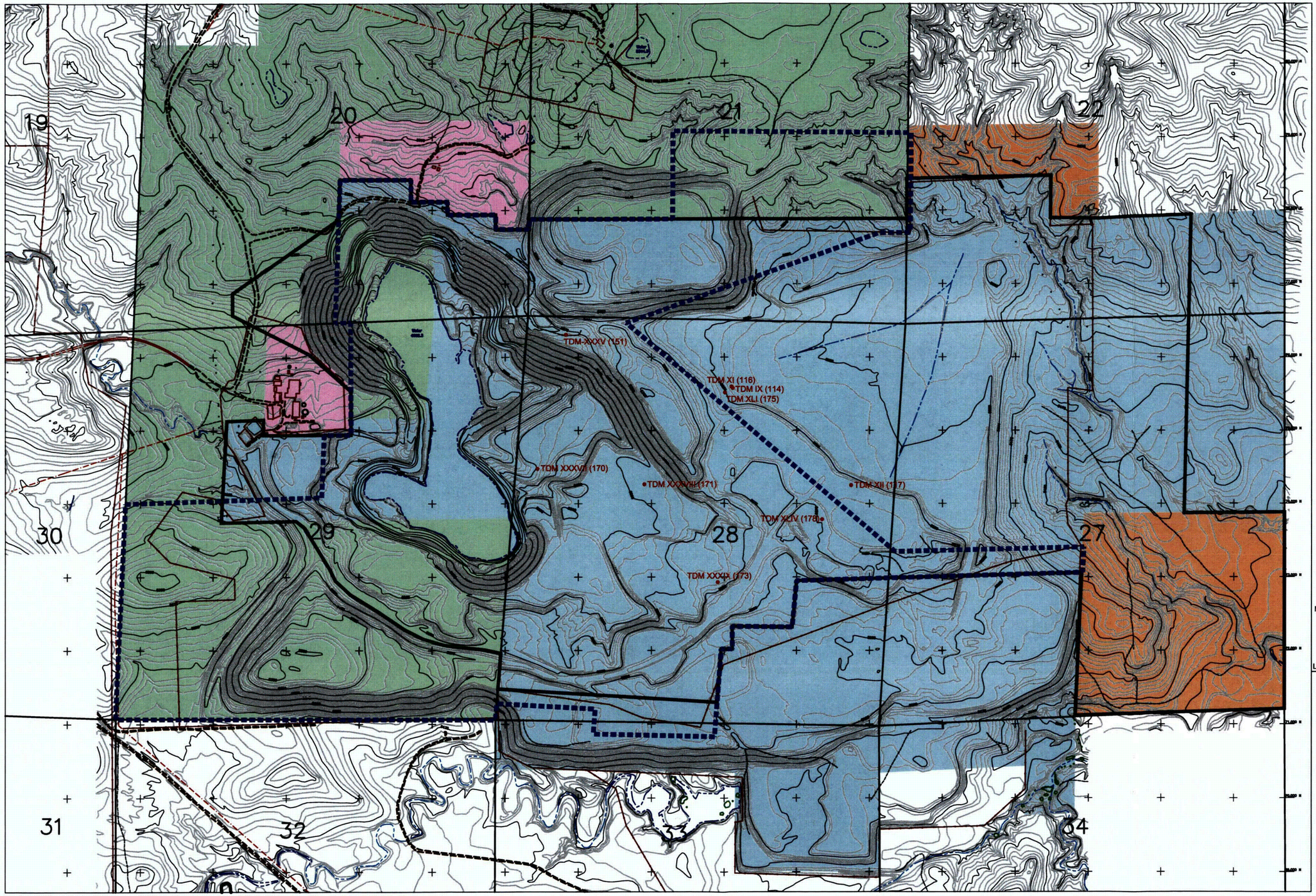
Technical Memorandum

To:	Document Control Desk	**From:**	Rebecca Bilodeau –Tetra Tech
Company:	NRC	**Date:**	6/19/09
Re:	Highland June 9 Meeting request, Well Trends	**Project #:**	180549.2009
CC:	Keith McConnell -NRC Thomas McLaughlin –NRC Mahesh Vidyasagar –ExxonMobil	Bruce Wielinga –AMEC Anna Krzyszowska-Waitkus –WDEQ Steve Ingle - WDEQ	

