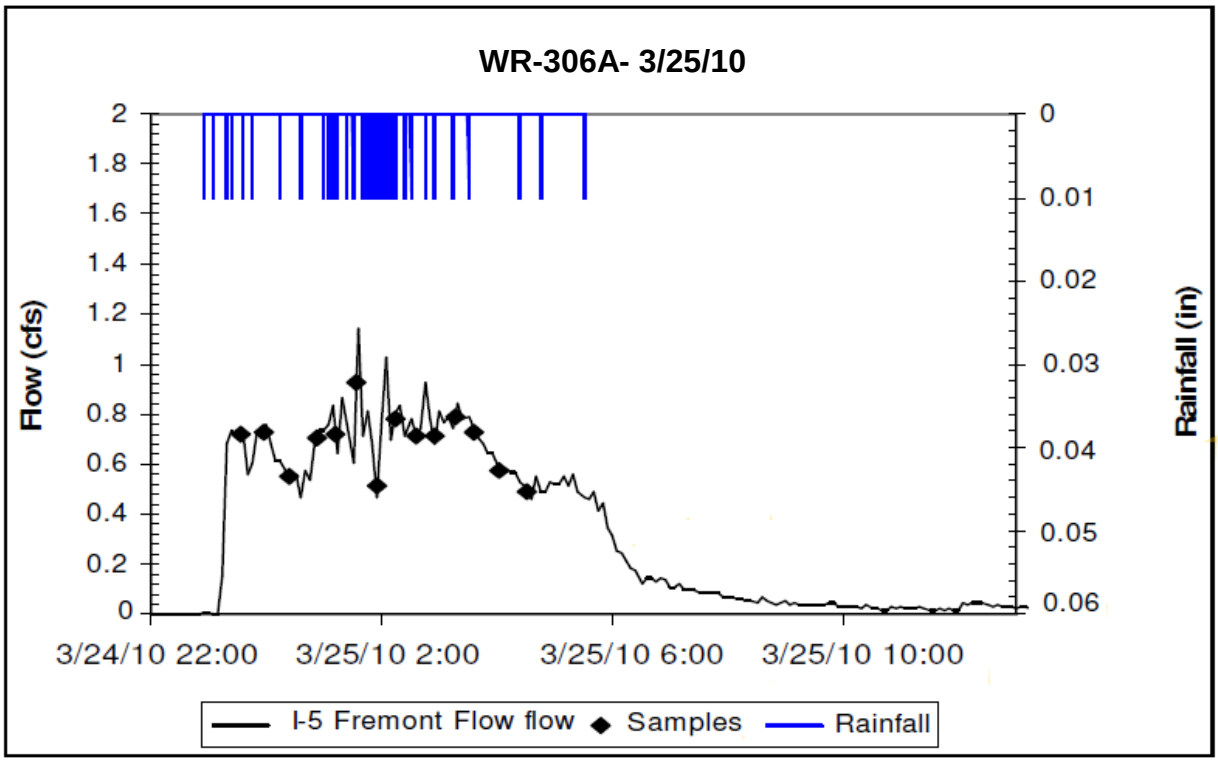
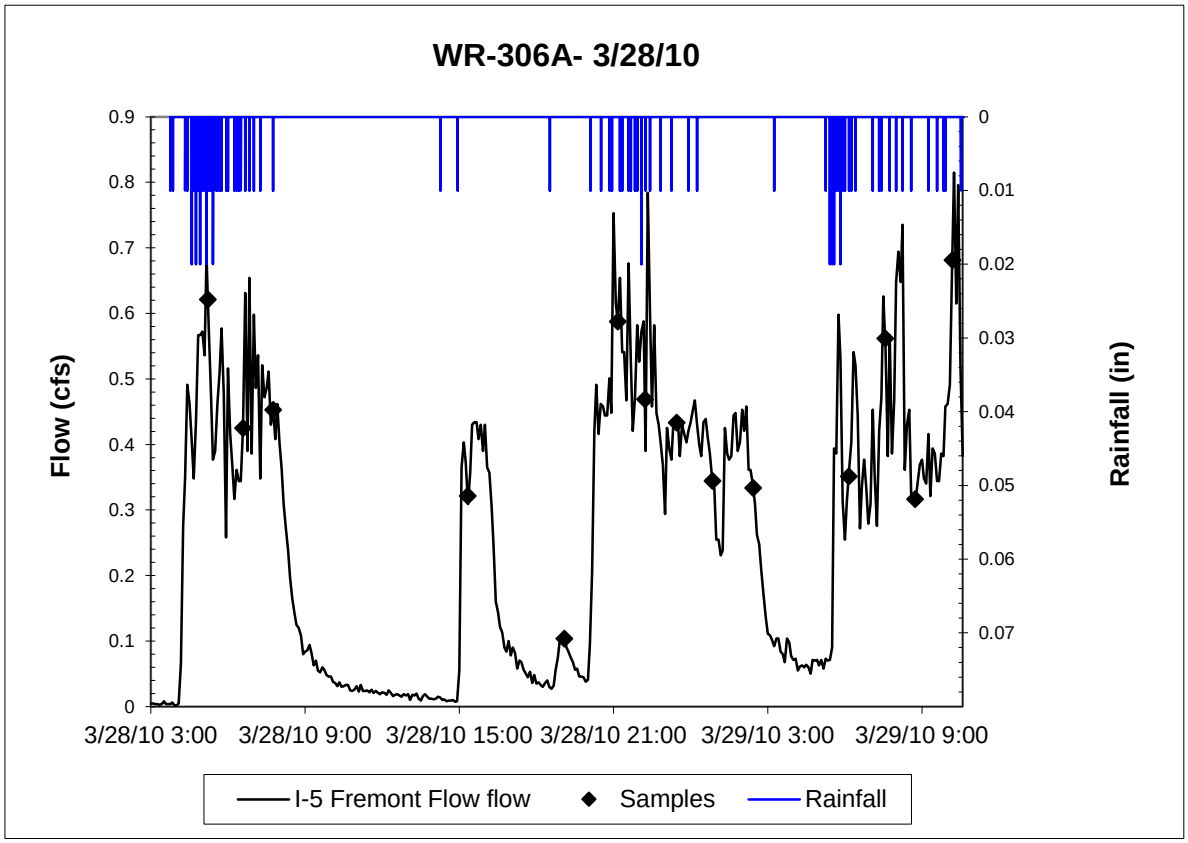
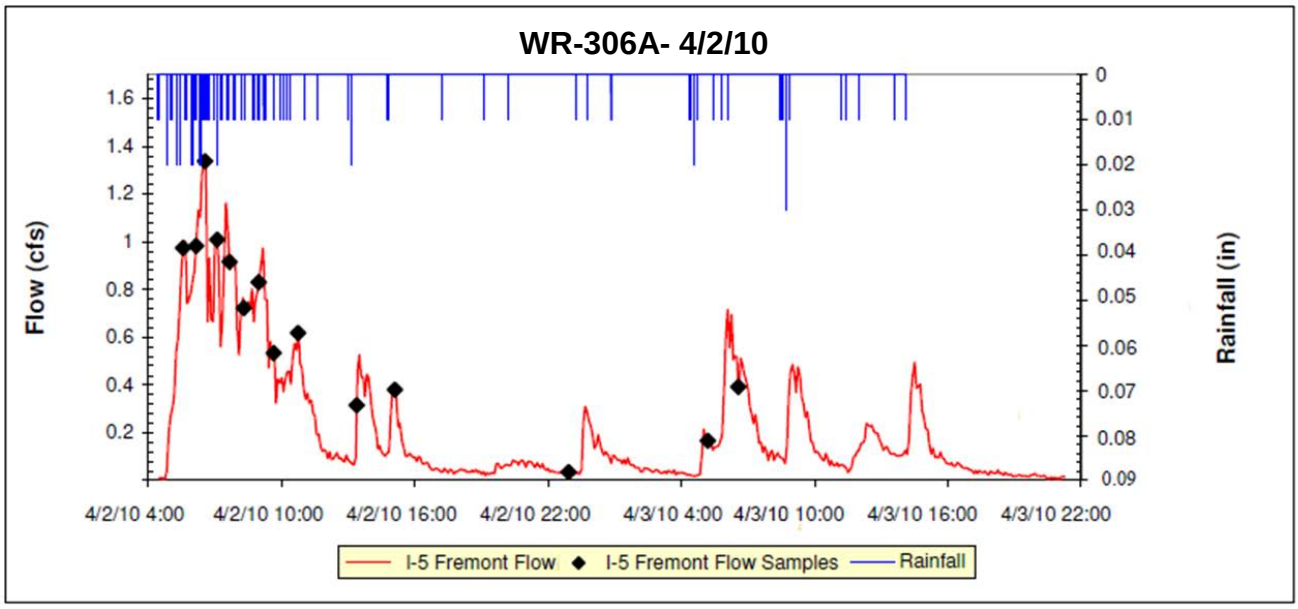
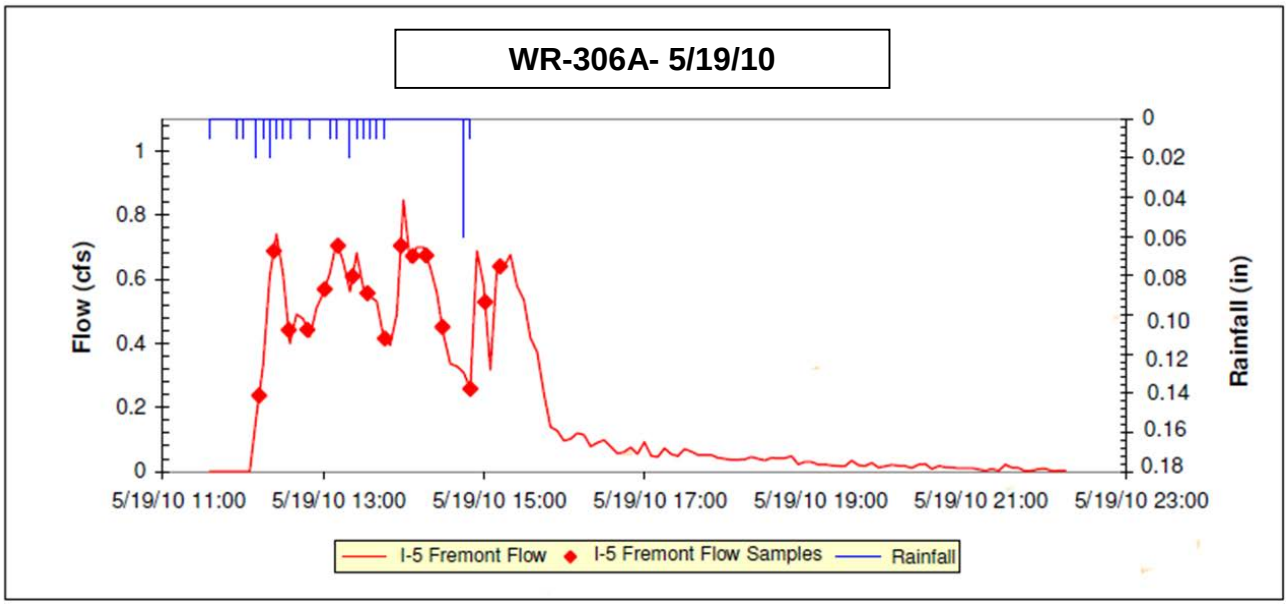
# ATTACHMENT A

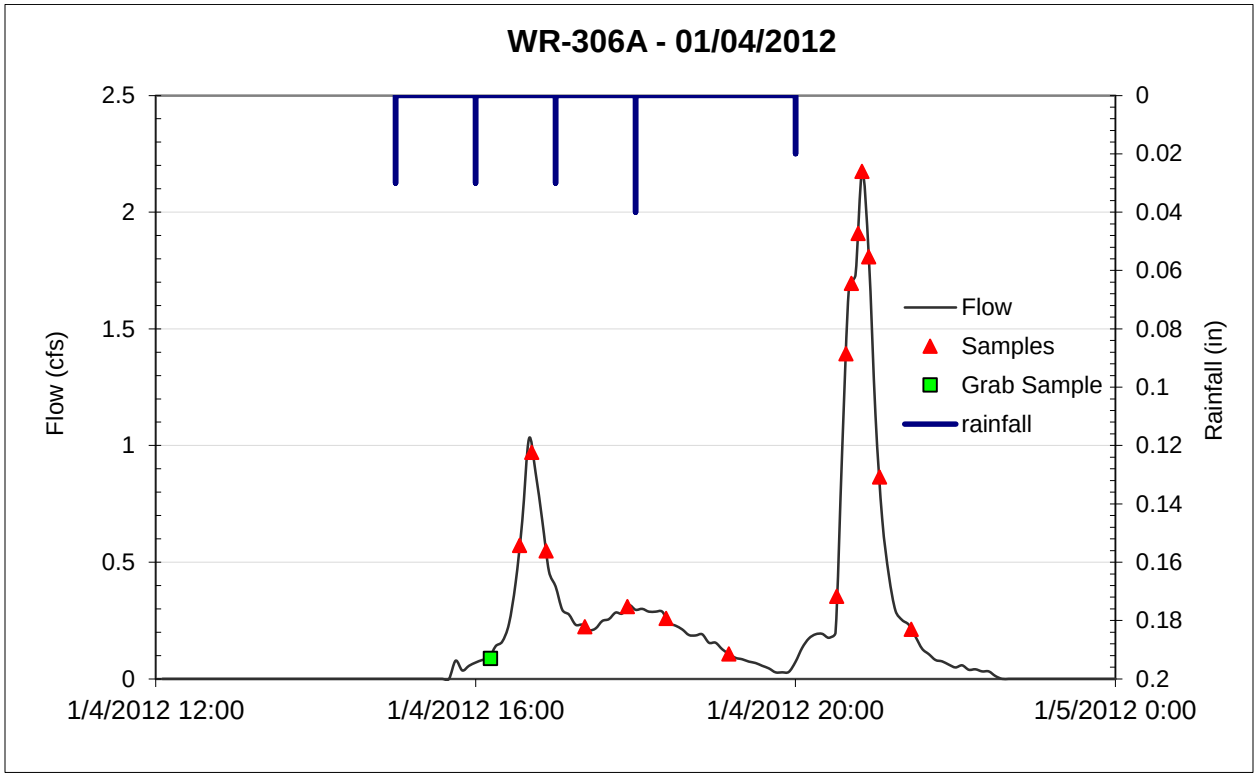
# Hydrographs for Sampled Storm Events

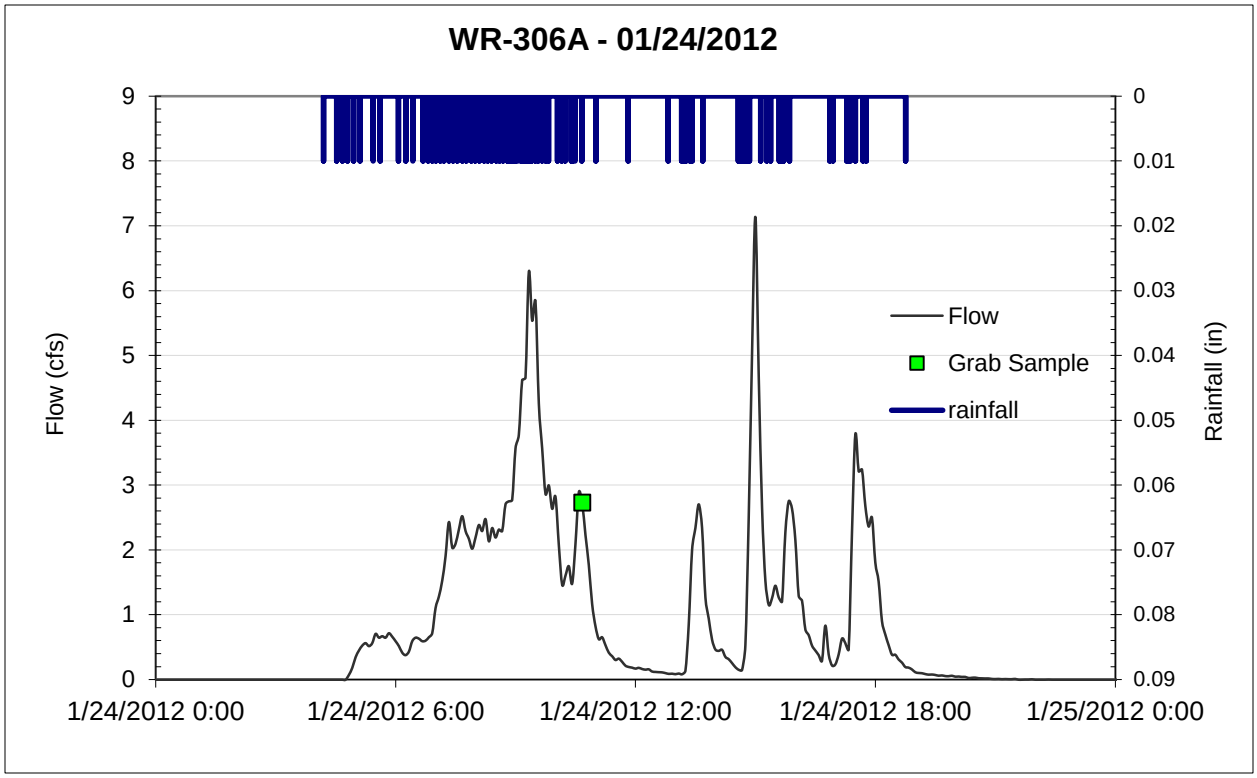

WR-306A- 3/25/10
Flow (cfs)
Rainfall (in)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.01
0.02
0.03
0.04
0.05
0.06
3/24/10 22:00
3/25/10 2:00
3/25/10 6:00
3/25/10 10:00
I-5 Fremont Flow flow
Samples
Rainfall

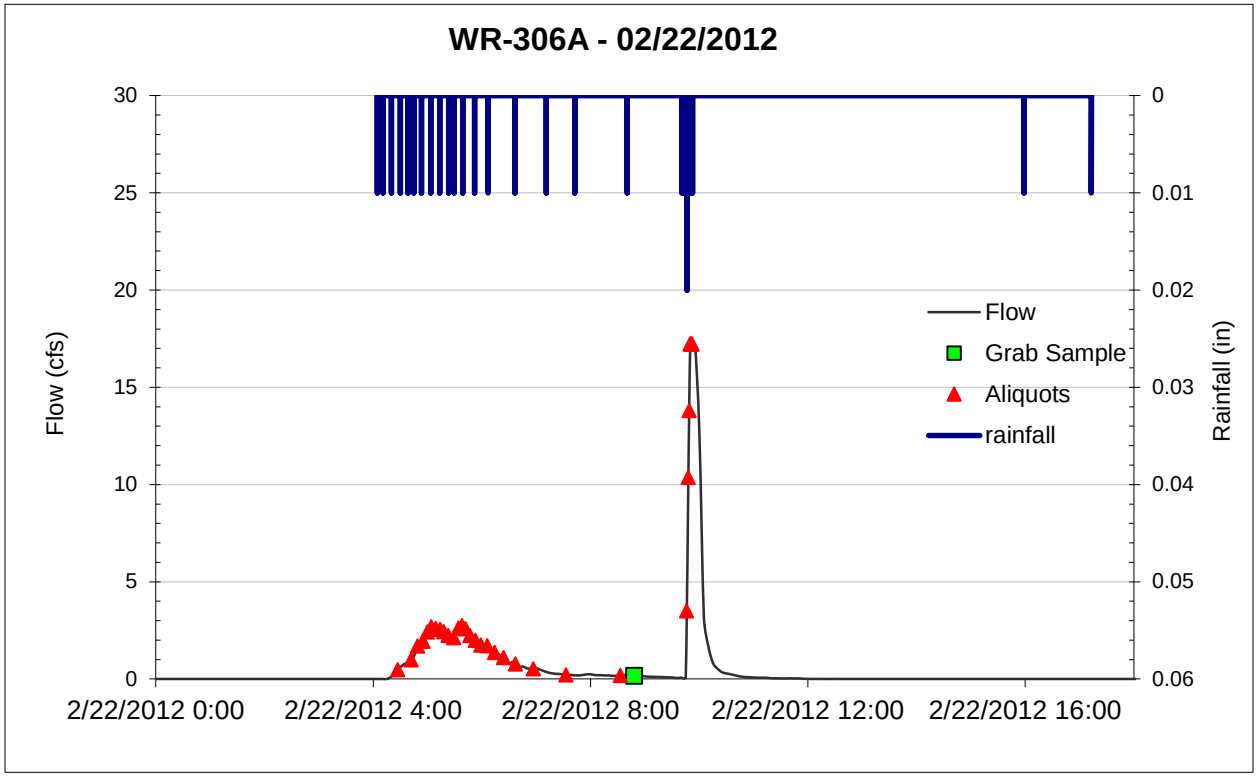

WR-306A- 3/28/10
Flow (cfs)
Rainfall (in)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
3/28/10 3:00
3/28/10 9:00
3/28/10 15:00
3/28/10 21:00
3/29/10 3:00
3/29/10 9:00
I-5 Fremont Flow flow
Samples
Rainfall

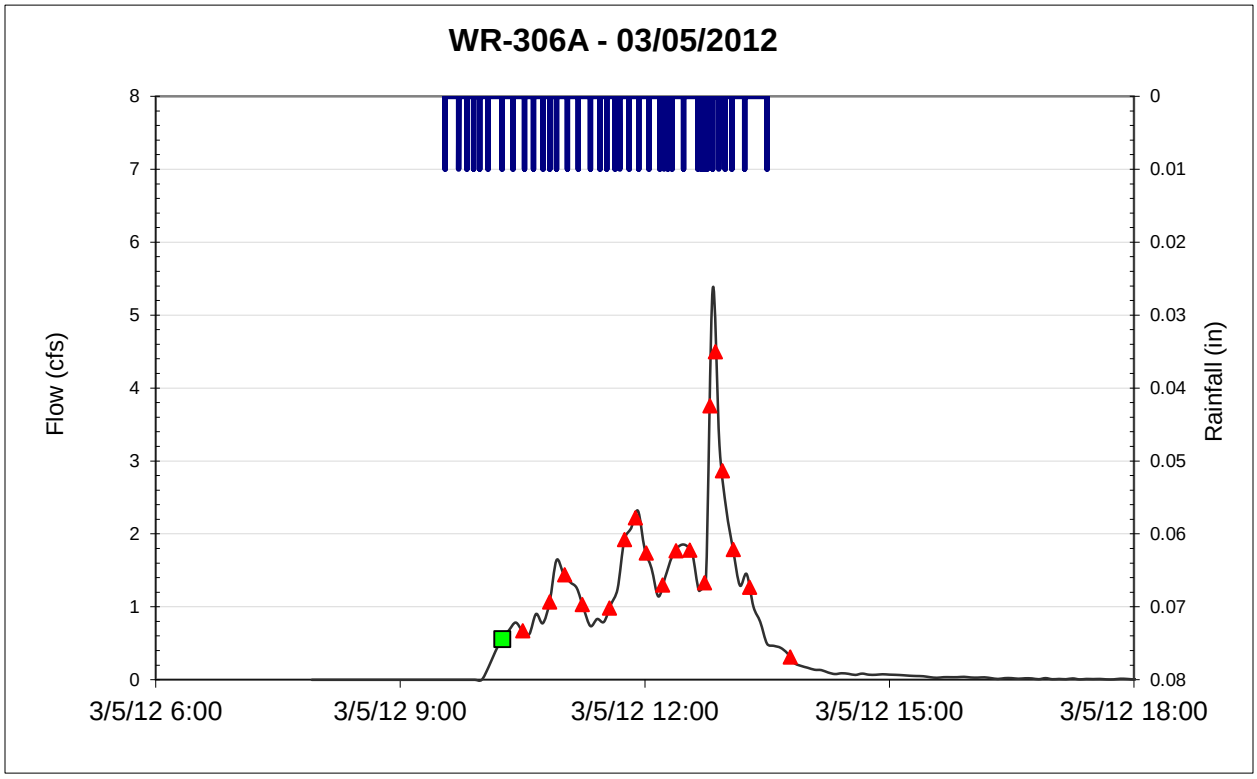

WR-306A- 4/2/10
Flow (cfs)
Rainfall (in)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
4/2/10 4:00
4/2/10 10:00
4/2/10 16:00
4/2/10 22:00
4/3/10 4:00
4/3/10 10:00
4/3/10 16:00
4/3/10 22:00
I-5 Fremont Flow
I-5 Fremont Flow Samples
Rainfall

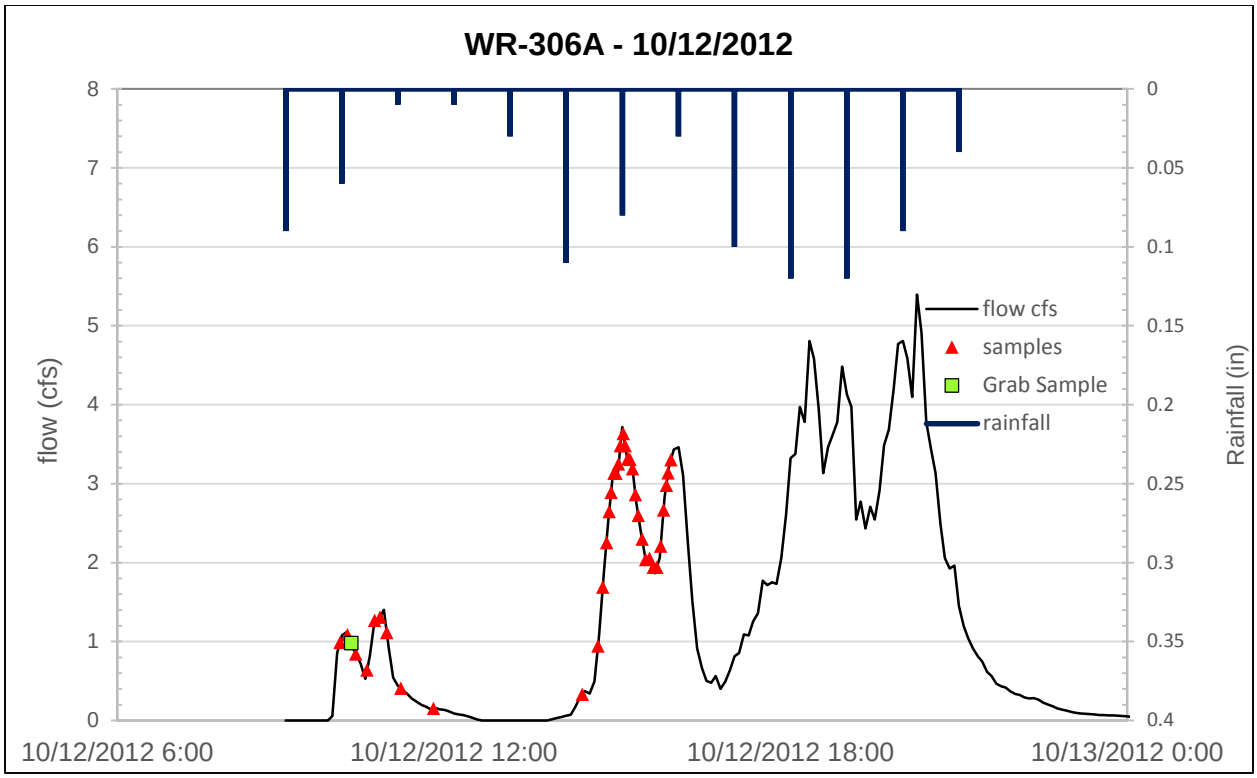

WR-306A- 5/19/10
Flow (cfs)
Rainfall (in)
1
0.8
0.6
0.4
0.2
0
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
0.18
5/19/10 11:00
5/19/10 13:00
5/19/10 15:00
5/19/10 17:00
5/19/10 19:00
5/19/10 21:00
5/19/10 23:00
I-5 Fremont Flow
I-5 Fremont Flow Samples
Rainfall

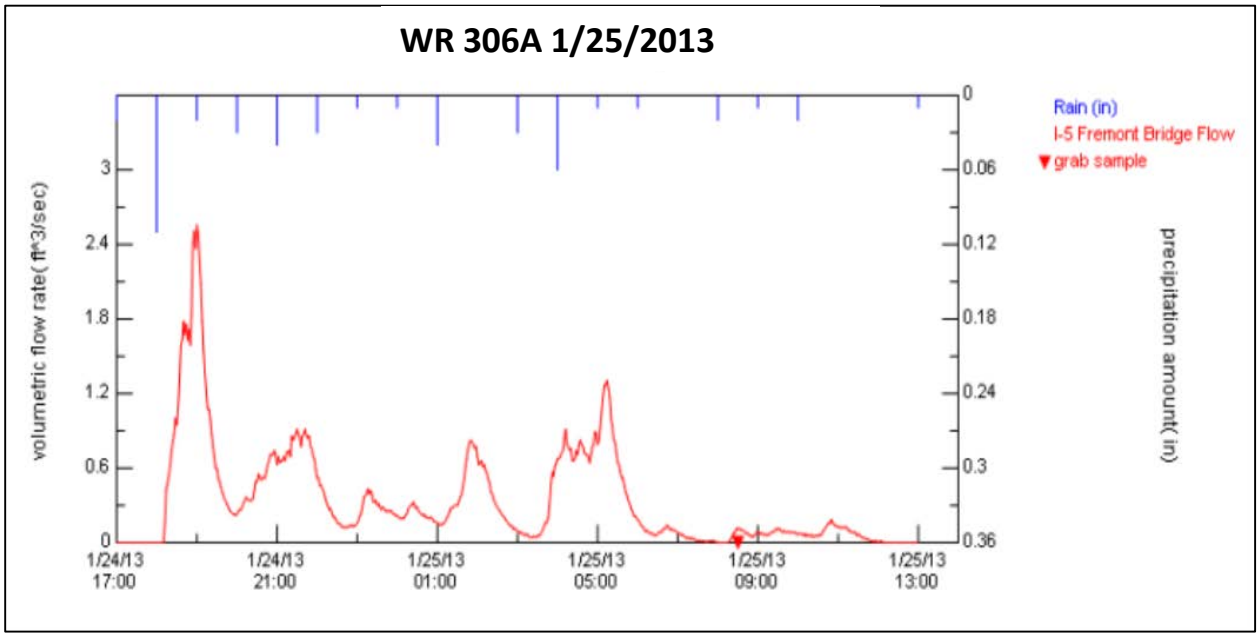

WR-306A - 01/04/2012
Flow (cfs)
Rainfall (in)
2.5
2
1.5
1
0.5
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
1/4/2012 12:00
1/4/2012 16:00
1/4/2012 20:00
1/5/2012 0:00
Flow
Samples
Grab Sample
rainfall

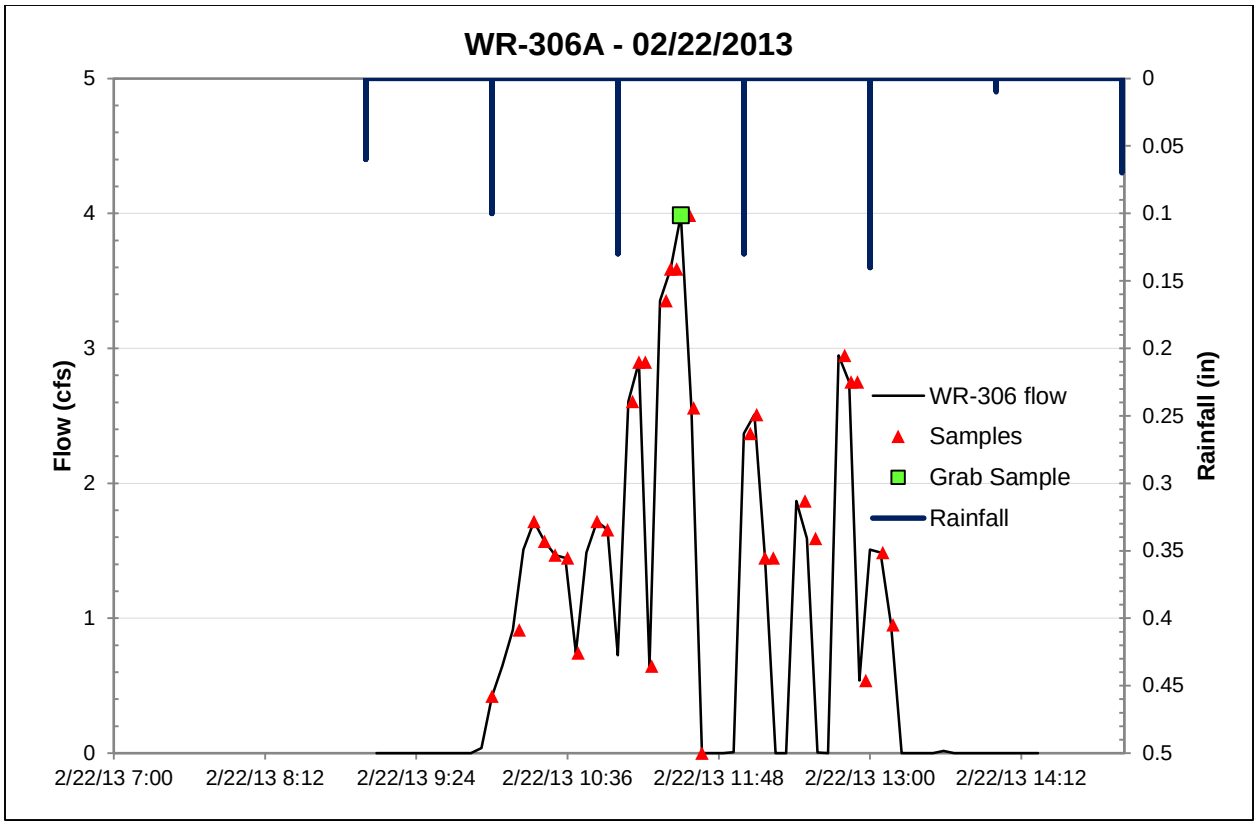

WR-306A - 01/24/2012
Flow (cfs)
Rainfall (in)
9
8
7
6
5
4
3
2
1
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
1/24/2012 0:00
1/24/2012 6:00
1/24/2012 12:00
1/24/2012 18:00
1/25/2012 0:00
Flow
Grab Sample
rainfall

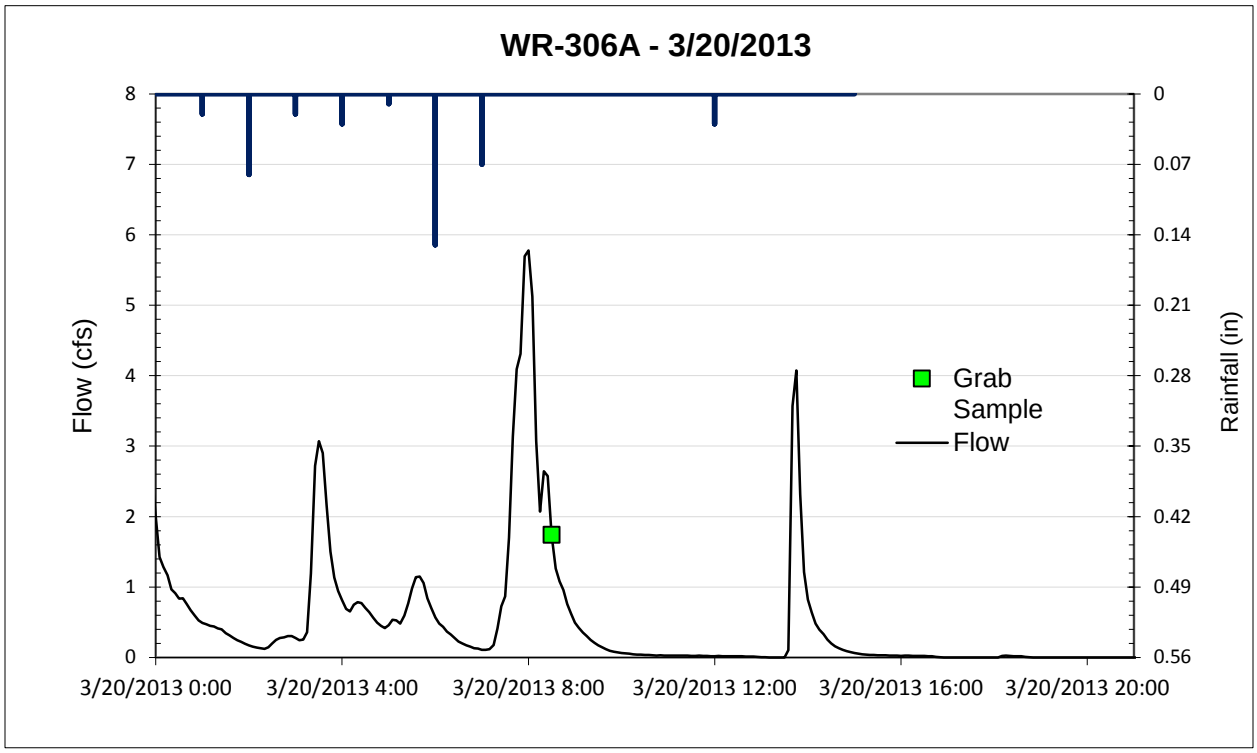

WR-306A - 02/22/2012
Flow (cfs)
Rainfall (in)
30
25
20
15
10
5
0
0
0.01
0.02
0.03
0.04
0.05
0.06
Flow
Grab Sample
Aliquots
rainfall
2/22/2012 0:00
2/22/2012 4:00
2/22/2012 8:00
2/22/2012 12:00
2/22/2012 16:00

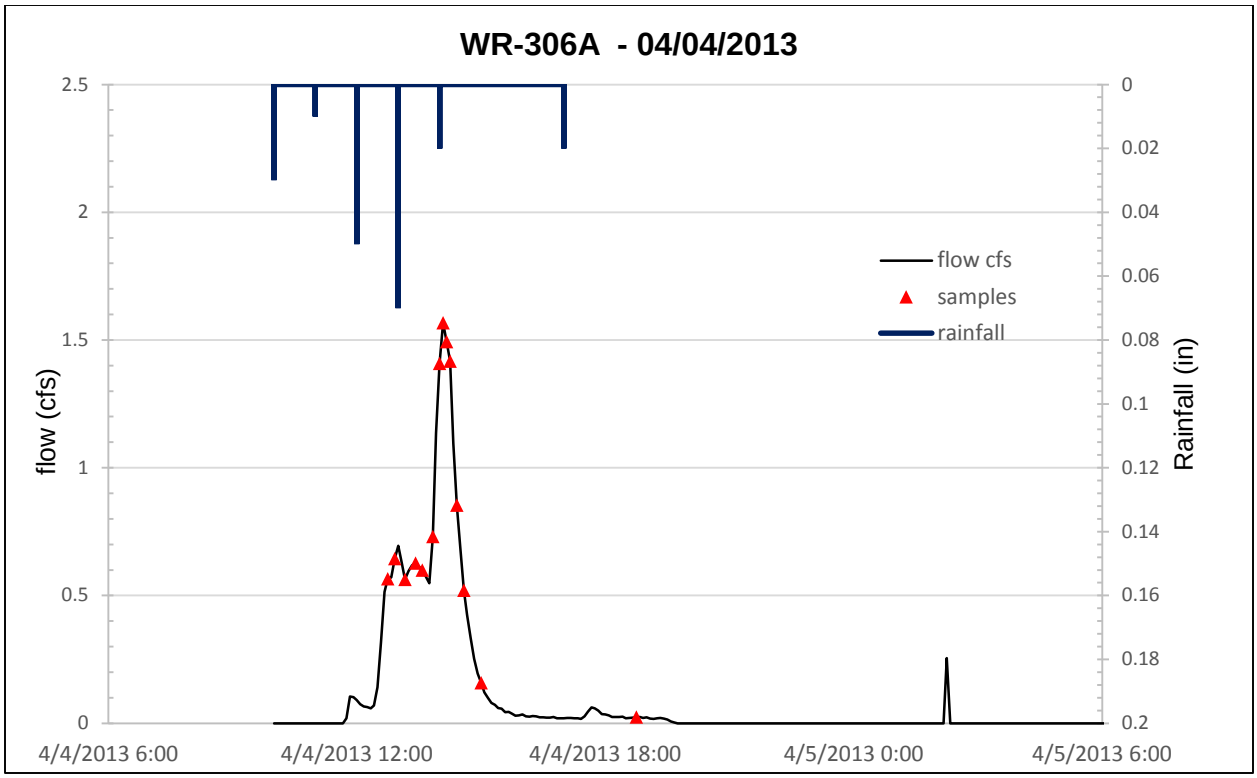

WR-306A - 03/05/2012
Flow (cfs)
Rainfall (in)
8
7
6
5
4
3
2
1
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
3/5/12 6:00
3/5/12 9:00
3/5/12 12:00
3/5/12 15:00
3/5/12 18:00

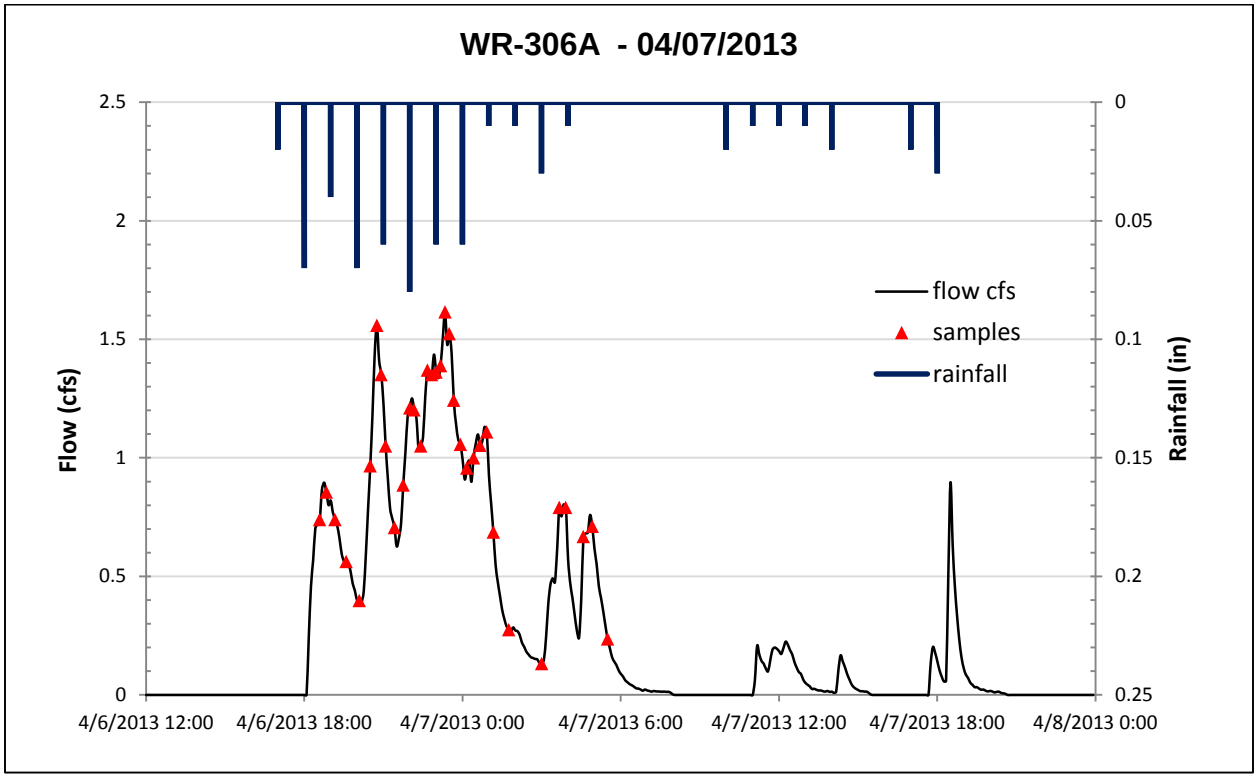

WR-306A - 10/12/2012
flow (cfs)
Rainfall (in)
flow cfs
samples
Grab Sample
rainfall
10/12/2012 6:00
10/12/2012 12:00
10/12/2012 18:00
10/13/2012 0:00

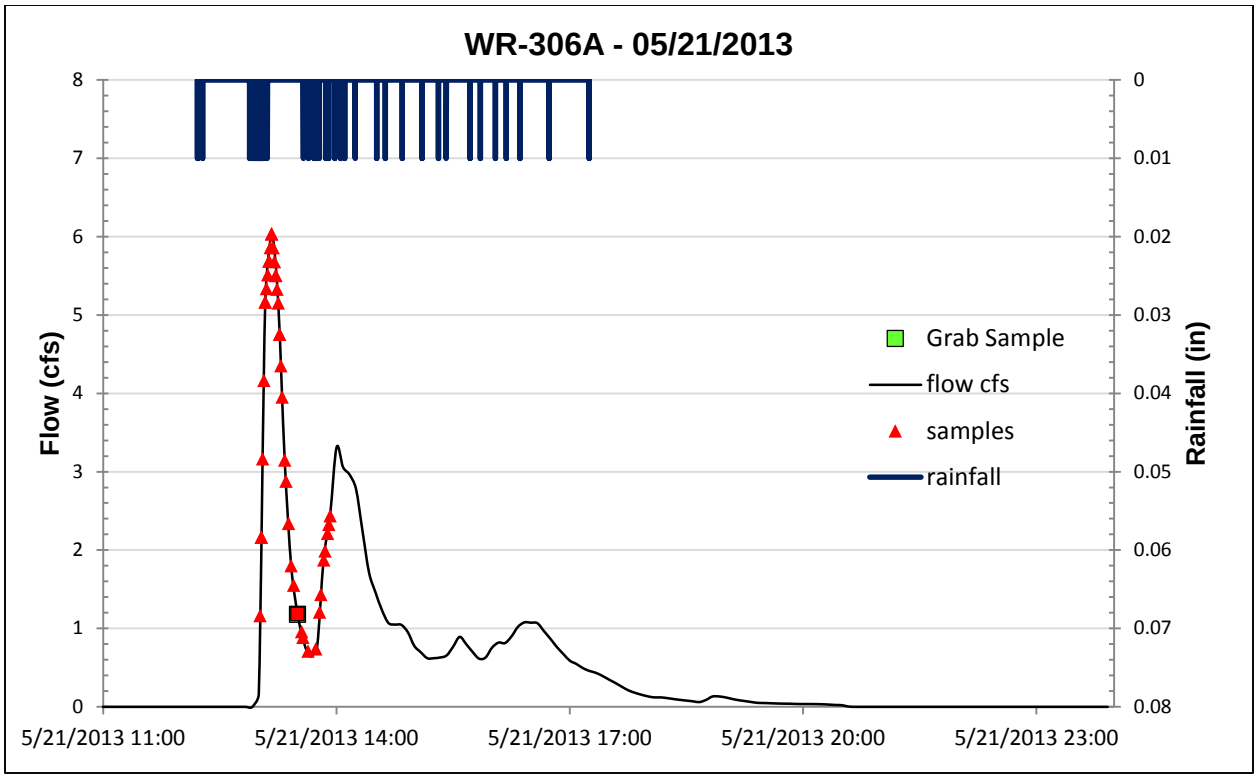

WR 306A 1/25/2013
volumetric flow rate( ft^3/sec)
precipitation amount( in)
Rain (in)
I-5 Fremont Bridge Flow
grab sample
1/24/13 17:00
1/24/13 21:00
1/25/13 01:00
1/25/13 05:00
1/25/13 09:00
1/25/13 13:00