During the June 9, 2009 meeting between NRC, WDEQ and ExxonMobil in Casper, WY, WDEQ requested that ExxonMobil provide graphs of the water quality and water level in the groundwater wells between the tailing impoundment and the pit lake. Included in this memorandum is a map of these specific groundwater wells, some of which are outside of the WDEQ permit area, and in the NRC jurisdiction. The wells between the tailings impoundment and the pit lake are wells 114, 117, 151, 175, and 178, which are completed in the TDSS; well 116, which is completed in the OBSS; and wells 170, 171, and 173, which are completed in the backfill. Also included are graphs showing the water elevations, radium 226+228, chloride, selenium, sulfate, TDS, and uranium. The reports "Long Term Pit Lake and Groundwater Hydrology at the Highland Mine Site" (Tetra Tech 2007) and "Long Term Geochemical Evolution of the Highland Pit Lake" (Tetra Tech 2007) describe the groundwater flow surrounding the pit lake, including the flow of water and constituents from the tailing impoundment. These studies indicate that as much as 24 percent of the uranium and 11 percent of the selenium in the Pit Lake come from the tailing impoundment. The historic data from the groundwater monitoring wells at the site were also included in the geochemical report.

NMSS01
FSME



NOTE: EASTERN BOUNDARY TO BE FINALIZED PENDING RESULTS FROM RECENT WELL SAMPLING.