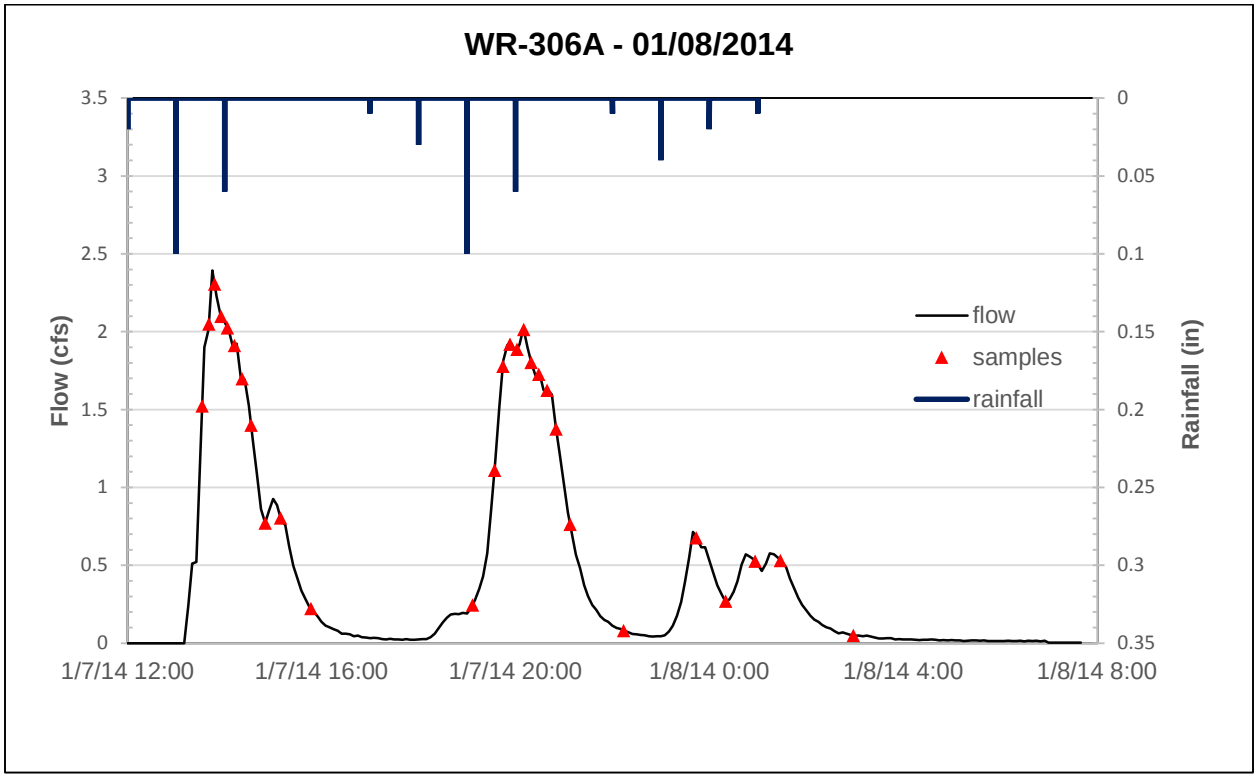

WR-306A - 02/22/2013
Flow (cfs)
Rainfall (in)
WR-306 flow
Samples
Grab Sample
Rainfall
0
1
2
3
4
5
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
2/22/13 7:00
2/22/13 8:12
2/22/13 9:24
2/22/13 10:36
2/22/13 11:48
2/22/13 13:00
2/22/13 14:12

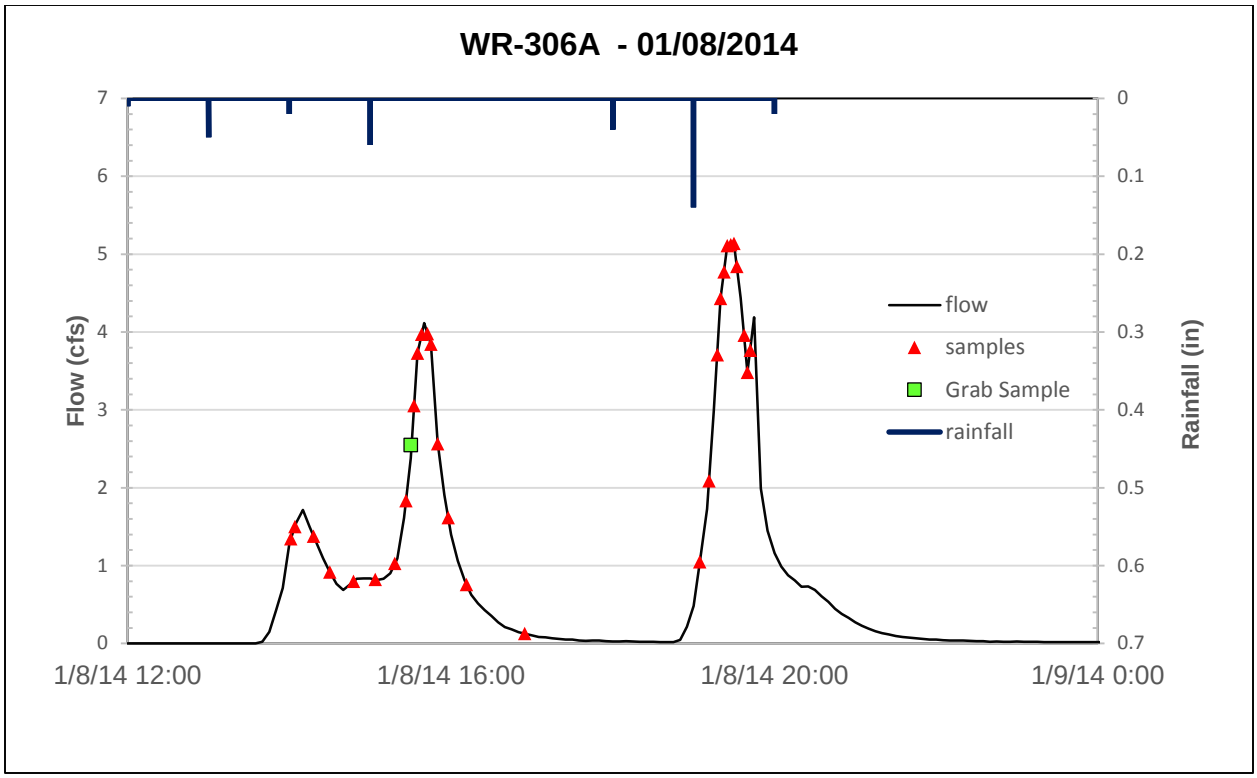

WR-306A - 3/20/2013
Flow (cfs)
Rainfall (in)
Grab Sample
Flow
0
1
2
3
4
5
6
7
8
0
0.07
0.14
0.21
0.28
0.35
0.42
0.49
0.56
3/20/2013 0:00
3/20/2013 4:00
3/20/2013 8:00
3/20/2013 12:00
3/20/2013 16:00
3/20/2013 20:00

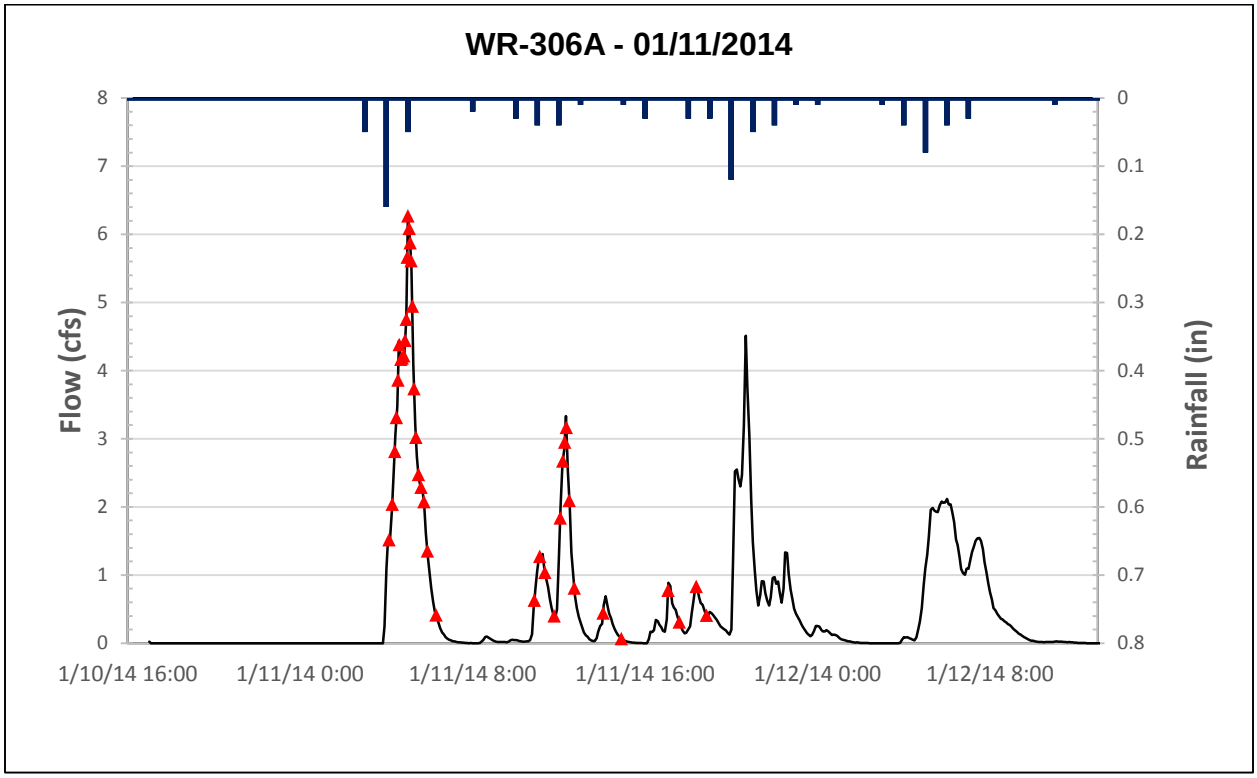

WR-306A - 04/04/2013
flow (cfs)
Rainfall (in)
flow cfs
samples
rainfall
2.5
2
1.5
1
0.5
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
4/4/2013 6:00
4/4/2013 12:00
4/4/2013 18:00
4/5/2013 0:00
4/5/2013 6:00

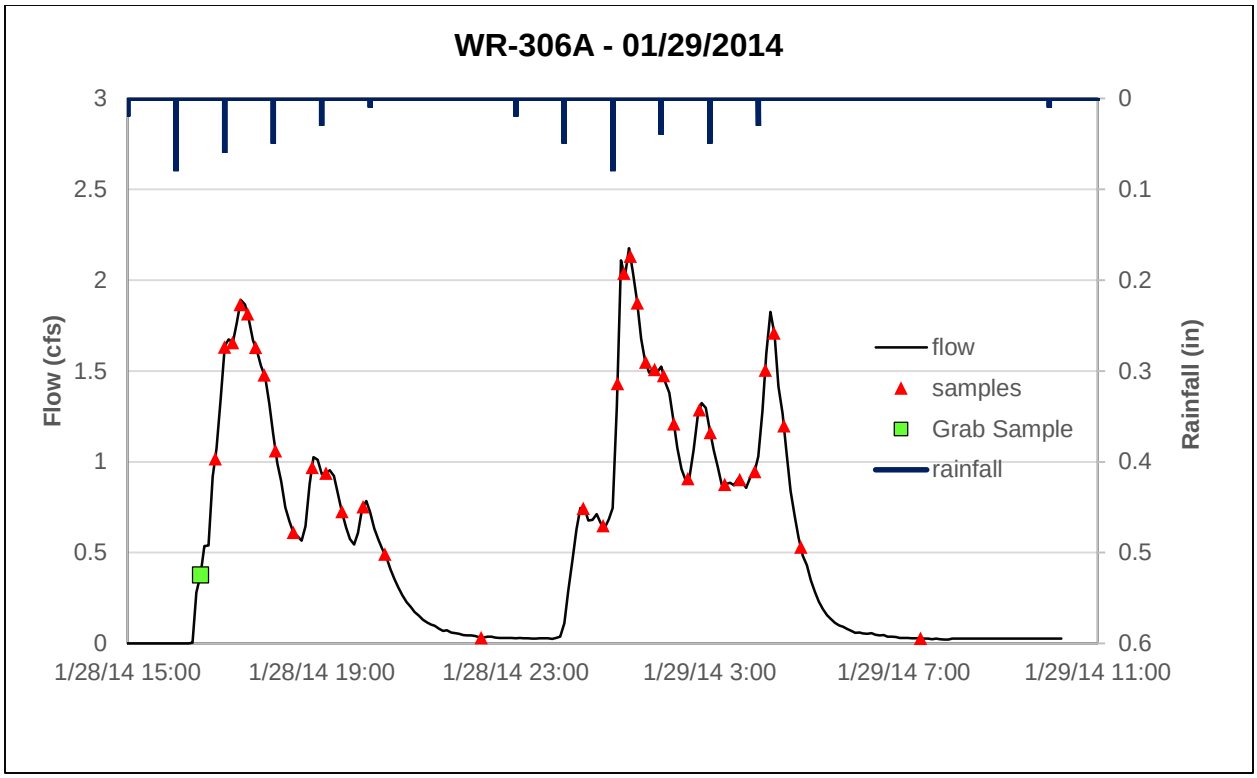

WR-306A - 04/07/2013
Flow (cfs)
Rainfall (in)
flow cfs
samples
rainfall
2.5
2
1.5
1
0.5
0
0
0.05
0.1
0.15
0.2
0.25
4/6/2013 12:00
4/6/2013 18:00
4/7/2013 0:00
4/7/2013 6:00
4/7/2013 12:00
4/7/2013 18:00
4/8/2013 0:00

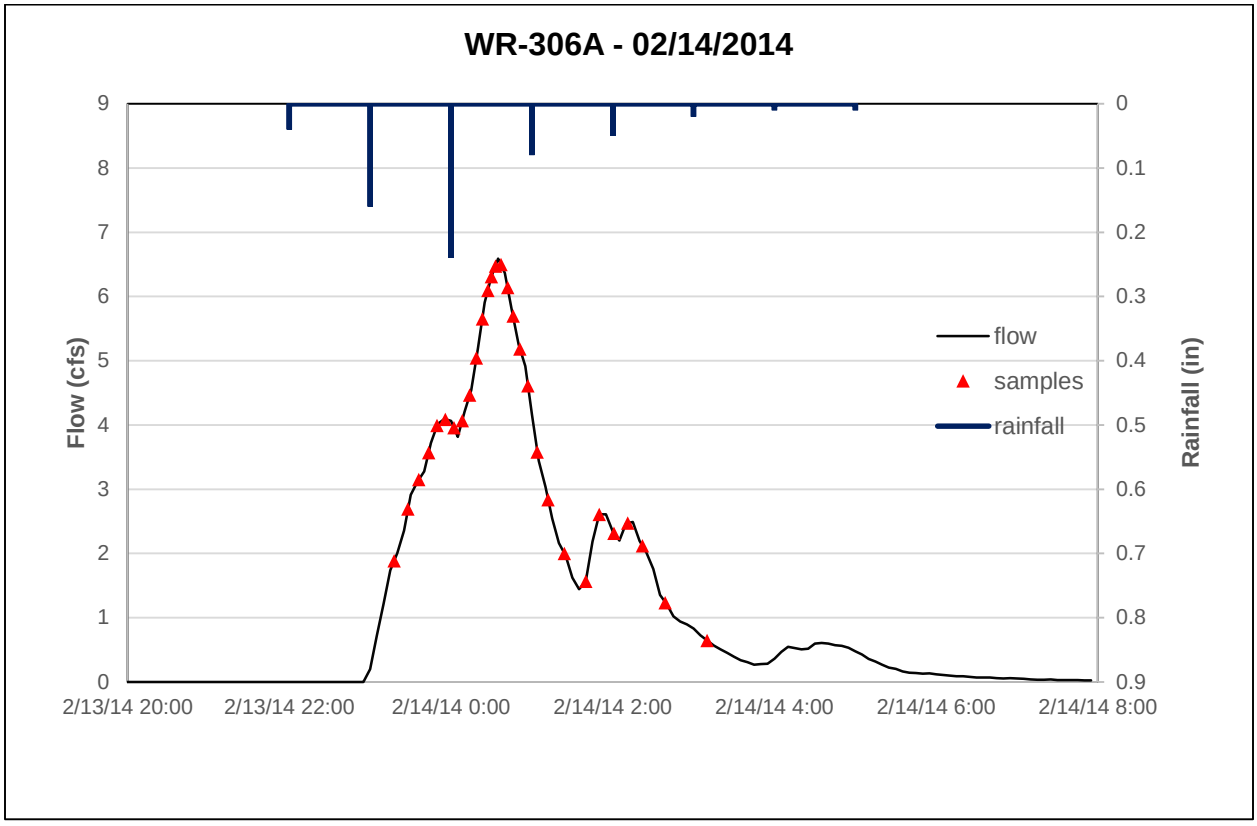

WR-306A - 05/21/2013
Flow (cfs)
Rainfall (in)
Grab Sample
flow cfs
samples
rainfall
5/21/2013 11:00
5/21/2013 14:00
5/21/2013 17:00
5/21/2013 20:00
5/21/2013 23:00

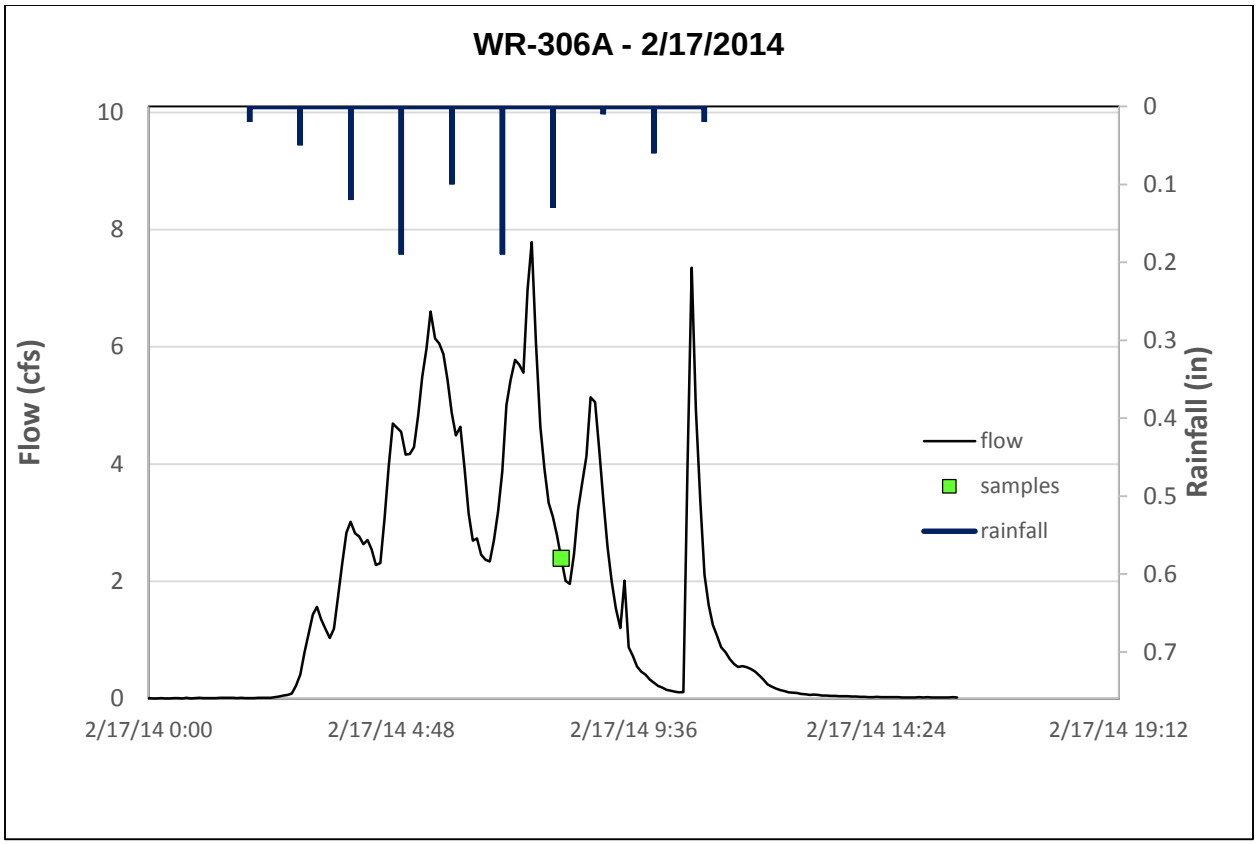

WR-306A - 01/08/2014
Flow (cfs)
Rainfall (in)
flow
samples
rainfall
1/7/14 12:00
1/7/14 16:00
1/7/14 20:00
1/8/14 0:00
1/8/14 4:00
1/8/14 8:00

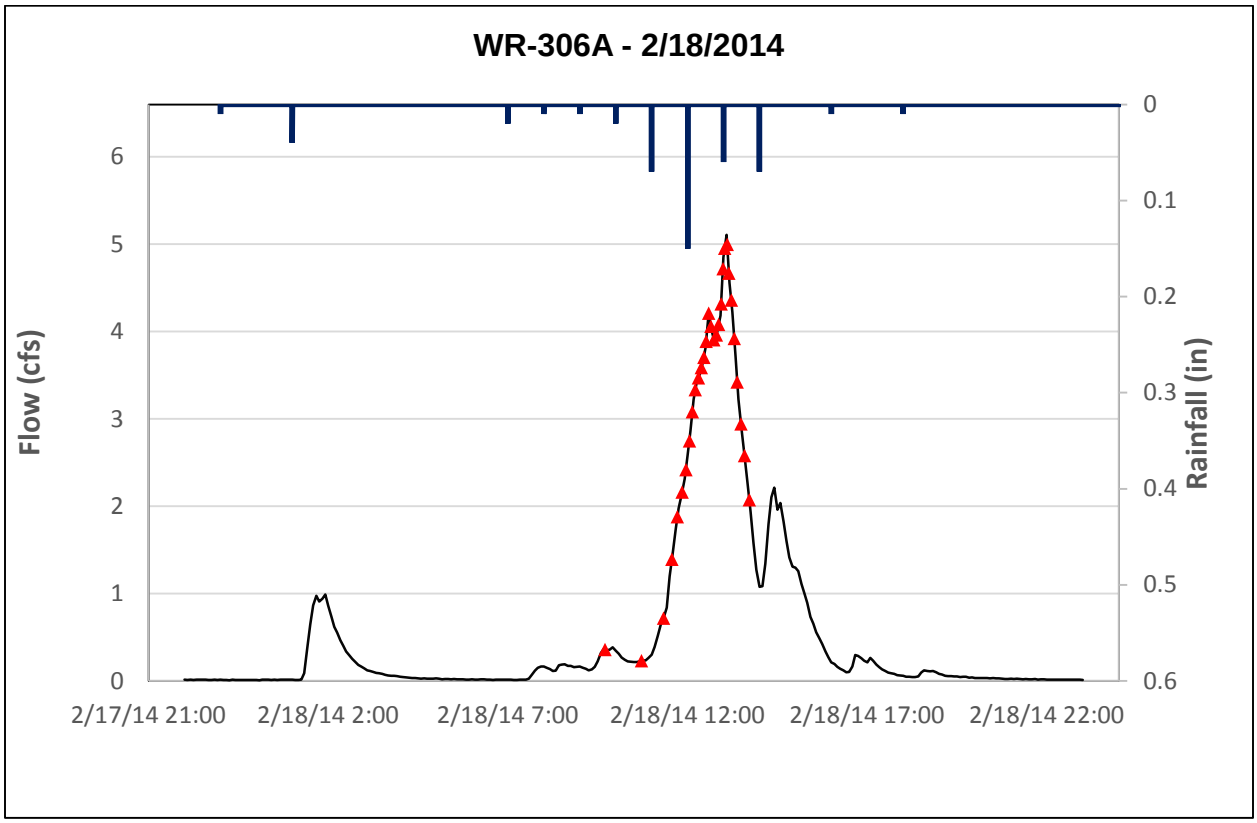

WR-306A - 01/08/2014
Flow (cfs)
Rainfall (in)
flow
samples
Grab Sample
rainfall
1/8/14 12:00
1/8/14 16:00
1/8/14 20:00
1/9/14 0:00

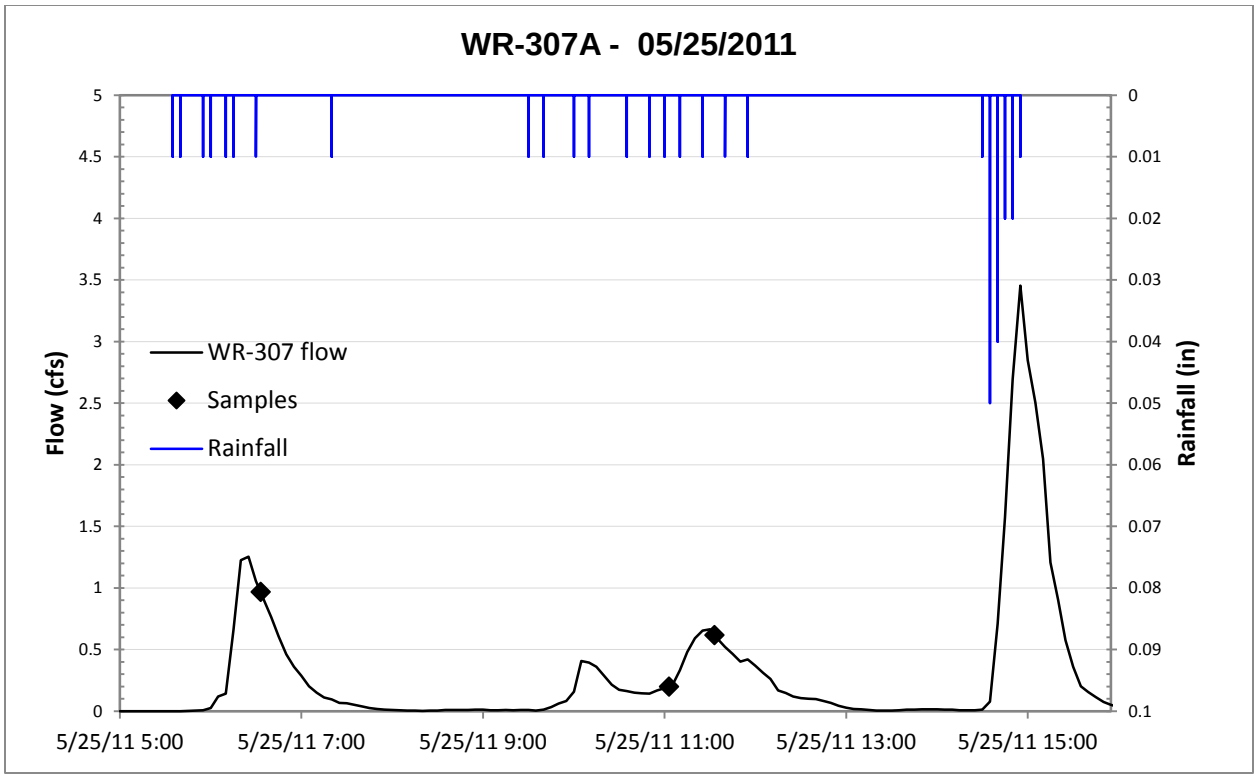

WR-306A - 01/11/2014
Flow (cfs)
Rainfall (in)
1/10/14 16:00
1/11/14 0:00
1/11/14 8:00
1/11/14 16:00
1/12/14 0:00
1/12/14 8:00

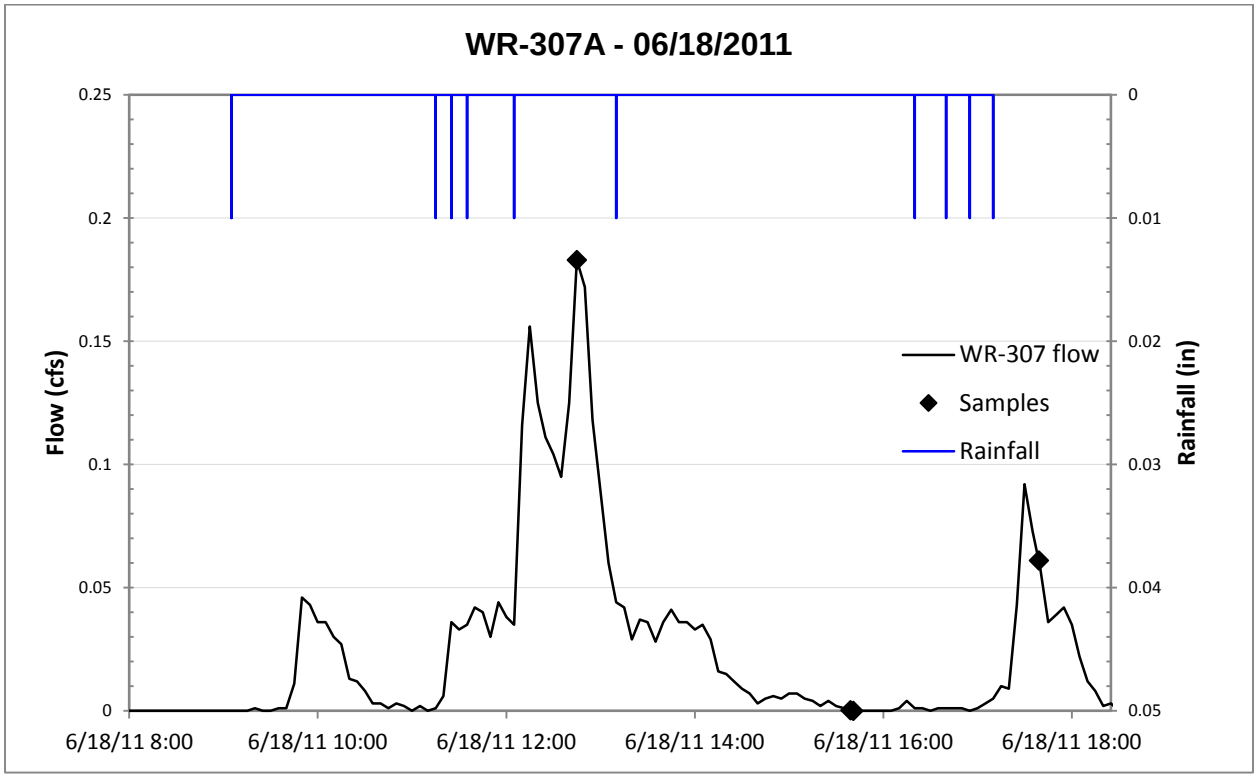

WR-306A - 01/29/2014
Flow (cfs)
Rainfall (in)
3
2.5
2
1.5
1
0.5
0
0
0.1
0.2
0.3
0.4
0.5
0.6
1/28/14 15:00
1/28/14 19:00
1/28/14 23:00
1/29/14 3:00
1/29/14 7:00
1/29/14 11:00
flow
samples
Grab Sample
rainfall

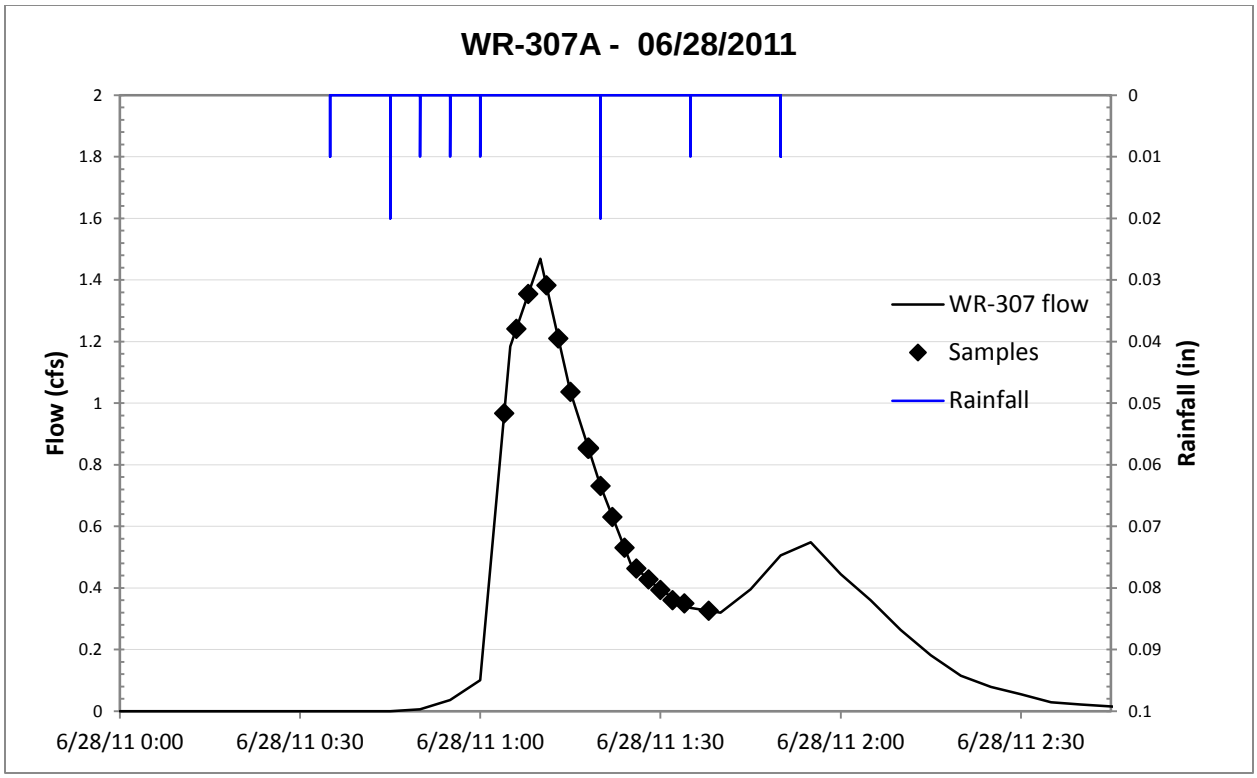

WR-306A - 02/14/2014
Flow (cfs)
Rainfall (in)
9
8
7
6
5
4
3
2
1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
2/13/14 20:00
2/13/14 22:00
2/14/14 0:00
2/14/14 2:00
2/14/14 4:00
2/14/14 6:00
2/14/14 8:00
flow
samples
rainfall

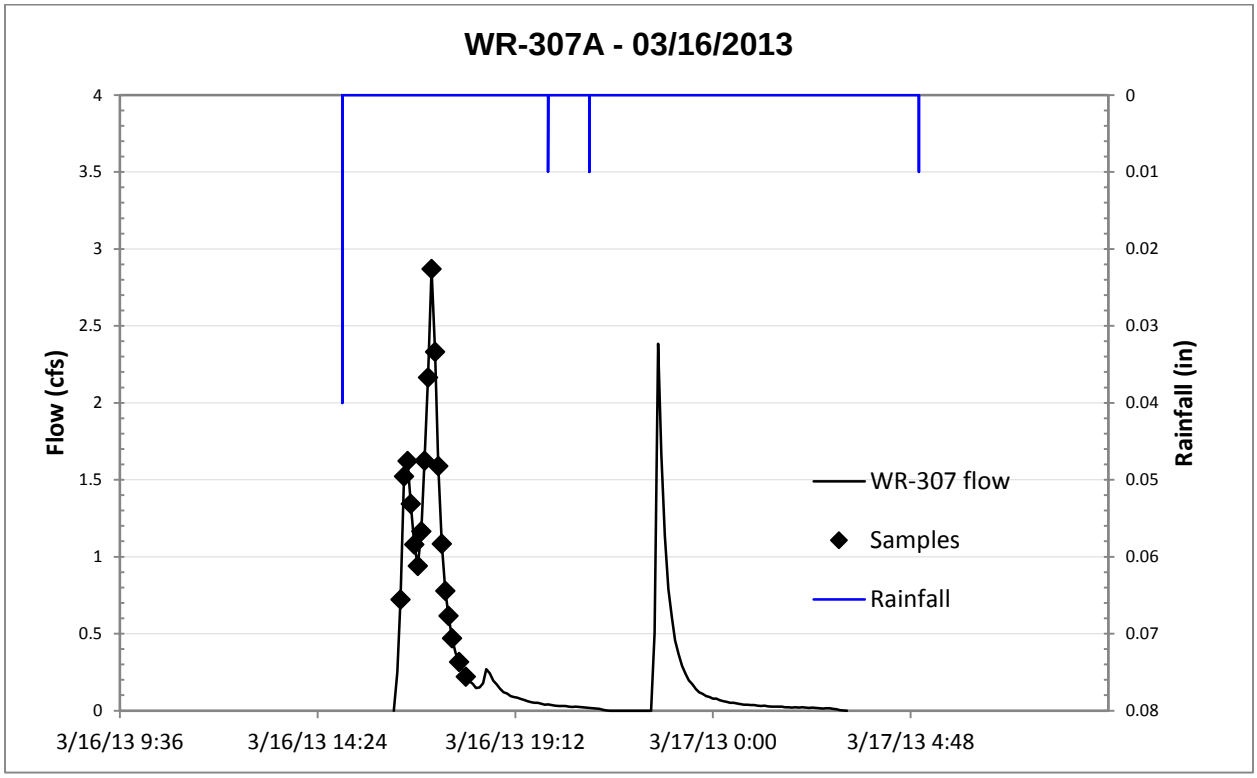

WR-306A - 2/17/2014
Flow (cfs)
Rainfall (in)
10
8
6
4
2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
flow
samples
rainfall
2/17/14 0:00
2/17/14 4:48
2/17/14 9:36
2/17/14 14:24
2/17/14 19:12

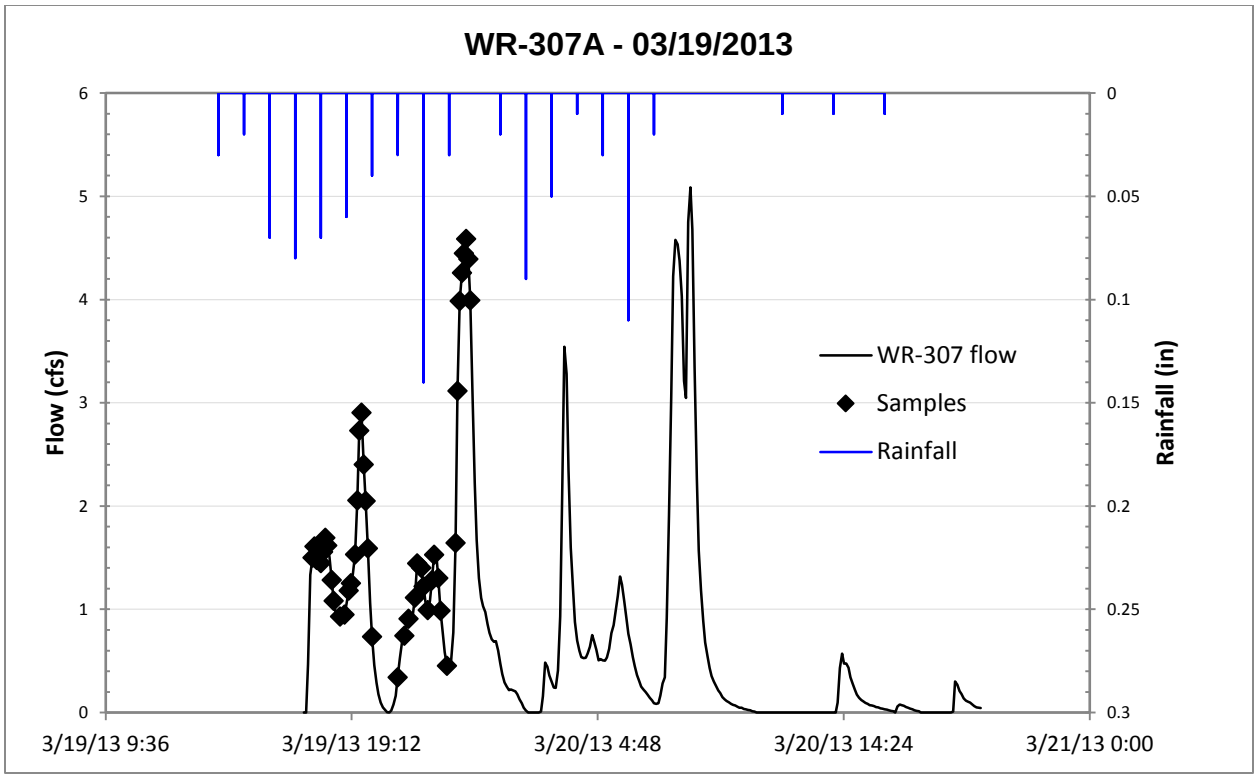

WR-306A - 2/18/2014
Flow (cfs)
Rainfall (in)
6
5
4
3
2
1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
2/17/14 21:00
2/18/14 2:00
2/18/14 7:00
2/18/14 12:00
2/18/14 17:00
2/18/14 22:00

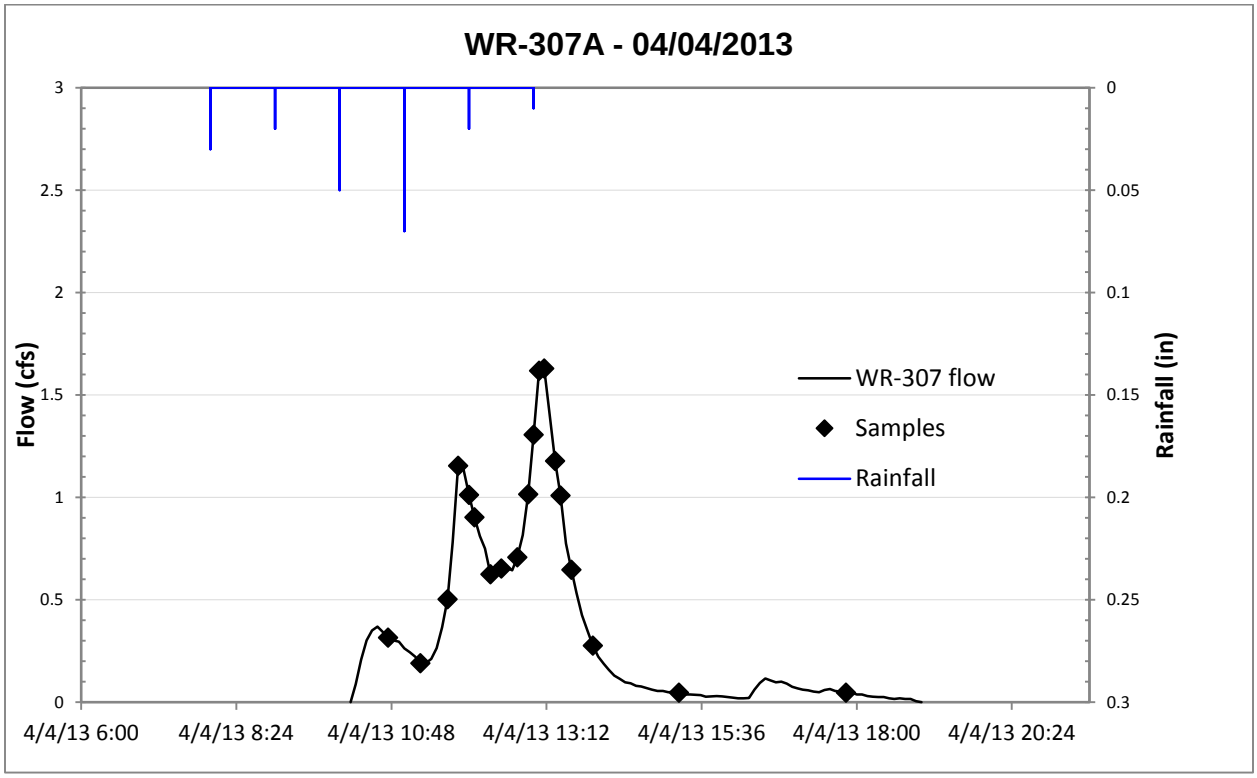

WR-307A - 05/25/2011
Flow (cfs)
Rainfall (in)
WR-307 flow
Samples
Rainfall
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
5/25/11 5:00
5/25/11 7:00
5/25/11 9:00
5/25/11 11:00
5/25/11 13:00
5/25/11 15:00

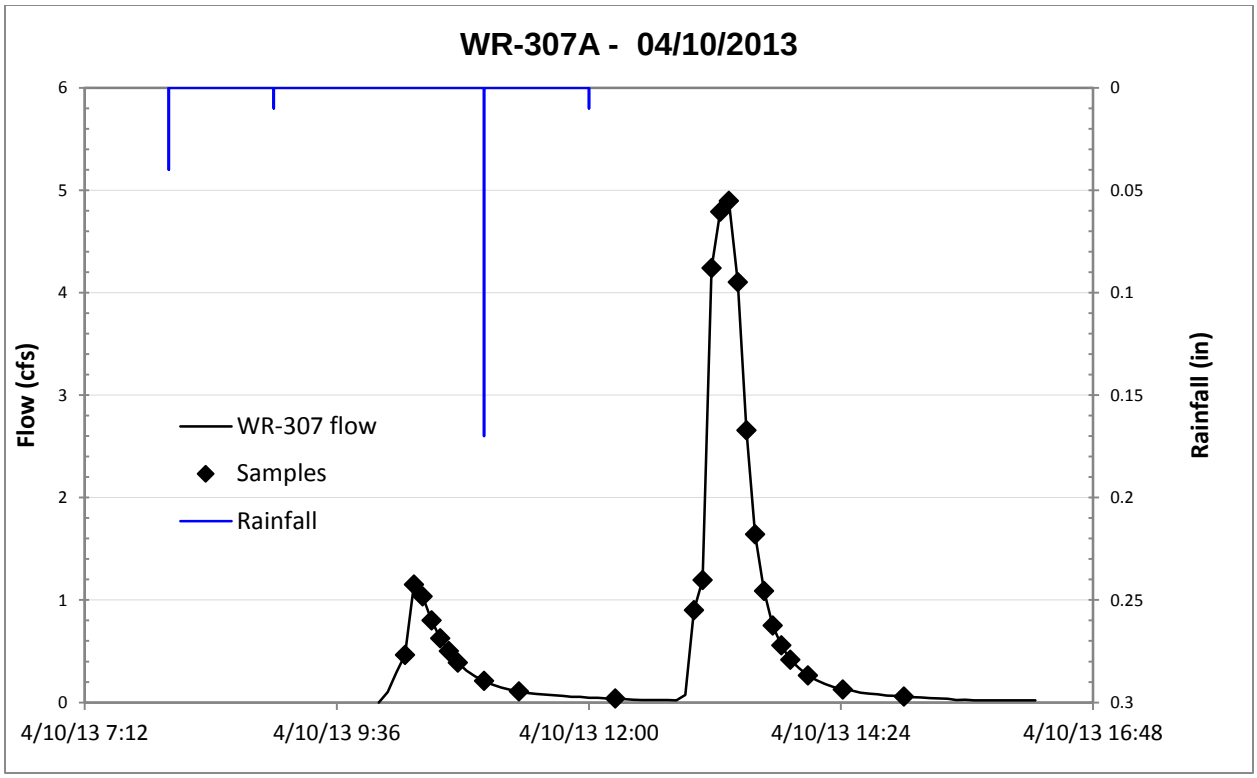

WR-307A - 06/18/2011
Flow (cfs)
Rainfall (in)
WR-307 flow
Samples
Rainfall
0.25
0.2
0.15
0.1
0.05
0
0
0.01
0.02
0.03
0.04
0.05
6/18/11 8:00
6/18/11 10:00
6/18/11 12:00
6/18/11 14:00
6/18/11 16:00
6/18/11 18:00

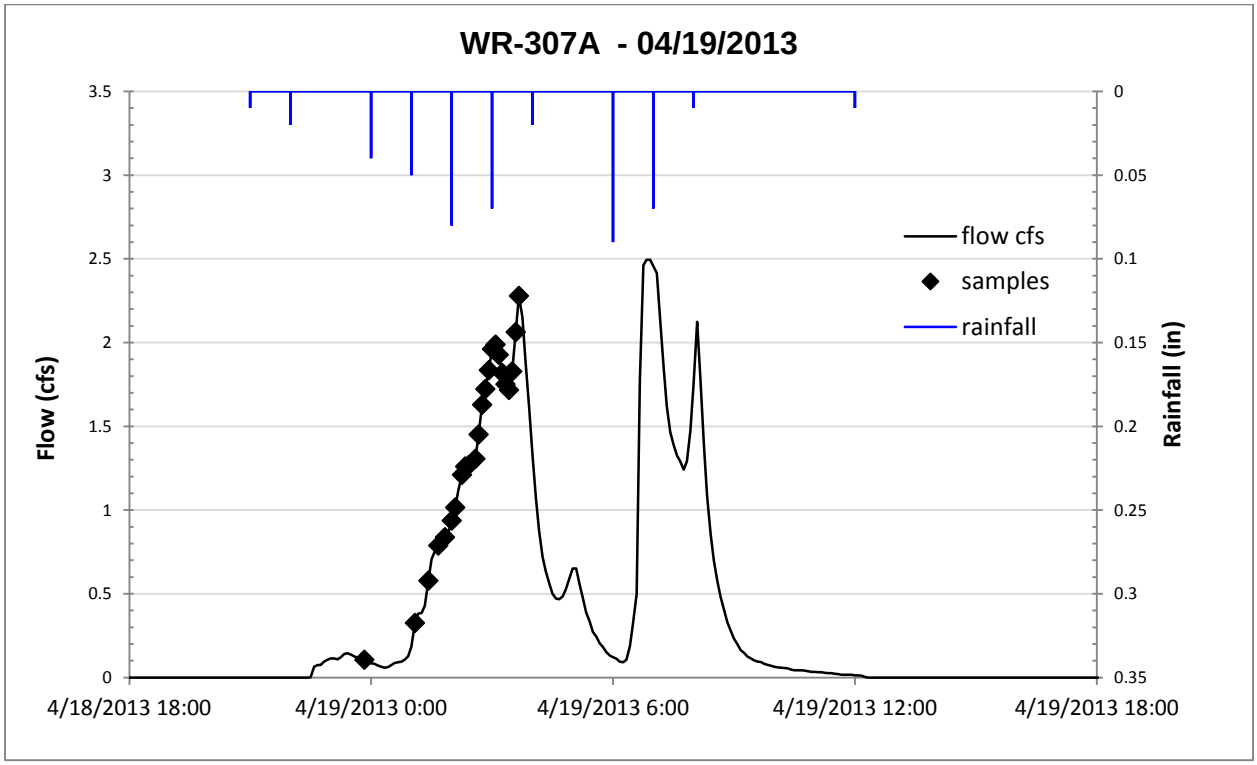

WR-307A - 06/28/2011
Flow (cfs)
Rainfall (in)
WR-307 flow
Samples
Rainfall
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
6/28/11 0:00
6/28/11 0:30
6/28/11 1:00
6/28/11 1:30
6/28/11 2:00
6/28/11 2:30