LEGEND

- EXXONMOBIL
- BONER
- FOWLER
- POWER RESOURCES
- PROPOSED DOE LONG-TERM CARE BOUNDARY
- DEQ PERMIT AREA

NORTH

SCALE IN FEET

600 0 1200

REVISIONS	No.	DESCRIPTION	BY	CHKD.	APPROVED	DATE

REFERENCES	DWG No.	DRAWING TITLE

DESIGNERS	ENGINEERING RECORD	BY	DATE

PREPARED BY

TETRA TECH

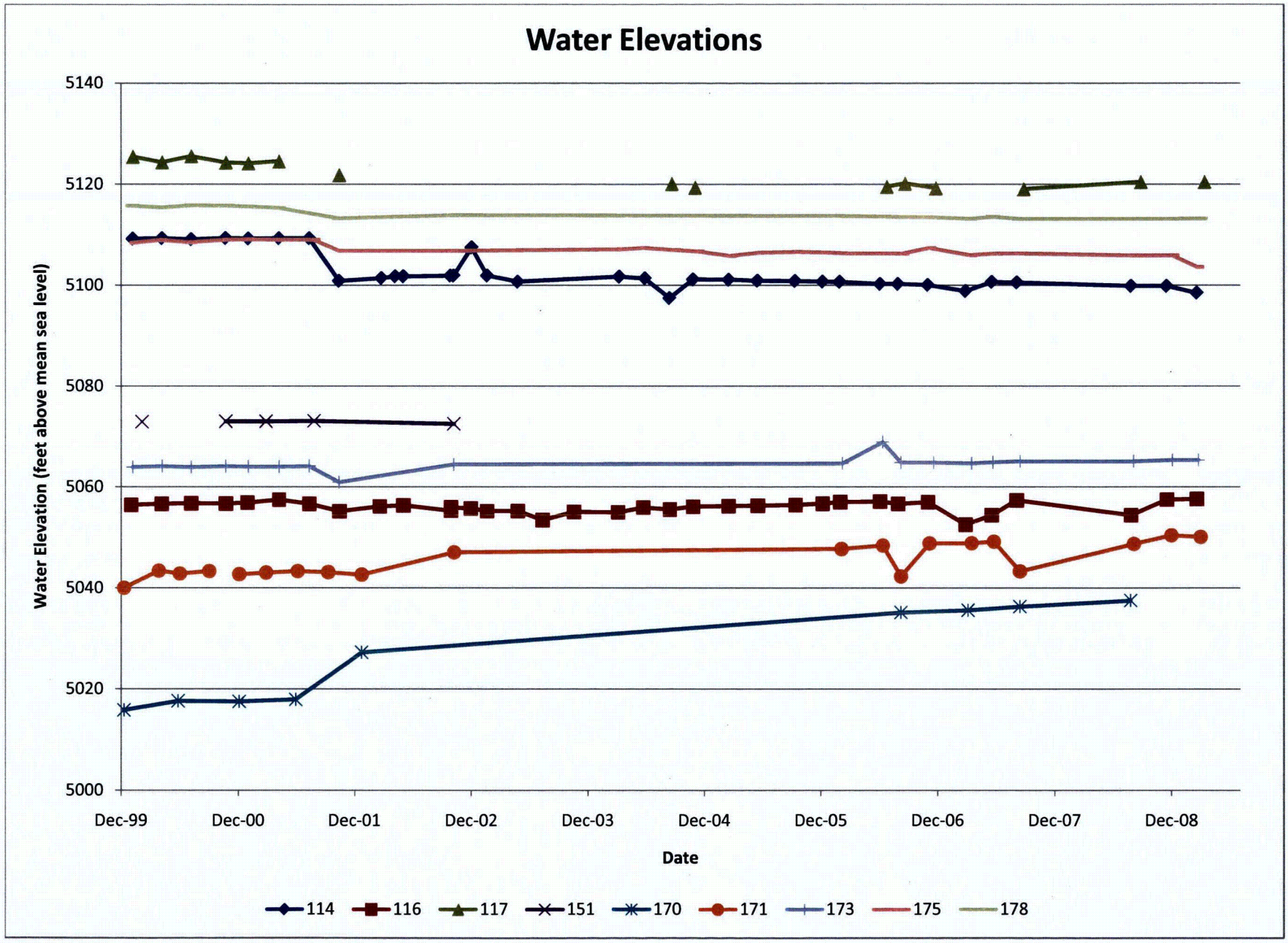
PREPARED FOR

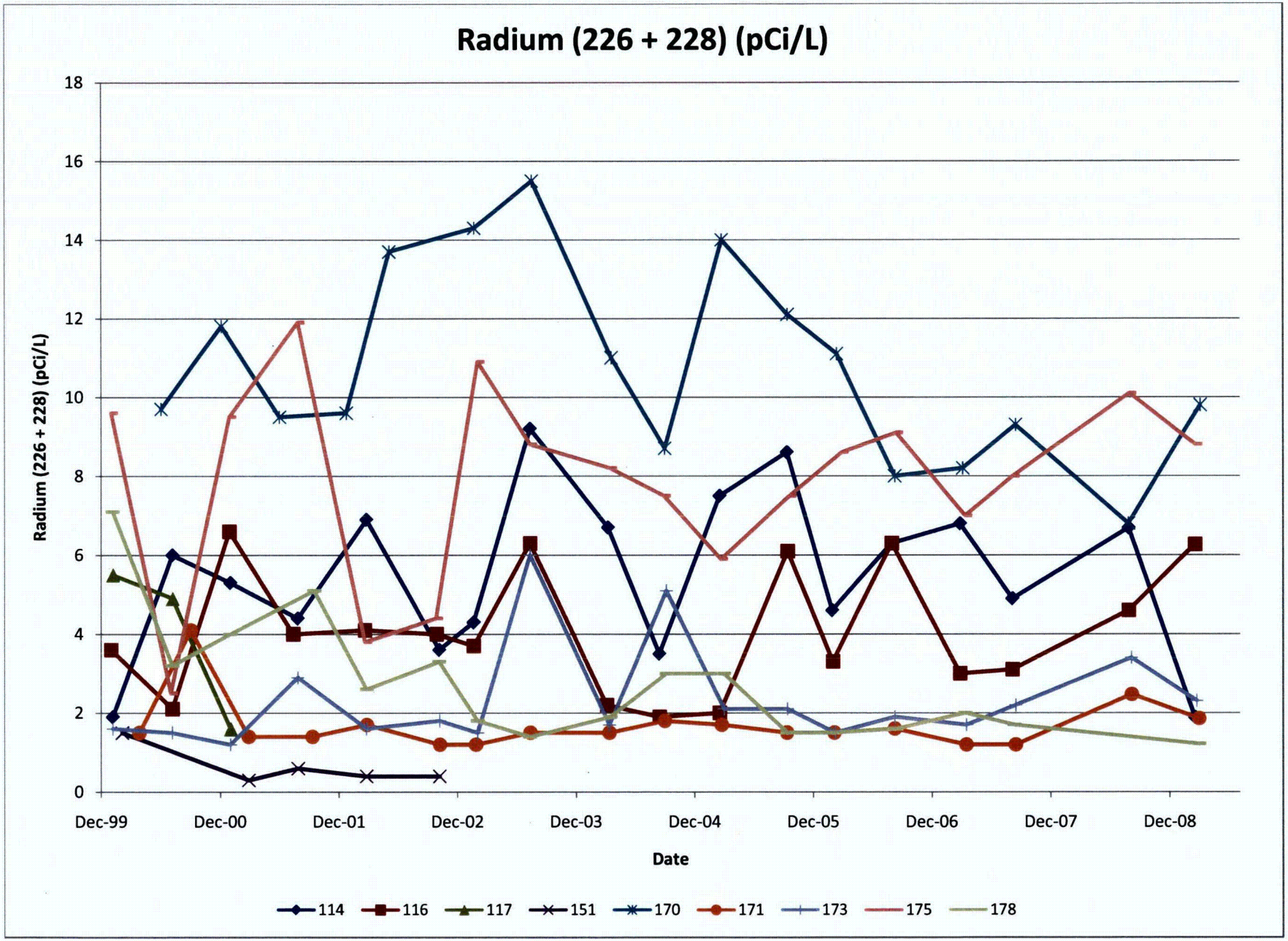
ExxonMobil Refining & Supply

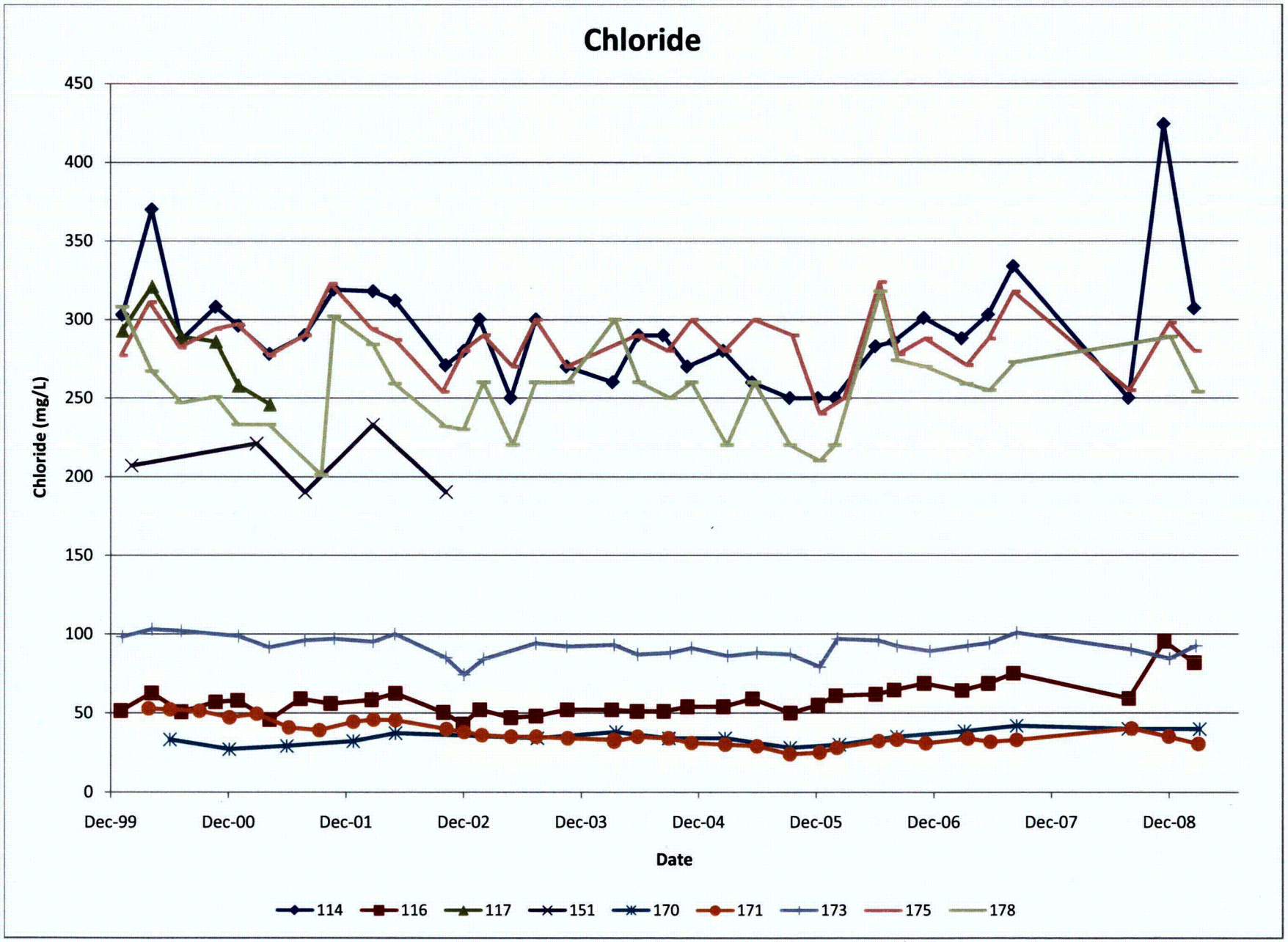
TITLE

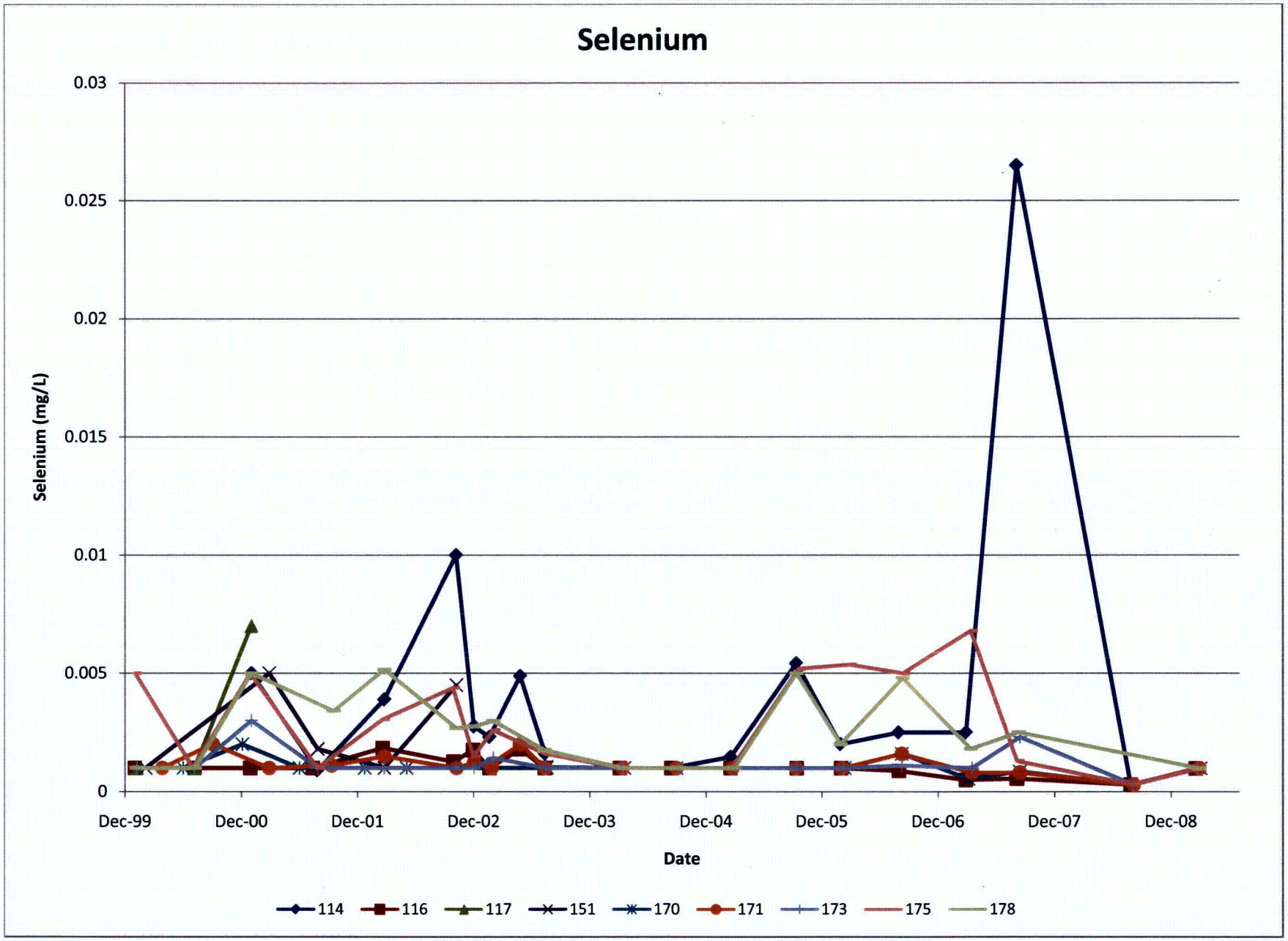
HIGHLAND RECLAMATION PROJECT