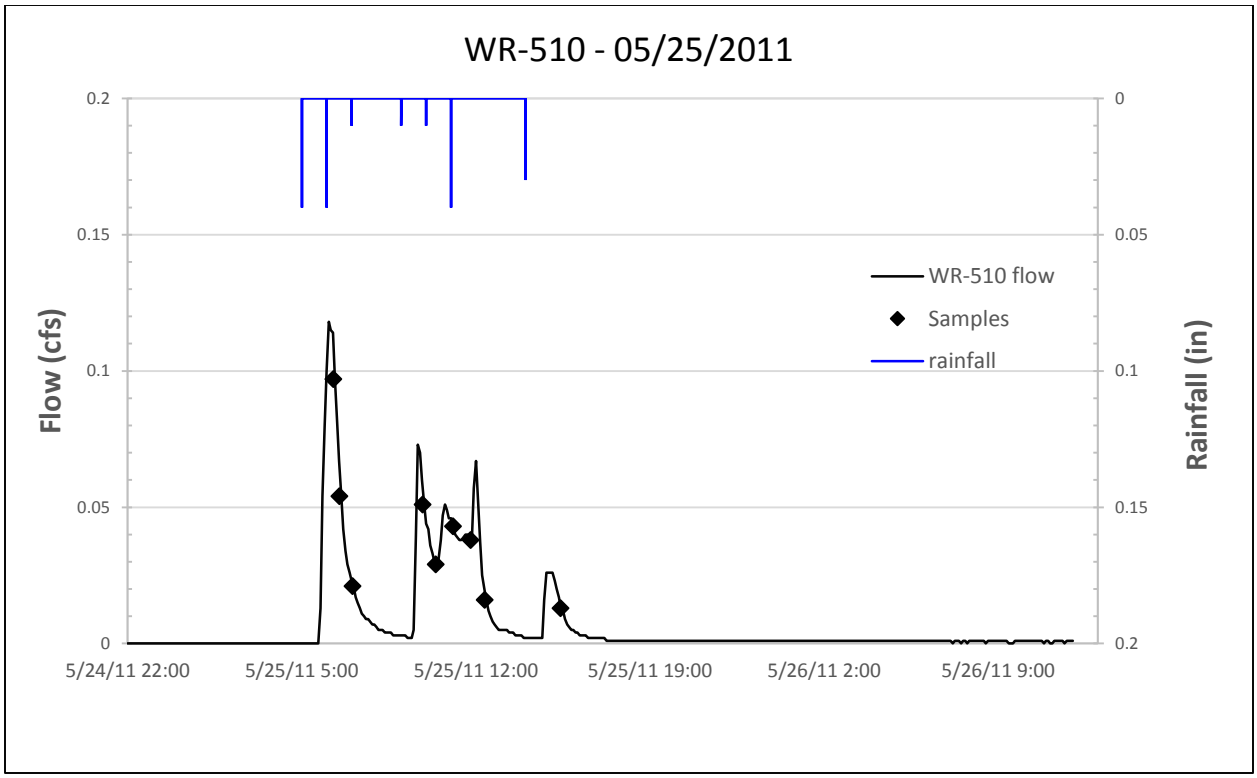

WR-307A - 03/16/2013
Flow (cfs)
Rainfall (in)
WR-307 flow
Samples
Rainfall
4
3.5
3
2.5
2
1.5
1
0.5
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
3/16/13 9:36
3/16/13 14:24
3/16/13 19:12
3/17/13 0:00
3/17/13 4:48

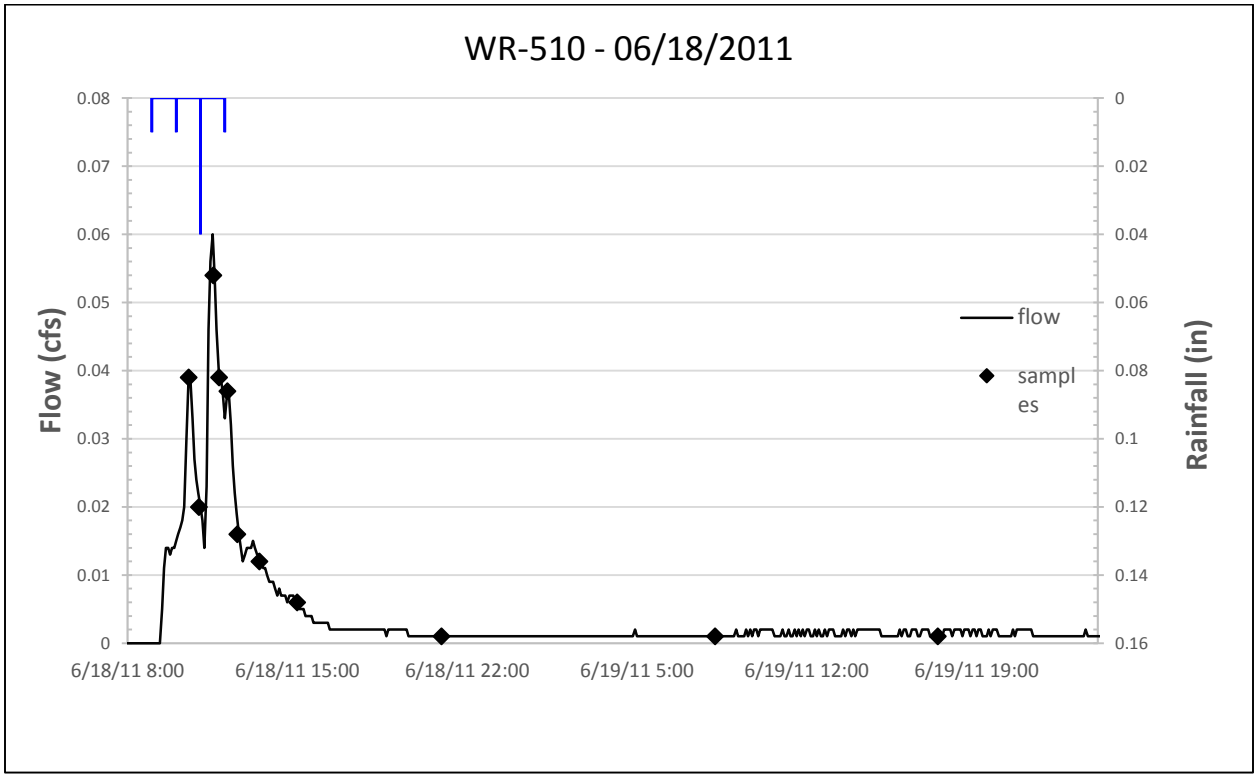

WR-307A - 03/19/2013
Flow (cfs)
Rainfall (in)
WR-307 flow
Samples
Rainfall
0
1
2
3
4
5
6
0
0.05
0.1
0.15
0.2
0.25
0.3
3/19/13 9:36
3/19/13 19:12
3/20/13 4:48
3/20/13 14:24
3/21/13 0:00

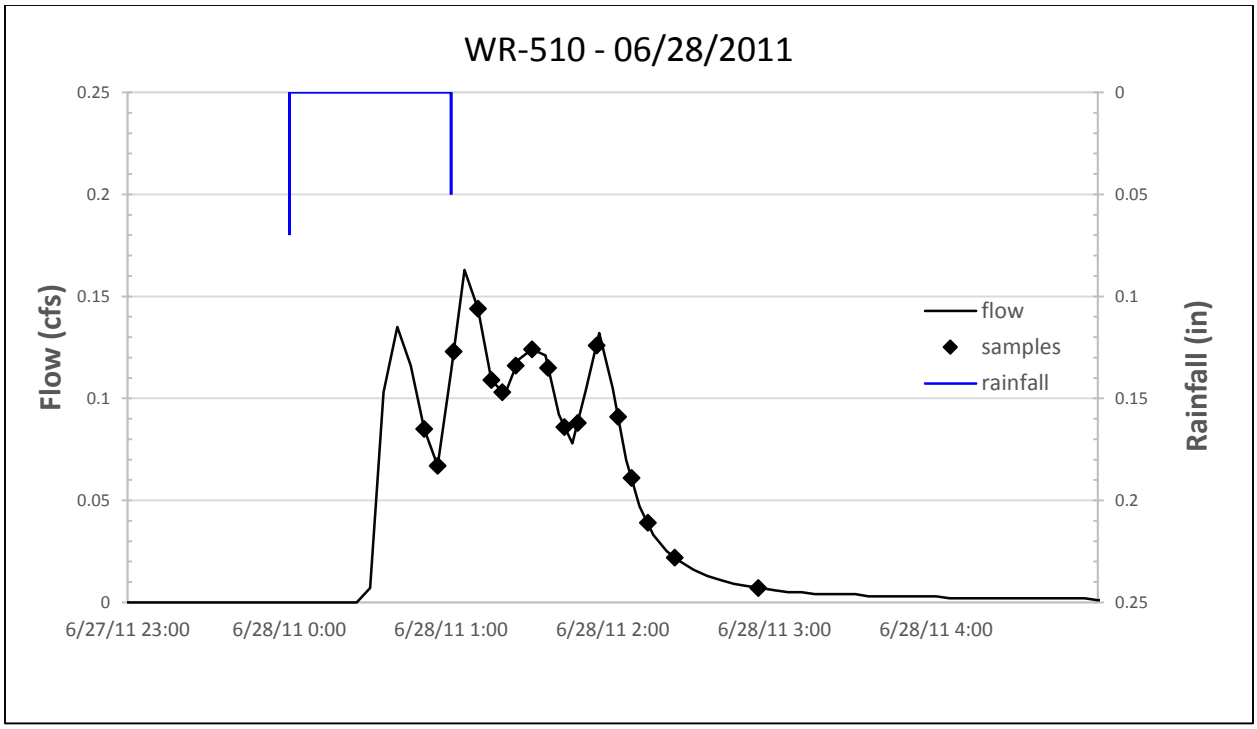

WR-307A - 04/04/2013
Flow (cfs)
Rainfall (in)
WR-307 flow
Samples
Rainfall
0
0.5
1
1.5
2
2.5
3
0
0.05
0.1
0.15
0.2
0.25
0.3
4/4/13 6:00
4/4/13 8:24
4/4/13 10:48
4/4/13 13:12
4/4/13 15:36
4/4/13 18:00
4/4/13 20:24

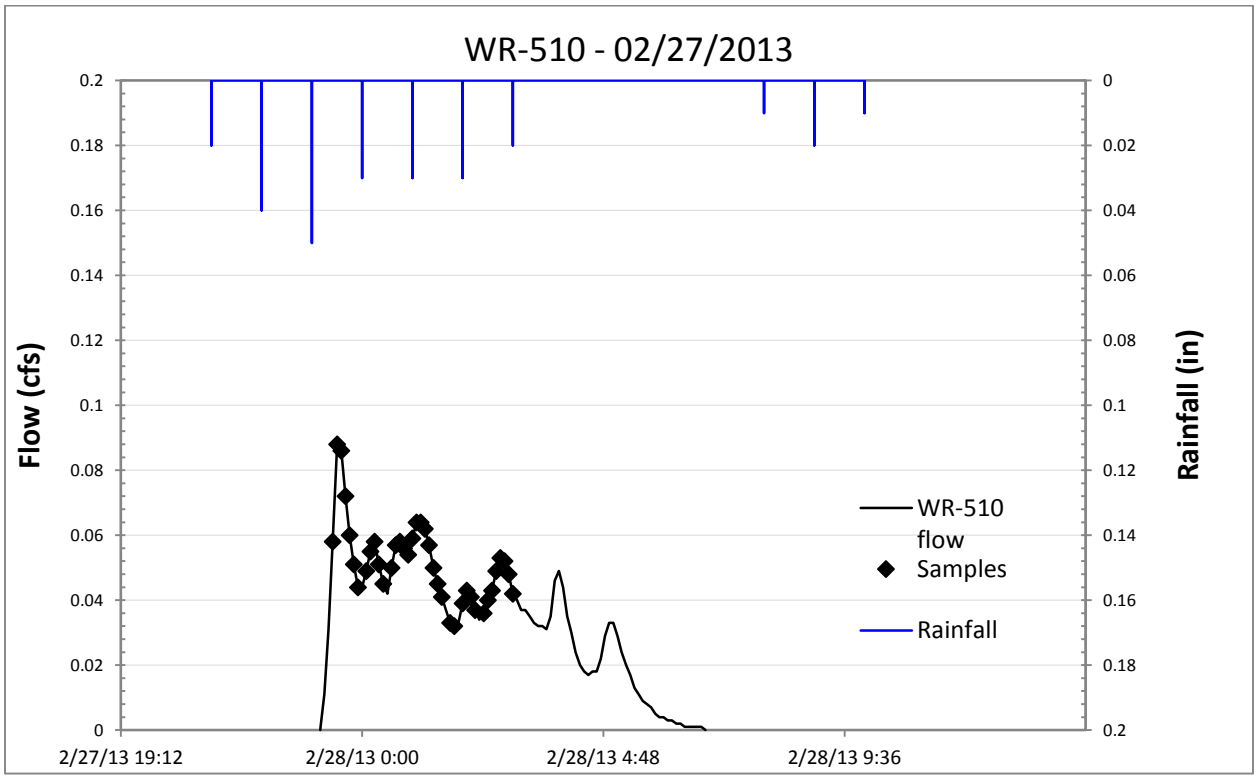

WR-307A - 04/10/2013
Flow (cfs)
Rainfall (in)
WR-307 flow
Samples
Rainfall
0
1
2
3
4
5
6
0
0.05
0.1
0.15
0.2
0.25
0.3
4/10/13 7:12
4/10/13 9:36
4/10/13 12:00
4/10/13 14:24
4/10/13 16:48

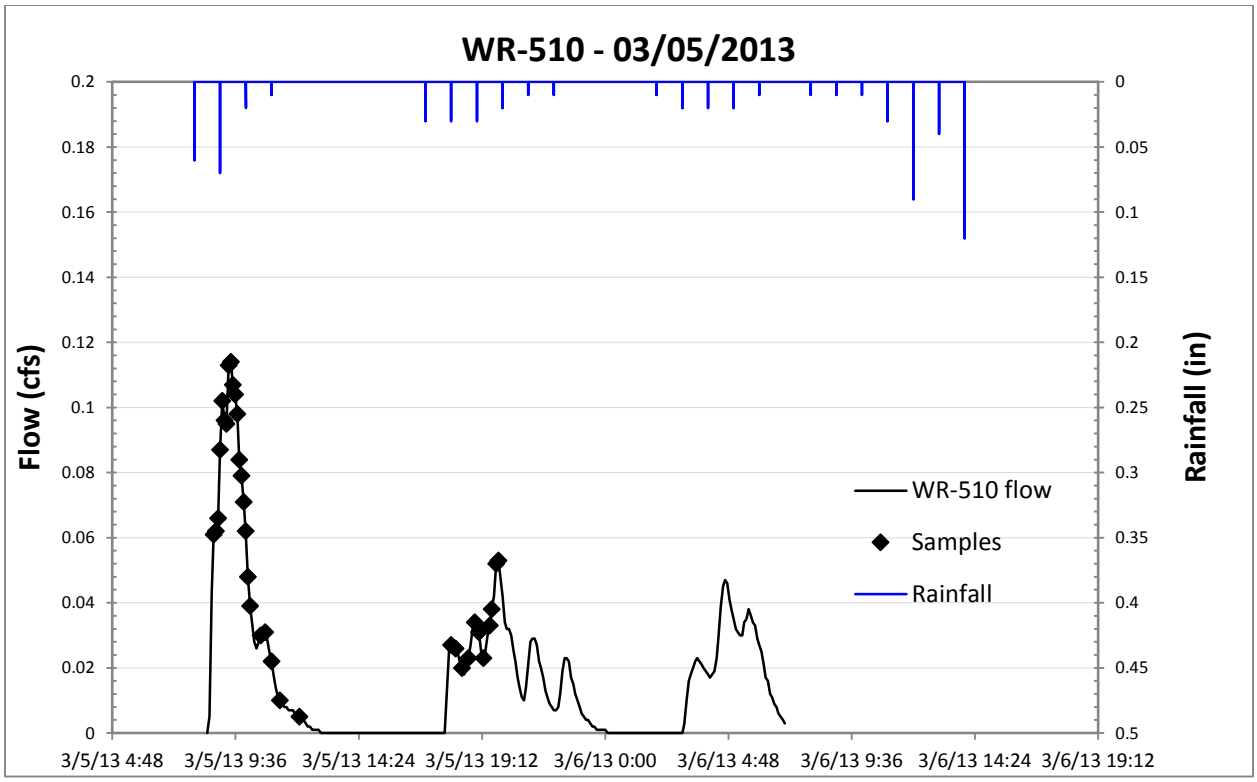

WR-307A - 04/19/2013
Flow (cfs)
Rainfall (in)
flow cfs
samples
rainfall
0
0.5
1
1.5
2
2.5
3
3.5
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
4/18/2013 18:00
4/19/2013 0:00
4/19/2013 6:00
4/19/2013 12:00
4/19/2013 18:00

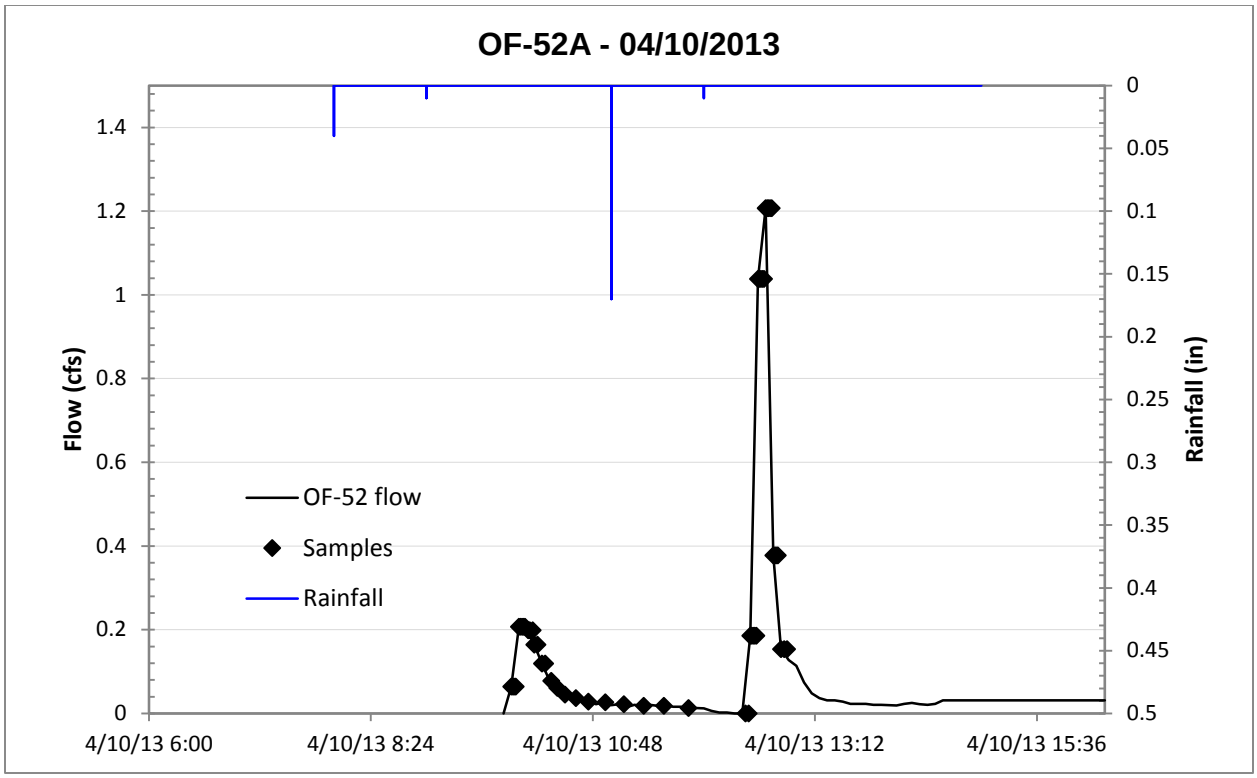

WR-510 - 05/25/2011
Flow (cfs)
Rainfall (in)
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
5/24/11 22:00
5/25/11 5:00
5/25/11 12:00
5/25/11 19:00
5/26/11 2:00
5/26/11 9:00
WR-510 flow
Samples
rainfall

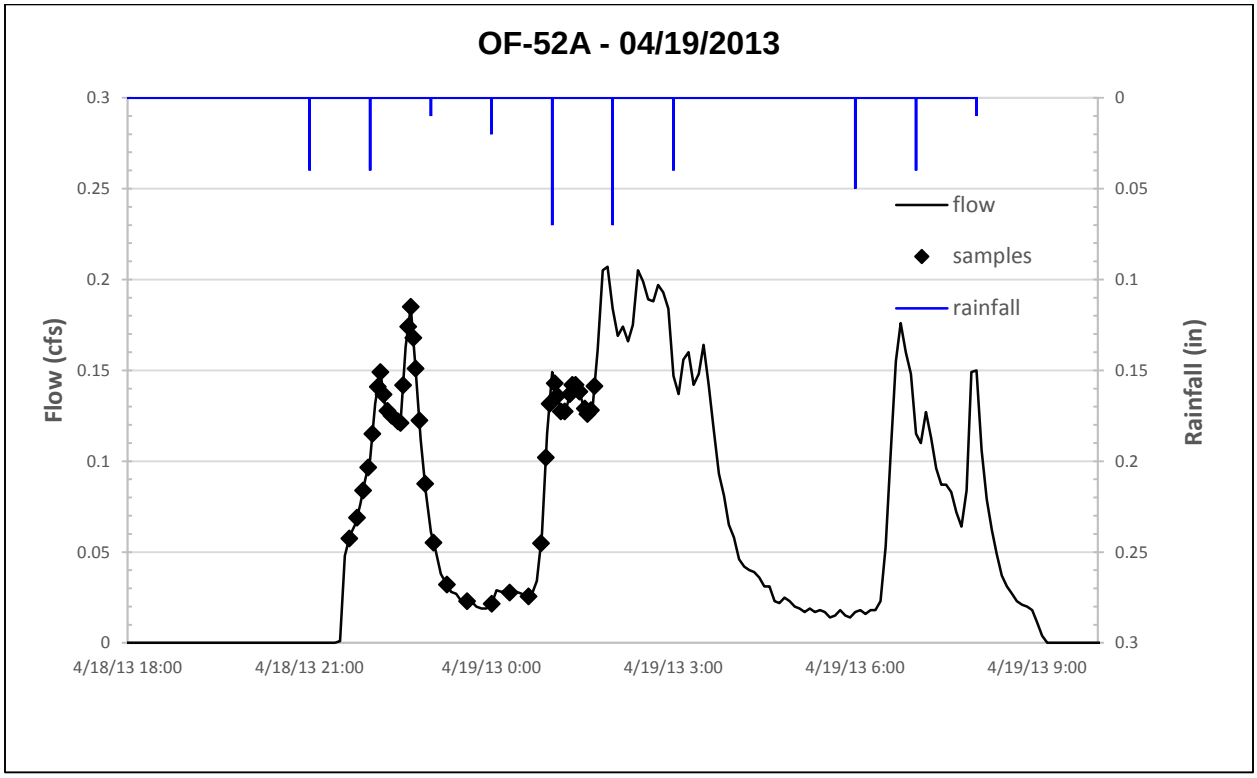

WR-510 - 06/18/2011
Flow (cfs)
Rainfall (in)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
6/18/11 8:00
6/18/11 15:00
6/18/11 22:00
6/19/11 5:00
6/19/11 12:00
6/19/11 19:00
flow
sampl
es

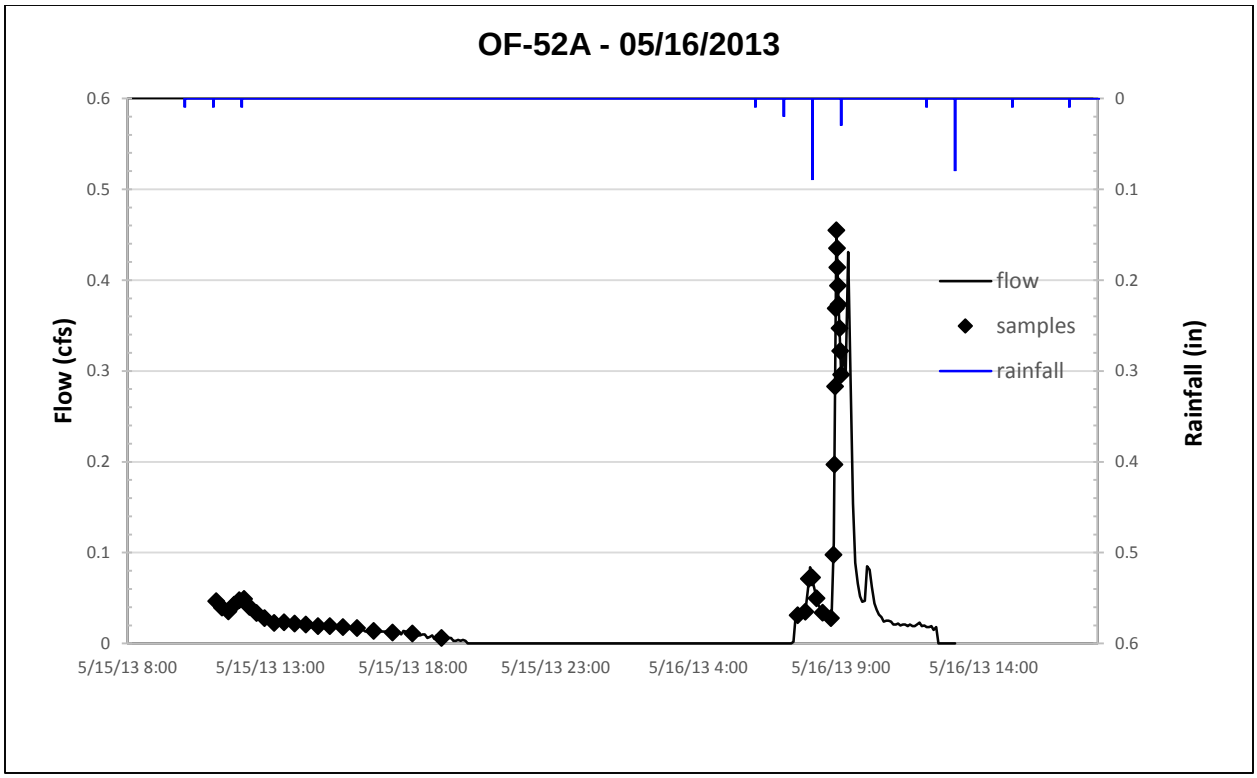

WR-510 - 06/28/2011
Flow (cfs)
Rainfall (in)
0.25
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
0.25
6/27/11 23:00
6/28/11 0:00
6/28/11 1:00
6/28/11 2:00
6/28/11 3:00
6/28/11 4:00
flow
samples
rainfall

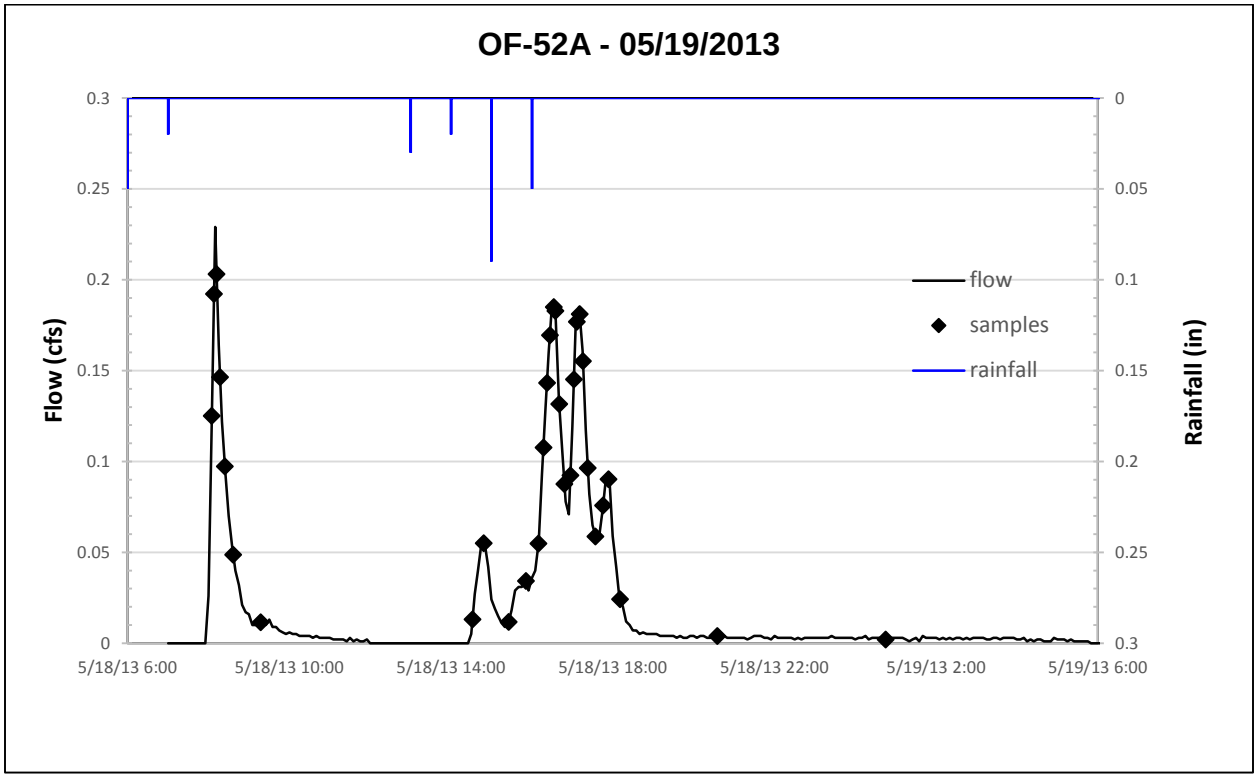

WR-510 - 02/27/2013
Flow (cfs)
Rainfall (in)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
2/27/13 19:12
2/28/13 0:00
2/28/13 4:48
2/28/13 9:36
WR-510 flow
Samples
Rainfall

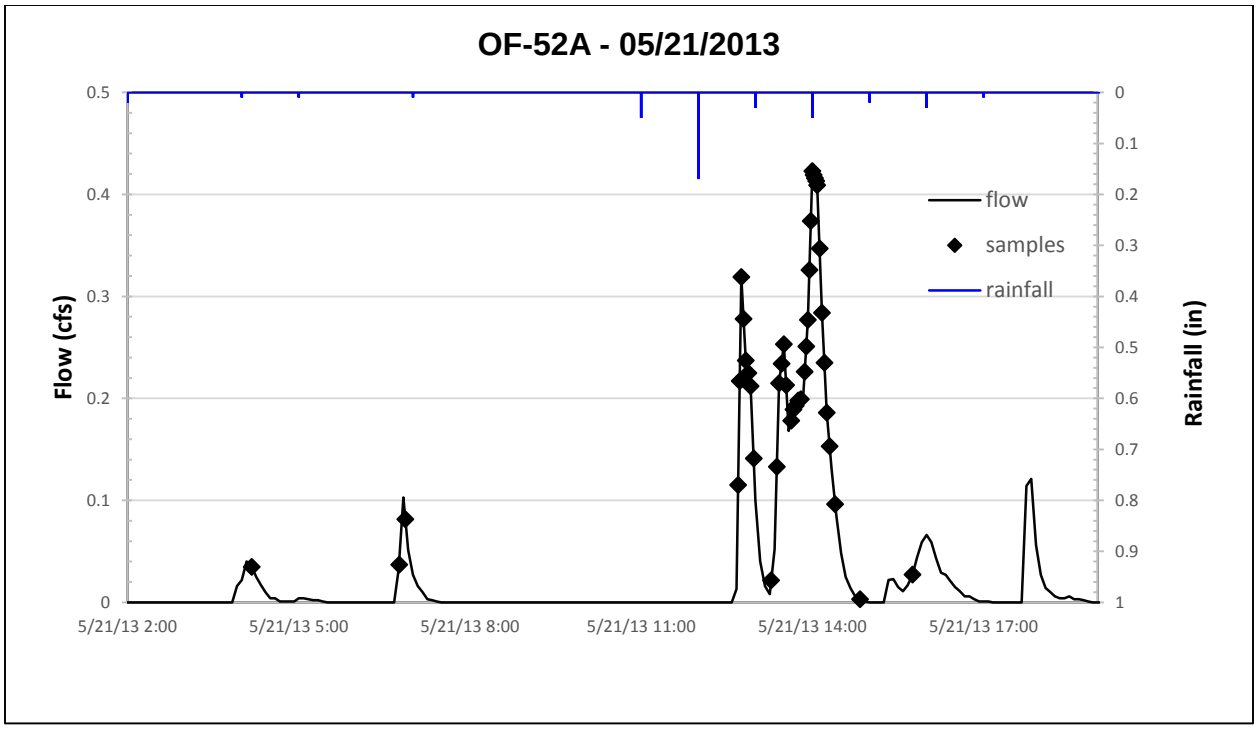

WR-510 - 03/05/2013
Flow (cfs)
Rainfall (in)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
3/5/13 4:48
3/5/13 9:36
3/5/13 14:24
3/5/13 19:12
3/6/13 0:00
3/6/13 4:48
3/6/13 9:36
3/6/13 14:24
3/6/13 19:12
WR-510 flow
Samples
Rainfall

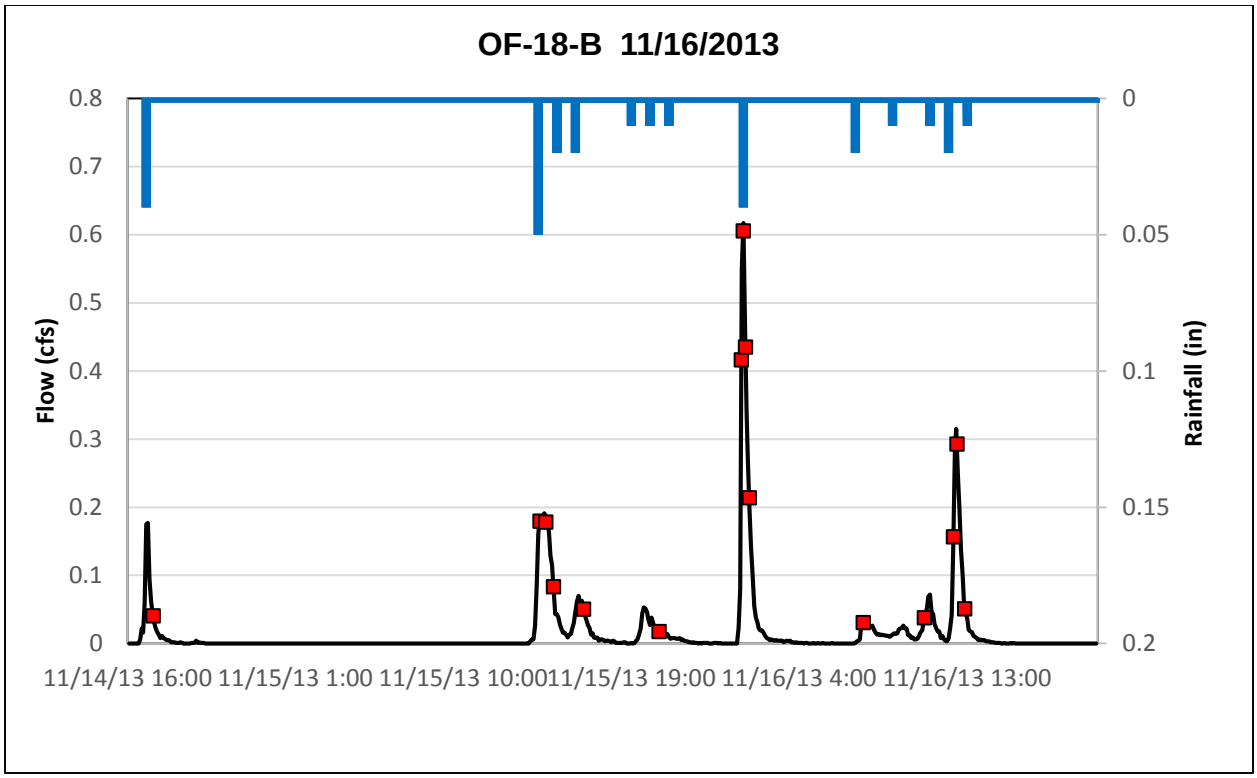

OF-52A - 04/10/2013
Flow (cfs)
Rainfall (in)
OF-52 flow
Samples
Rainfall
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
4/10/13 6:00
4/10/13 8:24
4/10/13 10:48
4/10/13 13:12
4/10/13 15:36

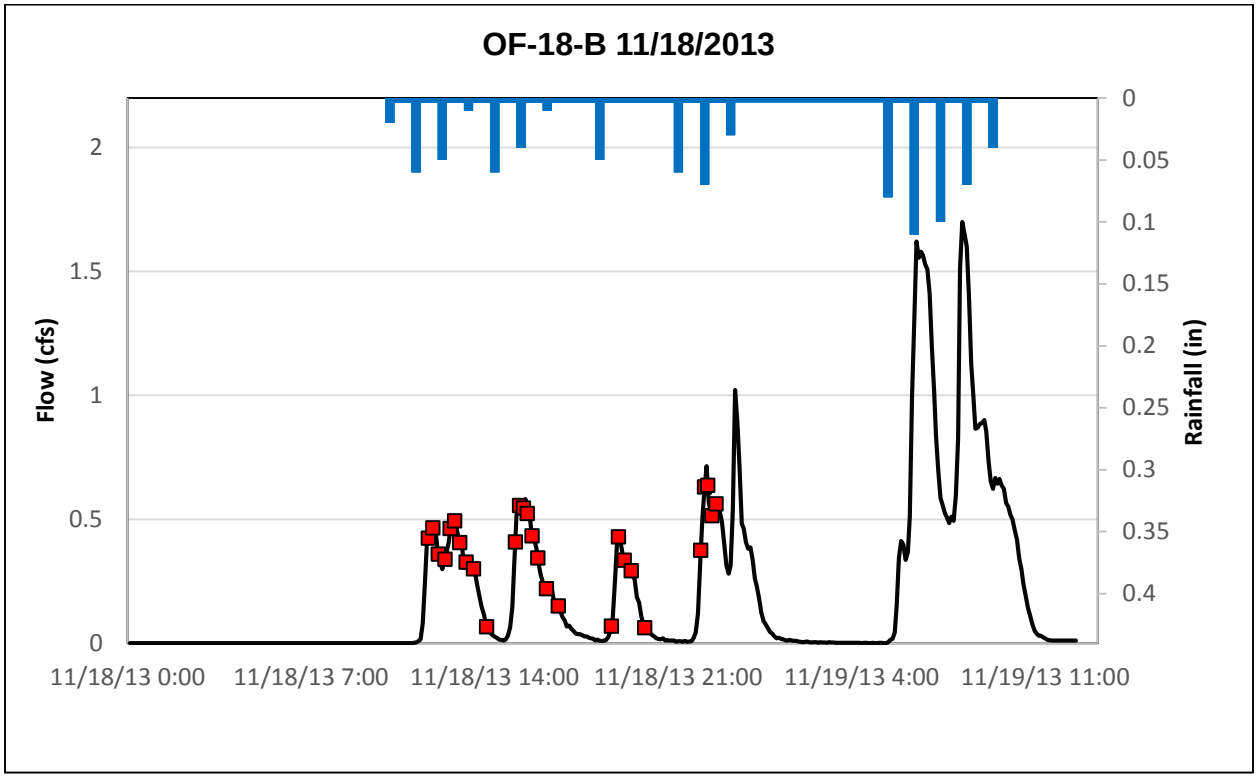

OF-52A - 04/19/2013
Flow (cfs)
Rainfall (in)
flow
samples
rainfall
0.3
0.25
0.2
0.15
0.1
0.05
0
4/18/13 18:00
4/18/13 21:00
4/19/13 0:00
4/19/13 3:00
4/19/13 6:00
4/19/13 9:00

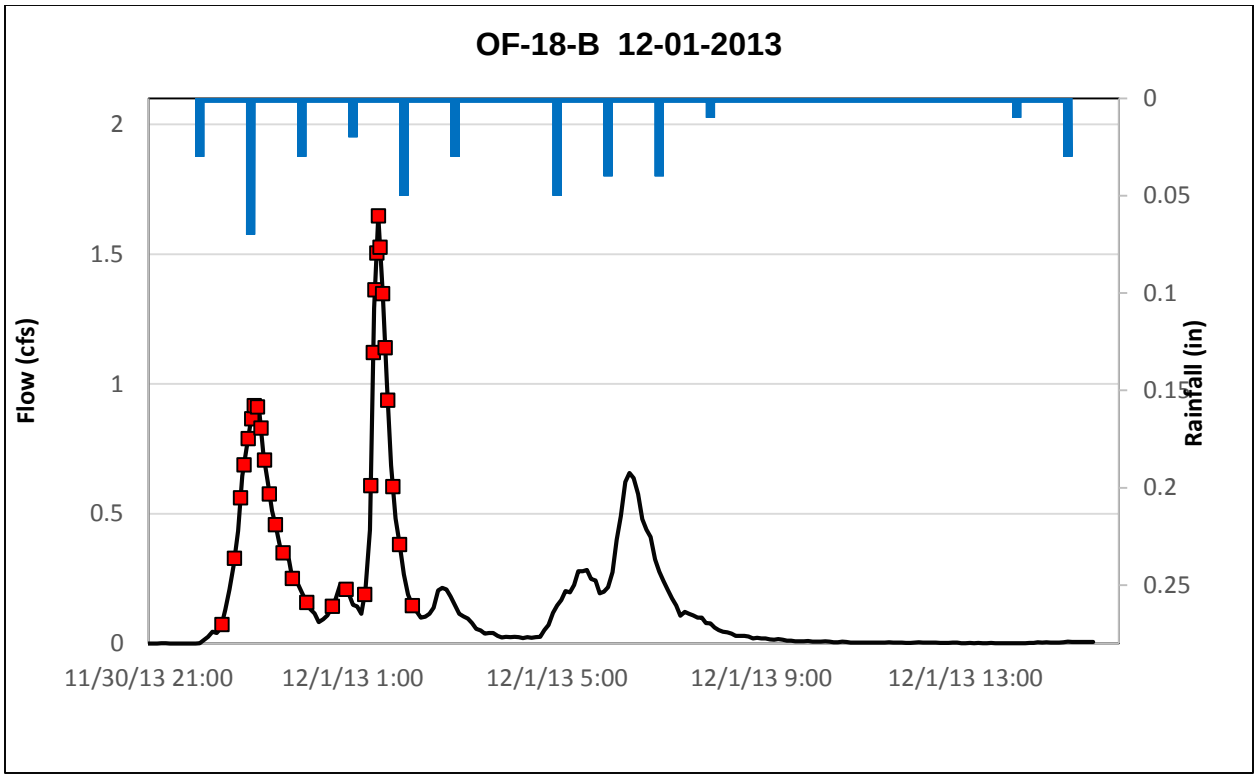

OF-52A - 05/16/2013
Flow (cfs)
Rainfall (in)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
flow
samples
rainfall
5/15/13 8:00
5/15/13 13:00
5/15/13 18:00
5/15/13 23:00
5/16/13 4:00
5/16/13 9:00
5/16/13 14:00

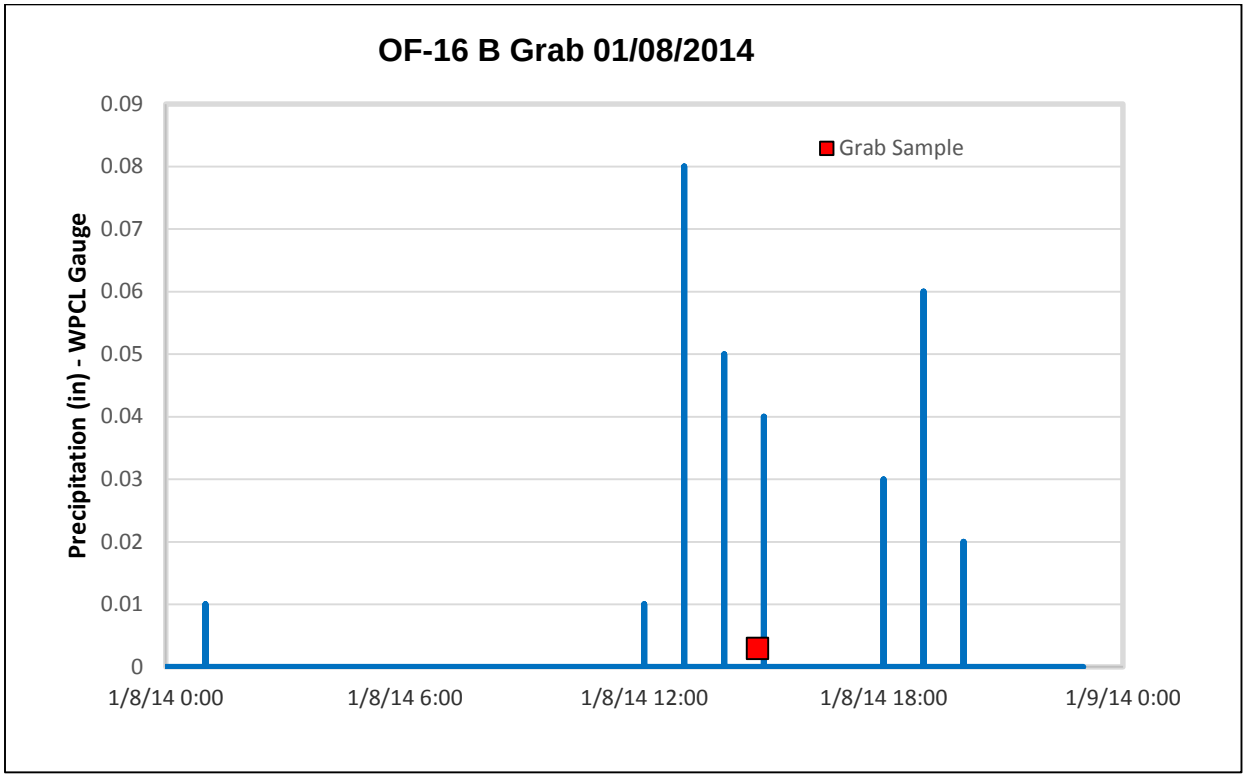

OF-52A - 05/19/2013
Flow (cfs)
Rainfall (in)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
0.25
0.3
flow
samples
rainfall
5/18/13 6:00
5/18/13 10:00
5/18/13 14:00
5/18/13 18:00
5/18/13 22:00
5/19/13 2:00
5/19/13 6:00