MONITORING WELLS BETWEEN TAILINGS AND PIT LAKE

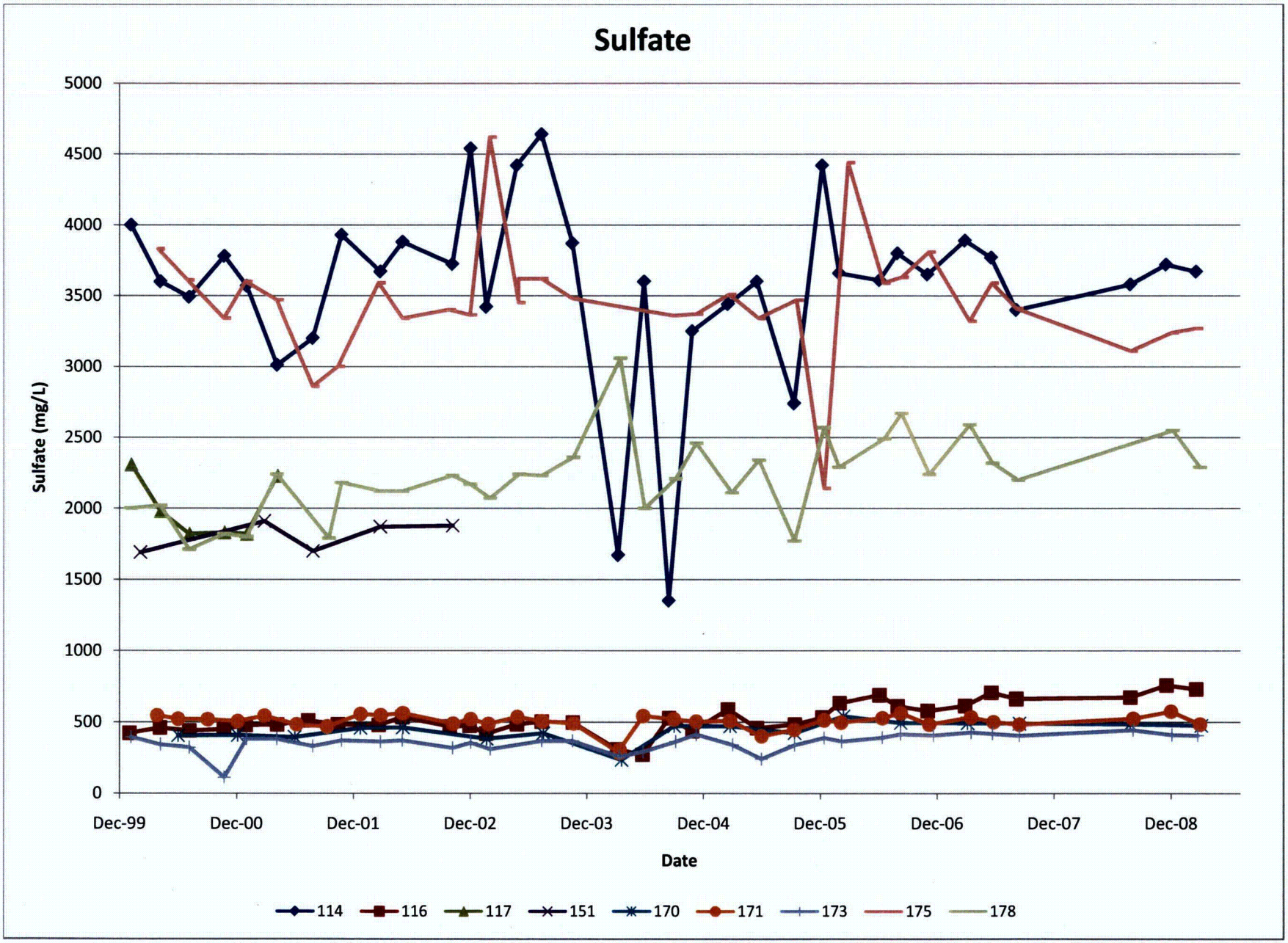
PROJECT:	100548-3	DATE:	JUNE 2009	DRAWING	REVISION
SCALE:	AS SHOWN	ACAD FILE:	LTCB-2009-06-17	1	0

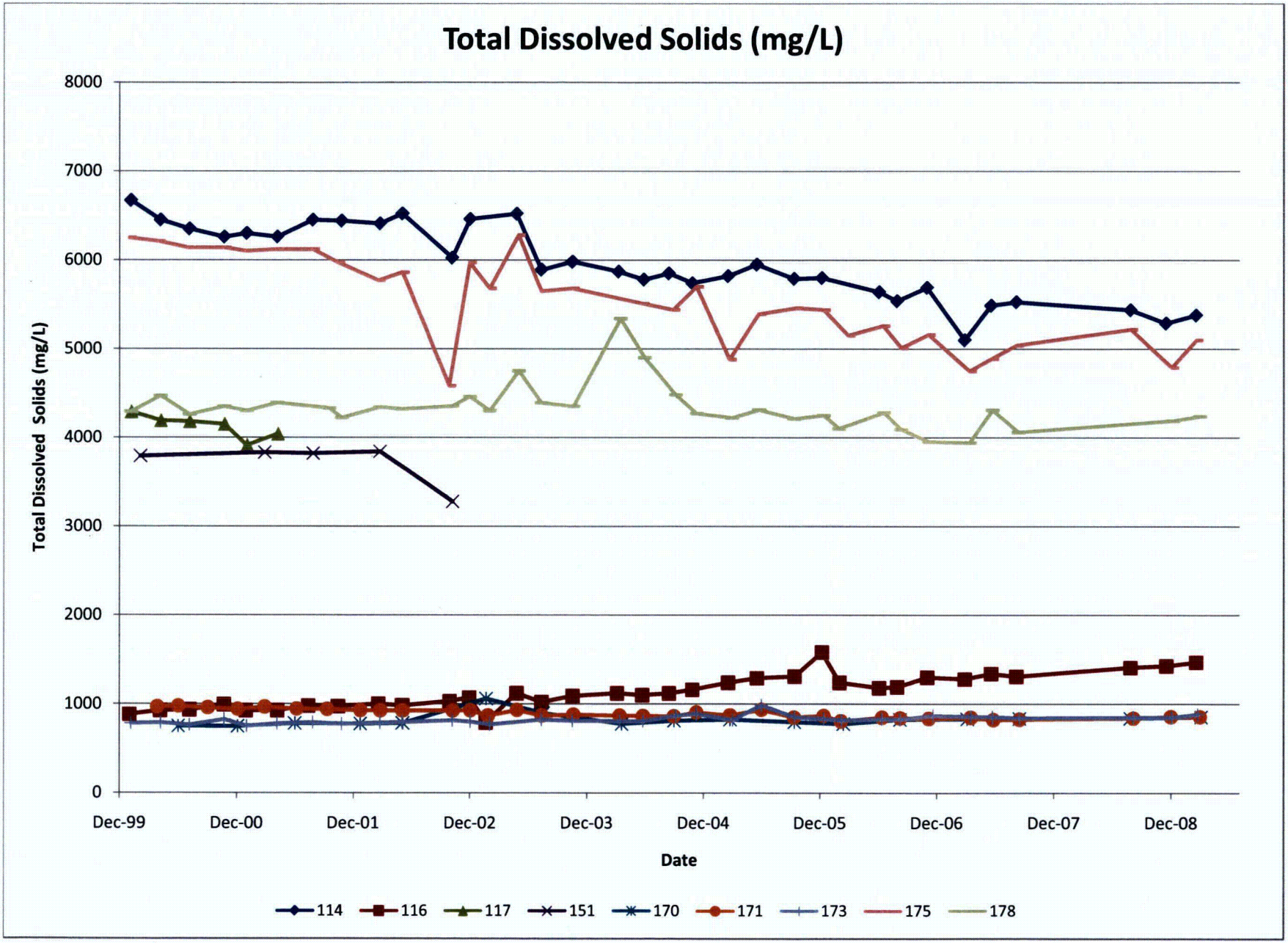

Water Elevations
Water Elevation (feet above mean sea level)
5140
5120
5100
5080
5060
5040
5020
5000
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Date
114
116
117
151
170
171
173
175
178