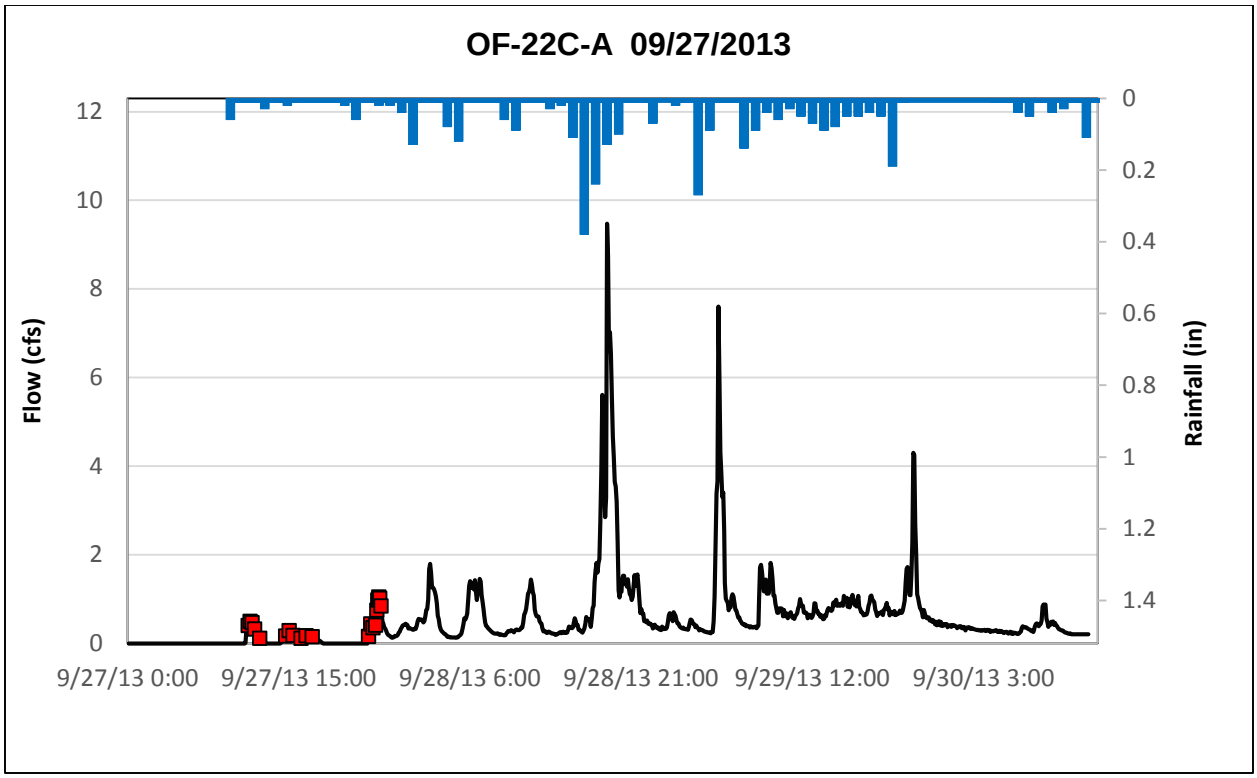

OF-52A - 05/21/2013
Flow (cfs)
Rainfall (in)
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
5/21/13 2:00
5/21/13 5:00
5/21/13 8:00
5/21/13 11:00
5/21/13 14:00
5/21/13 17:00
flow
samples
rainfall

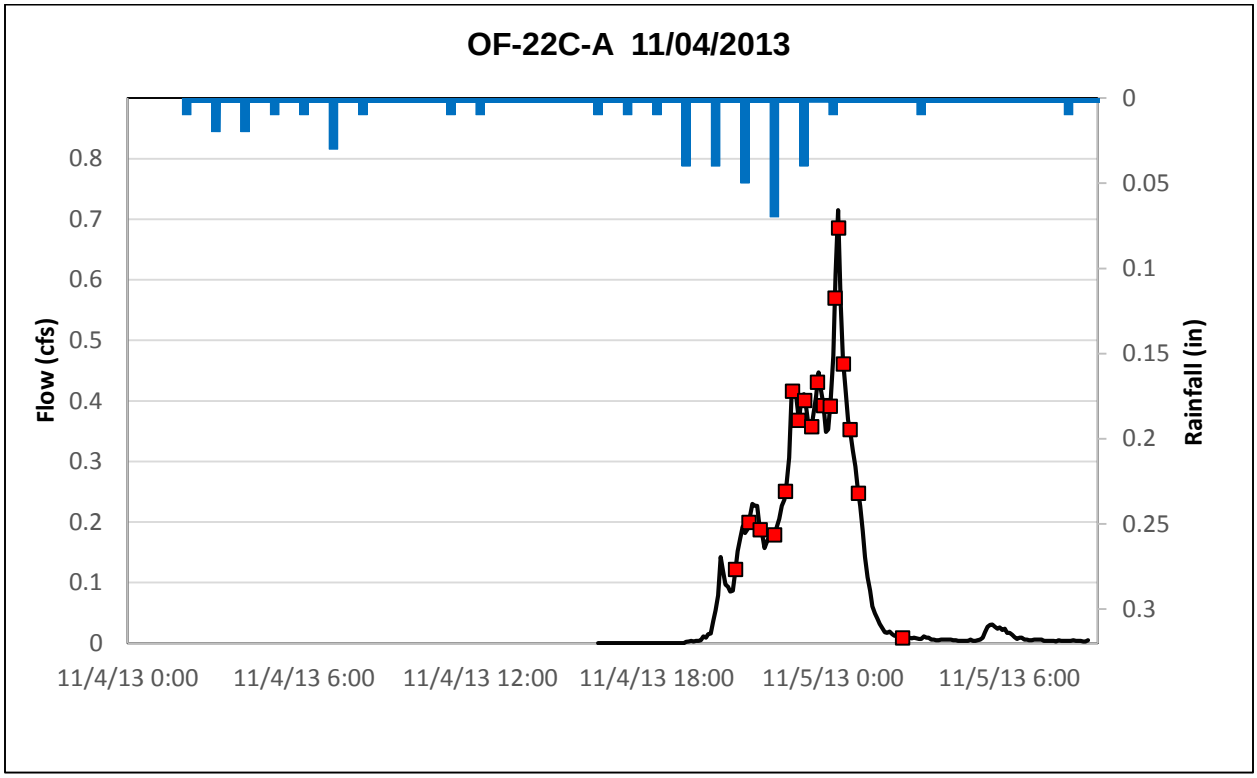

OF-18-B 11/16/2013
Flow (cfs)
Rainfall (in)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.05
0.1
0.15
0.2
11/14/13 16:00
11/15/13 1:00
11/15/13 10:00
11/15/13 19:00
11/16/13 4:00
11/16/13 13:00

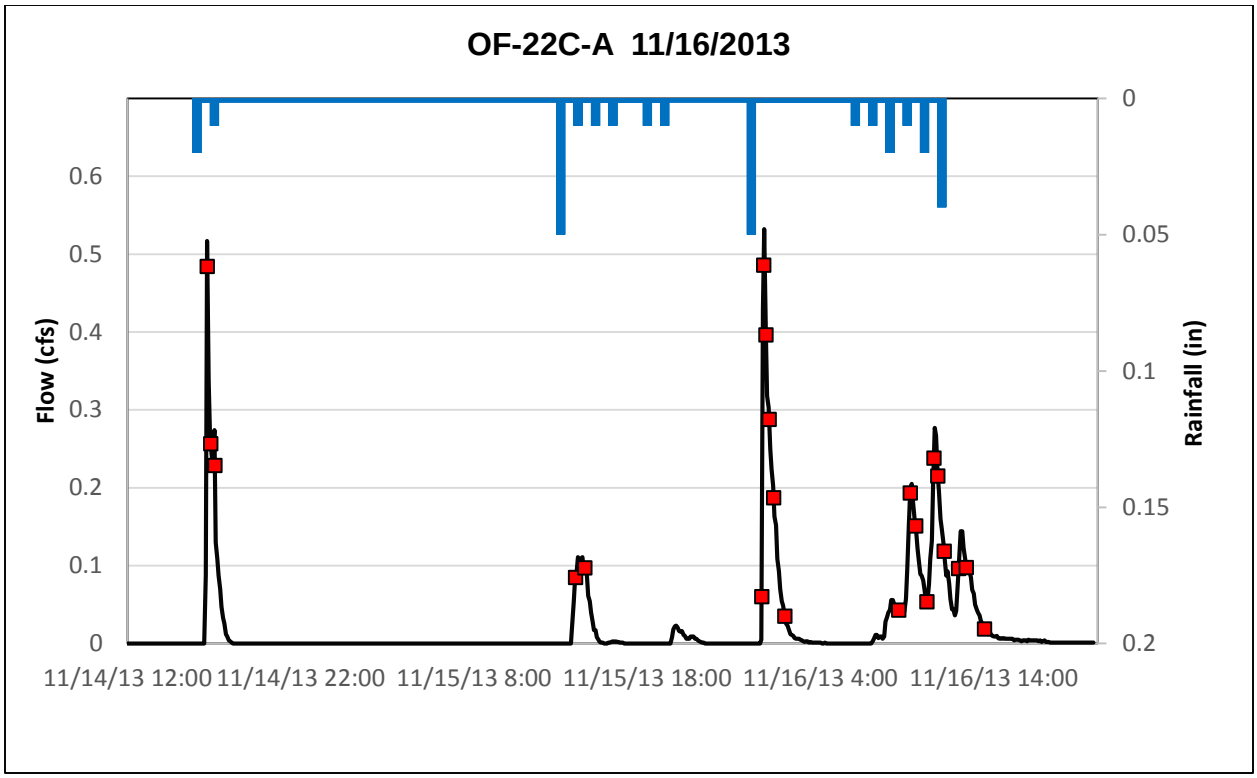

OF-18-B 11/18/2013
Flow (cfs)
Rainfall (in)
2
1.5
1
0.5
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
11/18/13 0:00
11/18/13 7:00
11/18/13 14:00
11/18/13 21:00
11/19/13 4:00
11/19/13 11:00

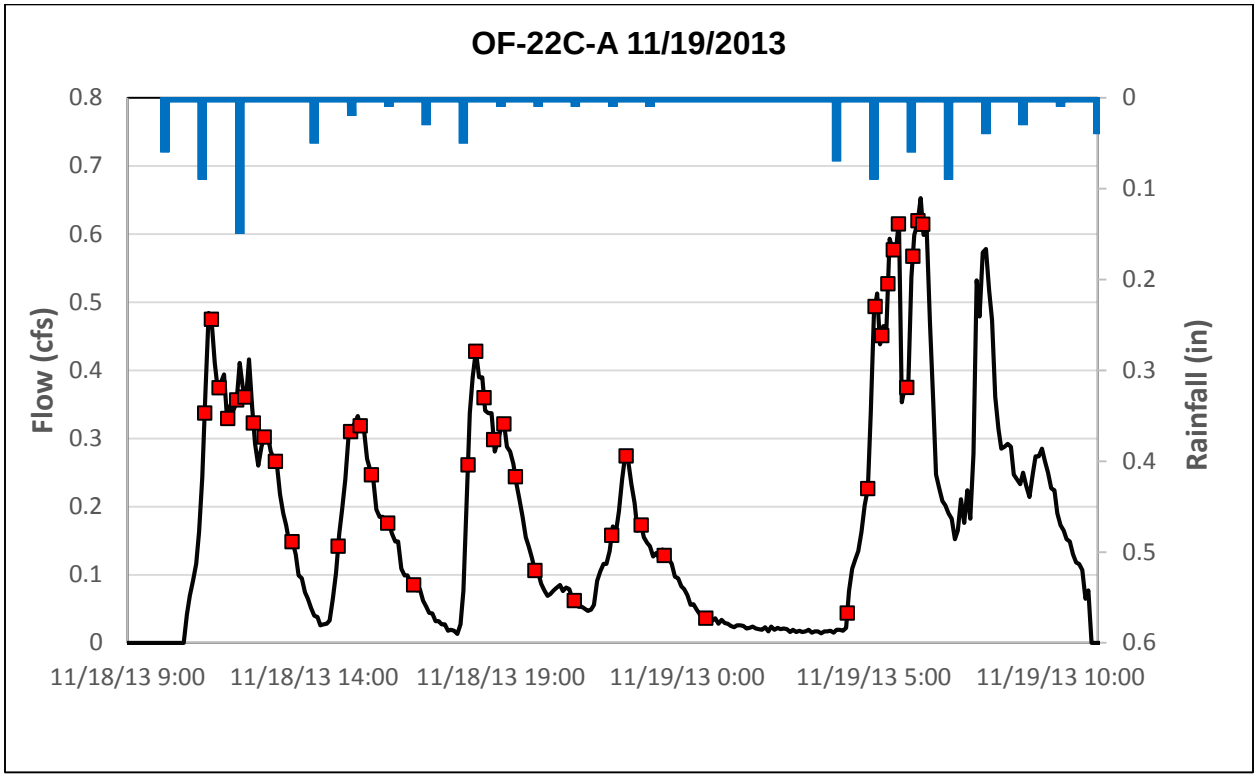

OF-18-B 12-01-2013
Flow (cfs)
Rainfall (in)
2
1.5
1
0.5
0
0
0.05
0.1
0.15
0.2
0.25
11/30/13 21:00
12/1/13 1:00
12/1/13 5:00
12/1/13 9:00
12/1/13 13:00

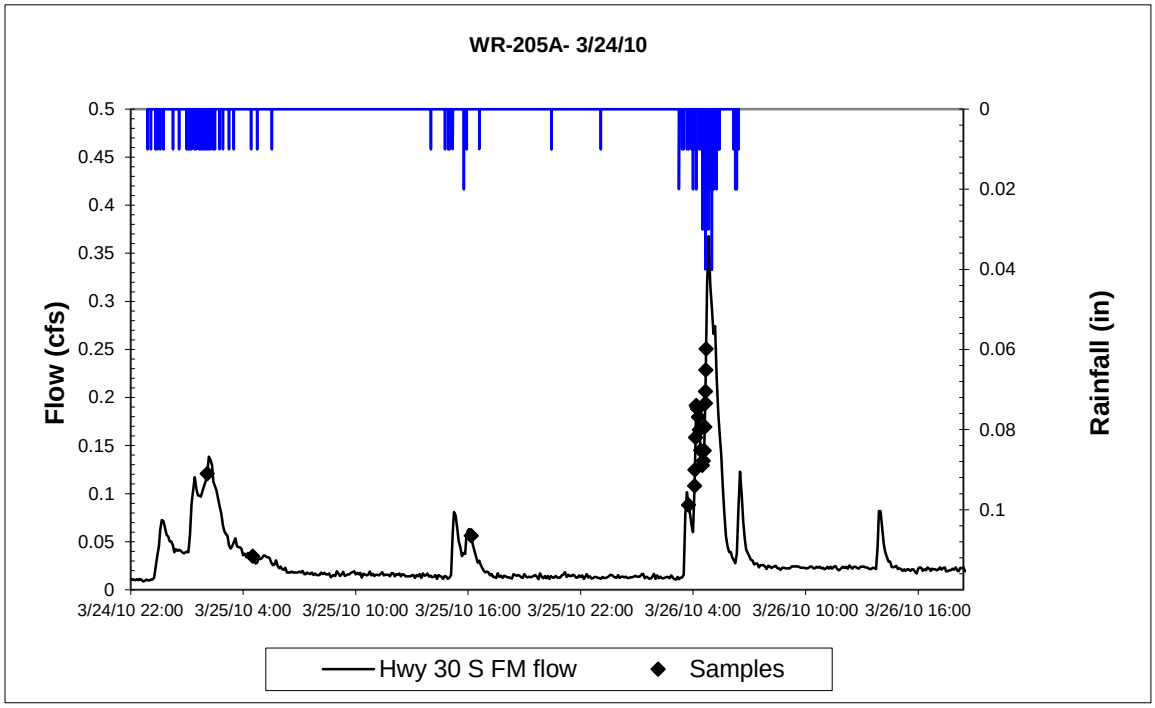

OF-16 B Grab 01/08/2014
Grab Sample
Precipitation (in) - WPCL Gauge
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1/8/14 0:00
1/8/14 6:00
1/8/14 12:00
1/8/14 18:00
1/9/14 0:00

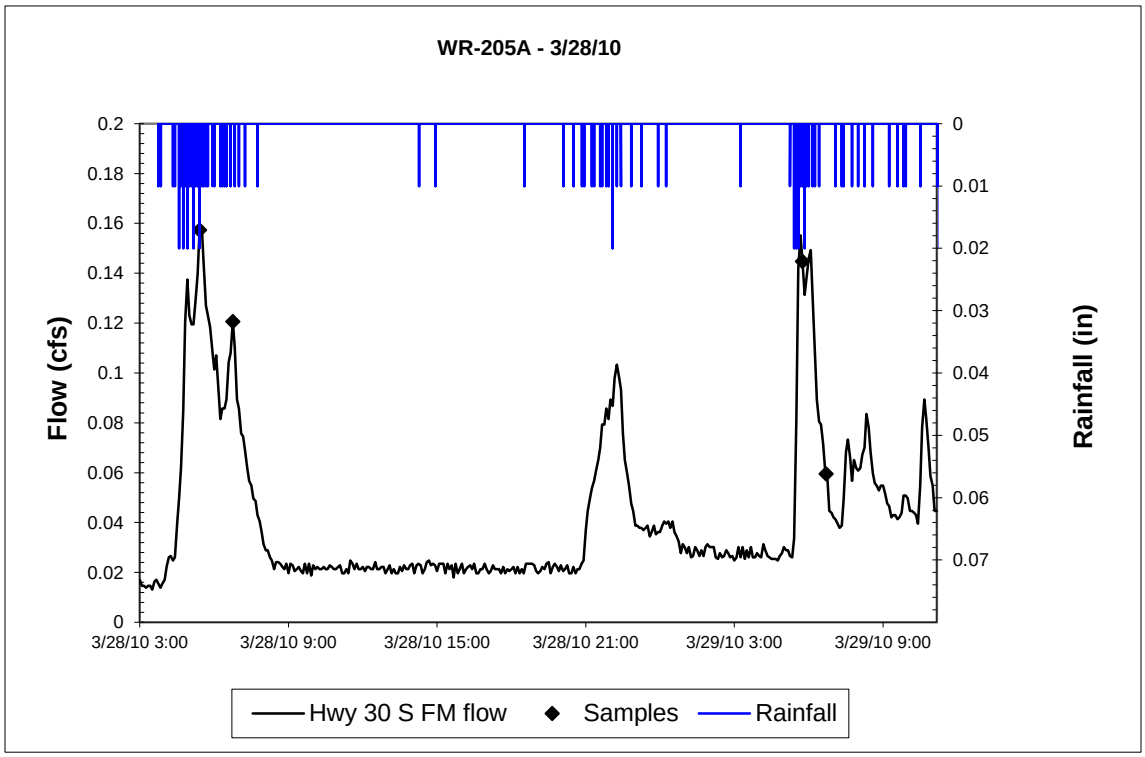

OF-22C-A 09/27/2013
Flow (cfs)
Rainfall (in)
12
10
8
6
4
2
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
9/27/13 0:00
9/27/13 15:00
9/28/13 6:00
9/28/13 21:00
9/29/13 12:00
9/30/13 3:00

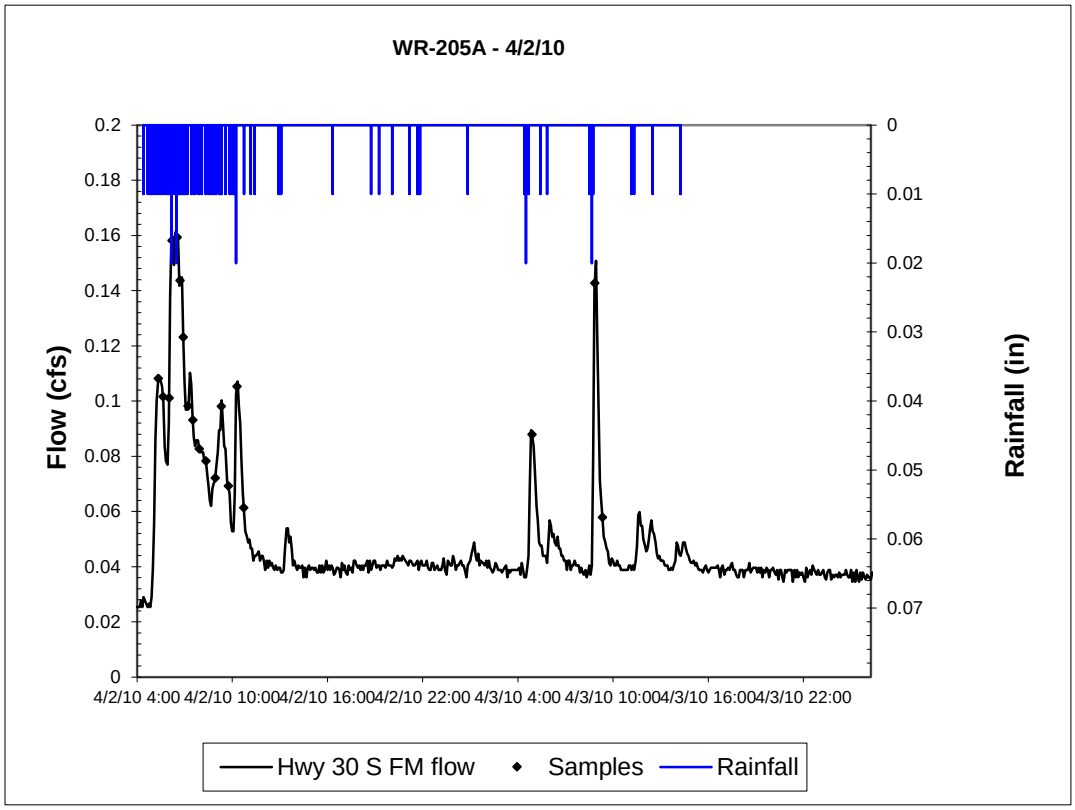

OF-22C-A 11/04/2013
Flow (cfs)
Rainfall (in)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.05
0.1
0.15
0.2
0.25
0.3
11/4/13 0:00
11/4/13 6:00
11/4/13 12:00
11/4/13 18:00
11/5/13 0:00
11/5/13 6:00

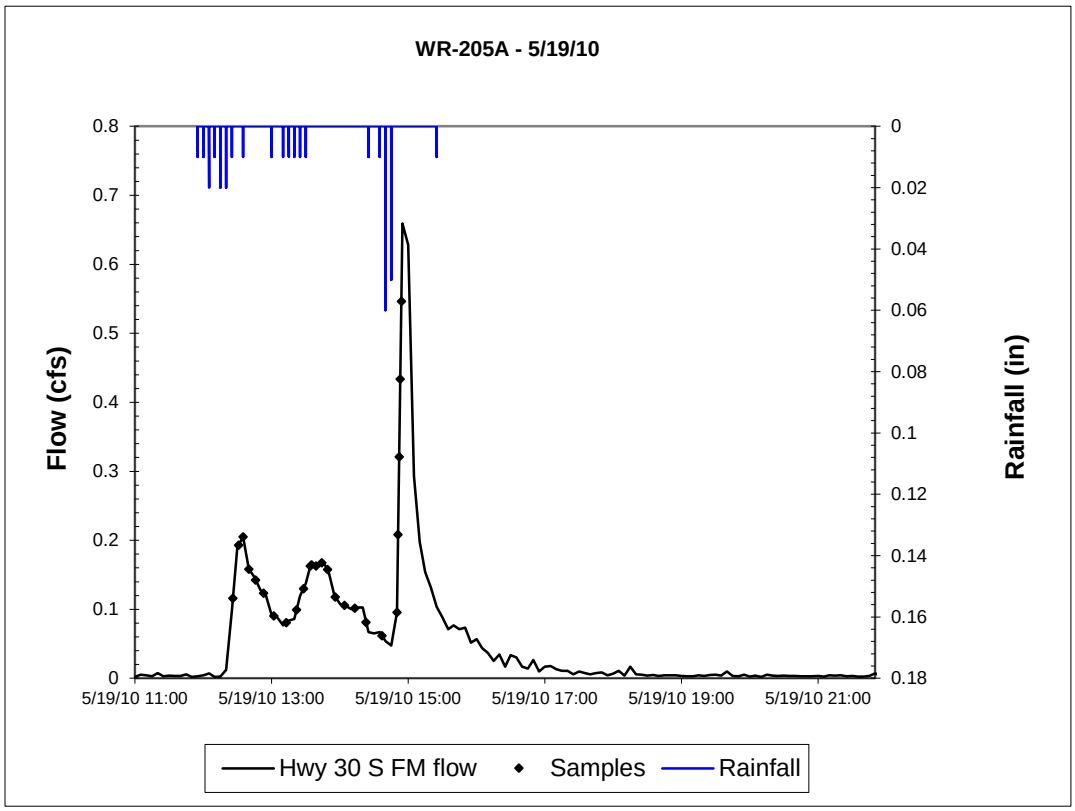

OF-22C-A 11/16/2013
Flow (cfs)
Rainfall (in)
0
0.1
0.2
0.3
0.4
0.5
0.6
0
0.05
0.1
0.15
0.2
11/14/13 12:00
11/14/13 22:00
11/15/13 8:00
11/15/13 18:00
11/16/13 4:00
11/16/13 14:00

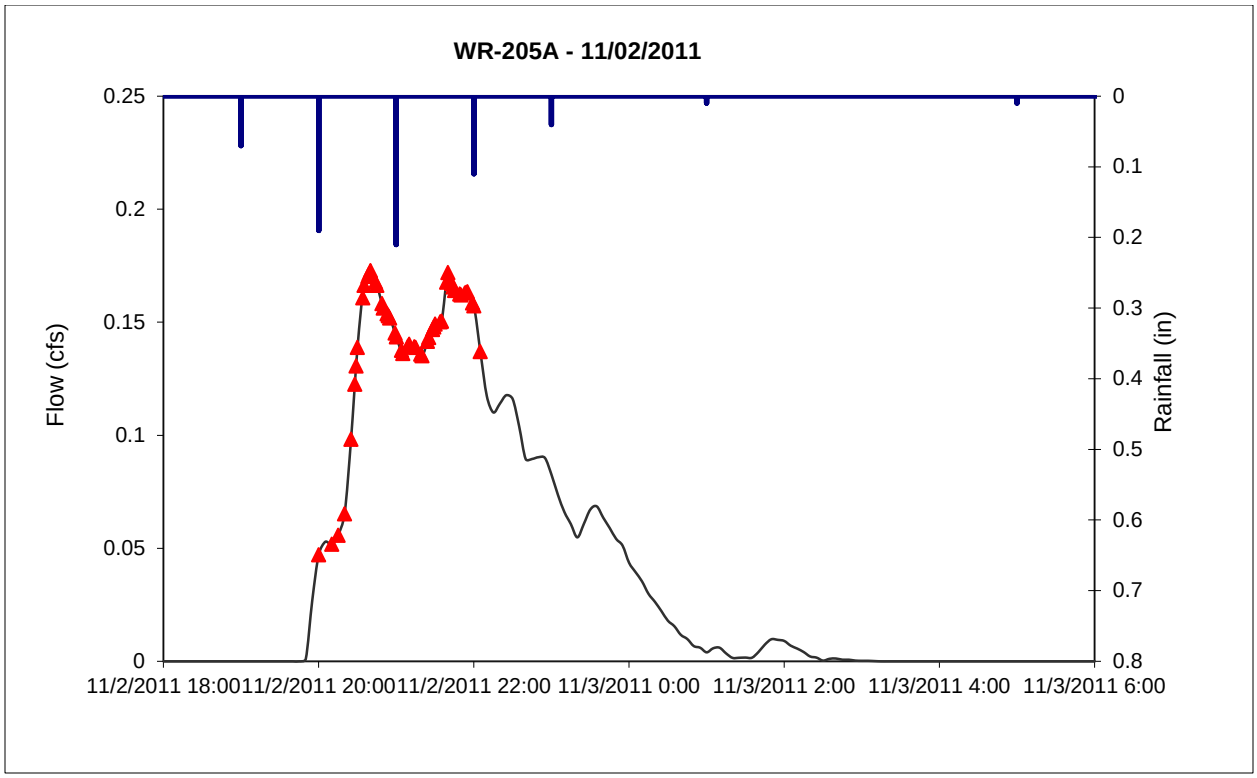

OF-22C-A 11/19/2013
Flow (cfs)
Rainfall (in)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0
0.1
0.2
0.3
0.4
0.5
0.6
11/18/13 9:00
11/18/13 14:00
11/18/13 19:00
11/19/13 0:00
11/19/13 5:00
11/19/13 10:00

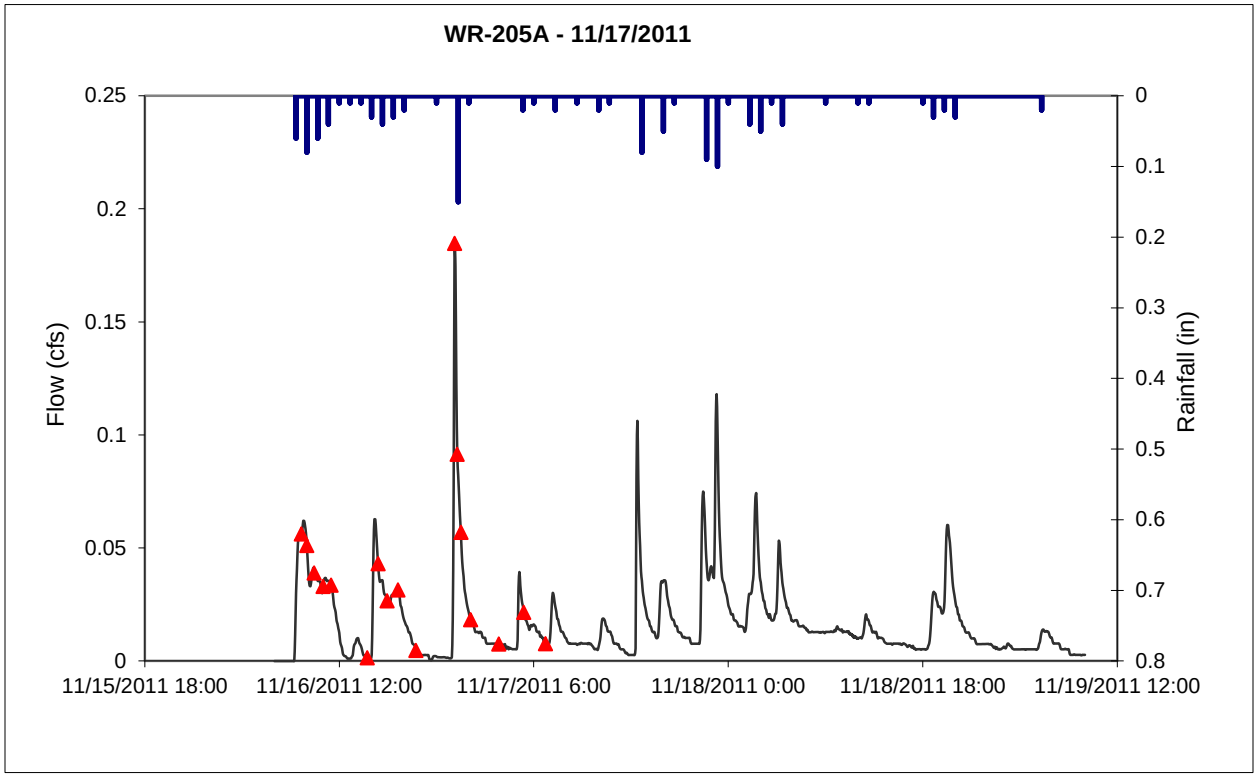

WR-205A- 3/24/10
Flow (cfs)
Rainfall (in)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.02
0.04
0.06
0.08
0.1
3/24/10 22:00
3/25/10 4:00
3/25/10 10:00
3/25/10 16:00
3/25/10 22:00
3/26/10 4:00
3/26/10 10:00
3/26/10 16:00
Hwy 30 S FM flow
Samples

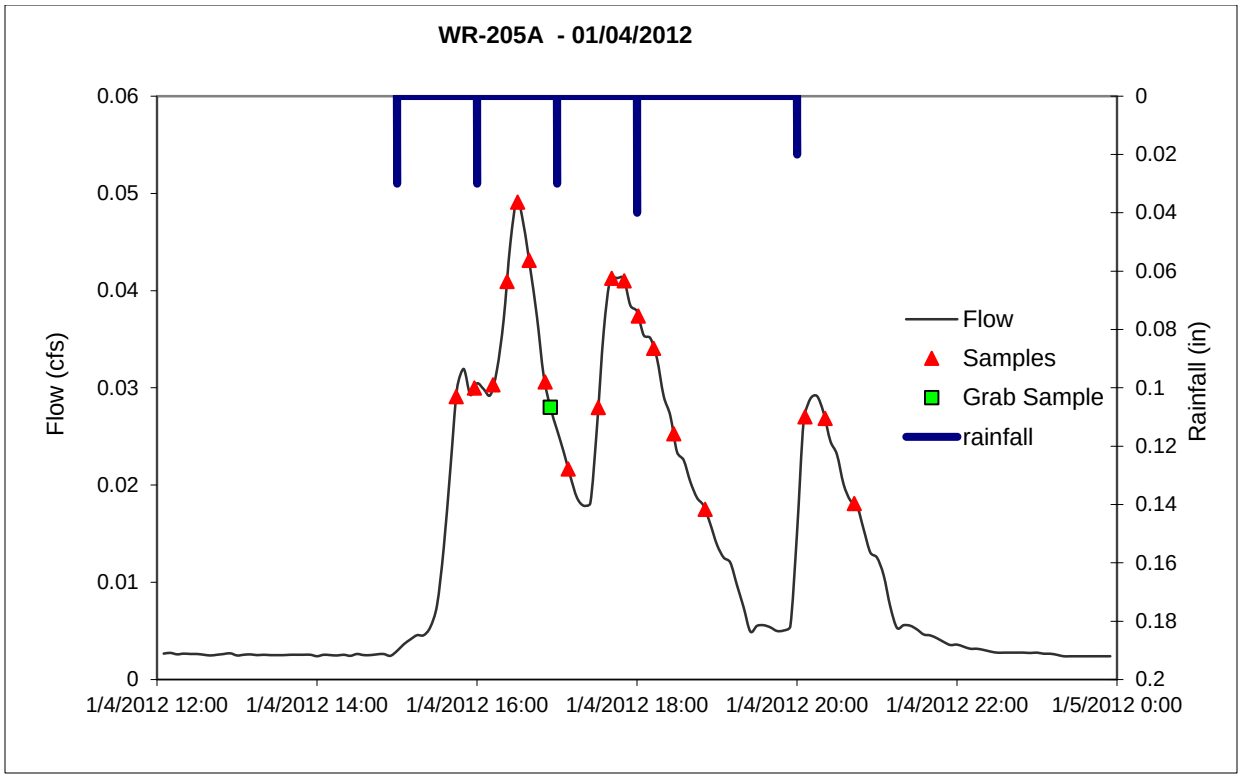

WR-205A - 3/28/10
Flow (cfs)
Rainfall (in)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
3/28/10 3:00
3/28/10 9:00
3/28/10 15:00
3/28/10 21:00
3/29/10 3:00
3/29/10 9:00
Hwy 30 S FM flow
Samples
Rainfall

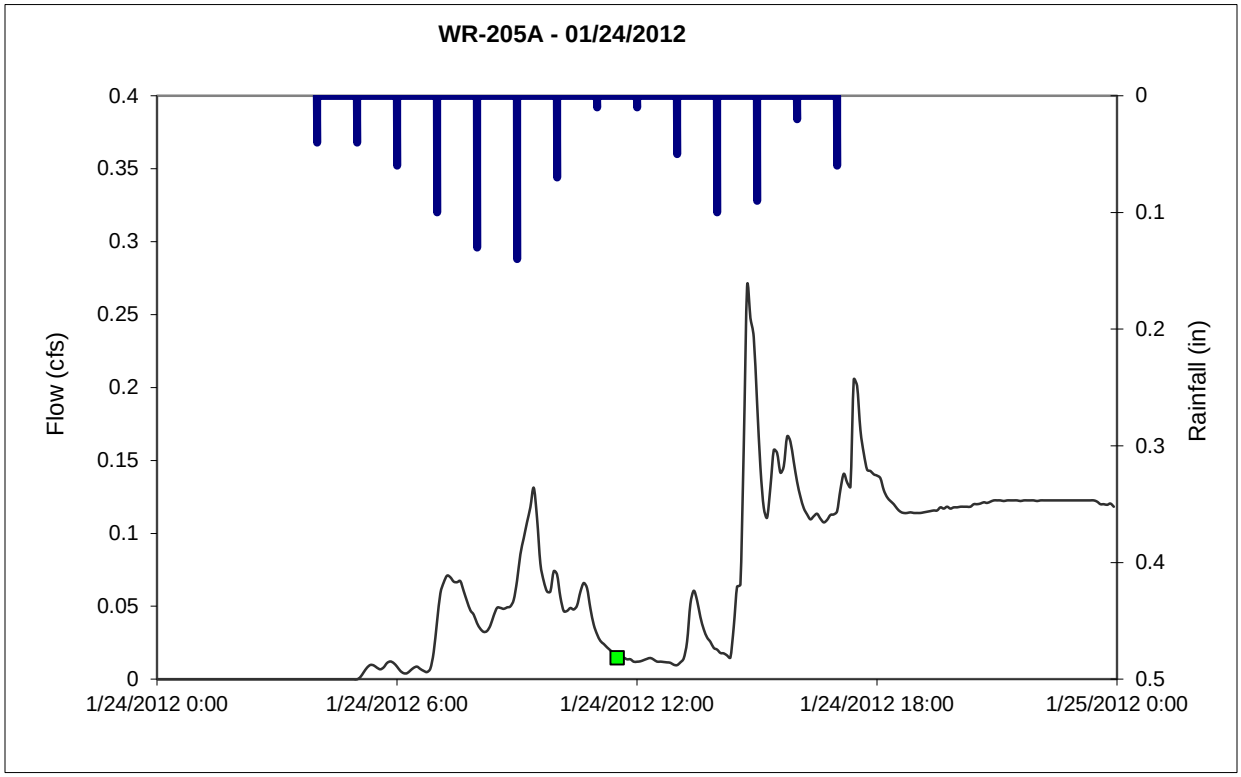

WR-205A - 4/2/10
Flow (cfs)
Rainfall (in)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
4/2/10 4:00
4/2/10 10:00
4/2/10 16:00
4/2/10 22:00
4/3/10 4:00
4/3/10 10:00
4/3/10 16:00
4/3/10 22:00
Hwy 30 S FM flow
Samples
Rainfall

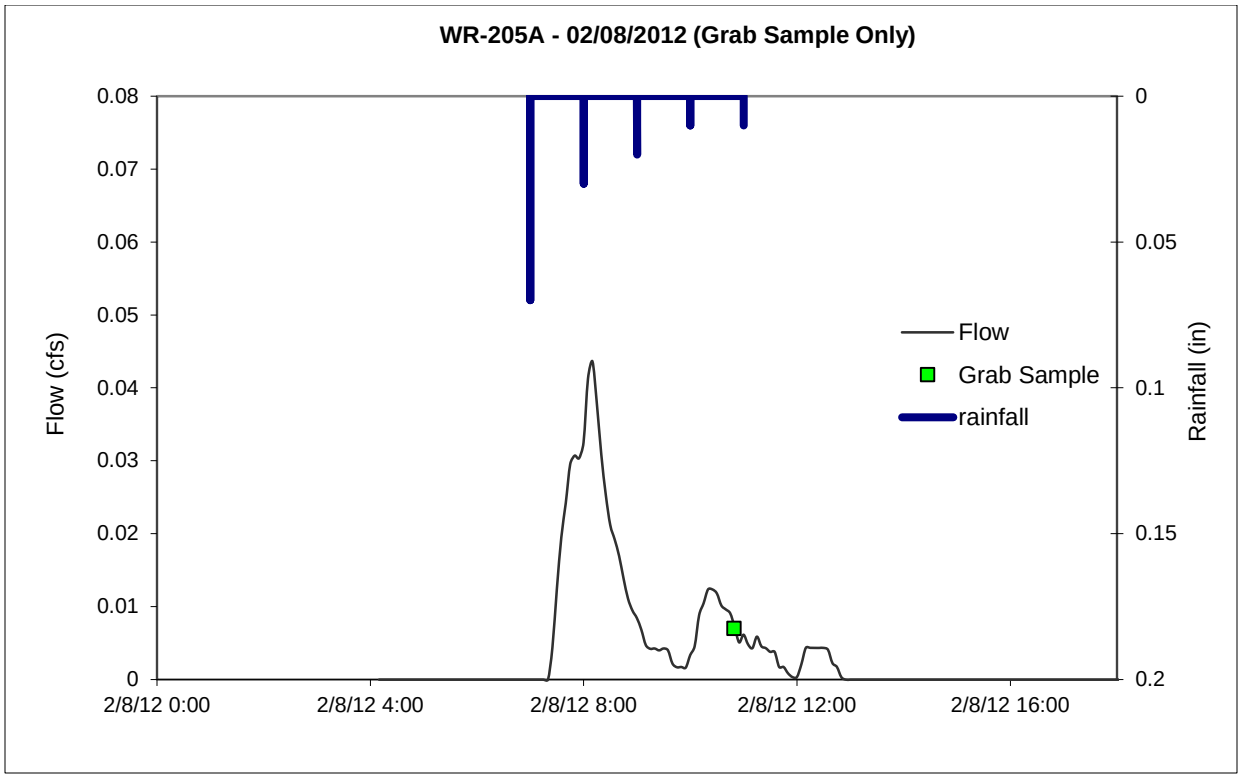

WR-205A - 5/19/10
Flow (cfs)
Rainfall (in)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
5/19/10 11:00
5/19/10 13:00
5/19/10 15:00
5/19/10 17:00
5/19/10 19:00
5/19/10 21:00
Hwy 30 S FM flow
Samples
Rainfall

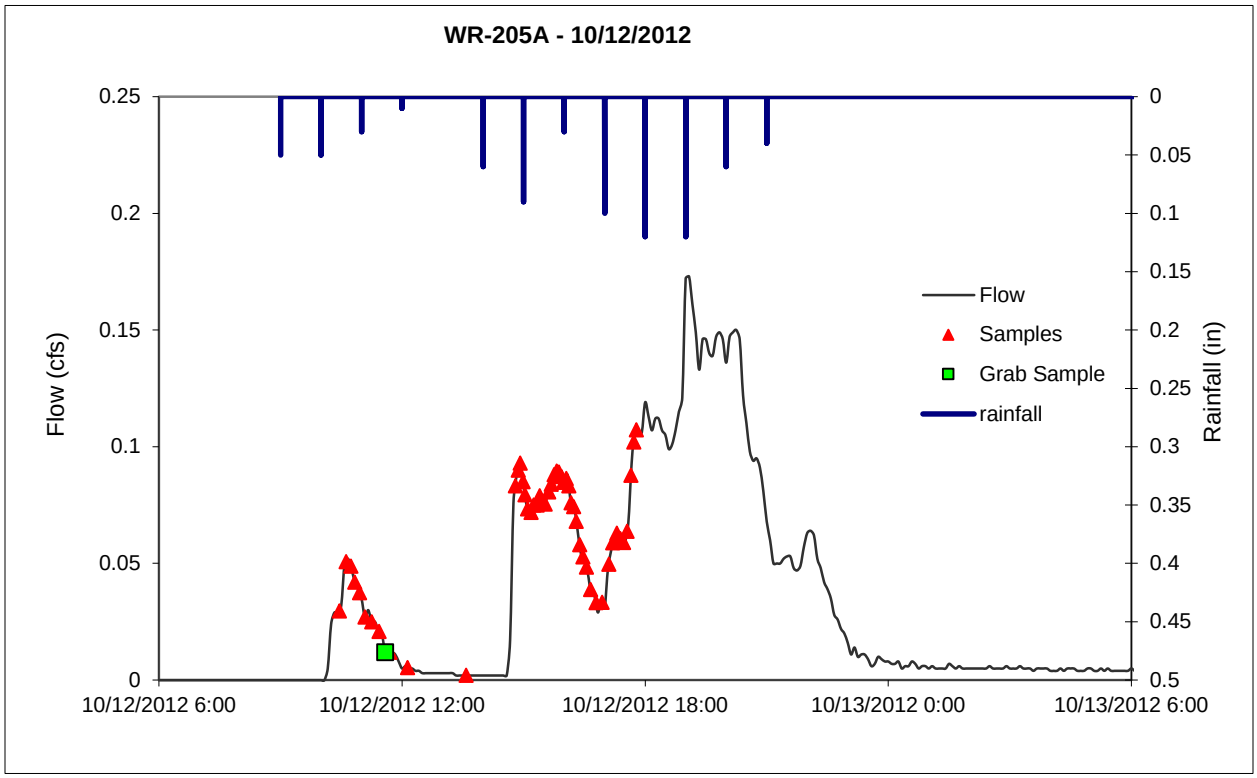

WR-205A - 11/02/2011
Flow (cfs)
Rainfall (in)
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
11/2/2011 18:00
11/2/2011 20:00
11/2/2011 22:00
11/3/2011 0:00
11/3/2011 2:00
11/3/2011 4:00
11/3/2011 6:00

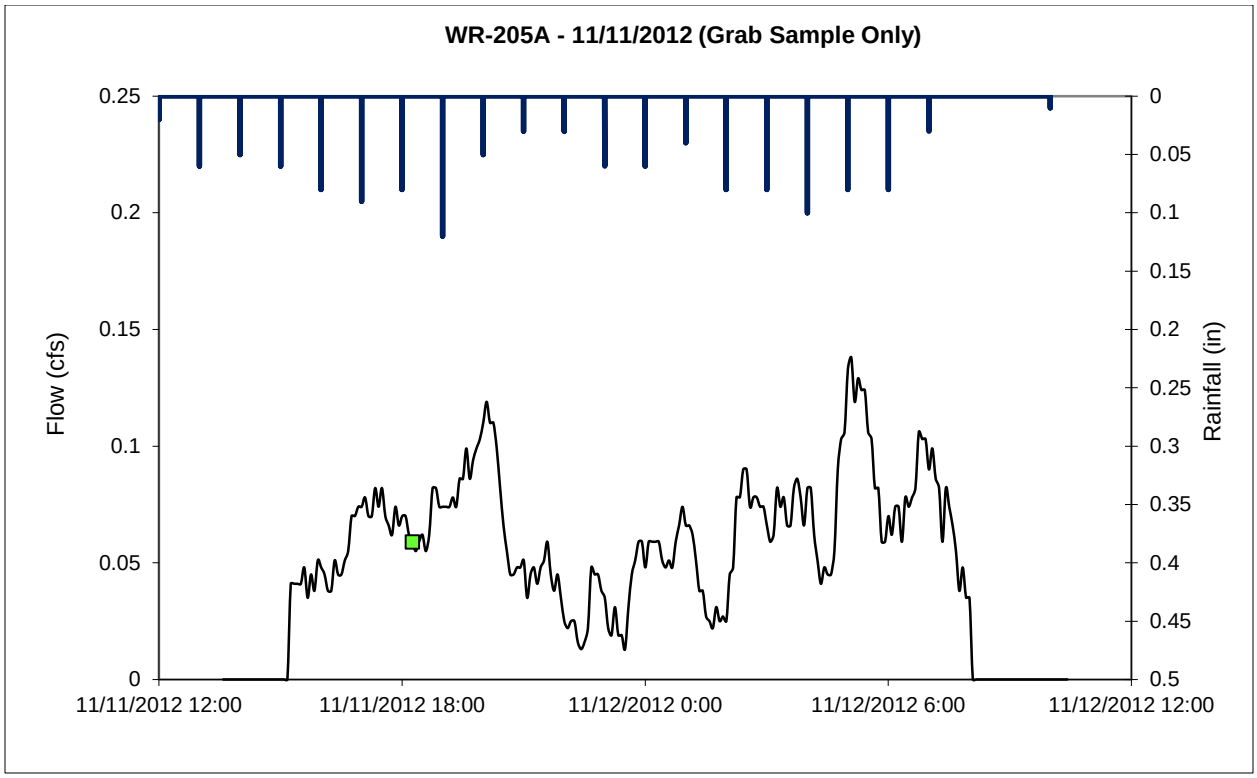

WR-205A - 11/17/2011
Flow (cfs)
Rainfall (in)
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
11/15/2011 18:00
11/16/2011 12:00
11/17/2011 6:00
11/18/2011 0:00
11/18/2011 18:00
11/19/2011 12:00