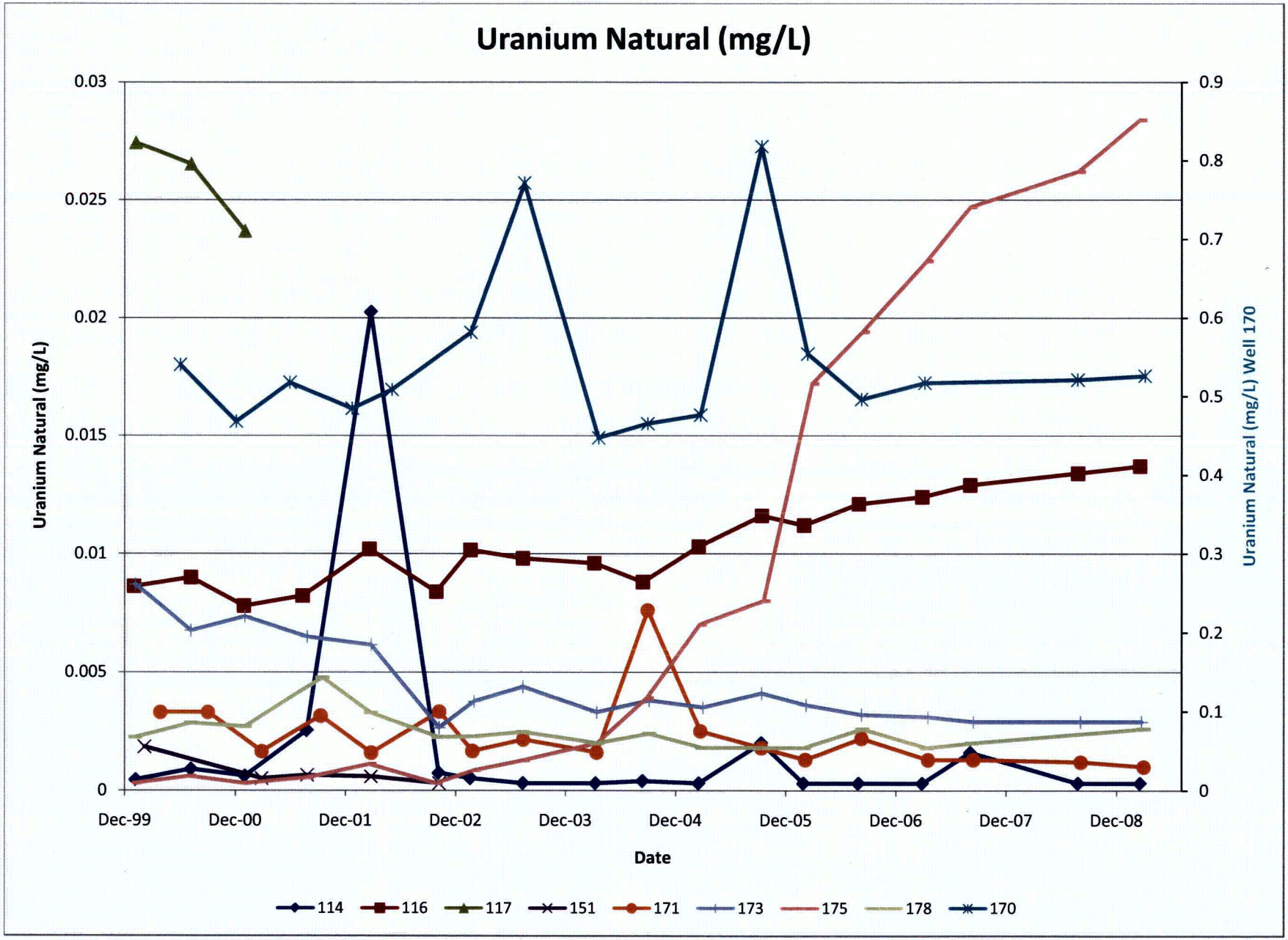

Radium (226 + 228) (pCi/L)
Radium (226 + 228) (pCi/L)
18
16
14
12
10
8
6
4
2
0
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Date
114
116
117
151
170
171
173
175
178


Chloride
Chloride (mg/L)
450
400
350
300
250
200
150
100
50
0
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Date
114
116
117
151
170
171
173
175
178


Selenium
0.03
0.025
0.02
0.015
0.01
0.005
0
Selenium (mg/L)
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Date
114
116
117
151
170
171
173
175
178


Sulfate
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Sulfate (mg/L)
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Date
114
116
117
151
170
171
173
175
178


Total Dissolved Solids (mg/L)
8000
7000
6000
5000
4000
3000
2000
1000
0
Total Dissolved Solids (mg/L)
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Date
114
116
117
151
170
171
173
175
178


Uranium Natural (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
Uranium Natural (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Uranium Natural (mg/L) Well 170
Dec-99
Dec-00
Dec-01
Dec-02
Dec-03
Dec-04
Dec-05
Dec-06
Dec-07
Dec-08
Date
114
116
117
151
171
173
175
178
170