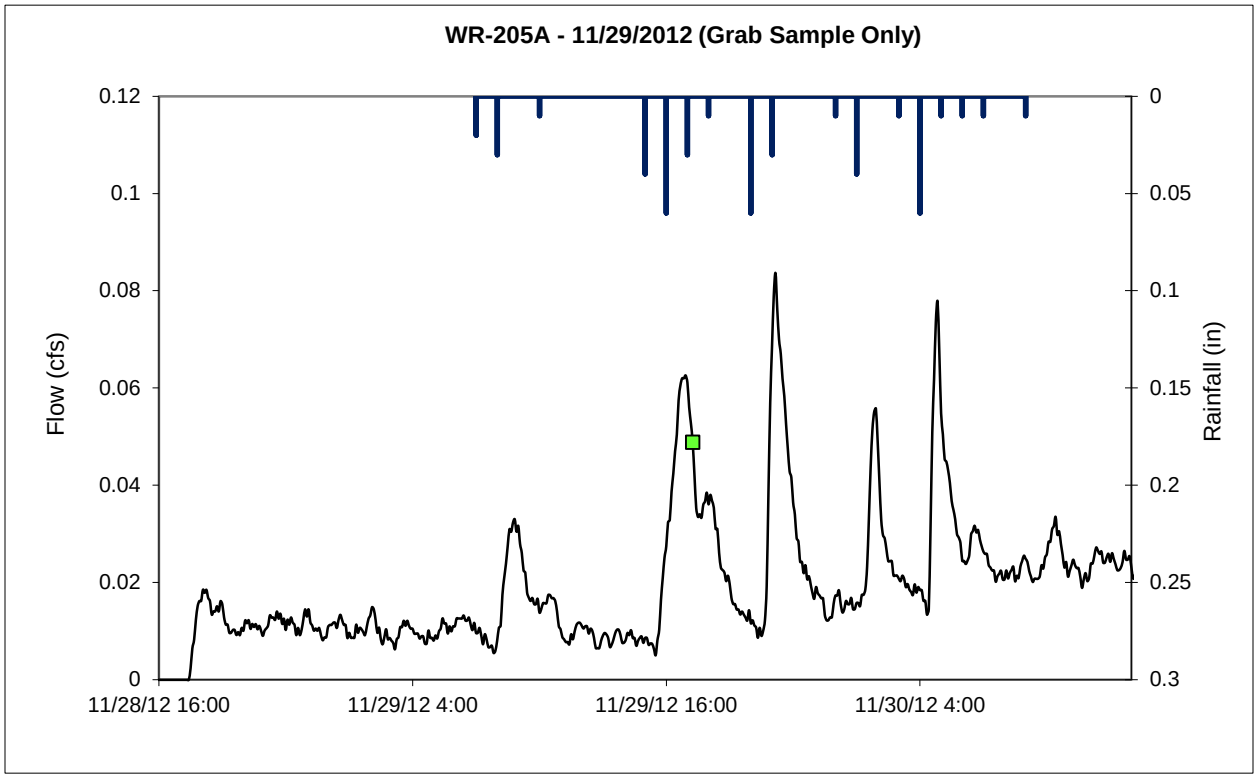

WR-205A - 01/04/2012
Flow (cfs)
Rainfall (in)
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
1/4/2012 12:00
1/4/2012 14:00
1/4/2012 16:00
1/4/2012 18:00
1/4/2012 20:00
1/4/2012 22:00
1/5/2012 0:00
Flow
Samples
Grab Sample
rainfall

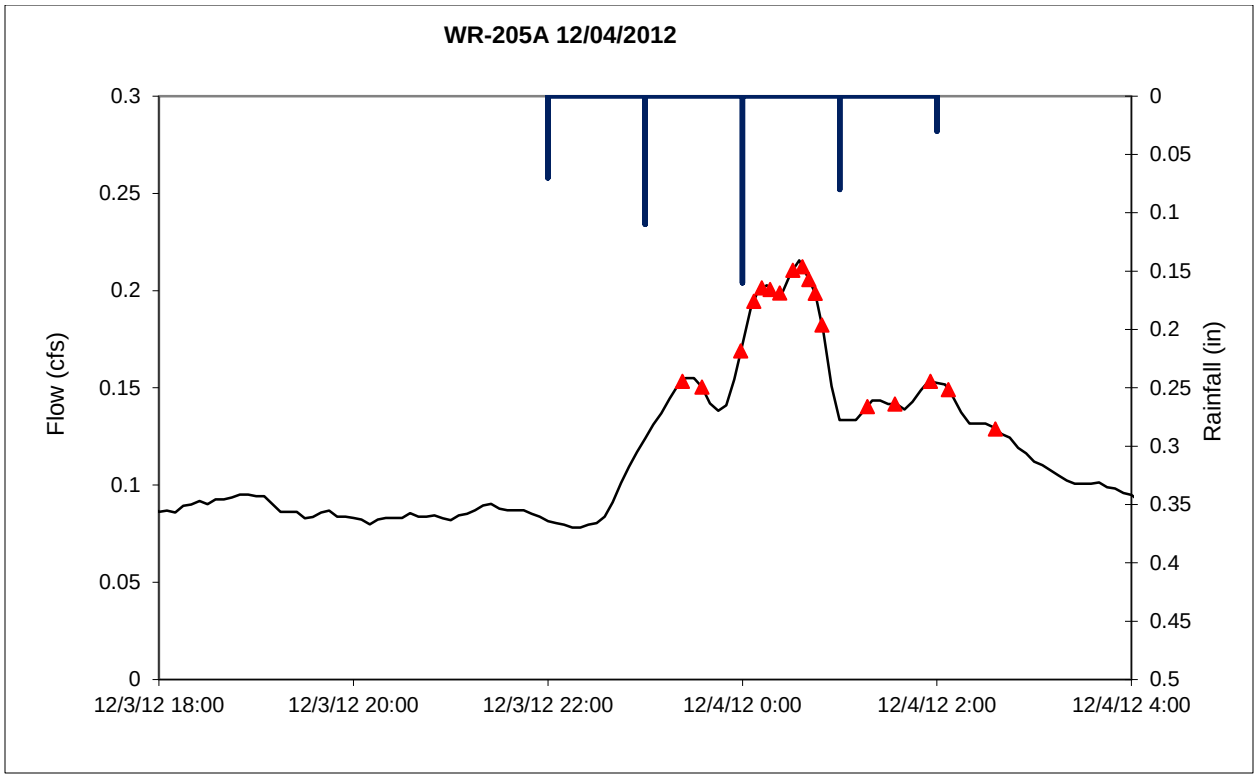

WR-205A - 01/24/2012
Flow (cfs)
Rainfall (in)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
0.4
0.5
1/24/2012 0:00
1/24/2012 6:00
1/24/2012 12:00
1/24/2012 18:00
1/25/2012 0:00

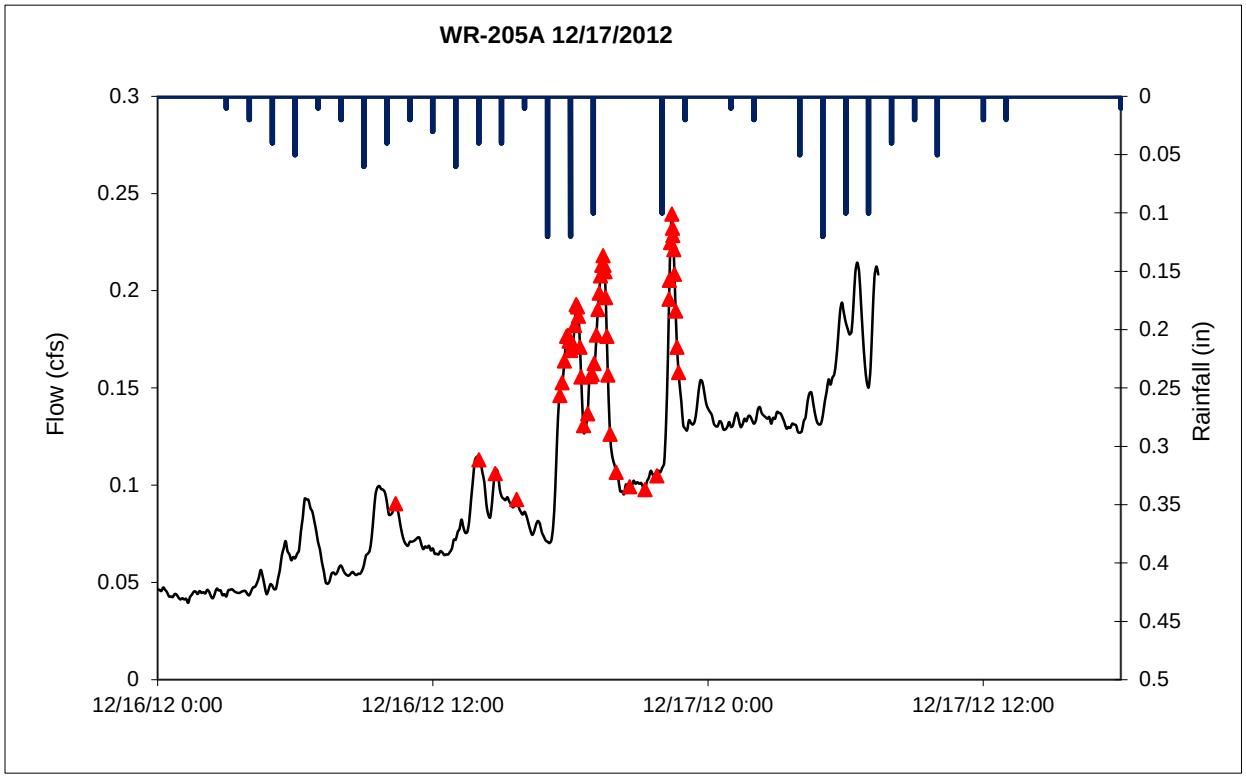

WR-205A - 02/08/2012 (Grab Sample Only)
Flow (cfs)
Rainfall (in)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.05
0.1
0.15
0.2
2/8/12 0:00
2/8/12 4:00
2/8/12 8:00
2/8/12 12:00
2/8/12 16:00
Flow
Grab Sample
rainfall

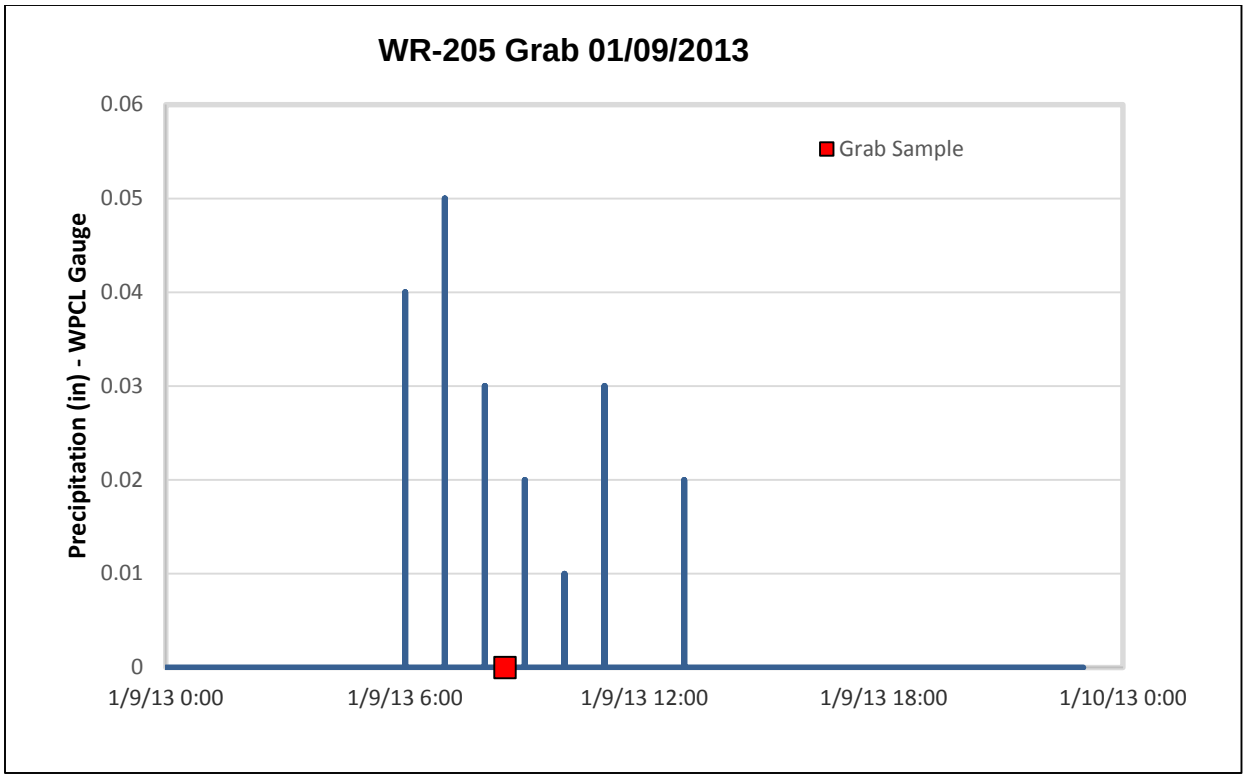

WR-205A - 10/12/2012
Flow (cfs)
Rainfall (in)
0.25
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
10/12/2012 6:00
10/12/2012 12:00
10/12/2012 18:00
10/13/2012 0:00
10/13/2012 6:00
Flow
Samples
Grab Sample
rainfall

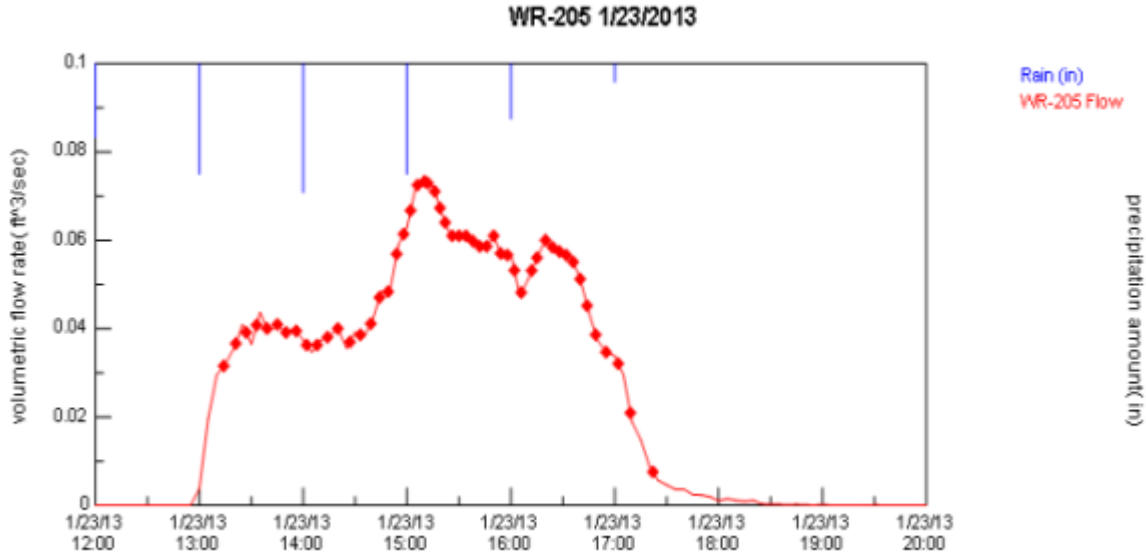

WR-205A - 11/11/2012 (Grab Sample Only)
Flow (cfs)
Rainfall (in)
0.25
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
11/11/2012 12:00
11/11/2012 18:00
11/12/2012 0:00
11/12/2012 6:00
11/12/2012 12:00

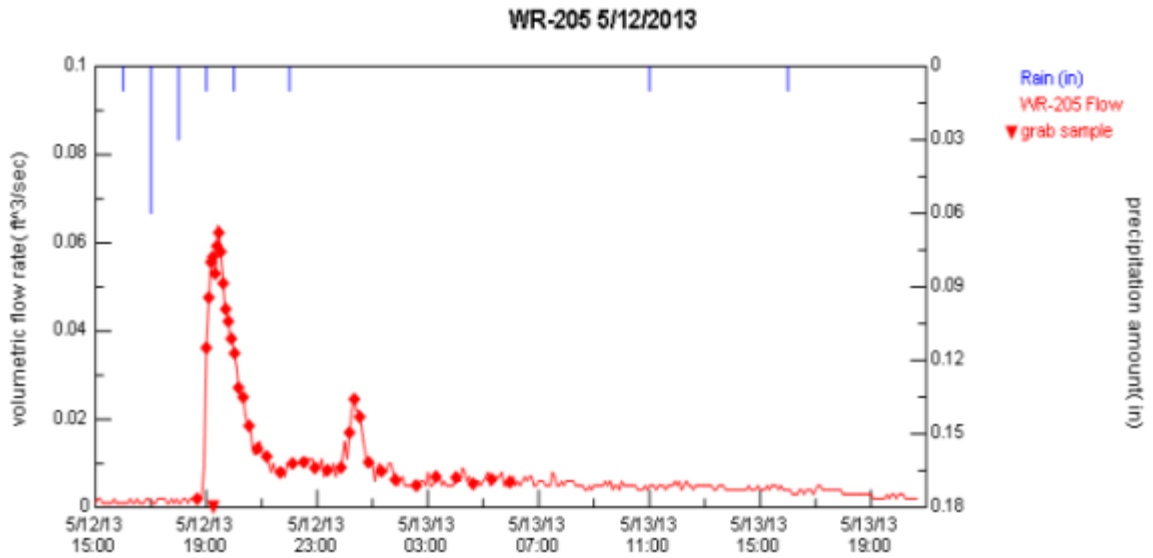

WR-205A - 11/29/2012 (Grab Sample Only)
Flow (cfs)
Rainfall (in)
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.05
0.1
0.15
0.2
0.25
0.3
11/28/12 16:00
11/29/12 4:00
11/29/12 16:00
11/30/12 4:00

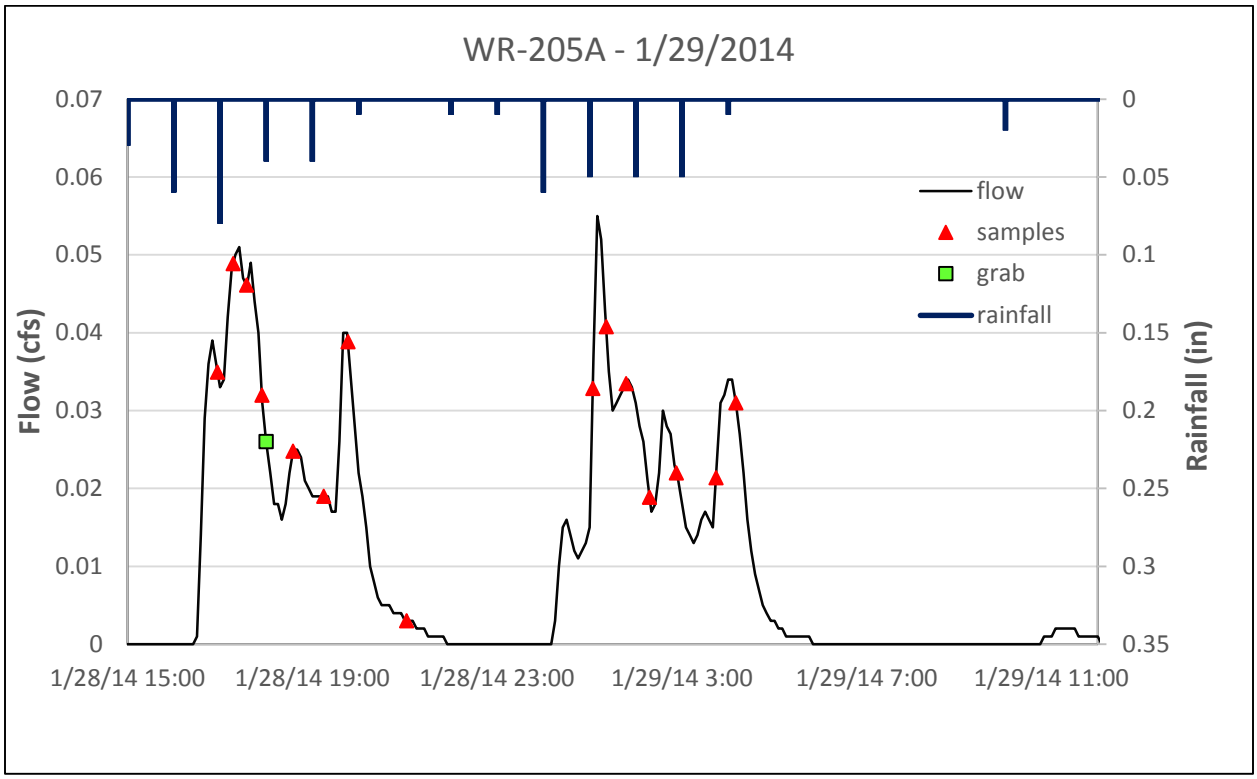

WR-205A 12/04/2012
Flow (cfs)
Rainfall (in)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
12/3/12 18:00
12/3/12 20:00
12/3/12 22:00
12/4/12 0:00
12/4/12 2:00
12/4/12 4:00

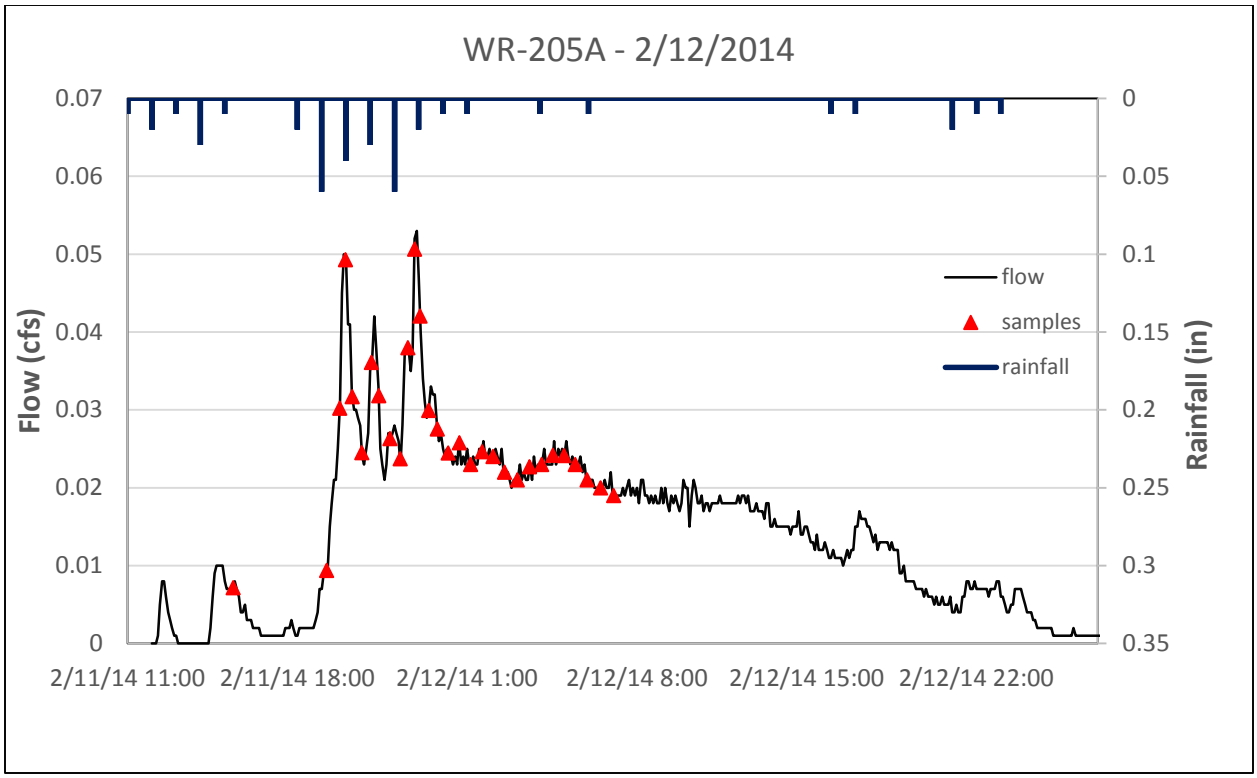

WR-205A 12/17/2012
Flow (cfs)
Rainfall (in)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
12/16/12 0:00
12/16/12 12:00
12/17/12 0:00
12/17/12 12:00

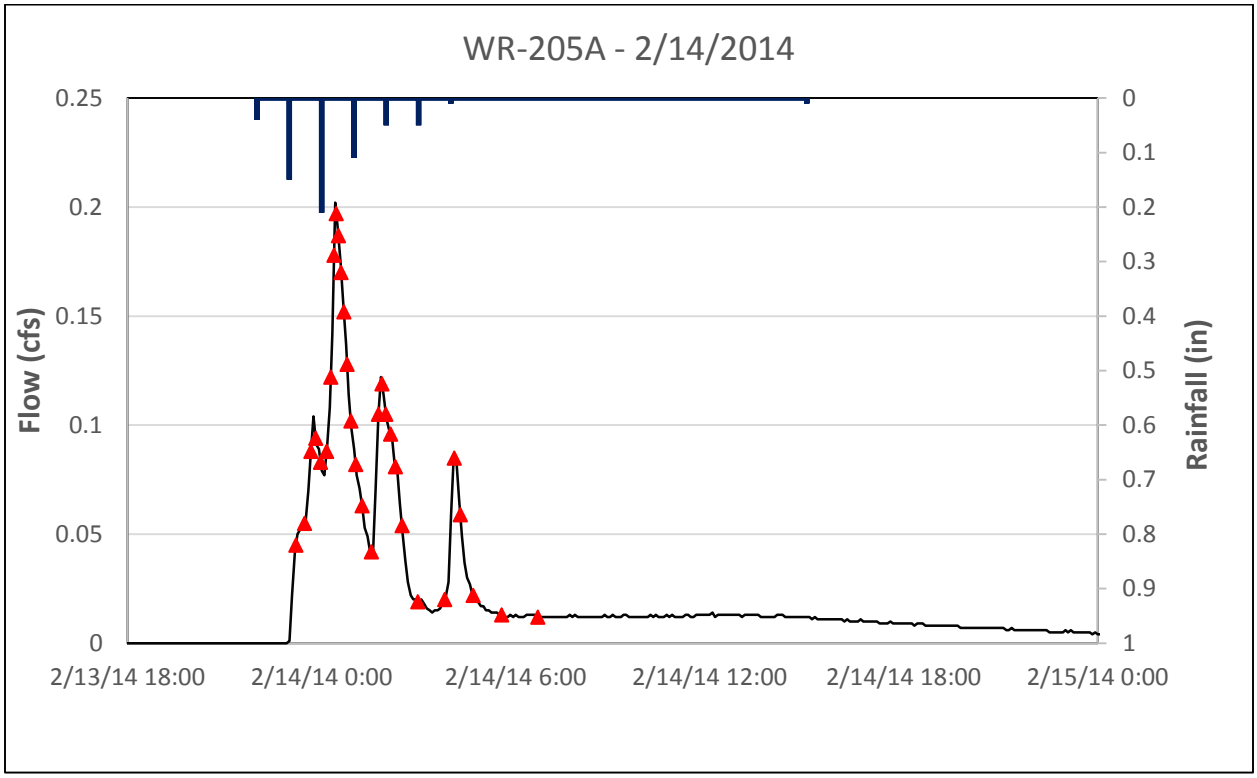

WR-205 Grab 01/09/2013
Grab Sample
Precipitation (in) - WPCL Gauge
0.06
0.05
0.04
0.03
0.02
0.01
0
1/9/13 0:00
1/9/13 6:00
1/9/13 12:00
1/9/13 18:00
1/10/13 0:00

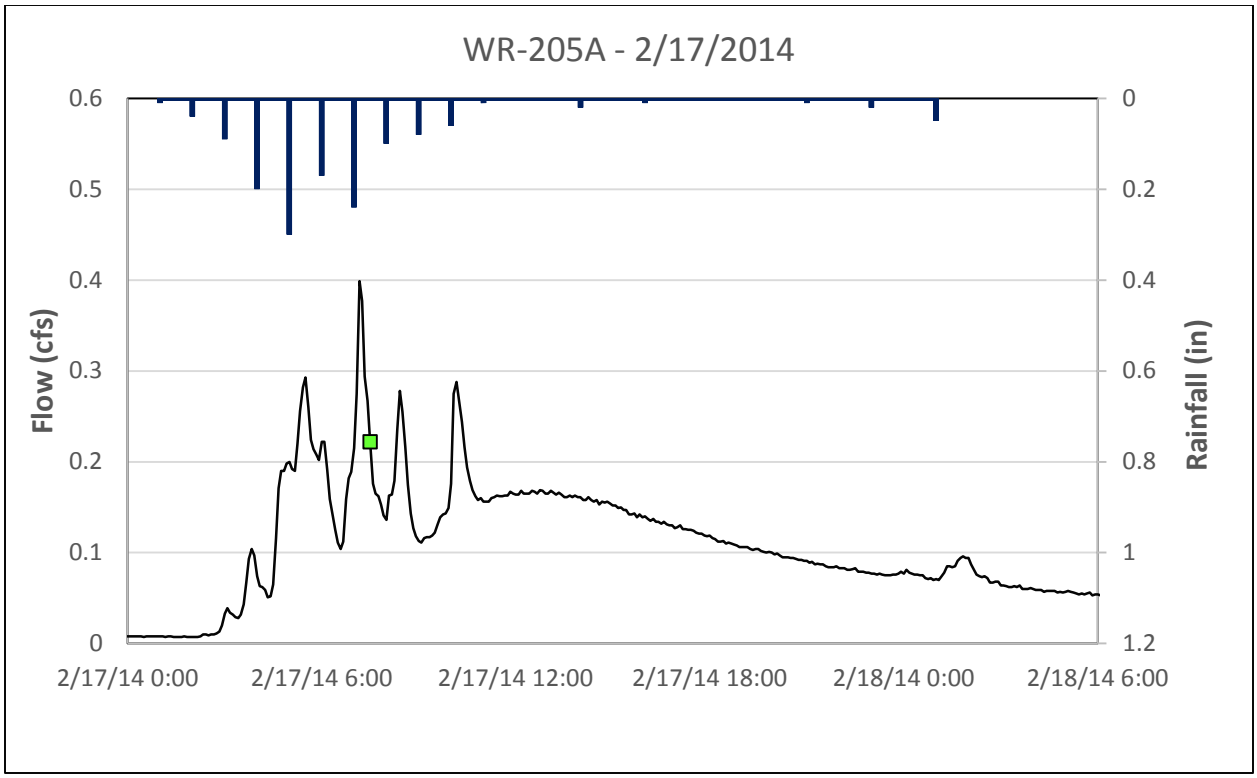

WR-205 1/23/2013
Rain (in)
WR-205 Flow
volumetric flow rate( ft^3/sec)
precipitation amount( in)
0.1
0.08
0.06
0.04
0.02
0
1/23/13 12:00
1/23/13 13:00
1/23/13 14:00
1/23/13 15:00
1/23/13 16:00
1/23/13 17:00
1/23/13 18:00
1/23/13 19:00
1/23/13 20:00

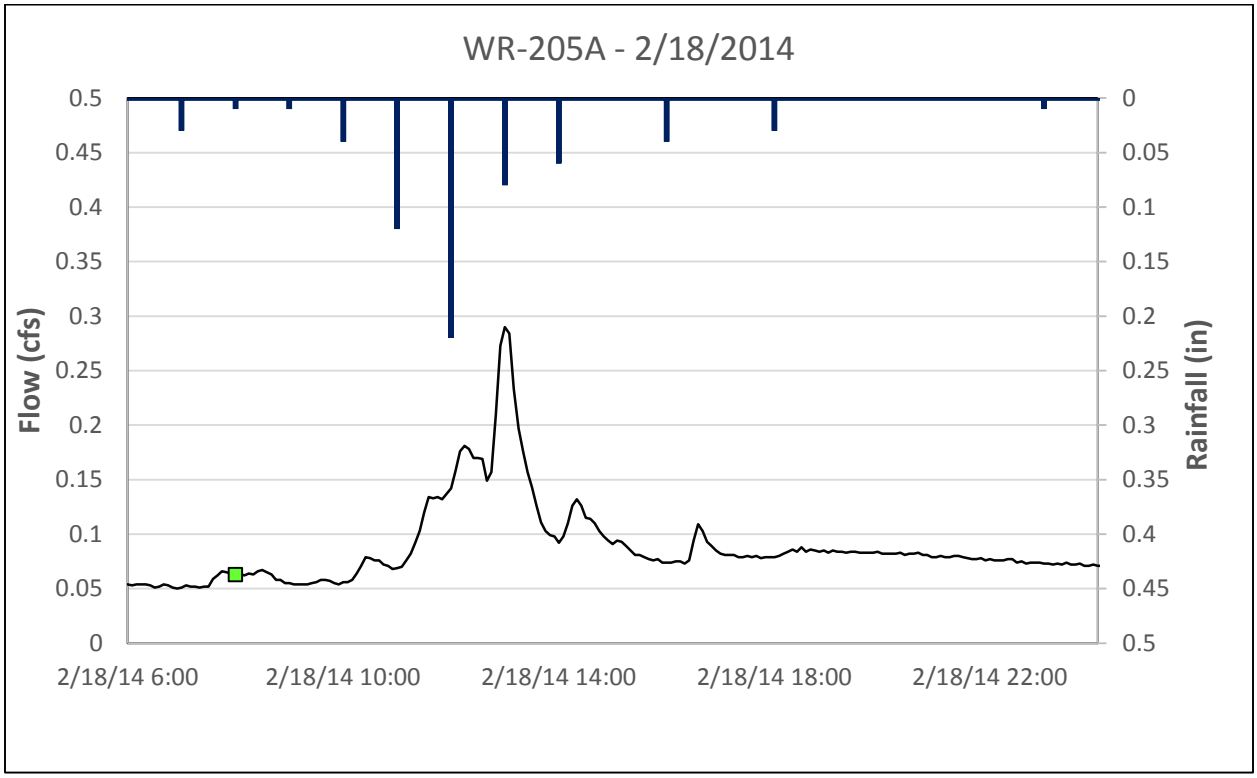

WR-205 5/12/2013
volumetric flow rate( ft^3/sec)
precipitation amount( in)
Rain (in)
WR-205 Flow
grab sample
0.1
0.08
0.06
0.04
0.02
0
0
0.03
0.06
0.09
0.12
0.15
0.18
5/12/13 15:00
5/12/13 19:00
5/12/13 23:00
5/13/13 03:00
5/13/13 07:00
5/13/13 11:00
5/13/13 15:00
5/13/13 19:00

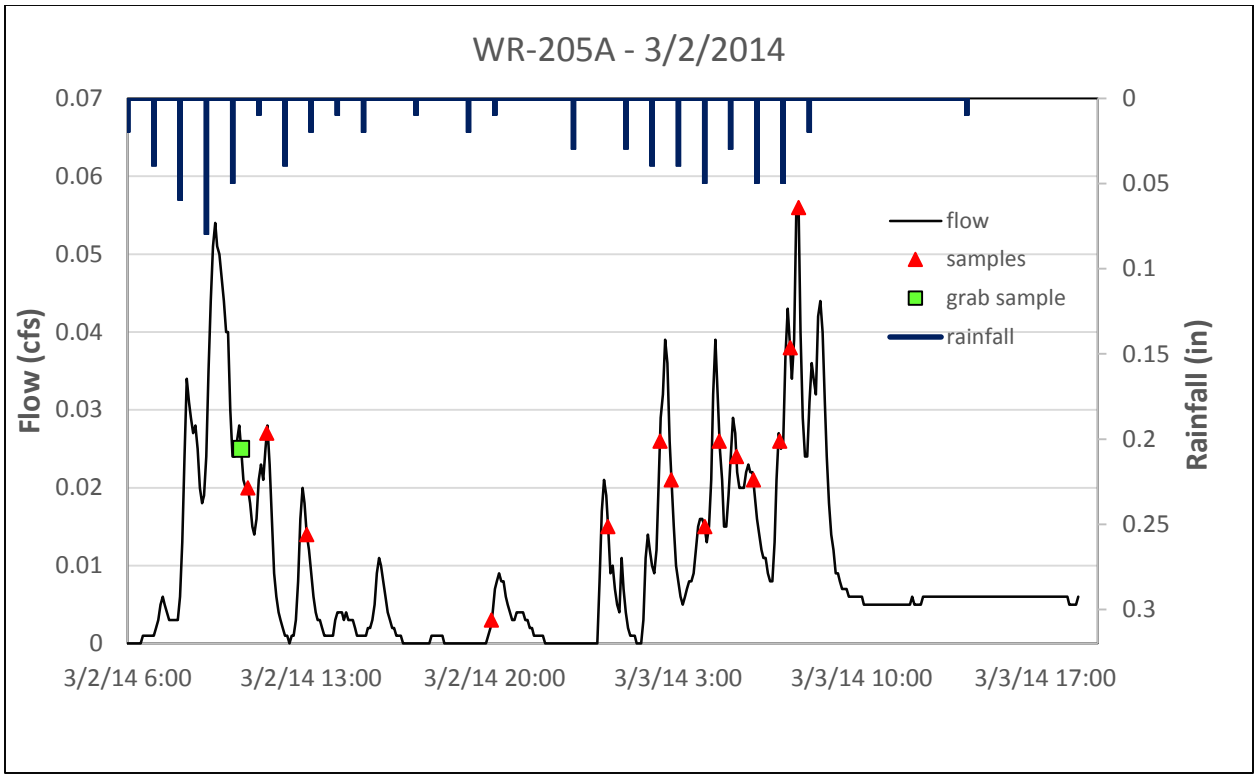

WR-205A - 1/29/2014
Flow (cfs)
Rainfall (in)
flow
samples
grab
rainfall
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
1/28/14 15:00
1/28/14 19:00
1/28/14 23:00
1/29/14 3:00
1/29/14 7:00
1/29/14 11:00

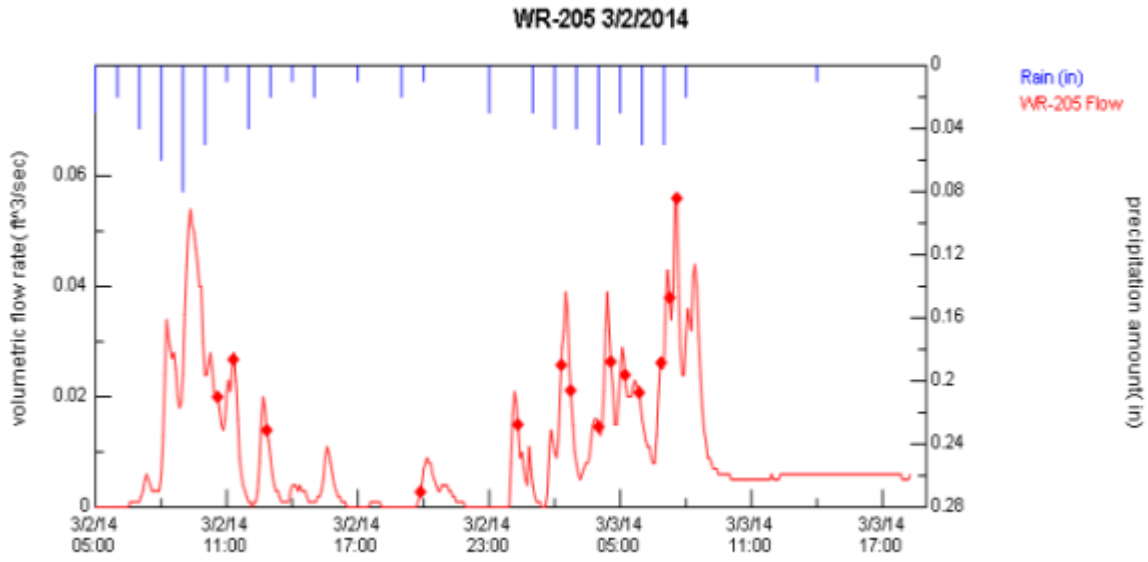

WR-205A - 2/12/2014
Flow (cfs)
Rainfall (in)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
flow
samples
rainfall
2/11/14 11:00
2/11/14 18:00
2/12/14 1:00
2/12/14 8:00
2/12/14 15:00
2/12/14 22:00

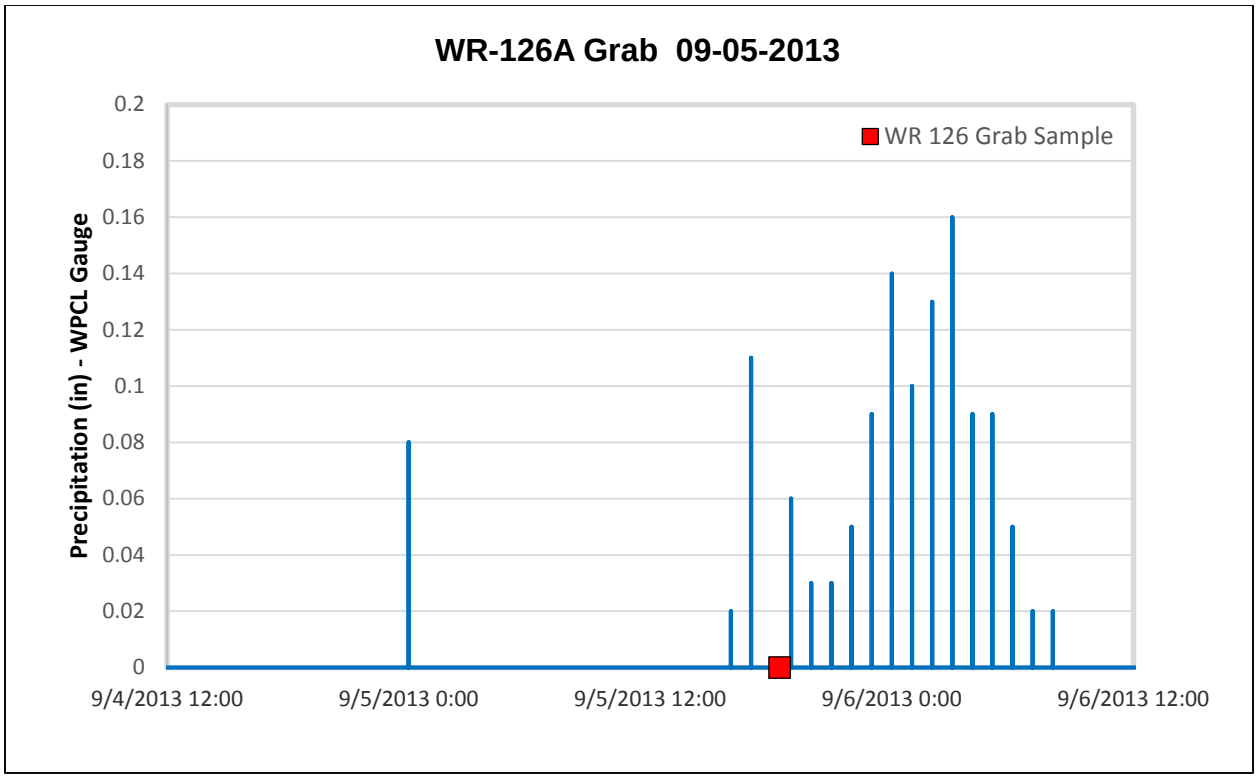

WR-205A - 2/14/2014
Flow (cfs)
Rainfall (in)
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2/13/14 18:00
2/14/14 0:00
2/14/14 6:00
2/14/14 12:00
2/14/14 18:00
2/15/14 0:00

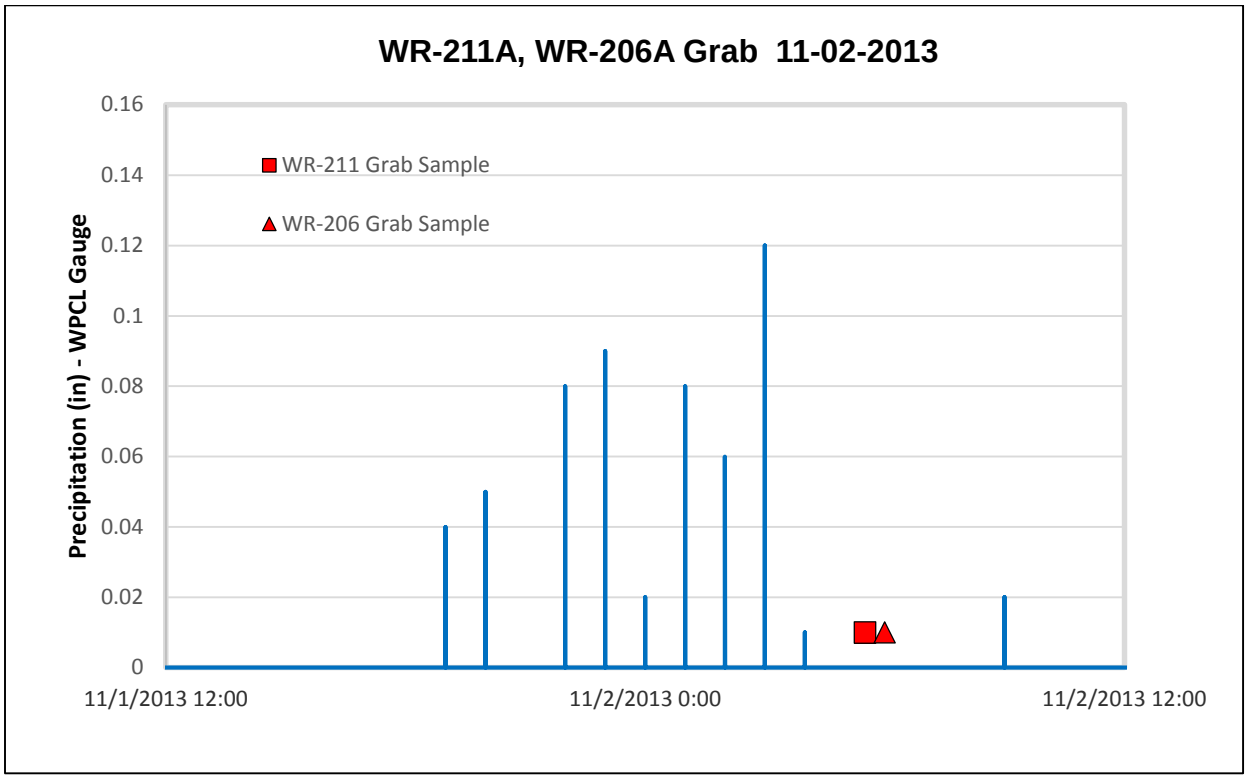

WR-205A - 2/17/2014
Flow (cfs)
Rainfall (in)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.2
0.4
0.6
0.8
1
1.2
2/17/14 0:00
2/17/14 6:00
2/17/14 12:00
2/17/14 18:00
2/18/14 0:00
2/18/14 6:00

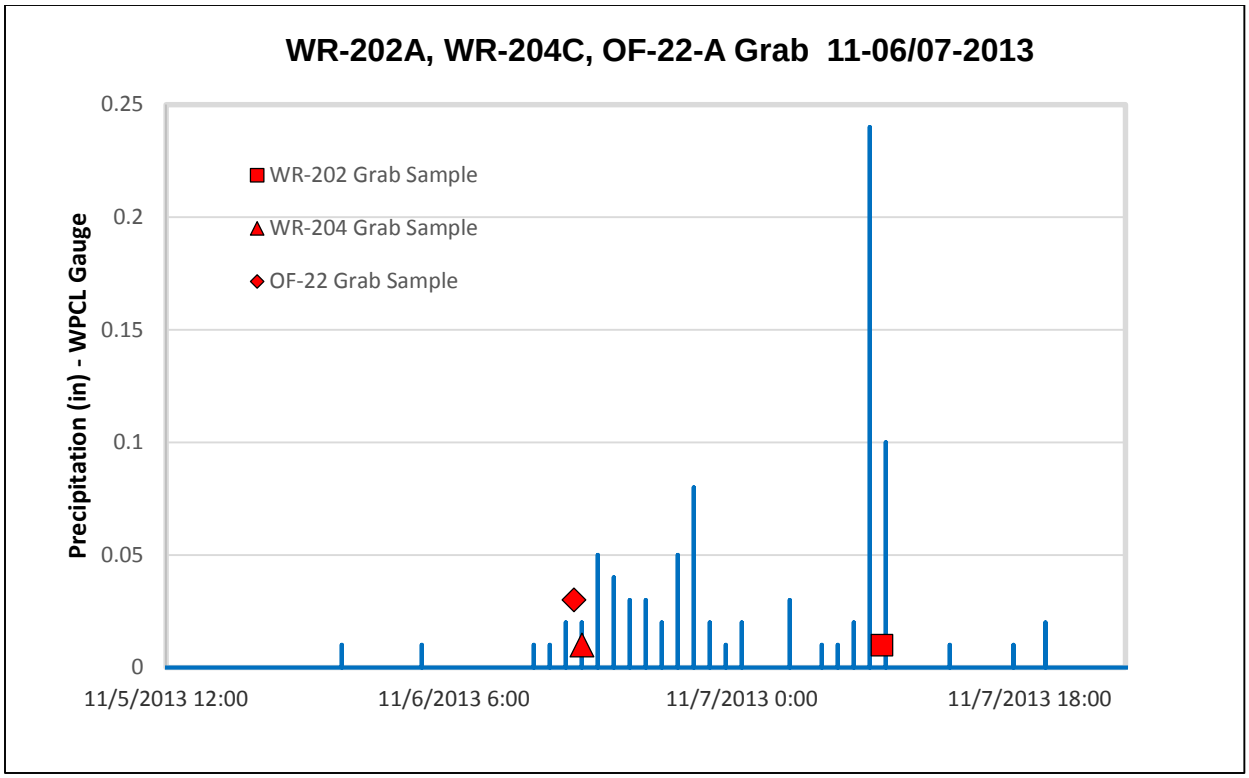

WR-205A - 2/18/2014
Flow (cfs)
Rainfall (in)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
2/18/14 6:00
2/18/14 10:00
2/18/14 14:00
2/18/14 18:00
2/18/14 22:00

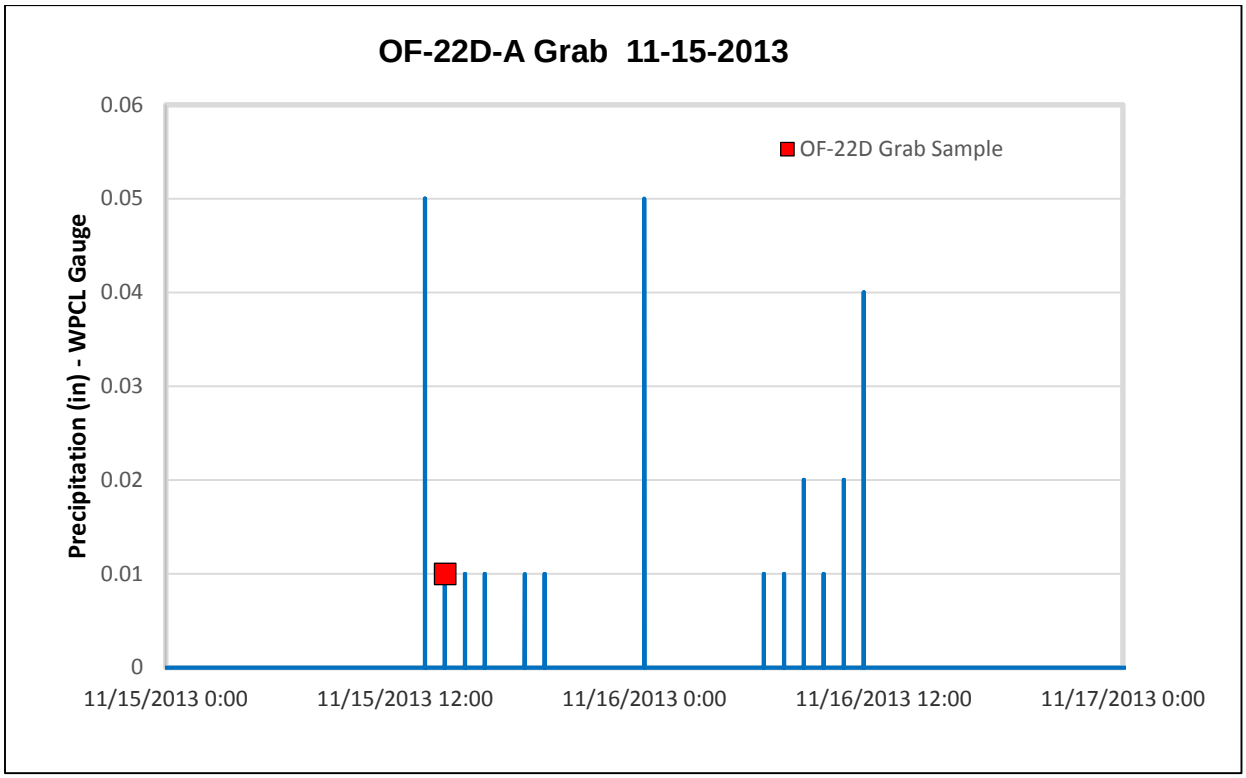

WR-205A - 3/2/2014
Flow (cfs)
Rainfall (in)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.05
0.1
0.15
0.2
0.25
0.3
flow
samples
grab sample
rainfall
3/2/14 6:00
3/2/14 13:00
3/2/14 20:00
3/3/14 3:00
3/3/14 10:00
3/3/14 17:00

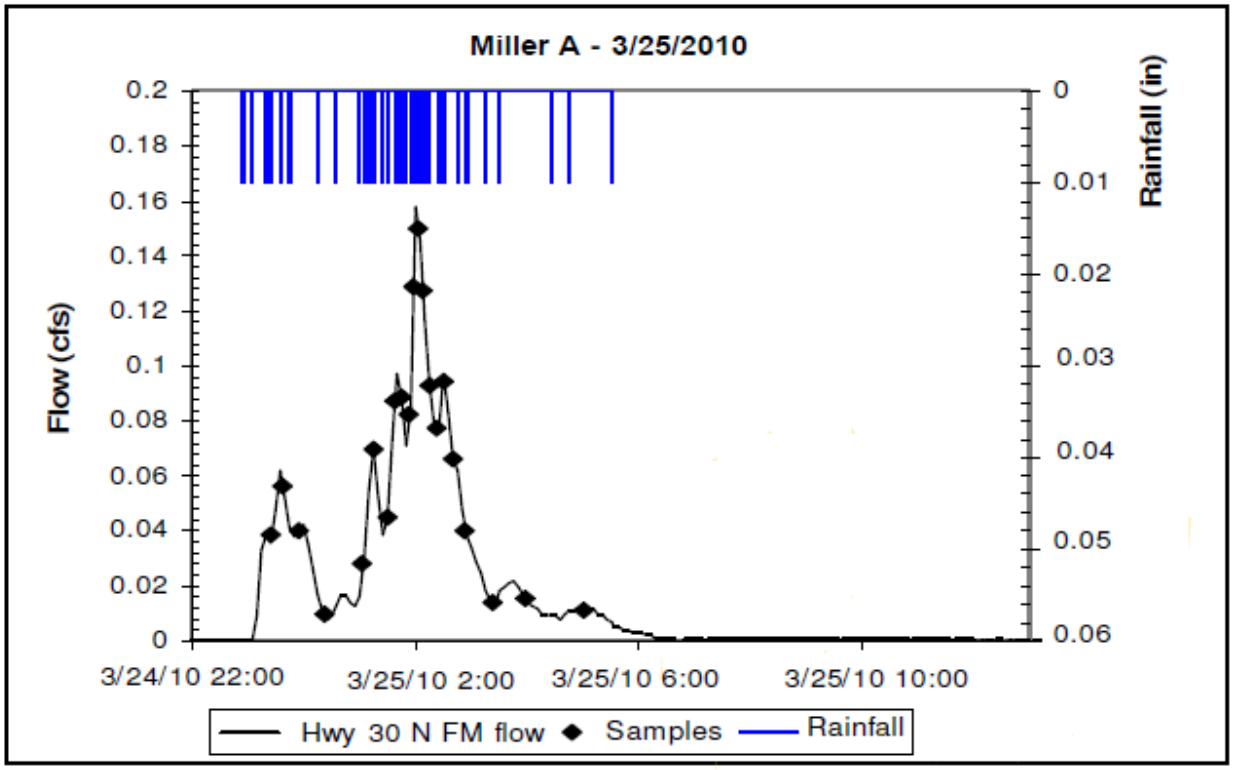

WR-205 3/2/2014
volumetric flow rate( ft^3/sec)
precipitation amount( in)
Rain (in)
WR-205 Flow
0.06
0.04
0.02
0
0
0.04
0.08
0.12
0.16
0.2
0.24
0.28
3/2/14 05:00
3/2/14 11:00
3/2/14 17:00
3/2/14 23:00
3/3/14 05:00
3/3/14 11:00
3/3/14 17:00

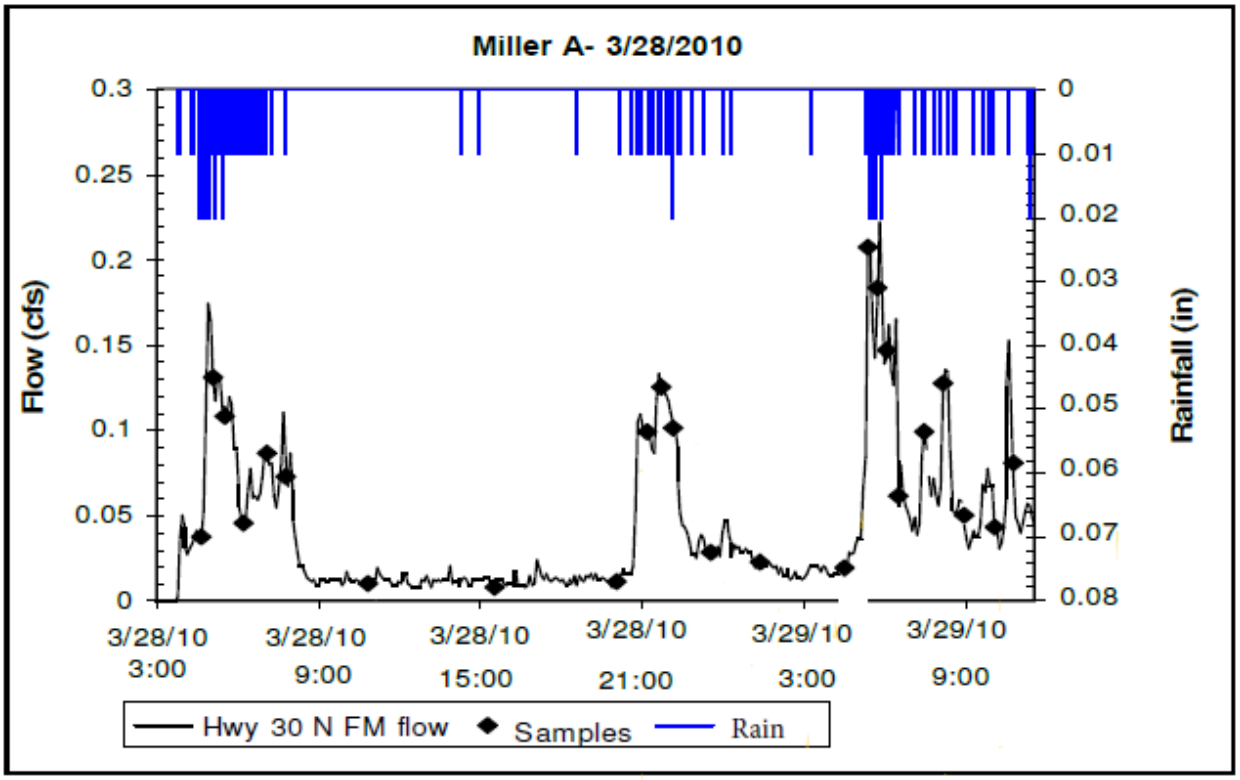

WR-126A Grab 09-05-2013
WR 126 Grab Sample
Precipitation (in) - WPCL Gauge
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
9/4/2013 12:00
9/5/2013 0:00
9/5/2013 12:00
9/6/2013 0:00
9/6/2013 12:00

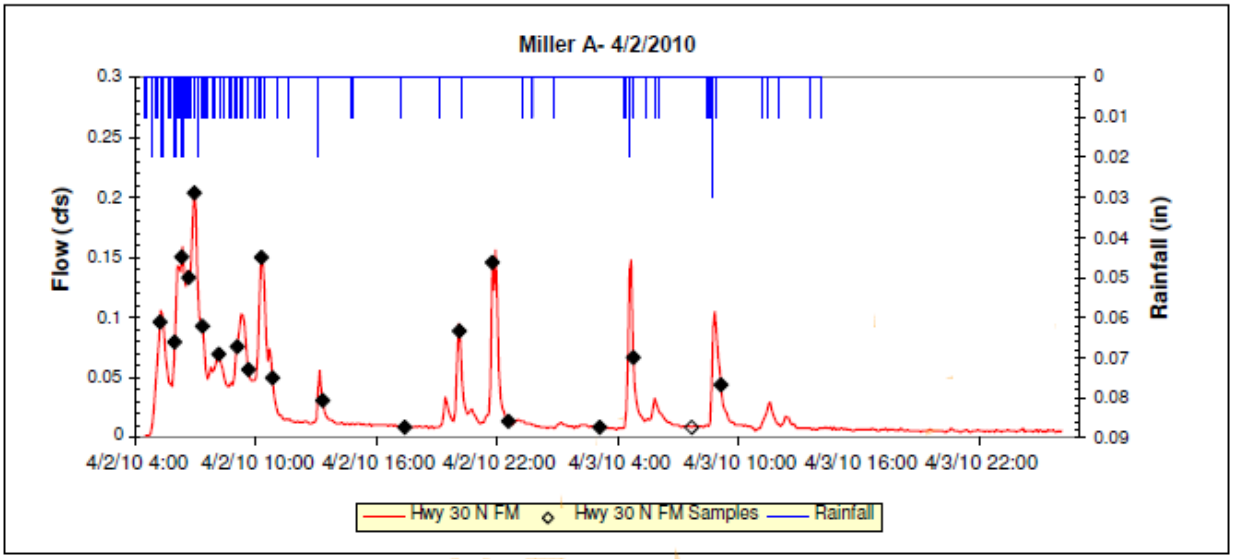

WR-211A, WR-206A Grab 11-02-2013
WR-211 Grab Sample
WR-206 Grab Sample
Precipitation (in) - WPCL Gauge
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
11/1/2013 12:00
11/2/2013 0:00
11/2/2013 12:00

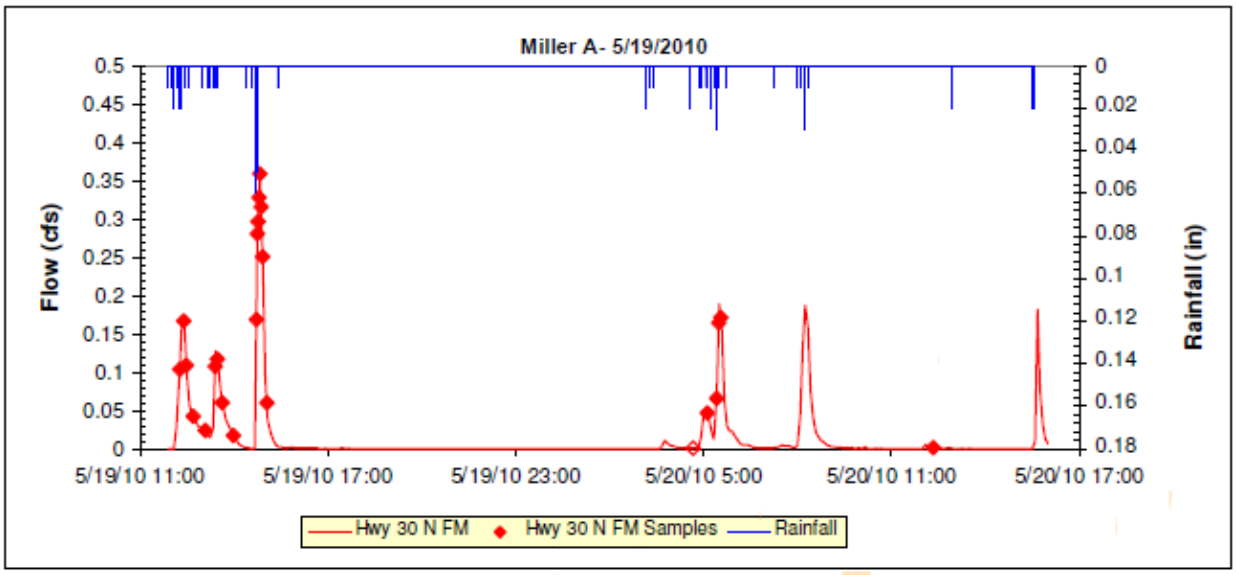

WR-202A, WR-204C, OF-22-A Grab 11-06/07-2013
Precipitation (in) - WPCL Gauge
0.25
0.2
0.15
0.1
0.05
0
WR-202 Grab Sample
WR-204 Grab Sample
OF-22 Grab Sample
11/5/2013 12:00
11/6/2013 6:00
11/7/2013 0:00
11/7/2013 18:00

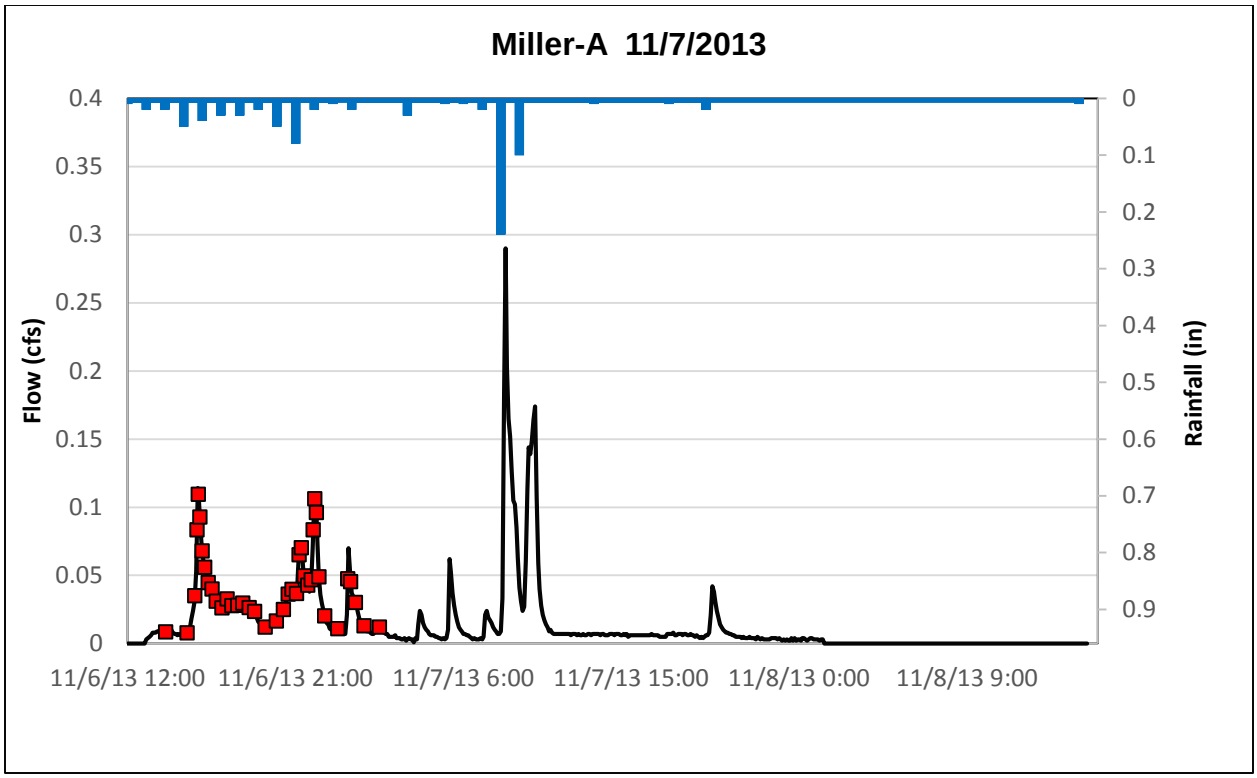

OF-22D-A Grab 11-15-2013
Precipitation (in) - WPCL Gauge
0.06
0.05
0.04
0.03
0.02
0.01
0
OF-22D Grab Sample
11/15/2013 0:00
11/15/2013 12:00
11/16/2013 0:00
11/16/2013 12:00
11/17/2013 0:00

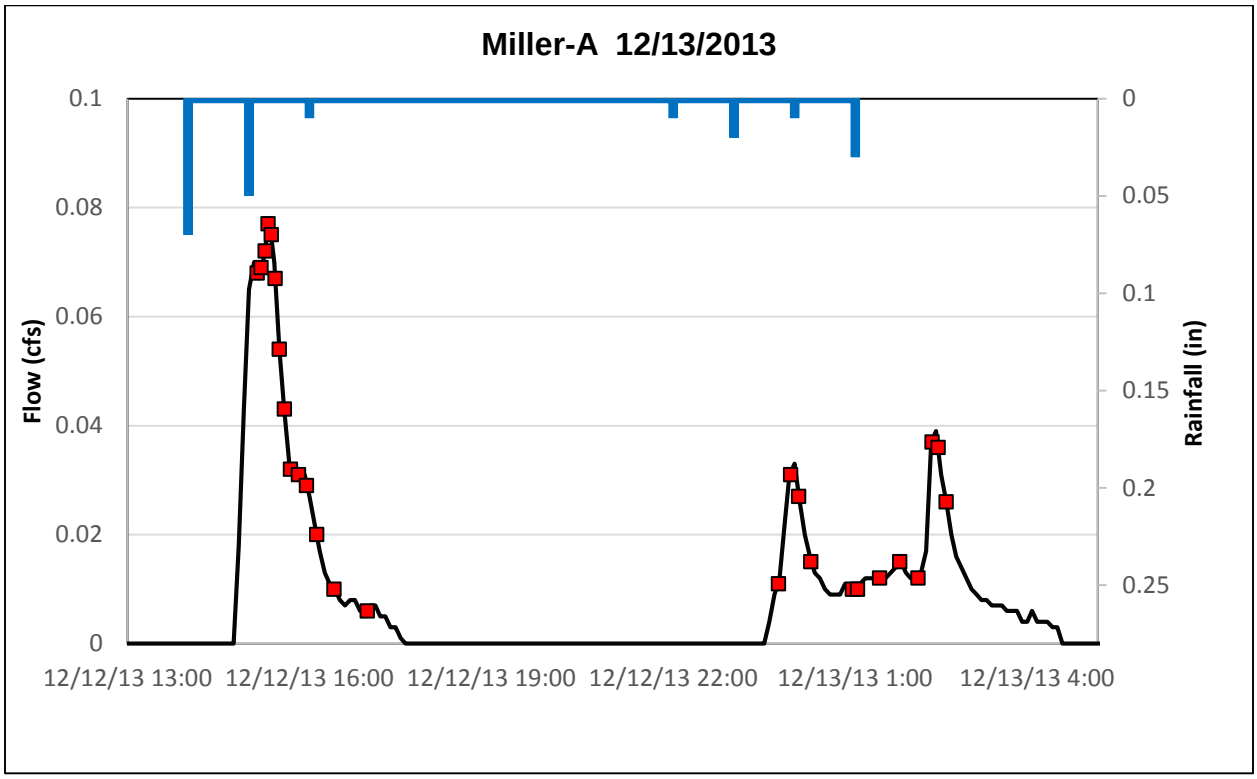

Miller A - 3/25/2010
Flow (cfs)
Rainfall (in)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
0.01
0.02
0.03
0.04
0.05
0.06
3/24/10 22:00
3/25/10 2:00
3/25/10 6:00
3/25/10 10:00
Hwy 30 N FM flow
Samples
Rainfall

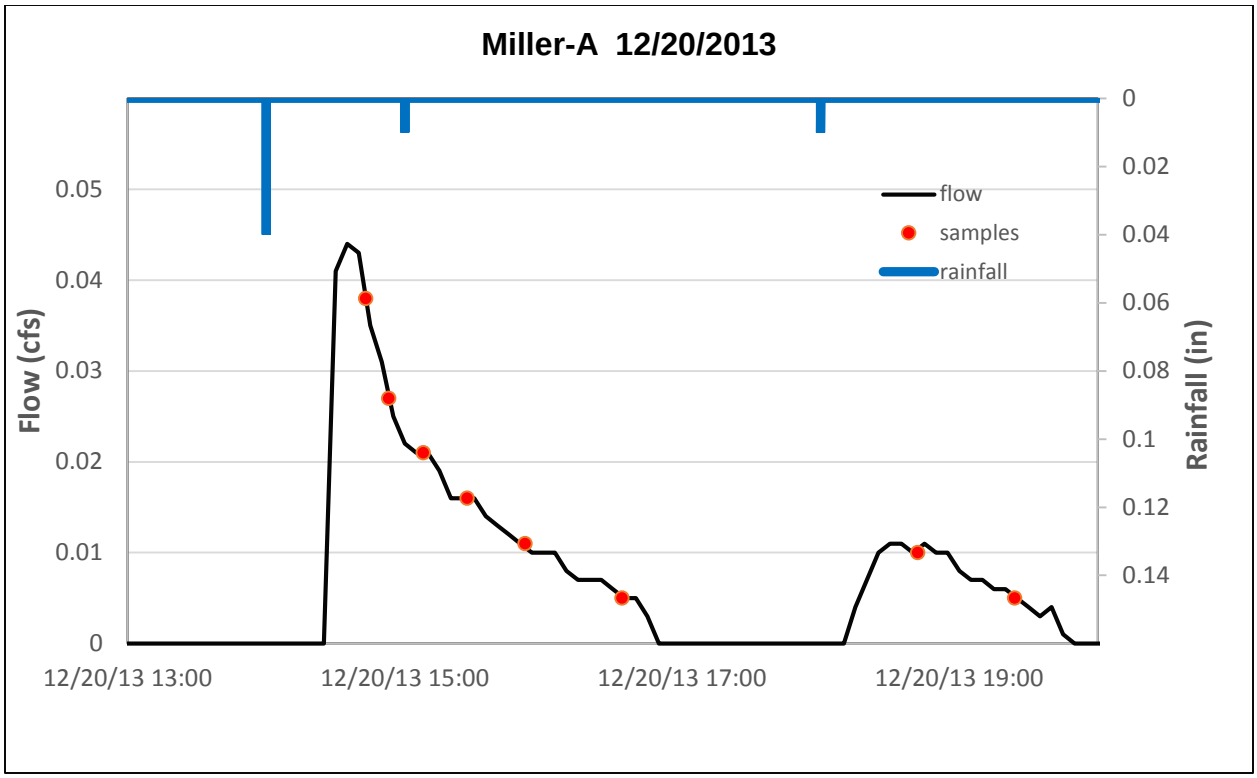

Miller A- 3/28/2010
Flow (cfs)
Rainfall (in)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
3/28/10 3:00
3/28/10 9:00
3/28/10 15:00
3/28/10 21:00
3/29/10 3:00
3/29/10 9:00
Hwy 30 N FM flow
Samples
Rain


Miller A- 4/2/2010
Flow (cfs)
Rainfall (in)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
4/2/10 4:00
4/2/10 10:00
4/2/10 16:00
4/2/10 22:00
4/3/10 4:00
4/3/10 10:00
4/3/10 16:00
4/3/10 22:00
Hwy 30 N FM
Hwy 30 N FM Samples
Rainfall


Miller A- 5/19/2010
Flow (cfs)
Rainfall (in)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
5/19/10 11:00
5/19/10 17:00
5/19/10 23:00
5/20/10 5:00
5/20/10 11:00
5/20/10 17:00
Hwy 30 N FM
Hwy 30 N FM Samples
Rainfall


Miller-A 11/7/2013
Flow (cfs)
Rainfall (in)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
11/6/13 12:00
11/6/13 21:00
11/7/13 6:00
11/7/13 15:00
11/8/13 0:00
11/8/13 9:00


Miller-A 12/13/2013
Flow (cfs)
Rainfall (in)
0.1
0.08
0.06
0.04
0.02
0
0
0.05
0.1
0.15
0.2
0.25
12/12/13 13:00
12/12/13 16:00
12/12/13 19:00
12/12/13 22:00
12/13/13 1:00
12/13/13 4:00


Miller-A 12/20/2013
Flow (cfs)
Rainfall (in)
0.05
0.04
0.03
0.02
0.01
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
flow
samples
rainfall
12/20/13 13:00
12/20/13 15:00
12/20/13 17:00
12/20/13 19:00

asdfsdf

# ATTACHMENT B

# Data Quality Assurance Review Summary

# Data Quality Assurance Review Summary

Data quality was reviewed and data were validated based on measurement quality objectives (MQOs) specified in various quality assurance project plans. Some data were qualified as estimates (flagged J) or undetected (flagged U) based on qualification by the laboratory or exceedance of MQOs. These data qualifiers are included in the database and summary tables. No data were rejected based on the quality assurance review.

Data quality assurance review worksheets were prepared summarizing the objectives and results of the following quality assurance elements:

- Completeness and methodology
- Sample holding times
- Method blanks
- Matrix spikes
- Lab control samples
- Lab duplicates
- Field duplicates
- Instrument calibration and performance
- Corrective action

Data quality assurance worksheets are provided in this appendix. Data quality assurance worksheets for additional samples collected at WR-205A and WR-306A as part of the NEDC compliance program are presented and summarized in a separate document (ODOT 2013).

The following results were data qualified as estimated (J) or rejected (R) due to MQO exceedance:

- The result for benzo(a)pyrene in the sample collected at WR-205 on 2/8/2012 was qualified as estimated (J).
- Results for PAHs in the sample collected at WR-306 on 2/22/2012 were qualified as estimated (J).
- Results for PAHs and aroclor PCBs in samples collected at WR-306 and WR-205 on 10/12/2012 were qualified as estimated (J).
- Results for PCB 147+149 and PCB 209 in the sample collected at WR-306 on 2/22/2013 were qualified as estimated (J).
- Results for benzyl alcohol and 4-methylphenol in the sample collected at WR-510 on 3/5/2013 were qualified as estimated (J).

- The result for 4,4′-DDT in the sample collected at WR-307 on 3/19/2013 was qualified as estimated (J).
- The result for PCB 4 in the sample collected at WR-307 on 4/4/2013 was qualified as estimated (J).
- Results for tributyltins, dieldrin, and endrin in the sample collected at WR-307 on 4/10/2013 were qualified as estimated (J).
- The result for cadmium in the sample collected at OF-52 on 4/19/2013 was qualified as estimated (J).
- Results for copper, PCB 4, PCB 54, PCB 104, PCB 205, PCB 208, PCB 209, 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT in the sediment sample collected at WR-307 on 4/23/2013 were qualified as estimated (J). The result for 4-nitrophenol in this sample was rejected.
- Results for 4-nitrophenol in samples collected at OF-52 on 5/16/2013 and 5/21/2013 were rejected.
- Results for all pesticides compounds in sediment samples collected at Miller and WR-306 on 5/28/2013, and at WR-126 and OF-22D on 5/30/2013 were qualified as estimated (J).
- Results for copper and lead in the sediment sample collected at WR-306 on 5/28/2013 were qualified as estimated (J).
- The result for 4-nitrophenol in the sediment sample collected at OF-22D on 5/30/2013 was rejected.
- Results for phenol, dieldrin, and endrin in the sediment sample collected at WR-211 on 8/14/2013 were qualified as estimated (J).
- The result for 4,4′-DDE in the sediment sample collected at WR-206 on 8/14/2013 was qualified as estimated (J).
- Results for 4,4′-DDE, chromium, and lead collected at OF-22 on 8/14/2013 were qualified as estimated (J).
- Results for acenaphthylene, 2-methylnaphthalene, chrysene, and acenaphthene in the stormwater sample collected at WR-126 on 9/5/2013 were qualified as estimated (J).
- Results for PCB-1, PCB-3, PCB-15, and PCB-37 in the stormwater sample collected at OF-22C on 11/2/2013 were qualified as estimated (J).
- The result for PCB-118 in the stormwater sample collected at OF-22C on 11/5/2013 was qualified as estimated (J).
- Results for hexachlorocyclopentdiene in stormwater samples collected at Miller, WR-202, and WR-204 on 11/6/2013 and 11/7/2013 were rejected.

- Results for all PCB congeners in stormwater samples collected at Miller on 11/7/2013 were qualified as estimated (J).
- Results for benz(a)anthracene, chrysene, Aroclor 1254, and PCB-11 in stormwater samples collected at OF-18 and OF-22C were qualified as estimated (J).
- The result for benz(a)anthracene in the stormwater sample collected at Miller on 12/13/2013 was qualified as estimated (J).
- Results for all PAH parameters in the stormwater sample collected at Miller on 12/20/2013 were qualified as estimated (J).

The analytical laboratory provided additional data flags that are described in detail in the laboratory reports in Attachment C of Appendix A. For summary purposes, only flags that indicate the result is an estimate (J) or not detected (U) are included in the data tables presented in Appendix D.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 06/11/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, grain size, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 1/16/2014 / OF-16, OF-22C, WR-204 (K1400520)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TS | EPA 160.3 | 5 | ≤180 | NA<br>0.1 % | NA | NA | NA | NA | NR | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 21 | ≤28 | <0.05<br>0.05 % | Batch 107,107 | 70-122 | 100 | 72-122 | Batch 3 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 8 | ≤28 | <0.98<br>1.4-1.5 ug/kg | Batch 74,77 | 10-115 | 78 | 10-122 | Batch 5 | ≤40 | NS | ≤20 | OK | None |
| Grain size | PSEP | 19 | ≤180 | NA<br>0.01 gram | NA | NA | NA | NA | Batch OK | ≤20 | NS | ≤20 | OK | None |
| Metals | EPA 6020/7471B | 11,5 | ≤180, 28(hg) | <0.02-2.0<br>0.01-2.0 mg/kg | OF-16 80-120 | 75-125 | 73-104 | 47-152 | OF-16 0.6-16 | ≤20 | NS | ≤20 | OK | %RPD exceeded criteria for Cu, Pb, Mn, and Ni. "J" Cu, Pb, Mn, and Ni results for OF-16. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 6/11/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, grain size, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 1/16/2014 / OF-16, OF-22C, WR-204 (K1400520)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤14 | <5-9.9<br>20-57 ug/kg | Batch 70-75 | 27-131 | 52,55 | 37-123 | Batch 8,3 | ≤40 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 20 | ≤365 | <19.3- 193<br>29.5-453 ng/kg | NA | NA | 98-118 | 60-135 | NA | ≤50 | NS | ≤20 | OK | Several cong. >EDL, but <MRL, no action. |
| OC Pesticides | HRGC/MS/MS | 23 | ≤14 | <0.1-0.2<br>1.23-3.66 ug/kg | Batch 86-108 | 24-123 | 86-109 | 24-123 | Batch 0-23 | ≤30 | NS | ≤20 | OK | Holding time exceeded; "J" all results. |
| SVOCs | EPA 8270D LL | 6 | ≤14 | <5.0-200<br>120-4000 µg/kg | Batch 0-141 | 10-132 | 42-102 | 17-104 | Batch NC-29 | ≤40 | NS | ≤20 | OK | MS/MSD Batch sample, no action.<br>LCS %R Benzoic acid 0, LCSD okay, no action. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 09/12/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, PCBs, Phenols)

Checked: initials

Sample Date/Sample ID: 10/12/2012 10:10 / WR-306 GRAB (K1210392)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | | ≤7 | <1.0<br>1.0 mg/L | | NA | | ±15 | | ≤10 | | ≤20 | OK | Not requested |
| TOC | SM 2540D | | ≤28 | <0.5mg/L<br>0.5 mg/L | | 83-117 | | 83-117 | | ≤20 | | ≤20 | OK | Not requested |
| Tributyltin | | | ≤28 | <1.00<br>1 mg/L | | ±25 | | ±15 | | ≤20 | | ≤20 | OK | Not monitored at this site |
| Total and Dissolved Metals | EPA 200.8 | | ≤180 | <.2-2<br>0.02-2 ug/L | | ±30 | | ±25 | | ≤20 | | ≤40 | OK | Not requested |
| Total and Dissolved Mercury | EPA 1631E | | ≤28 | <0.0200<br>1.0 ng/L | | 71-125 | | 77-123 | | ≤20 | | ≤20 | OK | Not requested |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 09/12/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, PCBs, Phenols)

Checked: initials

Sample Date/Sample ID: 10/12/2012 10:10 / WR-306 GRAB (K1210392)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 10 | ≤14 | <0.0021-.04<br>0.026-0.18 µg/L | 64-73 | 25-144 | 83,88 | 50-103 | 0,6 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 27 | ≤365 | various<br>101-1010 pg/L | NA | NA | 105-139 | 60-135 | <1-9 | ≤50 | NS | ≤20 | OK | MB contamination, all < MRL,no action. LCSD high for PCB-1, no action because sample ND |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.49-4.9<br>2.1-21 ng/L | 75-138 | 24-123 | 76-97 | 50-120 | 9-35 | ≤30 | NS | ≤20 | OK | Endrin <MRL, >MDL in MB, ND in sample, no action. MSD %R high for 2,4-DDD, sample ND, no action. RPD high for 2,4- and 4,4-DDD, no action , samples ND, marginal failure and all other criteria met. |
| SVOCs | EPA 8270D LL | 6 | ≤7 | <0.2-1.0<br>1.1-5.3 µg/L | 53-107 | 53-133 | 52-90 | 33-118 | 1-16 | ≤30 | NS | ≤20 | OK | MSD %R for di-n-butylphthalate 1% less than 54% criterion; no action, MS okay and marginal exceedance. |
| PAHs | | 7 | ≤7 | 0.86-2.0<br>18-140 ng/L | 0-86 | 32-139 | 63-88 | 39-134 | 0-30 | ≤30 | NS | ≤20 | OK | All PAHs detected in MB above MDL, but less MRL. Surrogates exceeded criteria. "J" all PAH results. |

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 3/07/2013 Page 1 of 2

Laboratory/Parameters: Test America

Checked: initials

Sample Date/Sample ID: I-5 Comp, HWY 30 Comp, Wemme Comp / 10/12/2012

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 6 | ≤7 | <5.0<br>4.0 mg/L | NA | NA | 91,92 | ±10 | NC,3 | ≤20 | NS | ≤20 | OK | |
| Hardness | Calculation / SM18 2340C | 6 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 102 | ±15 | 1-4 | ≤20 | NS | ≤20 | OK | |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 18,20 | ≤28 | <0.50<br>1 mg/L | 101,104 | ±25 | 100,102 | ±15 | 1-10 | ≤20 | NS | ≤20 | OK | |
| TOC | | 18-20 | ≤28 | <1.00<br>1 mg/L | 104 | ±25 | 101,102 | ±15 | 1-9 | ≤40 | NS | ≤40 | OK | |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | NA | ≤2 | <2.00<br>4 mg/L | NA | NA | NA | ±15 | NA | ≤35 | NS | ≤35 | OK | Not requested on COC. |
| Total P | Colorimetric / EPA 365.1 | 7 | ≤28 | <0.010<br>0.02 mg/L | 95,96 | ±10 | 99 | ±10 | 1,4 | ≤20 | NS | ≤20 | OK | |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 3/07/2013 Page 2 of 2

Laboratory/Parameters: Test America

Checked: initials

Sample Date/Sample ID: I-5 Comp, HWY 30 Comp, Wemme Comp / 10/12/2012

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | NA | ≤2 | <0.0100<br>0.01 mg/L | NA | ±20 | NA | ±10 | NA | ≤20 | NS | ≤20 | OK | Not requested on COC |
| TKN | Colorimetric / EPA 351.2 | 18 | ≤28 | <0.20<br>0.5 mg/L | 91,97 | ±10 | 95 | ±10 | 6 | ≤20 | NS | ≤20 | OK | |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 11 | ≤28 | <0.050<br>0.5 mg/L | 98 | ±10 | 98 | ±10 | <1 | ≤20 | NS | ≤20 | OK | |
| Nitrate | IC / EPA 300.0 | NA | ≤2 | <0.100<br>0.1 mg/L | NA | ±20 | NA | ±10 | NA | ≤20 | NS | ≤20 | OK | Not requested on COC |
| Total metals | ICP-MS / EPA 200.8 | 11 | ≤180 | <0.02-2<br>0.02-2 µg/L | 76-107 | ±30 | 98-107 | ±15 | 0.1-7 | ≤20 | NS | ≤20 | OK | |
| Dissolved metals | | 11 | ≤180 | <0.02-2<br>0.02-2 µg/L | 76-107 | ±30 | 98-107 | ±15 | 0.1-7 | ≤20 | NS | ≤20 | OK | |

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NA – not applicable or not available
NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 3/07/2013 Page 1 of 2

Laboratory/Parameters: Test America / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: I-5 Grab, HWY 30 Grab, Wemme Grab / 10/12/12

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | NA | ≤6 hours | <2.0<br>2 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | Not requested on COC |
| *E. coli* bacteria | MF/ SM 9222D | NA | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | Not requested on COC |
| Phthalates | GC/MS / EPA 8270 SIM | 6 | ≤7 | <RL<br>0.2-1 µg/L | 86,73 | 20-150 | 53,69 | 20-150 | 16,27 | ≤35 | NS | ≤35 | OK | |
| PCP | GC/MS / EPA 8270 SIM | 6 | ≤7 | <1.00<br>1 µg/L | I-5Grab 53-107 | 24 - 147 | 69-90 | 10-100 | 1-16 | ≤35 | NS | ≤35 | OK | MS – marginal exceedance, no action. |
| PAHs | GC/MS / EPA 8270-SIM | 7 | ≤7 | 0.56-2.8<br>0.1-0.2 µg/L | I-5Grab 0-86 | 26-137 | 63-88 | 26-137 | 0-22 | ≤35 | NS | ≤35 | OK | All results 5x greater than MB. Flag I-5 "J" for compounds outside MS criteria. |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 7 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 22-105 | 40-151 | NA | ≤20 | NA | ≤35 | NA | Flag sulfometuron "J" due to BS recovery. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 3/07/2013 Page 2 of 2

Laboratory/Parameters: Columbia Analytical / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: I-5 Grab, HWY 30 Grab, Wemme Grab / 10/12/12

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 10 | ≤7 | <0.02-0.04<br>0.02-0.04 µ/L | 64-140 | ±50 | 83,88 | 8-127 | 0-7 | ≤30 | NS | ≤35 | OK | Flag all results "J" due to holding time. |
| Chlorides | IC / EPA 300.0 | 5 | ≤28 | <0.200<br>0.2 mg/L | Batch 89-92 | ±10 | 92 | ±20 | 2,<1 | ≤20 | NS | ≤20 | OK | No action, batch sample |
| TPH | GC/FID / NWTPH-Dx | 11 | ≤14 | 0.022, <00.5<br>0.25-0.5 mg/L | NA | ±50 | 80-87 | ±50 | 1,0 | ≤35 | NS | ≤35 | OK | No action, all samples >5x MB. |
| Oil&Grease | IS / EPA 413.2, 1664 | 13 | ≤14 | <5.0<br>5.0 mg/L | 82 | 78-114 | 88,91 | 78-114 | 3 | ≤18 | NS | ≤20 | OK | |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 3/28/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: HWY 30 Grab / 11/11/12

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 21 hours | ≤6 hours | <2.0<br>2 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | No flag, analyzed as soon as possible. |
| *E. coli* bacteria | MF/ SM 9222D | 9 hours | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | No flag, analyzed as soon as possible. |
| Phthalates | GC/MS / EPA 8270 SIM | 5 | ≤7 | <RL<br>0.2-1 µg/L | NA | 20-150 | 81-101 | 20-150 | 4-7 | ≤35 | NS | ≤35 | OK | None. |
| PCP | GC/MS / EPA 8270 SIM | 5 | ≤7 | <1.00<br>1 µg/L | NA | 24 - 147 | 66,65 | 10-100 | 2 | ≤35 | NS | ≤35 | OK | None. |
| PAHs | GC/MS / EPA 8270-SIM | 4 | ≤7 | <0.019<br>0.020 µg/L | Batch 71-109 | 26-137 | 70-98 | 26-137 | 0-6 | ≤35 | NS | ≤35 | OK | None. |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 5 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 67-147 | 40-151 | NA | ≤20 | NA | ≤35 | NA | None. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 3/28/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: HWY 30 Grab / 11/11/12

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 5 | ≤7 | <0.02-0.04<br>0.02-0.04 µ/L | NA | ±50 | 79-81 | 50-103 | 2,4 | ≤30 | NS | ≤35 | OK | None. |
| Chlorides | IC / EPA 300.0 | 3 | ≤28 | <0.200<br>0.2 mg/L | Batch 102-108 | ±20 | 95 | ±10 | Batch 1, <1 | ≤20 | NS | ≤20 | OK | None. |
| TPH | GC/FID / NWTPH-Dx | 2 | ≤14 | < 0.025-0.5<br>0.25-0.5 mg/L | NA | ±50 | 100-112 | ±50 | 0,5 | ≤35 | NS | ≤35 | OK | None. |
| Oil&Grease | IS / EPA 413.2, 1664 | 18 | ≤28 | <5.0<br>5.0 mg/L | Batch 32 | 78-114 | 84,88 | 78-114 | 4 | ≤18 | NS | ≤20 | OK | No action, batch sample and LCS okay. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 4/7/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: HWY 30 Grab / 11/29/12

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 21 hours | ≤6 hours | <2.0<br>2 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | No flag, analyzed as soon as possible. |
| *E. coli* bacteria | MF/ SM 9222D | 21 hours | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | No flag, analyzed as soon as possible. |
| Phthalates | GC/MS / EPA 8270 SIM | 5 | ≤7 | <RL<br>0.2-1 µg/L | 75-112 | 20-150 | 81-99 | 20-150 | 3-17 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 5 | ≤7 | <1.00<br>1 µg/L | 109,116 | 24 - 147 | 76,83 | 10-100 | 6 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 7 | ≤7 | <0.019<br>0.020 µg/L | 78-133 | 26-137 | 64-100 | 26-137 | 0-9 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 6 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 72-109 | 40-151 | NA | ≤20 | NA | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 4/7/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: HWY 30 Grab / 11/29/12

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 4 | ≤7 | <0.02-0.04<br>0.02-0.04 µ/L | NA | ±50 | 78-81 | 50-103 | 3,0 | ≤30 | NS | ≤35 | OK | None. |
| Chlorides | IC / EPA 300.0 | 4 | ≤28 | <0.20<br>0.4 mg/L | 99,100 | ±20 | 96 | ±10 | 1, <1 | ≤20 | NS | ≤20 | OK | None. |
| TPH | GC/FID / NWTPH-Dx | 8 | ≤14 | < 0.025-0.5<br>0.25-0.5 mg/L | NA | ±50 | 96,86 | ±50 | 5,2 | ≤35 | NS | ≤35 | OK | None. |
| Oil&Grease | IS / EPA 413.2, 1664 | 14 | ≤28 | <5.0<br>4.7 mg/L | 72,26 | 78-114 | 84-91 | 78-114 | 2,7 | ≤18 | NS | ≤20 | OK | Flag results UJ, due to low MS recovery. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 12/04/2013 / K1211966-001

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 6 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 95,95 | ±10 | D = 5 | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | | ≤180 | <2.0mg/L<br>2.0 mg/L | | ±25 | | ±15 | | ≤20 | NS | ≤20 | OK | Not requested |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 3 | ≤28 | <0.50<br>0.5 mg/L | NA | ±25 | 98 | ±15 | 2 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 3 | ≤28 | <0.50<br>0.5 mg/L | 102 | ±25 | 100,99 | ±15 | 2 | ≤40 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 1 | ≤2 | <4<br>4 mg/L | NA | NA | 112,92 | ±15 | Batch 4 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 2 | ≤28 | <0.0100<br>0.01 mg/L | Batch 107,111 | 60-135 | 113 | ±15 | Batch 4 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 12/04/2013 / K1212110-001

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.0100 / 0.01 mg/L | 112,104 | ±20 | 95 | ±10 | 13,7 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 13 | ≤28 | <0.20 / 0.4 mg/L | 94,94 | ±10 | 106 | ±10 | 3 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 1 | ≤28 | <0.050 / 0.5 mg/L | 100,97 | ±10 | 98 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | <1 | ≤2 | <0.050 / 0.1 mg/L | Batch 102-111 | ±10 | 101 | ±10 | 1,<1 | ≤20 | NS | ≤20 | OK | No flag, batch sample. |
| Total metals | ICP-MS / EPA 200.8/7470 | 8 | ≤180 | <0.02-2 / 0.02-2 µg/L | Batch 99-104 | ±30 | 97-103 | ±15 | Batch 1.0-6.3 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 8 | ≤180 | <0.02-2 / 0.02-2 µg/L | Batch 99-104 | ±30 | 97-103 | ±15 | Batch 1.0-6.3 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 12/16/2013 / K1212560-001, 002 HWY 30, Hwy 30 QA

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 5 | ≤7 | <4.0<br>5.0 mg/L | NA | NA | 89,101 | ±10 | 5 | ≤20 | 6.8 | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 11 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 103 | ±15 | 11 | ≤20 | 0.6 | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 15 | ≤28 | <0.50<br>0.5 mg/L | 99 | ±25 | 99,101 | ±15 | 1,<1 | ≤20 | 7.0 | ≤20 | OK | None |
| TOC | | 15 | ≤28 | <0.50<br>0.5 mg/L | 97 | ±25 | 99,101 | ±15 | 14,4 | ≤20 | D=0.57 | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 1 | ≤2 | <4<br>4 mg/L | NA | NA | 99 | ±15 | Batch <1 | ≤35 | NC | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 3 | ≤28 | <0.010<br>0.01 mg/L | NA | 60-135 | 102 | ±15 | NA | ≤20 | 9.4 | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 12/16/2013 / K1212560-001, 002 HWY 30, Hwy 30 QA

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 2 | ≤2 | <0.010<br>0.01 mg/L | 97,97 | ±20 | 101 | ±10 | 12 | ≤20 | 0 | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 18 | ≤28 | <0.20<br>0.4 mg/L | 90,95 | ±10 | 97 | ±10 | 6 | ≤20 | D=0.11 | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 2 | ≤28 | <0.050<br>0.05 mg/L | Batch 100,99 | ±10 | 97,97 | ±10 | Batch NC | ≤20 | NC | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050<br>0.1 mg/L | Batch 99,98 | ±10 | 103 | ±10 | Batch 1 | ≤20 | 0 | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | 15 | ≤180 | <0.02-2<br>0.02-2 µg/L | Batch 90-102 | ±30 | 99-104 | ±15 | Batch NC-13 | ≤20 | NC-14 | ≤20 | OK | None |
| Dissolved metals | | 15 | ≤180 | <0.02-2<br>0.02-2 µg/L | Batch 90-102 | ±30 | 99-104 | ±15 | Batch NC-13 | ≤20 | NC-46 | ≤20 | OK | Flag Al results "J" due to Field Dup RPD. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 1/10/2013 / HWY 30 Grab, HWY 30 Grab QA (K1300292)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | | ≤6 hours | <2.0<br>2 MPN | | NA | | NA | | ≤20 | | ≤20 | OK | Not requested |
| *E. coli* bacteria | MF/ SM 9222D | | ≤6 hours | <1.0<br>1 MPN | | NA | | NA | | ≤20 | | ≤20 | OK | Not requested |
| Phthalates | GC/MS / EPA 8270 SIM | 4 | ≤7 | <RL<br>0.22-1.1 µg/L | Batch 79-158 | 20-150 | 79-93 | 20-150 | Batch 2-15 | ≤35 | NC | ≤35 | OK | BEHP MS/MSD %R high, sample ND, no flag. |
| PCP | GC/MS / EPA 8270 SIM | 4 | ≤7 | <1.00<br>1.1 µg/L | Batch 77,81 | 24 - 147 | 79,81 | 10-100 | Batch 5 | ≤35 | NC | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 4 | ≤7 | <0.019<br>0.020 µg/L | 73-126 | 26-137 | 72-107 | 26-137 | 0-12 | ≤35 | NC-40 | ≤35 | OK | Some compounds field dup RPD 37-40%, no flag because minimal failure and all other criteria met. |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 7 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 74-109 | 40-151 | NA | ≤20 | 11-22 | ≤35 | NA | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 4/7/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 1/10/2013 / HWY 30 Grab (K1300292)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 1 | ≤7 | <0.02-0.04<br>0.02-0.04 µ/L | NA | ±50 | 72-83 | 50-103 | 10,11 | ≤30 | NC | ≤35 | OK | None. |
| Chlorides | IC / EPA 300.0 | | ≤28 | <0.20<br>0.4 mg/L | | ±20 | | ±10 | | ≤20 | | ≤20 | OK | Not Requested |
| TPH | GC/FID / NWTPH-Dx | | ≤14 | < 0.025-0.5<br>0.25-0.5 mg/L | | ±50 | | ±50 | | ≤35 | | ≤35 | OK | Not Requested |
| Oil&Grease | IS / EPA 413.2, 1664 | | ≤28 | <5.0<br>4.7 mg/L | | 78-114 | | 78-114 | | ≤18 | | ≤20 | OK | Not Requested |

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NA – not applicable or not available
NC – not calculable due to one or more values below the detection limit
NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 2/4/2015 Page 1 of 2

Laboratory/Parameters: ALS / grain size, TOC, phenolics, metals, PAHs, herbicides (PAL), TPH, phthalates

Checked: initials

Sample Date/Sample ID: 1/14/2013 / I-5 Fremont East Sediment (K1300400)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Grain size | ASTM D422 | 3 | ≤180 | NA<br>NA | NA | NA | NA | NA | 0.1-17 | ≤20 | NS | ≤20 | OK | None |
| TOC | Combustion / EPA 9060 | 17 | ≤28 | <0.050<br>0.050 % | Batch 92,93 | 76-128 | 96 | 34-166 | Batch 8 | ≤40 | NS | ≤40 | OK | None |
| Metals | ICP-MS / EPA 6020 | 10 | ≤180 | <0.02-0.1<br>0.03-0.6 mg/kg | 97-360 | ±25 | 97-105 | ±20 | 9.5-117 | ≤40 | NS | ≤35 | OK | MS %R for Pb (360) outside of control limits, flag sample "J" for Pb. Dup RPD high for Pb and Cu, flag results "J". |
| PAHs | GC/MS / EPA 8270SIM | 7 | ≤14 | <2.5<br>3.2-32 µg/kg | 65-101 | 39-138 | 74-90 | 39-138 | 0-13 | ≤40 | NS | ≤50 | OK | None |
| Phthalates | GC/MS / EPA 8270SIM | 7 | ≤14 | <5.0-50<br>130-1300 µg/kg | 0-267 | 10-150 | 60-69 | 20-150 | 3-85 | ≤40 | NS | ≤50 | OK | MS %R for di-n-octyl phthalate (0) in MS and butyl benzyl phthalate (267) outside of limits; flag results "J". Dup RPD for all except BEHP outside limits, flag results "J". |
| Phenolics | Spectrophotometric / EPA 9065 | 4 | ≤28 | <0.20<br>0.26 mg/kg | 89,87 | ±30 | 96 | ±20 | Diff = 0.30 | ≤23 | NS | ≤50 | OK | None |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 2/4/2015 Page 2 of 2

Laboratory/Parameters: ALS / grain size, TOC, phenolics, metals, PAHs, herbicides (PAL), TPH, phthalates

Checked: initials

Sample Date/Sample ID: 1/14/2013 / I-5 Fremont East Sediment (K1300400)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 14 | ≤14 | <0.0067-0.2<br>0.0067-0.2 mg/kg | 42-105 | 0-190 | 82,85 | 38-128 | NA | NA | NS | ≤50 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 9 | ≤14 | <25-99<br>330-1300 mg/kg | NA | ±25 | 95,87 | ±50 | Batch NC,5 | ≤40 | NS | ≤50 | OK | None |

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NA – not applicable or not available
NC – not calculable due to one or more values below the detection limit
NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 1/23/2013 / HWY 30 Comp (K1300659)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 2 | ≤7 | <5.0<br>13 mg/L | NA | NA | 98 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 2 | ≤180 | <4.0mg/L<br>20 mg/L | NA | ±25 | 104 | ±15 | Batch 4,<1 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 2 | ≤28 | <0.50<br>10 mg/L | 103 | ±25 | 103 | ±15 | 10 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 2 | ≤28 | <0.50<br>10 mg/L | 103 | ±25 | 103 | ±15 | 3 | ≤20 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 2 | ≤2 | <4<br>12 mg/L | NA | NA | 113 | ±15 | Batch 2 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 13 | ≤28 | <0.010<br>0.01 mg/L | Batch 91,106 | 60-135 | 109 | ±15 | Batch <1 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 1/23/2013 / HWY 30 Comp (K1300659)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 2 | ≤2 | <0.010 / 0.01 mg/L | Batch 84,89 | ±20 | 97 | ±10 | Batch 18 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 15 | ≤28 | <0.20 / 0.4 mg/L | Batch 94,91 | ±10 | 92 | ±10 | Batch 4 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 5 | ≤28 | <0.050 / 0.05 mg/L | Batch 101,101 | ±10 | 98 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050 / 0.1 mg/L | Batch 101,102 | ±10 | 104 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8 | 5 | ≤180 | <0.02-2 / 0.02-2 µg/L | Batch 98-110 | ±30 | 96-104 | ±15 | Batch 0-17 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 5 | ≤180 | <0.02-2 / 0.02-2 µg/L | Batch 98-110 | ±30 | 96-104 | ±15 | Batch 0-17 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Omic (herbicides)

Checked: initials

Sample Date/Sample ID: 1/25/2013 / I5 Fremont Grab (K1300700)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | <6 hours | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | None |
| *E. coli* bacteria | MF/ SM 9222D | <6 hours | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | None |
| Phthalates | GC/MS / EPA 8270 SIM | 3 | ≤7 | <RL<br>0.21-1.1 µg/L | NA | 20-150 | 77-93 | 20-150 | 7-12 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 3 | ≤7 | <1.00<br>1.1 µg/L | NA | 24 - 147 | 91,82 | 10-100 | 10 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 4 | ≤7 | <0.020<br>0.021 µg/L | NA | 26-137 | 88-116 | 26-137 | 1-4 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 7 | ≤7 | <0.02-2<br>0.02-2 µg/L | NA | Surr 22-111 | 46-100 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 1/25/2013 / I5 Fremont Grab (K1300700)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 4 | ≤7 | <0.02-0.04<br>0.021-0.094 µ/L | NA | ±50 | 82-87 | 50-103 | 4,0 | ≤30 | NS | ≤35 | OK | None |
| Chlorides | IC / EPA 300.0 | 1 | ≤28 | <0.20<br>4.0 mg/L | Batch 114,117 | ±20 | 94 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 1 | ≤14 | < 240-480<br>250-490 ug/L | NA | ±50 | 89-100 | ±50 | 1,1 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 6 | ≤28 | <5.0<br>4.8 mg/L | Batch 83 | 78-114 | 88,85 | 78-114 | 4 | ≤18 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 07/03/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, PCBs, Phenols)

Checked: initials

Sample Date/Sample ID: 2/22/2013 13:11 / WR-306 COMP (K1301618)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 5 | ≤7 | <1.0<br>1.0 mg/L | NA | NA | 95,94 | ±15 | batch <1,NC | ≤10 | NS | ≤20 | OK | |
| TOC | SM 2540D | 3 | ≤28 | <0.5mg/L<br>0.5 mg/L | 105 | 83-117 | 102 | 83-117 | WR-306 2 | ≤20 | NS | ≤20 | OK | |
| Tributyltin | | | ≤28 | <1.00<br>1 mg/L | | ±25 | | ±15 | | ≤20 | NS | ≤20 | OK | Not monitored at this site |
| Total and Dissolved Metals | EPA 200.8 | 6 | ≤180 | <.2-2<br>0.02-2 ug/L | WR-306 95-104 | ±30 | 101-104 | ±25 | WR-306 0-7.4 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 1631E | 6 | ≤28 | <0.0200<br>1.0 ng/L | WR-306 94,94 | 71-125 | 86 | 77-123 | <1 | ≤20 | NS | ≤20 | OK | Total mercury RL elevated (40ng/L) due to dilution.Result "J" by laboratory. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 07/03/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TP, TSS, Metals, TKN, Ammonia, Hardness, TOC/DOC, chloride, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, Phenols)

Checked: initials

Sample Date/Sample ID: 2/22/2013 13:11 / WR-306 COMP

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤7 | <0.005-0.01<br>0.005-0.095 µg/L | Batch 75-80 | 25-144 | 74,75 | 50-103 | Batch 1,3 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 13 | ≤365 | various<br>101-1010 pg/L | NA | NA | 79-214 | 60-135 | <1-23 | ≤50 | NS | ≤20 | OK | MB contamination, all < 2x MRL, except PCB 147+149. Flag result "J" because <5x MB.LCS/LCSD high for PCB-209. "J" sample result. LCS high for PCB-205, LCSD okay, no action. |
| OC Pesticides | HRGC/MS/MS | 6 | ≤7 | <0.5-5.0<br>0.5-5.0 ng/L | NA | NA | 84-119 | 50-120 | 4-14 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 7 | ≤7 | <0.19-0.95<br>0.95-4.8µg/L | NA | ±30 | 83-99 | 33-118 | 0-3 | ≤30 | NS | ≤20 | OK | Only phthalates requested. |
| PAHs | | 6 | ≤7 | <3.4<br>3.4-17 ng/L | Batch 50-91 | 32-139 | 73-97 | 39-134 | 0-14 | ≤30 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Omic (herbicides)

Checked: initials

Sample Date/Sample ID: 2/22/2013 / I5 Fremont Grab (K1301557)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | | ≤6 hours | <2.0<br>1.0 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | Not reported |
| *E. coli* bacteria | MF/ SM 9222D | <6 hours | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | None |
| Phthalates | GC/MS / EPA 8270 SIM | 3 | ≤7 | <RL<br>3.8-38 µg/L | NA | 20-150 | 78-99 | 20-150 | 13-18 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | | ≤7 | <1.00<br>3.8 µg/L | | 24 - 147 | | 10-100 | | ≤35 | NS | ≤35 | OK | Not reported |
| PAHs | GC/MS / EPA 8270-SIM | 3 | ≤7 | <0.020<br>0.019 µg/L | NA | 26-137 | 81-112 | 26-137 | 0-9 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | | ≤7 | <0.02-2<br>0.02-2 µg/L | NA | Surr 22-111 | | 40-151 | NA | ≤20 | NS | ≤35 | NA | Not requested |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 2/22/2013 / I5 Fremont Grab (K1301557)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | | ≤7 | <0.02-0.04<br>0.021-0.094 µ/L | | ±50 | | 50-103 | | ≤30 | NS | ≤35 | OK | Not requested |
| Chlorides | IC / EPA 300.0 | | ≤28 | <0.20<br>4.0 mg/L | | ±20 | | ±10 | | ≤20 | NS | ≤20 | OK | Not requested |
| TPH | GC/FID / NWTPH-Dx | 4 | ≤14 | < 240-480<br>2400-4800 ug/L | NA | ±50 | 54-76 | ±50 | Batch NC,28 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 10 | ≤28 | <5.0<br>4.8 mg/L | Batch 93 | 78-114 | 95,95 | 78-114 | <1 | ≤18 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/08/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT

Checked: initials

Sample Date/Sample ID: 2/28/2013 3:06 / WR-510 (K1301806 and K 1301850))

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 7 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 89,89 | ±15 | Batch NC-18 | ≤10 | NS | ≤20 | OK | Batch sample, no flags for lab duplicate. |
| TOC | SM 2540D | 1 | ≤28 | <0.5mg/L<br>0.5 mg/L | WR-510 101 | 83-117 | 101,100 | 83-117 | WR-510 19 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 15 | ≤28 | <0.050<br>0.05 ug/L | WR-510 95,100 | 17-142 | 100 | 32-122 | WR-510 4, NC | ≤30 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 13-20 | ≤180 | <.2-20<br>0.02-20 ug/L | WR-510 92-116 | ±30 | 99-108 | ±25 | WR-510 0.7-7.5 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 1631E | 7 | ≤28 | <1.000<br>1.0 ng/L | WR-510 84,75 | 71-125 | 86 | 77-123 | WR-510 11 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 07/03/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT

Checked: initials

Sample Date/Sample ID: 2/28/2013 3:06 / WR-510 (K1301806 and K 1301850))

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 8 | ≤14 | <0.005-0.01<br>0.0074-0.069 µg/L | Batch 82-90 | 25-144 | 73,75 | 50-103 | Batch 2,1 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 26 | ≤365 | various<br>95.8-941 pg/L | NA | NA | 82-138 | 60-135 | <1-6 | ≤50 | NS | ≤20 | OK | PCB 170, PCB 194, and PCB 209 > MRL, but less than 2x MRL. Sample flagged "B" by laboratory. PCB 4 %R high for LCS; no action, sample ND and LCSD okay. |
| OC Pesticides | HRGC/MS/MS | 5 | ≤7 | <0.5-5.0<br>0.5-5.0 ng/L | NA | NA | 94-111 | 50-120 | WR-510 NC | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 7 | ≤7 | <0.20-1.0<br>0.2-0.99µg/L | NA | ±30 | 78-101 | 33-118 | 3-18 | ≤30 | NS | ≤20 | OK | PCP and phthalates, only. |
| PAHs | | 7 | ≤7 | <3.4<br>7.1 ng/L | **NA** | 32-139 | 60-78 | 39-134 | 0-4 | ≤30 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/12/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT

Checked: initials

Sample Date/Sample ID: 3/05/2013 19:48 / WR-510 (K1301966)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 6 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 95 | ±15 | Batch NC | ≤10 | NS | ≤20 | OK | Batch sample, no flags for lab duplicate. |
| TOC | SM 2540D | 14 | ≤28 | <0.5mg/L<br>0.5 mg/L | WR-510 100 | 83-117 | 101,100 | 83-117 | WR-510 2 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 14 | ≤28 | <0.050<br>0.05 ug/L | Batch 79,75 | 17-142 | 82 | 32-122 | Batch 5 | ≤30 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 13 | ≤180 | <0.02-2<br>0.02-2 ug/L | Batch 85-112 | ±30 | 99-108 | ±25 | Batch 7,50 | ≤20 | NS | ≤40 | OK | Mn RPD=50; no action, batch sample. |
| Total and Dissolved Mercury | EPA 1631E | 3 | ≤28 | <1.0<br>1.0 ng/L | WR-510 93,82 | 71-125 | 99 | 77-123 | WR-510 12 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/12/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT

Checked: initials

Sample Date/Sample ID: 3/05/2013 19:48 / WR-510 (K1301966)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 3 | ≤14 | <0.02-0.04 / 0.020-0.07 µg/L | WR-510 82-90 | 25-144 | 73,75 | 50-103 | WR-510 2,1 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 20 | ≤365 | various / 95.8-941 pg/L | NA | NA | 82-138 | 60-135 | <1-6 | ≤50 | NS | ≤20 | OK | PCB 170, PCB 194, and PCB 209 > MRL, but less than 2x MRL. Sample flagged "B" by laboratory. PCB 4 %R high for LCS; no action, sample ND and LCSD okay. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0 / 0.5-5.0 ng/L | WR-510 82-109 | 42-120 | 89-111 | 50-120 | WR-510 0-12 | ≤30 | NS | ≤20 | OK | Surrogates failed high, no action because samples ND. |
| SVOCs/ PAHs | EPA 8270D LL | 2 | ≤7 | <0.20-5.0 / 0.2-5.0µg/L | NA | ±30 | 51-133 | 10-128 | 1-52 | ≤30 | NS | ≤20 | OK | LCSD high %R for Benzyl Alcohol, N-nitrosodi-n-propylamine, 4-methylphenol, Nitrobenzene. "J" flag benzyl alcohol and 4-methylphenol (other 2 ND). LCS RPD high for 7 compounds, no flag. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/12/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 3/16/2013 18:28 / WR-307 COMP (K1302363)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 6 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 103 | ±15 | batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 6 | ≤28 | <0.5mg/L<br>0.5 mg/L | WR-307 102 | 83-117 | 102,101 | 83-117 | WR-307 5 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | | | ≤28 | <1.00<br>1 mg/L | | ±25 | | ±15 | | ≤20 | NS | ≤20 | OK | Not monitored at this site |
| Total and Dissolved Metals | EPA 200.8 | 5 | ≤180 | <.2-2<br>0.02-2 ug/L | WR-307 84-103 | ±30 | 95-100 | ±25 | WR-307 0-9 | ≤20 | NS | ≤40 | OK | None |
| Total Mercury | EPA 1631E | 9 | ≤28 | <1.0<br>1.0 ng/L | WR-307 80,75 | 71-125 | 87 | 77-123 | WR-307 6 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/12/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 3/16/2013 18:28 / WR-307 COMP (K1302363)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤7 | <0.02-0.039 / 0.02-0.084 µg/L | NA | 25-144 | 94-84 | 50-103 | 6,5 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 30 | ≤365 | <100-1000 / 99.1- 991 pg/L | NA | NA | 89-144 | 60-135 | <1-6 | ≤50 | NS | ≤20 | OK | MB contamination, all < MRL. PCB 4 high %R in LCS/LCSD; no action, sample ND. |
| OC Pesticides | HRGC/MS/MS | 6 | ≤7 | <0.5-5.0 / 0.5-5.0 ng/L | Batch 52-134 | 50-120 | 93-104 | 50-120 | Batch 29-103 | ≤30 | NS | ≤20 | OK | Batch sample, no action. |
| SVOCs | EPA 8270D LL | 4 | ≤7 | <1.0-25 / 1.0-25µg/L | WR-307 36-143 | ±30 | 29-108 | 10-128 | WR-307 1-30 | ≤30 | NS | ≤20 | OK | Phenol %R 143/141; sample ND, no action. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/12/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 3/19/2013 23:51 / WR-307 COMP (K1302487)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 7 | ≤7 | <1.0<br>5.0 mg/L | NA | NA | 94,94 | ±15 | batch<br><1 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 3 | ≤28 | <0.5mg/L<br>0.5 mg/L | WR-307<br>103 | 83-117 | 102,101 | 83-117 | WR-307<br>1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 14 | ≤28 | <0.050<br>0.050 ug/L | WR-307<br>84,80 | 17-142 | 82 | 32-122 | WR-307<br>4 | ≤30 | NS | ≤20 | OK | Not monitored at this site |
| Total and Dissolved Metals | EPA 200.8 | 9 | ≤180 | <.2-2<br>0.02-2 ug/L | WR-307<br>93-115 | ±30 | 98-109 | ±25 | WR-307<br>1.1-8.4 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 3 | ≤28 | <0.2<br>0.2 ug/L | WR-307<br>107 | 71-125 | 104 | 77-123 | WR-307<br>NC | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/12/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 3/19/2013 23:51 / WR-307 COMP (K1302487)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 7 | ≤7 | <0.02-0.040 / 0.02-0.040 µg/L | NA | 25-144 | 74-80 | 50-103 | 5,6 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 27 | ≤365 | <100-1000 / 99.1- 991 pg/L | NA | NA | 89-144 | 60-135 | <1-6 | ≤50 | NS | ≤20 | OK | MB contamination, all < MRL except PCB 132 and PCB 174. Less than 2x MRL, okay. PCB 4 high %R in LCS/LCSD; no action, sample ND. |
| OC Pesticides | HRGC/MS/MS | 3 | ≤7 | <0.5-5.0 / 0.5-5.0 ng/L | WR-307 52-190 | 50-120 | 93-104 | 50-120 | WR-307 0-109 | ≤30 | NS | ≤20 | OK | "J" DDT for MS/MSD exceedance. |
| SVOCs | EPA 8270D LL | 1 | ≤7 | <1.0-25 / 1.0-25µg/L | Batch 36-143 | ±30 | 29-108 | 10-128 | Batch 1-30 | ≤30 | NS | ≤20 | OK | Phenol %R 143/141 in MS/MSD; sample ND, no action. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Omic (herbicides)

Checked: initials

Sample Date/Sample ID: 3/20/2013 / I5 Grab, Wemme Grab (K1302483)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 10.5 hours | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | No flag, analyzed ASAP |
| *E. coli* bacteria | MF/ SM 9222D | 10.5 hours | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | None |
| Phthalates | GC/MS / EPA 8270 SIM | 1 | ≤7 | <RL<br>1.1-5.1 µg/L | Batch 68-117 | 20-150 | 79-90 | 20-150 | Batch 3-11 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 1 | ≤7 | <1.00<br>5.1 µg/L | Batch 81,81 | 24 - 147 | 80,82 | 10-100 | Batch 2 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 1 | ≤7 | <0.020<br>0.020 µg/L | Batch 75-127 | 26-137 | 77-114 | 26-137 | Batch 1-12 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 2 | ≤7 | <0.02-2<br>0.02-2 µg/L | NA | Surr 22-111 | 60-90 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 3/20/2013 / I5 Grab, Wemme Grab (K1302483)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 6,7 | ≤7 | <0.02-0.04<br>0.020-0.056 µ/L | NA | ±50 | 74-80 | 50-103 | 5,6 | ≤30 | NS | ≤35 | OK | None |
| Chlorides | IC / EPA 300.0 | 5,6 | ≤28 | <0.20<br>0.4-20 mg/L | Batch 91-93 | ±20 | 92 | ±10 | Batch 1,2 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 7.8 | ≤14 | < 91<br>1000 ug/L | NA | ±50 | 84-93 | ±50 | Batch 16-23 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 14,15 | ≤28 | <5.0<br>5.2 mg/L | Batch 90,100 | 78-114 | 90-96 | 78-114 | 3,3 | ≤18 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/14/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 4/04/2013 17:54 / WR-307 COMP (K1303100)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 5 | ≤7 | <1.0<br>20 mg/L | NA | NA | 100 | ±15 | batch 6 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | | ≤28 | <0.5mg/L<br>0.5 mg/L | | 83-117 | | 83-117 | | ≤20 | | ≤20 | | Limited sample volume – not analyzed |
| Tributyltin | EPA 3520C | | | <0.050<br>0.050 ug/L | | 17-142 | | 32-122 | | ≤30 | | ≤20 | | Not monitored at this site |
| Total Metals and mercury | EPA 200.8 | 8 | ≤180 | <.2-2<br>0.02-2 ug/L | WR-307 100-108 | ±30 | 99-106 | ±25 | WR-307 0.3-14 | ≤20 | NS | ≤40 | OK | None |
| Dissolved metals and Mercury | EPA 7470A | | ≤28 | <0.2<br>0.2 ug/L | | 71-125 | | 77-123 | | ≤20 | | ≤20 | | Limited sample volume – not analyzed |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/14/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 4/04/2013 17:54 / WR-307 COMP (K1303100)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤7 | <0.02-0.040<br>0.02-0.19 µg/L | NA | 25-144 | 74-83 | 50-103 | 4,5 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 33 | ≤365 | <100-1000<br>99.1- 991 pg/L | NA | NA | 89-144 | 60-135 | <1-6 | ≤50 | NS | ≤20 | OK | MB contamination, all < MRL except PCB 132 and PCB 174. Less than 2x MRL, okay. PCB 4 high %R in LCS/LCSD; "J" flag sample result for PCB 4. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0<br>0.5-5.0 ng/L | NA | 50-120 | 80-110 | 50-120 | 1-6 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | | ≤7 | <1.0-25<br>1.0-25µg/L | | ±30 | | 10-128 | | ≤30 | NS | ≤20 | | Limited sample volume – not analyzed |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 4/04/2013 / I-5 Composite (K1303101)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 5 | ≤7 | <5.0<br>20 mg/L | NA | NA | 100 | ±10 | Batch 6 | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 14 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 102,103 | ±15 | Batch 2-10 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 6 | ≤28 | <0.50<br>2.5 mg/L | 102 | ±25 | 99 | ±15 | 1 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 6 | ≤28 | <0.50<br>5 mg/L | 104 | ±25 | 100,99 | ±15 | 1 | ≤40 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 2 | ≤2 | <4<br>12 mg/L | NA | NA | 110,100 | ±15 | 10 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 12 | ≤28 | <0.0100<br>0.01 mg/L | Batch 105,102 | 60-135 | 98 | ±15 | Batch 1 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 4/04/2013 / I-5 Composite (K1303101)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.0100 / 0.01 mg/L | 98,97 | ±20 | 101 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 11 | ≤28 | <0.20 / 0.4 mg/L | Batch 99,96 | ±10 | 82 | ±10 | Batch 3 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 5 | ≤28 | <0.050 / 0.05 mg/L | Batch 100,100 | ±10 | 97,97 | ±10 | Batch 4 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 2 | ≤2 | <0.050 / 0.1 mg/L | 105,107 | ±10 | 107,103 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | 6 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 99-103 | ±30 | 102-105 | ±15 | Batch 0 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 6 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 99-103 | ±30 | 102-105 | ±15 | Batch 0 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 4/07/2013 / I-5 Composite (K1303124)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 2 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 100 | ±10 | Batch 6 | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 5 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 101 | ±15 | 3 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 3 | ≤28 | <0.50<br>0.5 mg/L | 106 | ±25 | 99 | ±15 | 5 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 3 | ≤28 | <0.50<br>1.0 mg/L | 103 | ±25 | 100,99 | ±15 | 2 | ≤40 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 1 | ≤2 | <4<br>4.0 mg/L | NA | NA | 94 | ±15 | Batch 8 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 15 | ≤28 | <0.010<br>0.01 mg/L | Batch 103,95 | 60-135 | 97 | ±15 | Batch <1 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 4/07/2013 / I-5 Composite (K1303124)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.0100 / 0.01 mg/L | 106,101 | ±20 | 100 | ±10 | D= 0.007 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 8 | ≤28 | <0.20 / 0.4 mg/L | Batch 99,96 | ±10 | 82 | ±10 | Batch 3 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 2 | ≤28 | <0.050 / 0.05 mg/L | Batch 100,100 | ±10 | 97,97 | ±10 | Batch 4 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050 / 0.10mg/L | Batch 99,100 | ±10 | 108 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | 4 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 87-96 | ±30 | 96-100 | ±15 | Batch 4.2-15 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 4 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 87-96 | ±30 | 96-100 | ±15 | Batch 4.2-15 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/14/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 4/10/2013 14:48 and 12:54 / WR-307, OF-52 COMP (K1303101)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 2 | ≤7 | <1.0<br>1.0 mg/L | NA | NA | 103,109 | ±15 | batch NC-15 | ≤10 | NS | ≤20 | OK | Duplicate batch sample, no action. |
| TOC | SM 2540D | 2 | ≤28 | <0.5mg/L<br>1.0 mg/L | WR-307 105 | 83-117 | 100-101 | 83-117 | WR-307 2 OF-52 <1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 9,7 | ≤7 | <0.050<br>0.050 ug/L | WR-307 93,89 | 17-142 | 80-88 | 32-122 | WR-307 4,1 | ≤30 | NS | ≤20 | OK | WR-307 extracted 2 day outside holding time; flag sample "UJ". |
| Total and Dissolved Metals | EPA 200.8 | 6 | ≤180 | <.2-2<br>0.02-2 ug/L | WR-307 97-104 | ±30 | 101-106 | ±25 | WR-307 0-4 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 6 | ≤28 | <0.2<br>0.2 ug/L | WR-307 101 | 71-125 | 101 | 77-123 | WR-307 NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/14/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 4/10/2013 14:48 and 12:54 / WR-307, OF-52 COMP (K1303101)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 5 | ≤7 | <0.02-0.040<br>0.02-0.094 µg/L | NA | 25-144 | 73-81 | 50-103 | 5,4 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 30 | ≤365 | <100-1000<br>99.1- 991 pg/L | NA | NA | 88-139 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | MB contamination, all < MRL except PCB 147/149,PCB 132 and PCB 174. Less than 2x MRL, okay. PCB 54, PCB 104, PCB 155, PCB 188 high %R in LCS/LCSD; All ND, no action. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0<br>0.5-5.0 ng/L | WR-307 73-148 | 50-120 | 91-97 | 50-120 | WR-307 0-49 | ≤30 | NS | ≤20 | OK | MS %R for Endrin high; no action, ND. RPD for dieldrin and endrin high. "J" WR-307 for dieldrin and endrin. |
| SVOCs | EPA 8270D LL | 7 | ≤7 | <0.2-4.9<br>1.0-10µg/L | WR-307 36-157 | 10-130 | 31-114 | 10-128 | WR-307 0-24 | ≤30 | NS | ≤20 | OK | MS %R=140(PCP), 157(4-nitrophenol); no action, sample ND. |
| PAHs | EPA 8270D SIM | 2 | ≤7 | <0.020<br>0.02 ug/L | OF-52 66-124 | 32-139 | 71-107 | 39-134 | 0-38 | ≤30 | NS | ≤20 | OK | MS/MSD RPD = 34(fluoranthene) and 38 (phenanthrene); no action, all other criteria met. |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Nitrate, BOD, OP only

Checked: initials

Sample Date/Sample ID: 4/10/2013 / I-5 Composite (K1303301)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | | ≤7 | <5.0<br>5.0 mg/L | | NA | | ±10 | | ≤20 | | ≤20 | OK | Not requested |
| Hardness | Calculation / SM18 2340C | | ≤180 | <2.0mg/L<br>2.0 mg/L | | ±25 | | ±15 | | ≤20 | | ≤20 | OK | Not requested |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | | ≤28 | <0.50<br>0.5 mg/L | | ±25 | | ±15 | | ≤20 | | ≤20 | OK | Not requested |
| TOC | | | ≤28 | <0.50<br>1.0 mg/L | | ±25 | | ±15 | | ≤40 | | ≤40 | OK | Not requested |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 2 | ≤2 | <4<br>12 mg/L | NA | NA | 96 | ±15 | Batch 2 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | | ≤28 | <0.010<br>0.01 mg/L | | 60-135 | | ±15 | | ≤20 | | ≤20 | OK | Not requested |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Nitrate, BOD, OP only

Checked: initials

Sample Date/Sample ID: 4/10/2013 / I-5 Composite (K1303301)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.010<br>0.01 mg/L | 95,98 | ±20 | 100 | ±10 | 2 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | | ≤28 | <0.20<br>0.4 mg/L | | ±10 | | ±10 | | ≤20 | | ≤20 | OK | Not requested |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | | ≤28 | <0.050<br>0.05 mg/L | | ±10 | | ±10 | | ≤20 | | ≤20 | OK | Not requested |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050<br>0.10mg/L | Batch 94,96 | ±10 | 108 | ±10 | Batch NC, 2 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | | ≤180 | <0.02-0.5<br>0.02-0.5 µg/L | | ±30 | | ±15 | | ≤20 | | ≤20 | OK | Not requested |
| Dissolved metals | | | ≤180 | <0.02-0.5<br>0.02-0.5 µg/L | | ±30 | | ±15 | | ≤20 | | ≤20 | OK | Not requested |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 09/10/2013 Page 1 of 1

Laboratory/Parameters: ALS Environmental (Metals, PCBs)

Checked: initials

Sample Date/Sample ID: 4/19/2013 09:30 / Fremont Bridge Upper Deck (sediment) (K1303608)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Metals | EPA 6020/7471B | 5 | ≤180, 28(hg) | <0.02-2<br>0.024-49 mg/kg | 91-1300 | 48-146 | 78-106 | 47-152 | 5.3-26 | ≤20 | NS | ≤20 | OK | Cr=0.08, Al=0.4, Ni=0.05, Zn=0.12 in MB; no action, all samples >10x MB<br>MS % rec Cr=210, Cu=1300, PDS okay; flag result for Cr and Cu "J".<br>Dup RPD Ni-26, "J" result. |
| PCBs, Aroclors | EPA 8082 LL | 4 | ≤14 | <5-10<br>22-44 ug/kg | 70-86 | 27-131 | 75,86 | 37-123 | 1,20 | ≤40 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 15 | ≤365 | <18.4-184<br>33.2-332 ng/kg | NA | NA | 97-142 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | MB - Several cong. >EDL, but <MRL, no action. MS high for PCB 4, PCB 54, PCB 104, PCB 188, PCB 205, PCB 209. "J" detected results – PCB4, 54, 205, 209. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 09/10/2013 Page 1 of 1

Laboratory/Parameters: ALS Environmental (Metals, PCBs)

Checked: initials

Sample Date/Sample ID: 4/19/2013 09:30 / Fremont Bridge Upper Deck (water) (K1303608)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Metals | EPA 200.8/7470A | 6 | ≤180, 28(hg) | <0.02-2<br>0.02-2 ug/L | 92-109 | ±30 | 100-106 | ±25 | 0-5.6 | ≤20 | NS | ≤40 | OK | Cr in MB = 0.03 and Al=0.5; no action, sample results >10x MB |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤14 | <0.005-0.0098<br>0.017-0.11 µg/L | NA | 25-144 | 70-85 | 50-103 | 11,10 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 12 | ≤365 | various<br>98.4-984 pg/L | NA | NA | 89-142 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | PCB147/149, PCB 132, PCB 174 > MRL in method blank; "J" results for these congeners. LCS high for PCB 54, 104, 155, 188; all ND, no flag. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 8/14/2013 / OF-22, WR-206, WR-211 (K1308325)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TS | EPA 160.3 | 22 | ≤180 | NA<br>0.1 % | NA | NA | NA | NA | OF-22<br><1 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 23 | ≤28 | <0.05<br>0.05 % | OF-22<br>103,100 | 70-122 | 101 | 72-122 | OF-22<br>5,3 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 8 | ≤28 | <0.98<br>1.3-2.7 ug/kg | Batch 77,90 | 10-115 | 107 | 10-122 | Batch 15 | ≤40 | NS | ≤20 | OK | None |
| PSD | EPA 200.8 | 14 | ≤180 | NA<br>0.01 gram | NA | NA | NA | NA | Batch OK | ≤20 | NS | ≤20 | OK | None |
| Metals | EPA 6020/7471B | 13,8 | ≤180, 28(hg) | <0.02-2<br>0.024-40.4 mg/kg | OF-22<br>67-101 | 75-125 | 64-100 | 47-152 | OF-22<br>0-16 | ≤20 | NS | ≤20 | OK | MS recovery Cr and Pb low, "J" flag OF-22 results only. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

# Data Quality Assurance Worksheet

NS – field duplicate not sampled.

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, TBT, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 8/14/2013 / OF-22, WR-206, WR-211 (K1308325)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤14 | <5-9.9<br>6.8-27 ug/kg | Batch 86-101 | 27-131 | 85,86 | 37-123 | Batch 13,8 | ≤40 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 8 | ≤365 | <18.4- 184<br>23.6-262 ng/kg | NA | NA | 104-124 | 60-135 | NA | ≤50 | NS | ≤20 | OK | Several cong. >EDL, but <MRL, no action. |
| OC Pesticides | HRGC/MS/MS | 12 | ≤14 | <0.05-0.2<br>0.07-0.27 ug/kg | WR-211 62-148 | 24-123 | 93-143 | 24-123 | WR-211 1-58 | ≤30 | NS | ≤20 | OK | "J" 4,4-DDE for OF-22, WR-206 due to LCS failure. "J" Dieldrin and Endrin for WR-211 for RPD failure. MS failure okay, WR-211 ND. |
| SVOCs | EPA 8270D LL | 12 | ≤14 | <7.5-200<br>34-1400 µg/kg | WR-211 55-136 | 10-132 | 41-108 | 17-104 | WR-211 1-15 | ≤40 | NS | ≤20 | OK | "J" phenol in WR-211 "J" due to interference.<br>MS/MSD 4-nitrophenol high %rec, no action sample ND. |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 11/30/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/15-16/2013 14:00, 13:34, 12:42 / OF-22D, OF22C and OF18 (K1312589)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | SM 2540D | 4,5 | ≤7 | <5.0<br>6.7-10 mg/L | NA | NA | 90,95 | ±15 | Batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | 415.1 | 17,18 | ≤28 | <0.5mg/L<br>5 mg/L | OF-22D 96 | 83-117 | 93-94 | 83-117 | OF-22D 18 OF-22C 5 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 12 | ≤28 | <0.05<br>0.05 ug/L | NA | ±25 | 116,97 | ±15 | LCS 17 | ≤30 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 14,15 | ≤180 | <0.02-2<br>0.02-20 ug/L | OF-22D 87-114 | ±30 | 97-105 | ±25 | OF-22D 0-4.9 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 3,4 | ≤28 | <0.200<br>0.2 ng/L | Batch 100 | 71-125 | 100 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 11/30/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/15-16/2013 14:00, 13:34, 12:42 / OF-22D, OF22C and OF18 (K1312589)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 11,12 | ≤14 | <0.005-0.0099<br>0.005-0.011 µg/L | Batch 84,78 | 39-128 | 92-95 | 60-103 | LCS 2,1 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 9,10 | ≤365 | <20-200<br>19.2- 234 pg/L | Batch 0-160 | NA | 87-105 | 60-135 | <1-51 | ≤50 | NS | ≤20 | OK | MB- PCB 11 > MRL, flag samples "J". MS %R and RPD high for several congeners, no action because batch sample. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0<br>0.5-5.1 ng/L | Batch 89-122 | 24-123 | 72-105 | 50-120 | Batch 2-11 | ≤30 | NS | ≤20 | OK | MS %R for 2,4-DDD high, no flag batch sample. |
| SVOCs | EPA 8270D LL | 5,6 | ≤7 | <0.2-5.0<br>0.20-5.1 µg/L | Batch 32-156 | 53-133 | 20-120 | 10-128 | Batch 0-12 | ≤30 | NS | ≤20 | OK | MS %R high, batch sample, no flag. |
| PAHs | | 5,6 | ≤7 | <0.019<br>0.020-0.021 ng/L | NA | 32-139 | 91-131 | 39-134 | LCS 0-3 | ≤30 | NS | ≤20 | OK | Indeno(1,2,3)pyrene and benzo(b) fluoranthene %R high in LCS, samples ND, no flag. |

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Columbia Slough / ODOT Compliance Monitoring / 05-03287-004

Date: 08/15/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TOC, TSS, Metals, OC Pesticides, PCBs, SVOCs, TBT

Checked: initials

Sample Date/Sample ID: 4/19/2013 / Col Slough Up, Col Slough Out (K1303653)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 6 | ≤7 | <1.0<br>6.7 mg/L | NA | NA | 90 | ±15 | batch 61, NC | ≤10 | NS | ≤20 | OK | Lab dup batch, no action. |
| TOC | SM 2540D | 3 | ≤28 | <0.5mg/L<br>0.5 mg/L | OF-52 105 | 83-117 | 96 | 83-117 | <1,2 | ≤20 | | ≤20 | | None |
| Tributyltin | EPA 3520C | 3 | ≤28 | <0.050<br>0.050 ug/L | NA | 17-142 | 83,84 | 32-122 | 1 | ≤30 | | ≤20 | | Col Slough Up only. None |
| Total and dissolved metals | EPA 200.8 | 7-25 | ≤180 | <.2-2<br>0.02-2 ug/L | OF-52 84-102 | ±30 | 100-106 | ±25 | OF-52 0.4-26 | ≤20 | NS | ≤40 | OK | Cr in MB>MDL<RL, sample >10x, no action. Cd RPD=26, "J" result. |
| Total and dissolved mercury | EPA 7470A | 7 | ≤28 | <0.2<br>0.2 ug/L | OF-52 103 | 76-126 | 103 | 77-123 | OF-52 NC | ≤20 | | ≤20 | | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Columbia Slough / ODOT Compliance Monitoring / 05-03287-004

Date: 8/15/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TOC, TSS, Metals, OC Pesticides, PCBs, SVOCs, TBT

Checked: initials

Sample Date/Sample ID: 4/19/2013 / Col Slough Up, Col Slough Out (K1303653)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤7 | <0.005-0.01<br>0.005-0.013 µg/L | NA | 25-144 | 70-85 | 50-103 | 11,10 | ≤30 | NS | ≤20 | OK | Col Slough Up only. None |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0<br>2-20 ng/L | NA | 50-120 | 87-111 | 50-120 | 1-14 | ≤30 | NS | ≤20 | OK | Col Slough Up only. None |
| SVOCs | EPA 8270D LL | 4 | ≤7 | <0.2-4.8<br>0.2-4.8 µg/L | Batch 73-152 | ±30 | 37-115 | 10-128 | Batch 0-4 | ≤30 | NS | ≤20 | | PCP % R high for MS/MSD, no action, batch sample. 2-nitrophenol LCS recovery high, no action samples ND. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/15/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 4/23/2013 8:30 / WR-307 (K1303792)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TS | EPA 160.3 | 14 | ≤14 | NA<br>0.1 % | NA | NA | NA | NA | WR-307<br>3 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 13 | ≤28 | <0.05<br>0.05 % | Batch<br>1015,98 | 70-<br>122 | 100 | 72-<br>122 | Batch<br>7 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | | | | | | | | | | | | | Not requested |
| PSD | EPA 200.8 | 15 | ≤180 | NA<br>0.01<br>gram | NA | NA | NA | NA | Batch<br>OK | ≤20 | NS | ≤20 | OK | None |
| Metals | EPA 6020/7471B | 7,6 | ≤180,<br>28(hg) | <0.02-2<br>0.03-156<br>mg/kg | WR-307<br>72-118 | 48-<br>146 | 83-112 | 41-<br>158 | WR-307<br>1-85 | ≤20 | NS | ≤20 | OK | Copper RPD=85; "J" flag sample result. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/15/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 4/23/2013 8:30 / WR-307 (K1303792)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 8 | ≤14 | <5-9.9<br>27-54 ug/kg | Batch 84-118 | 27-131 | 78,82 | 37-123 | 14,16 | ≤40 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 11 | ≤365 | <18.9- 189<br>37.7- 377 ng/kg | NA | NA | 97-144 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | Several cong. >EDL, but <MRL, no action. LCS/LCSD %R high for several compounds; flag "J" PCBs-4, 54, 104, 205, 208, 209. |
| OC Pesticides | HRGC/MS/MS | 10 | ≤14 | <0.1-0.5<br>1.7-4.4 ug/kg | WR-307 79-236 | 24-123 | 95-113 | 24-123 | WR-307 14-88 | ≤30 | NS | ≤20 | OK | MS/MSD and RPD high recovery for several compounds. All ND except 4,4-DDE, DDE, DDT. "J" results due to high MS/MSD recoveries. |
| SVOCs | EPA 8270D LL | 13 | ≤14 | <10-200<br>780- 16000 µg/kg | WR-307 0-239 | 10-132 | 36-70 | 17-104 | WR-307 NC-27 | ≤40 | NS | ≤20 | OK | MS/MSD high %R for several compounds. "J" result for phenol, n-nitrisodi-n-propylamine, Pentachlorophenol, pyrene, benzo(a)pyrene. "R" 4-nitrophenol – 0%R |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 5/12/2013 / HWY 30 Grab(K1304402)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | <1 day | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | Analyzed less than 24 hours |
| *E. coli* bacteria | MF/ SM 9222D | <1 day | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | Analyzed less than 24 hours |
| Phthalates | GC/MS / EPA 8270 SIM | 2 | ≤7 | <RL<br>2.1 µg/L | Batch 94,95 | 20-150 | 69-99 | 20-150 | Batch 0 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 2 | ≤7 | <1.00<br>1.1 µg/L | Batch 92,62 | 24 - 147 | 94,79 | 10-100 | Batch 10 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 1 | ≤7 | <0.020<br>0.021 µg/L | NA | 26-137 | 75-113 | 26-137 | 0-4 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 5 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 76-113 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 5/12/2013 / HWY 30 Grab(K1304402)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 8 | ≤7 | <0.02-0.04<br>0.02-0.04 µ/L | NA | ±50 | 77-81 | 50-103 | 4,0 | ≤30 | NS | ≤35 | OK | No flag, 1 day outside of holding time. |
| Chlorides | IC / EPA 300.0 | 2 | ≤28 | <0.20<br>0.4 mg/L | Batch 120,120 | ±20 | 96 | ±10 | Batch 1 | ≤20 | NS | ≤20 | OK | None. |
| TPH | GC/FID / NWTPH-Dx | 9 | ≤14 | < 240-470<br>250-500 ug/L | NA | ±50 | 98,83 | ±50 | Batch NC | ≤35 | NS | ≤35 | OK | None. |
| Oil&Grease | IS / EPA 413.2, 1664 | 8 | ≤28 | <5.0<br>4.9 mg/L | Batch 96 | 78-114 | 80-96 | 78-114 | <1,11 | ≤18 | NS | ≤20 | OK | None. |

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NA – not applicable or not available
NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 5/13/2013 / HWY 30 Comp (K1304404)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 7 | ≤7 | <4.0<br>6.7 mg/L | NA | NA | 96,107 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 16 | ≤180 | <4.0mg/L<br>20 mg/L | NA | ±25 | 103 | ±15 | Batch 13,4 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 2 | ≤28 | <0.50<br>2.5 mg/L | 99 | ±25 | 94,95 | ±15 | 2 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 7 | ≤28 | <0.50<br>5.0 mg/L | 99 | ±25 | 95,94 | ±15 | 2 | ≤20 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | <1 | ≤2 | <4<br>12 mg/L | NA | NA | 99 | ±15 | Batch 6 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 5 | ≤28 | <0.010<br>0.01 mg/L | Batch 101,102 | 60-135 | 98 | ±15 | Batch 2 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 5/13/2013 / HWY 30 Comp (K1304404)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | <1 | ≤2 | <0.010<br>0.01 mg/L | 94,97 | ±20 | 98 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 21 | ≤28 | <0.20<br>0.4 mg/L | Batch 68,80 | 40-160 | 94 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 1 | ≤28 | <0.050<br>0.05 mg/L | Batch 96,95 | ±10 | 97 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | <1 | ≤2 | <0.050<br>0.1 mg/L | Batch 104,105 | ±10 | 107 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8 | 3 | ≤180 | <0.02-5<br>0.02-5 µg/L | 93-102 | ±30 | 98-101 | ±15 | 0.6-4.9 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 3 | ≤180 | <0.02-5<br>0.02-5 µg/L | 93-102 | ±30 | 98-101 | ±15 | 0.6-4.9 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/16/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 5/14/2013 13:55 / WR-510 (K1304510)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TS | EPA 160.3 | 16 | ≤180 | NA<br>0.1 % | NA | NA | NA | NA | WR-510 <1 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 10 | ≤28 | <0.05<br>0.05 % | Batch 104,106 | 70-122 | 97 | 72-122 | Batch 11,2 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 16 | ≤28 | <0.99<br>2.6 ug/kg | Batch 58,52 | 10-115 | 33 | 10-122 | Batch 11 | ≤40 | NS | ≤20 | OK | None |
| PSD | EPA 200.8 | 4 | ≤180 | NA<br>0.01 gram | NA | NA | NA | NA | Batch OK | ≤20 | NS | ≤20 | OK | None |
| Metals | EPA 6020/7471B | 15,6 | ≤180, 28(hg) | <0.02-2<br>0.024-40.4 mg/kg | Batch 91-109 Batch 99 | 48-146 | 80-110 | 41-158 | Batch 1-6 Batch 0,1 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

# Data Quality Assurance Worksheet

NS – field duplicate not sampled.

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/16/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 5/14/2013 13:55 / WR-510 (K1304510)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤14 | <5-9.9<br>33-65 ug/kg | Batch 59-72 | 27-131 | 70,80 | 37-123 | Batch 13,4 | ≤40 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 21 | ≤365 | <18.4- 184<br>50.9-509 ng/kg | NA | NA | 88-124 | 60-135 | NA | ≤50 | NS | ≤20 | OK | Several cong. >EDL, but <MRL, no action. |
| OC Pesticides | HRGC/MS/MS | | ≤14 | <0.1-0.5<br>1.7-4.4 ug/kg | | 24-123 | | 24-123 | | ≤30 | NS | ≤20 | OK | Not analyzed as requested on COC. |
| SVOCs | EPA 8270D LL | 8 | ≤14 | <7.5-200<br>260-2600 µg/kg | Batch 0-409 | 10-132 | 0-103 | 17-104 | Batch NC-42 | ≤40 | NS | ≤20 | OK | MS/MSD Batch sample, no action.<br>LCS %R Benzoic acid 0, LCSD okay, no action. |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 2/4/2015 Page 1 of 2

Laboratory/Parameters: ALS / grain size, TOC, phenolics, metals, PAHs, herbicides (PAL), TPH, phthalates

Checked: initials

Sample Date/Sample ID: 5/14/2013 / Hwy 30 Sediment (K1304512)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Grain size | ASTM D422 | 4 | ≤180 | NA<br>NA | NA | NA | NA | NA | Batch 0-0.4 | ≤20 | NS | ≤20 | OK | None |
| TOC | Combustion / EPA 9060 | 10 | ≤28 | <0.050<br>0.050 % | Batch 104,106 | 76-128 | 97 | 34-166 | Batch 11 | ≤20 | NS | ≤40 | OK | None |
| Metals | ICP-MS / EPA 6020 | 15,16 | ≤180 | <0.02-0.1<br>0.04-0.9 mg/kg | 97-109 | ±25 | 97-109 | ±20 | 1.0-2.0 | ≤40 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270SIM | 6 | ≤14 | <2.5<br>29-150 µg/kg | Batch 73-99 | 39-138 | 82-114 | 39-138 | Batch 0-8 | ≤40 | NS | ≤50 | OK | None |
| Phthalates | GC/MS / EPA 8270SIM | 8 | ≤14 | <5.0-50<br>1200-12000 µg/kg | 86-253 | 10-150 | 44-105 | 20-150 | 1-38 | ≤40 | NS | ≤50 | OK | Several MS/MSD %R high, no flag because sample ND for those compounds. |
| Phenolics | Spectrophotometric / EPA 9065 | 3 | ≤28 | <0.20<br>1.1 mg/kg | 97,115 | ±30 | 94 | ±20 | 75 | ≤23 | NS | ≤50 | OK | "J" sample due to dup RPD. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 2/4/2015 Page 2 of 2

Laboratory/Parameters: ALS / grain size, TOC, phenolics, metals, PAHs, herbicides (PAL), TPH, phthalates

Checked: initials

Sample Date/Sample ID: 5/14/2013 / Hwy 30 Sediment (K1304512)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 62-64 | ≤14 | <0.0067-0.2<br>0.013-0.2 mg/kg | 63-101 | 0-190 | 66,57 | 38-128 | NA | NA | NS | ≤50 | OK | "J" all results due to holding time. |
| TPH | GC/FID / NWTPH-Dx | 6 | ≤14 | <25-99<br>710-2900 mg/kg | Batch 97-120 | ±25 | 102,87 | ±50 | Batch NC-29 | ≤40 | NS | ≤50 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/15/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 5/16/2013 9:01 / OF-52 (K1304606)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 5 | ≤7 | <4.0<br>10 mg/L | NA | NA | 90,89 | ±15 | batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 3 | ≤28 | <0.5mg/L<br>0.5 mg/L | OF-52 99 | 83-117 | 95,94 | 83-117 | OF-52 <1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 4 | ≤28 | <0.050<br>0.050 ug/L | OF-52 82,71 | 17-142 | 56 | 32-122 | OF-52 14, NC | ≤30 | NS | ≤20 | OK | Surrogate rec. low, OK in dup, both ND, no action.. |
| Total and dissolved metals | EPA 200.8 | 8 | ≤180 | <0.02-2<br>0.02-2 ug/L | OF-52 96-102 | ±30 | 97-103 | ±25 | OF-52 0-4 | ≤20 | NS | ≤40 | OK | None |
| Total and dissolved mercury | EPA 7470A | 13 | ≤28 | <0.2<br>0.2 ug/L | OF-52 106 | 76-126 | 99 | 77-123 | OF-52 NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/15/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 5/16/2013 9:01 / OF-52 (K1304606)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 4 | ≤7 | <0.02-0.04<br>0.02-0.04 µg/L | NA | 25-144 | 77-81 | 50-103 | 4,0 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 26 | ≤365 | <100-1000<br>101- 1010 pg/L | NA | NA | 91-115 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | MB contamination, all <MRL, no action. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0<br>2-20 ng/L | Batch 92-119 | 50-120 | 89-109 | 50-120 | Batch 1-24 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 5 | ≤7 | <0.2-5.0<br>2-50 µg/L | OF-52 0-244 | ±30 | 57-91 | 10-128 | OF-52 0-39 | ≤30 | NS | ≤20 | | Several MS/MSD rec. high; samples ND, no action. 4-nitrophenol %R 0 for MS/MSD; sample ND, reject "R" value. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/15/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 5/19/2013 1:05 / OF-52 (K1304677)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 4 | ≤7 | <1.0<br>5 mg/L | NA | NA | 91,94 | ±15 | batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 15 | ≤28 | <0.5mg/L<br>0.5 mg/L | OF-52 99 | 83-117 | 94 | 83-117 | OF-52 2 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | | ≤28 | <0.050<br>0.050 ug/L | | 17-142 | | 32-122 | | ≤30 | | ≤20 | | Not requested |
| Total and dissolved metals | EPA 200.8 | 4 | ≤180 | <0.02-2<br>0.02-2 ug/L | OF-52 100-108 | ±30 | 98-101 | ±25 | OF-52 0-6 | ≤20 | NS | ≤40 | OK | No dissolved metals. |
| Total and dissolved mercury | EPA 7470A | 10 | ≤28 | <0.2<br>0.2 ug/L | Batch 106 | 76-126 | 99 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | No dissolved metals. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/15/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 5/19/2013 1:05 / OF-52 (K1304677)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 5 | ≤7 | <0.02-0.04 0.02-0.04 µg/L | NA | 25-144 | 76-83 | 50-103 | 6,4 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 23 | ≤365 | <100-1000 101- 1010 pg/L | NA | NA | 91-115 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | MB contamination, all <MRL, no action. |
| OC Pesticides | HRGC/MS/MS | 4 | ≤7 | <0.5-5.0 2-20 ng/L | Batch 94-106 | 50-120 | 96-109 | 50-120 | Batch 1-10 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 2 | ≤7 | <0.2-5.0 0.2-5.0 µg/L | Batch 0-244 | ±30 | 57-91 | 10-128 | Batch 0-39 | ≤30 | NS | ≤20 | | Several MS/MSD rec. high; samples ND, no action. 4-nitrophenol %R 0 for MS/MSD; batch sample and LCS okay, no action. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/15/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 5/21/2013 15:50 / OF-52 (K1304819)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 7 | ≤7 | <5.0<br>5 mg/L | NA | NA | 100,94 | ±15 | batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 7 | ≤28 | <0.5mg/L<br>0.5 mg/L | OF-52 103 | 83-117 | 94-95 | 83-117 | OF-52 <1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 3 | ≤28 | <0.050<br>0.050 ug/L | Batch 66,66 | 17-142 | 52 | 32-122 | Batch 1 | ≤30 | NS | ≤20 | OK | None |
| Total and dissolved metals | EPA 200.8 | 9 | ≤180 | <0.02-2<br>0.02-2 ug/L | OF-52 95-102 | ±30 | 98-101 | ±25 | OF-52 0-12 | ≤20 | NS | ≤40 | OK | None |
| Total and dissolved mercury | EPA 7470A | 8 | ≤28 | <0.2<br>0.2 ug/L | Batch 80 | 76-126 | 99 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/15/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs, TBT)

Checked: initials

Sample Date/Sample ID: 5/21/2013 15:50 / OF-52 (K1304819)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 3 | ≤7 | <0.02-0.04<br>0.02-0.07 µg/L | NA | 25-144 | 76-83 | 50-103 | 6,4 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 21 | ≤365 | <100-1000<br>101- 1010 pg/L | NA | NA | 91-115 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | MB contamination, all <MRL, no action. |
| OC Pesticides | HRGC/MS/MS | 2 | ≤7 | <0.5-5.0<br>0.5-5.0 ng/L | OF-52 92-119 | 50-120 | 96-109 | 50-120 | OF-52 1-18 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 2 | ≤7 | <0.2-5.0<br>0.2-5.0 µg/L | OF-52 0-131 | ±30 | 54-94 | 10-128 | Batch 0-13 | ≤30 | NS | ≤20 | OK | PCP MS/MSD rec. high; sample ND, no action. 4-nitrophenol %R 0 for MS/MSD; Sample ND, reject "R" value. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / PAL (herbicides)

Checked: initials

Sample Date/Sample ID: 5/21/2013 / I5 Grab (K1302483)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | | ≤6 hours | <2.0<br>1.8 MPN | | NA | | NA | | ≤20 | | ≤20 | OK | Not requested |
| *E. coli* bacteria | MF/ SM 9222D | | ≤6 hours | <1.0<br>1 MPN | | NA | | NA | | ≤20 | | ≤20 | OK | Not requested |
| Phthalates | GC/MS / EPA 8270 SIM | 2 | ≤7 | <RL<br>1.0-201 µg/L | Batch 84,91 | 20-150 | 82-92 | 20-150 | Batch 6 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 2 | ≤7 | <1.00<br>5.0 µg/L | Batch 128,131 | 24 - 147 | 70,80 | 10-100 | Batch 2 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 2 | ≤7 | <0.020<br>0.021 µg/L | NA | 26-137 | 85-110 | 26-137 | 0-3 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 7 | ≤7 | <0.06-10<br>0.06-10 µg/L | NA | Surr 22-111 | 67-119 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 5/21/2013 / I5 Grab (K1302483)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 3 | ≤7 | <0.02-0.04<br>0.020-0.056 µ/L | NA | ±50 | 76-80 | 50-103 | 6,4 | ≤30 | NS | ≤35 | OK | None |
| Chlorides | IC / EPA 300.0 | 3 | ≤28 | <0.20<br>0.4 mg/L | 96,96 | ±20 | 94,92 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 7 | ≤14 | < 250-500<br>1300-2500 ug/L | NA | ±50 | 91-98 | ±50 | Batch 4,10 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 13 | ≤28 | <5.0<br>5.0 mg/L | Batch 51,21 | 78-114 | 79-99 | 78-114 | 7,9 | ≤18 | NS | ≤20 | OK | No flag, batch sample. |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 5/21/2013 / I-5 Composite (K1304823)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 7 | ≤7 | <5.0<br>25 mg/L | NA | NA | 100,94 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 17 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 102 | ±15 | 2 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 13 | ≤28 | <0.50<br>1.0 mg/L | 105 | ±25 | 94,95 | ±15 | <1 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 4 | ≤28 | <0.50<br>2.5 mg/L | 95 | ±25 | 94-95 | ±15 | 7 | ≤40 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 8 | ≤2 | <4<br>30 mg/L | NA | NA | 92 | ±15 | Batch NC | ≤35 | NS | ≤35 | OK | Flag result "J" due to holding time. |
| Total P | Colorimetric / EPA 365.1 | 2 | ≤28 | <0.010<br>0.10 mg/L | Batch 91,102 | 60-135 | 99 | ±15 | Batch <1 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 5/21/2013 / I-5 Composite (K1304823)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 2 | ≤2 | <0.0100 / 0.01 mg/L | 95,100 | ±20 | 97 | ±10 | 13 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 12 | ≤28 | <0.20 / 0.4 mg/L | 103,119 | ±10 | 91 | ±10 | 11 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 3 | ≤28 | <0.050 / 0.05 mg/L | 108,104 | ±10 | 97-99 | ±10 | 2 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 2 | ≤2 | <0.050 / 0.10mg/L | 102,103 | ±10 | 104 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | 14 | ≤180 | <0.02-0.5 / 0.04-20 µg/L | Batch 94-100 | ±30 | 96-100 | ±15 | Batch 1.8-15 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 14 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 94-100 | ±30 | 96-100 | ±15 | Batch 1.8-15 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 08/16/2013 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 5/28/2013 / WR-306 (16:00) and Miller (18:30) (K1305034)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TS | EPA 160.3 | 15 | ≤180 | NA<br>0.1 % | NA | NA | NA | NA | WR-306<br>5 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 17 | ≤28 | <0.05<br>0.05 % | Batch<br>103,100 | 70-<br>122 | 95 | 72-<br>122 | Batch<br><1, NC,3 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 7 | ≤28 | <0.98<br>16.-2.3<br>ug/kg | WR-306<br>83,68 | 10-<br>115 | 51 | 10-<br>122 | WR-306<br>19 | ≤40 | NS | ≤20 | OK | None |
| PSD | EPA 200.8 | 8 | ≤180 | NA<br>0.01<br>gram | NA | NA | NA | NA | Batch<br>OK | ≤20 | NS | ≤20 | OK | None |
| Metals | EPA 6020/7471B | 16<br>6 | ≤180,<br>28(hg) | <0.02-<br>250<br>0.024-<br>40.4<br>mg/kg | WR-306<br>83-189 | 48-<br>146 | 79-100 | 41-<br>158 | WR-306<br>0.6-16 | ≤20 | NS | ≤20 | OK | MS %R for Cu (189) and Pb (64) failed; "J" cu and pb results for WR-306. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 8/16/2013 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 5/28/2013 / WR-306 (16:00) and Miller (18:30) (K1305034)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤14 | <5-9.9<br>20-57 ug/kg | Batch 70-75 | 27-131 | 52,55 | 37-123 | Batch 8,3 | ≤40 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 20 | ≤365 | <19.3- 193<br>29.5-453 ng/kg | NA | NA | 98-118 | 60-135 | NA | ≤50 | NS | ≤20 | OK | Several cong. >EDL, but <MRL, no action. |
| OC Pesticides | HRGC/MS/MS | 23 | ≤14 | <0.1-0.2<br>1.23-3.66 ug/kg | Batch 86-108 | 24-123 | 86-109 | 24-123 | Batch 0-23 | ≤30 | NS | ≤20 | OK | Holding time exceeded; "J" all results. |
| SVOCs | EPA 8270D LL | 6 | ≤14 | <5.0-200<br>120-4000 µg/kg | Batch 0-141 | 10-132 | 42-102 | 17-104 | Batch NC-29 | ≤40 | NS | ≤20 | OK | MS/MSD Batch sample, no action.<br>LCS %R Benzoic acid 0, LCSD okay, no action. |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Total and Dissolved Metals, TBT, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 9/05/2013 18:25 / WR-126 (K1309260)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | SM2540D | 5 | ≤7 | <5.0<br>6.3 mg/L | NA | NA | 96 | 85-115 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| TOC | EPA 160.3 | 8 | ≤28 | <0.5<br>5 mg/L | WR-126 101 | 83-117 | 95,95 | 83-117 | WR-126 4, NC | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 7 | ≤7 | <0.98<br>1.7 ug/kg | Batch 83,68 | 10-115 | 51 | 10-122 | Batch 19 | ≤40 | NS | ≤20 | OK | None |
| Metals | EPA 200.8 | 11,12 | ≤180, 28(hg) | <0.02-2<br>0.02-2 ug/L | WR-126 99-121 Batch 102(Hg) | 70-130 | 100-110 | 70-130 | WR-126 0-20 Batch NC(Hg) | ≤20 | NS | ≤20 | OK | None |
| PAHs | EPA 8270D SIM | 5 | ≤7 | <0.019<br>0.02 ug/L | NA | | 87-112 | 39-133 | LCS 0-2 | ≤30 | NS | ≤20 | OK | 2-methylnaphthalene, acenaphthene, chrysene "J" or "UJ" due to interferences. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Total and Dissolved Metals, TBT, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 9/05/2013 18:25 / WR-126 (K1309260)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤7 | <0.0049-0.0098<br>0.005-0.015 ug/L | NA | 27-131 | 75-84 | 60-103 | LCS 5,3 | ≤30 | NS | ≤20 | OK | Insufficient volume for MS/MSD, no action. |
| PCBs, Congeners | EPA 1668C | 8 | ≤365 | <100-558<br>99.5-541 pg/L | NA | NA | 88-134 | 60-135 | LCS <1-9 | ≤50 | NS | ≤20 | OK | None. |
| OC Pesticides | HRGC/MS/MS | 5 | ≤7 | <0.49-4.9<br>0.52-5.2 ng/L | NA | 24-123 | 87-108 | 24-123 | LCS 1-12 | ≤30 | NS | ≤20 | OK | Insufficient volume for MS/MSD, no action. |
| SVOCs | EPA 8270D LL | 6 | ≤7 | <0.2-4.9<br>0.22-5.5 µg/L | WR-126 37-128 | 10-130 | 10-105 | 10-124 | WR-126 8-37 | ≤30 | NS | ≤20 | OK | MS/MSD PCP %R high in MS; MSD okay, no action.<br>RPD high for 4-nitrophenol, all other criteria okay, no action.<br>Acenaphthylene "UJ" due to interferences. |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (Total Metals, PCBs)

Checked: initials

Sample Date/Sample ID: 9/27/2013 14:01 / OF-22C (K1310484)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | | ≤7 | | | NA | | ±15 | | ≤10 | | ≤20 | OK | Not Requested on COC |
| TOC | SM 2540D | | ≤28 | | | 83-117 | | 83-117 | | ≤20 | | ≤20 | OK | Not Requested on COC |
| Tributyltin | EPA 3520C | | ≤28 | | | 17-142 | | 32-122 | | ≤30 | | ≤20 | OK | Not Requested on COC |
| Total metals | EPA 200.8 | 19 | ≤180 | <0.02-2<br>0.02-2 ug/L | OF-22C 100-120 | ±30 | 93-113 | ±25 | OF-22C 0-3 | ≤20 | NS | ≤40 | OK | None |
| Total mercury | EPA 7470A | 7 | ≤28 | <0.2<br>0.2 ug/L | OF-22C 102 | 76-126 | 99 | 77-123 | OF-22C NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (Total Metals, PCBs)

Checked: initials

Sample Date/Sample ID: 9/27/2013 14:01 / OF-22C (K1310484)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 11 | ≤14 | <0.02-0.04<br>0.02-0.04 µg/L | NA | 25-144 | 80-90 | 60-103 | LCS 12,7 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 17 | ≤365 | <100-1000<br>103- 1030 pg/L | NA | NA | 94-177 | 60-135 | <1-5 | ≤50 | NS | ≤20 | OK | MB contamination, all <MRL, no action. Several LCS %R high – "J" flag PCB 1,3,15,37 |
| OC Pesticides | HRGC/MS/MS | | ≤7 | | | 50-120 | | 50-120 | | ≤30 | | ≤20 | OK | Not Requested on COC |
| SVOCs | EPA 8270D LL | | ≤7 | L | | ±30 | | 10-128 | | ≤30 | | ≤20 | OK | Not Requested on COC |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/02/2013 06:00 and 05:30 / WR-211 and WR-206 GRAB (K1311970)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 4 | ≤7 | <1.0<br>5.0 mg/L | NA | NA | 93,91 | ±15 | Batch NC,2 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 16 | ≤28 | <0.5mg/L<br>1.0 mg/L | WR-211 99 | 83-117 | 93 | 83-117 | WR-211 2 WR-206 <1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 6 | ≤28 | <0.05<br>0.05 ug/L | NA | ±25 | 114,98 | ±15 | LCS 15 | ≤30 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 6 | ≤180 | <.2-2<br>0.02-2 ug/L | Batch 99-110 | ±30 | 100-112 | ±25 | Batch 0-6.9 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 3 | ≤28 | <0.200<br>0.2 ng/L | Batch 101 | 71-125 | 103 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/02/2013 06:00 and 05:30 / WR-211 and WR-206 GRAB (K1311970)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 4 | ≤14 | <0.005-0.0099<br>0.005-0.014 µg/L | WR-211 79-85 | 39-128 | 90,89 | 60-103 | WR-211 0,3 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 5 | ≤365 | <20-200<br>19.6- 196 pg/L | NA | NA | 96-142 | 60-135 | <1-14 | ≤50 | NS | ≤20 | OK | LCSD high for PCB-15, no action because LSC okay. |
| OC Pesticides | HRGC/MS/MS | 5 | ≤7 | <0.49-4.9<br>0.49-5 ng/L | WR-211 80-133 | 24-123 | 87-119 | 50-120 | WR-211 1-10 | ≤30 | NS | ≤20 | OK | MS/MSD %R high for 2,4-DDE, sample ND, no action. |
| SVOCs | EPA 8270D LL | 6 | ≤7 | <0.2-4.9<br>0.2-4.9 µg/L | WR-206 62-147 | 53-133 | 20-112 | 10-128 | WR-206 0-10 | ≤30 | NS | ≤20 | OK | MSD %R for N-nitrosodi-n-propylamine and 4-nitrophenol high; samples ND, no action. |
| PAHs | | 4 | ≤7 | <0.019<br>0.020-0.021 ng/L | WR-211 81-102 | 32-139 | 79-99 | 39-134 | WR-211 0-4 | ≤30 | NS | ≤20 | OK | None. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Total Metals, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/05/2013 1:11 / OF-22C (K1312031)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 2 | ≤7 | <5.0<br>40 mg/L | NA | NA | 93 | ±15 | Batch NC | ≤10 | | ≤20 | OK | None |
| TOC | SM 2540D | 13 | ≤28 | <0.50<br>2.5 mg/L | OF-22C 101 | 83-117 | 93 | 83-117 | OF-22C 4 | ≤20 | | ≤20 | OK | None |
| Tributyltin | EPA 3520C | | ≤28 | | | 17-142 | | 32-122 | | ≤30 | | ≤20 | OK | Not Requested on COC |
| Total metals | EPA 200.8 | 3 | ≤180 | <0.02-2<br>0.02-2 ug/L | OF-22C 101-115 | ±30 | 100-112 | ±25 | OF-22C 0-7.5 | ≤20 | NS | ≤40 | OK | None |
| Total mercury | EPA 7470A | 2 | ≤28 | <0.2<br>0.2 ug/L | Batch 90 | 76-126 | 102 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Total Metals, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/05/2013 1:11 / OF-22C (K1312031)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 1 | ≤14 | <0.005-0.0099<br>0.005-0.012 µg/L | Batch 79-85 | 25-144 | 90,89 | 60-103 | Batch 0,3 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 8 | ≤365 | <100-1000<br>19.6-196pg/L | NA | NA | 90-137 | 60-135 | NA | ≤50 | NS | ≤20 | OK | MB contamination, all <MRL, no action. LCS %R high for PCB-118 – "J" flag PCB 118 |
| OC Pesticides | HRGC/MS/MS | | ≤7 | | | 50-120 | | 50-120 | | ≤30 | | ≤20 | OK | Not Requested on COC |
| SVOCs | EPA 8270D LL | 8 | ≤14 | <0.2-4.9<br>0.2-5 ug/L | Batch 52-147 | ±30 | 37-112 | 10-128 | Batch 0-10 | ≤30 | NS | ≤20 | OK | MS %R high for two compounds; batch QC, no action. |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/06/2013 13:30 and 14:00 / OF-22 and WR-204 GRAB (K1312144)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | SM 2540D | 6 | ≤7 | <5.0<br>10-20 mg/L | NA | NA | 96,94 | ±15 | Batch <1 | ≤10 | NS | ≤20 | OK | None |
| TOC | 415.1 | 12 | ≤28 | <0.5mg/L<br>2.5 mg/L | OF-22 101 | 83-117 | 93 | 83-117 | OF-22 4 WR-204 6 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 2 | ≤28 | <0.05<br>0.05 ug/L | NA | ±25 | 114,98 | ±15 | LCS 15 | ≤30 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 14 | ≤180 | <0.02-2<br>0.02-100 ug/L | WR-204 92-129 | ±30 | 101-113 | ±25 | WR-204 0-5.1 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 6 | ≤28 | <0.200<br>0.2 ng/L | OF-22 104 | 71-125 | 104 | 77-123 | OF-22 NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/06/2013 13:30 and 14:00 / OF-22 and WR-204 GRAB (K1312144)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 6 | ≤14 | <0.005-0.0099<br>0.005-0.011 µg/L | NA | 39-128 | 96-98 | 60-103 | LCS 1,0 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 7 | ≤365 | <20-200<br>48.4- 234 pg/L | NA | NA | 94-137 | 60-135 | <1-51 | ≤50 | NS | ≤20 | OK | MB- contamination between EDL and MRL, no action. LCS high for PCB-118, no action because failure marginal. RPD for PCB-51 high; no action, samples ND. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0<br>0.5-5.9 ng/L | NA | 24-123 | 72-105 | 50-120 | LCS 1-9 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 6 | ≤7 | <0.2-5.0<br>0.20-5.1 µg/L | NA | 53-133 | 0-106 | 10-128 | LCS NC-35 | ≤30 | NS | ≤20 | OK | LCS/LCSD %R for hexachloro-cyclopentadiene 0; Reject values. RPD analine 35%, no flag, marginal failure |
| PAHs | | 5 | ≤7 | <0.019<br>0.020-0.021 ng/L | NA | 32-139 | 91-115 | 39-134 | LCS 0-3 | ≤30 | NS | ≤20 | OK | None. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/07/2013 8:45 and 1:28 / WR-202 and Miller GRAB (K1312145)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | SM 2540D | 6 | ≤7 | <5.0<br>5-13 mg/L | NA | NA | 96,90 | ±15 | Batch NC, 7 | ≤10 | NS | ≤20 | OK | None |
| TOC | 415.1 | 11 | ≤28 | <0.5mg/L<br>0.5-2.5 mg/L | WR-202 100 | 83-117 | 93 | 83-117 | WR-202 2 Miller 2 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 1 | ≤28 | <0.05<br>0.05 ug/L | NA | ±25 | 114,98 | ±15 | LCS 15 | ≤30 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 12 | ≤180 | <0.02-2<br>0.02-100 ug/L | Miller 103-117 | ±30 | 96-106 | ±25 | Miller 0-6 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 5 | ≤28 | <0.2<br>0.2 ng/L | Batch 104 | 71-125 | 104 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, OC Pest, TBT, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/07/2013 8:45 and 1:28 / WR-202 and Miller GRAB (K1312145)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 5 | ≤14 | <0.005-0.0099<br>0.005-0.011 µg/L | NA | 39-128 | 96-98 | 60-103 | LCS 1,0 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 6, 50 | ≤365 | <20-200<br>48.4- 234 pg/L | NA | NA | 94-137 | 60-135 | <1-51 | ≤50 | NS | ≤20 | OK | MB- contamination between EDL and MRL, no action. LCS high for PCB-118, no action because failure marginal. RPD for PCB-51 high; no action, samples ND. Flag all Miller results "J" due to interference. |
| OC Pesticides | HRGC/MS/MS | 6 | ≤7 | <0.5-5.0<br>0.5-5 ng/L | NA | 24-123 | 72-105 | 50-120 | LCS 1-9 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 5 | ≤7 | <0.2-5.0<br>0.20-5 µg/L | NA | 53-133 | 0-106 | 10-128 | LCS NC-35 | ≤30 | NS | ≤20 | OK | LCS/LCSD %R for hexachloro-cyclopentadiene 0; Reject values. RPD analine 35%, no flag, marginal failure |
| PAHs | | 5 | ≤7 | <0.019<br>0.019-0.02 ng/L | WR-202 81-107 | 32-139 | 91-113 | 39-134 | WR-202 0-10 | ≤30 | NS | ≤20 | OK | None. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, PCBs, TBT, OC Pests, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/19/2013 6:19 / OF-22C and 11/18/2013 13:14 / OF-18 (K1312733)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 5 | ≤7 | <5.0<br>6.3-8 mg/L | NA | NA | 94 | ±15 | Batch 8 | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 14,15 | ≤28 | <0.50<br>1.0 mg/L | Batch 96 | 83-117 | 93-94 | 83-117 | OF-22C <1 OF-18 1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 2 | ≤28 | <0.050<br>0.050 ug/L | NA | 17-142 | 116,97 | 32-122 | LCS 17 | ≤30 | NS | ≤20 | OK | OF-22C only.<br>None |
| Total/Diss metals | EPA 200.8 | 14,15 | ≤180 | <0.02-2<br>0.02-2 ug/L | Batch 78-112 | ±30 | 95-112 | ±25 | Batch 0.2-15 | ≤20 | NS | ≤40 | OK | OF-18 total metals only.<br>None |
| Total/Diss mercury | EPA 7470A | 3,4 | ≤28 | <0.2<br>0.2 ug/L | Batch 100 | 76-126 | 99 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | OF-18 total mercury only.<br>None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, PCBs, TBT, OC Pests, SVOCs)

Checked: initials

Sample Date/Sample ID: 11/19/2013 6:19 / OF-22C and 11/18/2013 13:14 / OF-18 (K1312733)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 8,9 | ≤14 | <0.005-0.0099<br>0.005-0.01 µg/L | Batch 84,78 | 25-144 | 92-96 | 60-103 | LCS 2,1 | ≤30 | NS | ≤20 | OK | "J" Aroclor 1254 result for OF-22C OF-18 due to column RPD exceedance. |
| PCBs, Congeners | EPA 1668C | 6,7 | ≤365 | <100-1000<br>19.8-202 pg/L | NA | NA | 87-110 | 60-135 | NA | ≤50 | NS | ≤20 | OK | PCB-11 > MRL in MB, flag samples "J". |
| OC Pesticides | HRGC/MS/MS | 3,4 | ≤7 | 0.5-5<br>0.5-5 ng/L | OF-22 89-122 | 50-120 | 103-113 | 50-120 | OF-22 2-11 | ≤30 | NS | ≤20 | OK | MS %R for 2,4-DDD high; MSD okay and sample ND, no flag. |
| SVOCs | EPA 8270D LL | 2,3 | ≤7 | <0.2-4.8<br>0.20-5.1 µg/L | Batch 37-156 | 53-133 | 32-109 | 10-128 | Batch 0-12 LCS 0-15 | ≤30 | NS | ≤20 | OK | MS/MSD for 2 compounds high; no action, batch sample. LCS/LCSD okay. |
| PAHs | | 2,3 | ≤7 | <0.020<br>0.020 ng/L | WR-202 81-107 | 32-139 | 88-117 | 39-134 | LCS 1-9 | ≤30 | NS | ≤20 | OK | "J" benz(a)anthracene and chrysene due to interferences. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, PCBs, OC Pests, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/01/2013 2:10 / OF-18 (K1313057)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 3 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 98 | ±15 | Batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 2 | ≤28 | <0.50<br>1.0 mg/L | Batch 96 | 83-117 | 93-94 | 83-117 | OF-18 <1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | | ≤28 | <0.050<br>0.050 ug/L | | 17-142 | | 32-122 | | ≤30 | NS | ≤20 | OK | Not monitored at this site. |
| Total metals | EPA 200.8 | 8 | ≤180 | <0.02-2<br>0.02-2 ug/L | Batch 103-113 | ±30 | 102-114 | ±25 | Batch 0-1.3 | ≤20 | NS | ≤40 | OK | None |
| Total mercury | EPA 7470A | 2 | ≤28 | <0.2<br>0.2 ug/L | Batch 106 | 76-126 | 102 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, PCBs, OC Pests, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/01/2013 2:10 / OF-18 (K1313057)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 3 | ≤14 | <0.005-0.01<br>0.0053-0.011 µg/L | NA | 25-144 | 78-82 | 60-103 | LCS 5,1 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 36 | ≤365 | <20-200<br>20.8-208 pg/L | NA | NA | 88-118 | 60-135 | LCS <1-12 | ≤50 | NS | ≤20 | OK | PCB-11 < MRL, but >MDL in MB, no flag. |
| OC Pesticides | HRGC/MS/MS | 4 | ≤7 | 0.5-5<br>0.53-5.3 ng/L | NA | 50-120 | 79-104 | 50-120 | LCS 2-14 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 4 | ≤7 | <0.2-5.0<br>0.22-5.4 µg/L | NA | 53-133 | 78-116 | 10-128 | LCS 0-18 | ≤30 | NS | ≤20 | OK | LCS %R for 2,4-dinitrophenol high; LCS/LCSD %R high for 2-methyl-4,6-dinitrophenol; sample ND, no action.. |
| PAHs | | 2 | ≤7 | <0.020<br>0.021 ng/L | NA | 32-139 | 96-123 | 39-134 | LCS 0-12 | ≤30 | NS | ≤20 | OK | None |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, PCBs, OC Pests, TBT, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/13/2013 3:43 / Miller (K1313531)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 5 | ≤7 | <5.0<br>13 mg/L | NA | NA | 95 | ±15 | Batch 1, NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 4 | ≤28 | <0.50<br>10 mg/L | Miller 103 | 83-117 | 92 | 83-117 | Miller <1 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 3 | ≤28 | <0.050<br>0.050 ug/L | NA | 17-142 | 130, 128 | 32-122 | LCS 2 | ≤30 | NS | ≤20 | OK | LCS/LCSD %R high; sample ND, no action. |
| Total/diss metals | EPA 200.8 | 4 | ≤180 | <0.02-2<br>0.02-2 ug/L | Batch 86-106 | ±30 | 98-108 | ±25 | Batch NC-3 | ≤20 | NS | ≤40 | OK | None |
| Total/diss mercury | EPA 7470A | 3 | ≤28 | <0.2<br>0.2 ug/L | Batch 106 | 76-126 | 98 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, Metals, PCBs, OC Pests, TBT, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/13/2013 3:43 / Miller (K1313531)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 3 | ≤14 | <0.005-0.0075<br>0.0053-0.011 µg/L | NA | 25-144 | 81-86 | 60-103 | LCS 3,1 | ≤30 | NS | ≤20 | OK | Aroclor 1260 in MB > MRL; sample ND Aroclor 1260, no action. |
| PCBs, Congeners | EPA 1668C | 5 | ≤365 | <20-200<br>21.0-210 pg/L | NA | NA | 81-118 | 60-135 | LCS <1-13 | ≤50 | NS | ≤20 | OK | PCB-11 < MRL, but >MDL in MB, no flag. |
| OC Pesticides | HRGC/MS/MS | 6 | ≤7 | 0.5-5<br>0.51 -5.1 ng/L | NA | 50-120 | 76-90 | 50-120 | LCS 0-12 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 3 | ≤7 | <0.19-4.8<br>2.1-53 µg/L | Miller 50-170 | 53-133 | 42-111 | 10-128 | Miller 0-12 | ≤30 | NS | ≤20 | OK | MS/MSD %R for 4-nitrophenol high; sample ND, no action.. |
| PAHs | | 3 | ≤7 | <0.020<br>0.021 ng/L | NA | 32-139 | 90-126 | 39-134 | LCS 1-3 | ≤30 | NS | ≤20 | OK | "J" benz(a)anthracene due to interference. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 10/31/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/19/2013 13:55 / OF-18 (K1313830)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TS | EPA 160.3 | 8 | ≤180 | NA / 0.1 % | NA | NA | NA | NA | NA | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 13 | ≤28 | <0.05 / 0.05 % | Batch 103,97 | 70-122 | 94 | 72-122 | Batch 4,6 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 22 | ≤28 | <0.99 / 1.2 ug/kg | 121,103 | 10-115 | 74 | 10-122 | 15 | ≤40 | NS | ≤20 | OK | MS recovery high, no flag because sample is ND. |
| Grain Size | PSEP | 15 | ≤180 | NA / 0.01 gram | NA | NA | NA | NA | OK | ≤20 | NS | ≤20 | OK | None |
| Metals | EPA 6020/7471B | 18,7 | ≤180, 28(hg) | <0.02-2.7 / 0.024-40.4 mg/kg | Batch 71-118/ 100 (Hg) | 75-125/ 80-120 | 70-116 | 47-152 | Batch 2-39/ NC(Hg) | ≤20 | NS | ≤20 | OK | Aluminum in MB = 2.7. No flag, sample>5x MB. MS recovery for CU low (71%) and dup RPD 39%; no flag, batch sample and all other QC okay. |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 10/31/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TS, PSD, Metals, OC Pest [dieldrin, endrin, DDE, DDD, DDT], PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/19/2013 13:55 / OF-18 (K1313830)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 8 | ≤14 | <4.3-5<br>15-30 ug/kg | 51-95 | 23-148 | 74,77 | 42-124 | 59,31 | ≤40 | NS | ≤20 | OK | MS/MSD RPD for Aroclor 1016 was 59%. No flag because all other criteria was net and Aroclor 1016 was not detected. |
| PCBs, Congeners | EPA 1668C | | ≤365 | <18.4- 184<br>50.9-509 ng/kg | NA | NA | 79-118 | 60-135 | NA | ≤50 | NS | ≤20 | OK | Several cong. >EDL, but <MRL, no action. PCB 11 = 22.4 ng/kg in MB, "J" result (174 ng/kg) because <5X MB. All "K" flags should be "U" flags. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤14 | <0.079-0.20<br>0.24-0.80 ug/kg | 64-160 | 24-123 | 88-108 | 24-123 | 0-38 | ≤30 | NS | ≤20 | OK | MS/MSD recovery high for 2,4-DDT (157/141%) and 4,4-DDT (124/160%). 2,4-DDT ND, no flag. "J" flag 4,4-DDT for MS recovery. MS/MSD RPD for Endrin 38%, no flag because sample ND and LCS/LCD RPD okay. |
| SVOCs | EPA 8270D LL | 7 | ≤14 | <7.5-400<br>120-1200 µg/kg | 69-302 | 10-132 | 0-103 | 17-104 | NC-16 | ≤40 | NS | ≤20 | OK | Several MS/MSD %R high, no flag because sample ND.<br>LCS/LCSD %R Benzoic acid 0, "R" reject Benzoic Acid result. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 01/23/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/20/2013 19:24 / Miller (K1313847)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 7 | ≤7 | <5.0<br>40 mg/L | NA | NA | 97 | ±15 | Batch <1, NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | | ≤28 | | | 83-117 | | 83-117 | | ≤20 | NS | ≤20 | OK | Not requested on COC |
| Tributyltin | EPA 3520C | | ≤28 | | | 17-142 | | 32-122 | | ≤30 | NS | ≤20 | OK | Not requested on COC |
| Total metals | EPA 200.8 | 10 | ≤180 | <0.02-2<br>0.02-2 ug/L | Miller 97-100 | ±30 | 100-105 | ±25 | Miller 0-3.5 | ≤20 | NS | ≤40 | OK | None |
| Total mercury | EPA 7470A | 7 | ≤28 | <0.2<br>0.2 ug/L | Batch 107 | 76-126 | 100 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 1/23/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 12/20/2013 19:24 / Miller (K1313847)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | | ≤14 | | | 25-144 | | 60-103 | | ≤30 | NS | ≤20 | OK | Not requested on COC |
| PCBs, Congeners | EPA 1668C | 11 | ≤365 | <20-200<br>20.9-209 pg/L | NA | NA | 92-130 | 60-135 | LCS <1-8 | ≤50 | NS | ≤20 | OK | PCB-11 < MRL, but >MDL in MB, no flag. |
| OC Pesticides | HRGC/MS/MS | | ≤7 | | | 50-120 | | 50-120 | | ≤30 | NS | ≤20 | OK | Not requested on COC |
| SVOCs | EPA 8270D LL | | ≤7 | | | 53-133 | | 10-128 | | ≤30 | NS | ≤20 | OK | Not requested on COC |
| PAHs | | 7 | ≤7 | <0.020<br>0.022 ng/L | Miller 72-111 | 32-139 | 79-125 | 39-134 | Miller 0-30 | ≤30 | NS | ≤20 | OK | "J" or "UJ" all results due to low surrogate recovery. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 06/5/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, TBT, Metals, PCBs, OC Pests, SVOCs)

Checked: initials

Sample Date/Sample ID: 1/08/2014 14:50 / OF-16 (K1400266)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 7 | ≤7 | <4.0<br>10 mg/L | NA | NA | 94 | ±15 | Batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 8 | ≤28 | <0.50<br>5.0 mg/L | Batch 99,100 | 83-117 | 90 | 83-117 | OF-16 8 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | EPA 3520C | 9 | ≤28 | <0.050<br>0.050 ug/L | NA | 17-142 | 98,99 | 32-122 | 2 | ≤30 | NS | ≤20 | OK | None |
| Total/ dissolved metals | EPA 200.8 | 12 | ≤180 | <0.02-2<br>0.02-2 ug/L | OF-16 95-105 | ±30 | 101-104 | ±25 | OF-16 0-1 | ≤20 | NS | ≤40 | OK | None |
| Total/ dissolved mercury | EPA 7470A | 7 | ≤28 | <0.2<br>0.2 ug/L | Batch 100 | 76-126 | 101 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 6/5/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TOC, TSS, TBT, Metals, PCBs, OC Pests, SVOCs)

Checked: initials

Sample Date/Sample ID: 1/08/2014 14:50 / OF-16 (K1400266)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 LL | 6 | ≤14 | <0.005-0.01<br>0.0054-0.011 µg/L | NA | 25-144 | 80-84 | 60-103 | LCS 3,0 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 13 | ≤365 | <20-200<br>20.8-208 pg/L | NA | NA | 87-111 | 60-135 | LCS <1-7 | ≤50 | NS | ≤20 | OK | Several PCBs < MRL, but >MDL in MB, no flag. PCB 209 > MRL in MB; Flag result for PCB 206 "J" due to MB. |
| OC Pesticides | HRGC/MS/MS | 2 | ≤7 | 0.5-5<br>0.5-5 ng/L | OF-16 82-125 | 50-120 | 94-112 | 50-120 | OF-16 1-18 | ≤30 | NS | ≤20 | OK | MS recovery for 2,4-DDD (125%) and Endrin (122%) exceeded 120% control limit; no data qualified because both ND in sample and failure biased high. |
| SVOCs | EPA 8270D LL | 6 | ≤7 | <0.2-5.0<br>1.1-21 µg/L | Batch 78-156 | 53-133 | 44-99 | 10-128 | Batch 1-7 | ≤30 | NS | ≤20 | OK | MB for BEHP=1.2, sample = 5.9 ug/L; flag sample "J". Several %R high for MS/MSD; no flag, all ND. |
| PAHs | | 6 | ≤7 | <0.020<br>0.020 ng/L | NA | 32-139 | 82-109 | 39-134 | LCS 0-5 | ≤30 | NS | ≤20 | OK | None |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 05/22/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 1/08/2014 02:33 / Harbor WR-306 GRAB (K1400190)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 7 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 94 | ±15 | Batch <1,NC | ≤10 | | ≤20 | OK | None |
| TOC | SM 2540D | 8 | ≤28 | <0.5mg/L<br>0.5 mg/L | 100 | 83-117 | 90,90 | 83-117 | 2 | ≤20 | | ≤20 | OK | None |
| Tributyltin | | | ≤28 | <1.00<br>1 mg/L | | ±25 | | ±15 | | ≤20 | | ≤20 | OK | Not monitored at this site |
| Total and Dissolved Metals | EPA 200.8 | 6 | ≤180 | <0.02-2<br>0.02-40 ug/L | Batch 103-110 | ±30 | 102-106 | ±25 | Batch 0-5.1 | ≤20 | | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 7 | ≤28 | <0.2<br>0.2 ug/L | Batch 100 | 71-125 | 101 | 77-123 | Batch NC | ≤20 | | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date 05/22/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, PCBs, SVOCs)

Checked: initials

Sample Date/Sample ID: 1/08/2014 02:33 / Harbor WR-306 GRAB (K1400190)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 6 | ≤7 | <0.005-.009<br>0.005-0.009 µg/L | NA | 25-144 | 80-84 | 50-103 | LCS 3,0 | ≤30 | NS | ≤20 | OK | None |
| PCBs, Congeners | EPA 1668C | 27 | ≤365 | various<br>19.6-196 pg/L | NA | NA | 92-110 | 60-135 | <1-7 | ≤50 | NS | ≤20 | OK | MB contamination, 2 cong < MRL, no action; PCB 209 >MRL, flag sample result for PCB 209 "J" due to MB. |
| OC Pesticides | HRGC/MS/MS | | ≤7 | | | 24-123 | | 50-120 | | ≤30 | | ≤20 | | Not requested. |
| SVOCs | EPA 8270D LL | 6 | ≤7 | 1.2<br>1.0-20 µg/L | 74-156 | 32-130 | 16-96 | 10-124 | 0-7 | ≤30 | NS | ≤20 | OK | MB – BEHP = 1.2, sample result 10x greater, no action. MS/MSD %R high for 7 compounds. All ND except phenol. Flag phenol result "J" for %R. |
| PAHs | | | ≤7 | | | 32-139 | | 39-134 | | ≤30 | | ≤20 | OK | .Not requested separately. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / PAL (herbicides)

Checked: initials

Sample Date/Sample ID: 1/08/2014 / I5 Grab (K1400251)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 1 | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | "J" due to holding time |
| *E. coli* bacteria | MF/ SM 9222D | 1 | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | "J" due to holding time |
| Phthalates | GC/MS / EPA 8270 SIM | | ≤7 | <RL<br>1.0-201 µg/L | | 20-150 | | 20-150 | | ≤35 | | ≤35 | | Not requested |
| PCP | GC/MS / EPA 8270 SIM | | ≤7 | <1.00<br>5.0 µg/L | | 24 - 147 | | 10-100 | | ≤35 | | ≤35 | | Not requested |
| PAHs | GC/MS / EPA 8270-SIM | | ≤7 | <0.020<br>0.021 µg/L | | 26-137 | | 26-137 | | ≤35 | | ≤35 | | Not requested |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 7 | ≤7 | <0.06-10<br>0.06-10 µg/L | NA | Surr 22-111 | 71-121 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 1/08/2014 / I5 Grab (K1400251)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | | ≤7 | <0.02-0.04<br>0.020-0.056 µ/L | | ±50 | | 50-103 | | ≤30 | | ≤35 | | Not requested |
| Chlorides | IC / EPA 300.0 | 5 | ≤28 | <0.20<br>10 mg/L | Batch 109,110 | ±20 | 103 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | | ≤14 | < 250-500<br>1300-2500 ug/L | | ±50 | | ±50 | | ≤35 | | ≤35 | | Not requested |
| Oil&Grease | IS / EPA 413.2, 1664 | | ≤28 | <5.0<br>5.0 mg/L | | 78-114 | | 78-114 | | ≤18 | | ≤20 | | Not requested |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 1/08/2014 / I-5 Composite (K1400254)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 7 | ≤7 | <4.0<br>40 mg/L | NA | NA | 94 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 7 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 103 | ±15 | Batch 5 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 8 | ≤28 | <0.50<br>0.5 mg/L | 104 | ±25 | 90 | ±15 | <1 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 14 | ≤28 | <0.50<br>5 mg/L | 100 | ±25 | 98 | ±15 | 11 | ≤40 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 1 | ≤2 | <4<br>12 mg/L | NA | NA | 103 | ±15 | Batch <1 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 2 | ≤28 | <0.010<br>0.10 mg/L | Batch 110,101 | 60-135 | 101 | ±15 | Batch <1 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 1/08/2014 / I-5 Composite (K1400254)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 2 | ≤2 | <0.0100 / 0.01 mg/L | 102,104 | ±20 | 99 | ±10 | NC | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 20 | ≤28 | <0.20 / 0.4 mg/L | 102,91 | ±10 | 109 | ±10 | 9 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 2 | ≤28 | <0.050 / 0.05 mg/L | Batch 104,104 | ±10 | 99 | ±10 | Batch 2 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050 / 0.10mg/L | Batch 104-106 | ±10 | 106 | ±10 | Batch 1,<1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | 7 | ≤180 | <0.02-0.5 / 0.04-1.0 µg/L | Batch 105-111 | ±30 | 103-108 | ±15 | Batch 0-2.6 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 105-111 | ±30 | 103-108 | ±15 | Batch 0-2.6 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 11/4/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, PCBs, SVOCs, OC pesticides)

Checked: initials

Sample Date/Sample ID: 1/11/2014 18:51 / Harbor WR-306 (K1400344)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 6 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 93 | ±15 | Batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 5 | ≤28 | <0.5mg/L<br>0.5 mg/L | Batch 99,100 | 83-117 | 90,90 | 83-117 | 4 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 12 | ≤28 | <0.050<br>0.050 ug/L | NA | ±25 | 111,104 | ±15 | LCS 6 | ≤20 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 9 | ≤180 | <0.02-2<br>0.02-40 ug/L | Batch 102-112 | ±30 | 100-103 | ±25 | Batch 0-11 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 4 | ≤28 | <0.2<br>0.2 ug/L | Batch 100 | 71-125 | 101 | 77-123 | Batch NC | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 11/4/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, PCBs, SVOCs, OC pesticides)

Checked: initials

Sample Date/Sample ID: 1/11/2014 18:51 / Harbor WR-306 (K1400344)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 3 | ≤7 | <0.005-.010<br>0.005-0.010 µg/L | NA | 25-144 | 80-84 | 50-103 | LCS 3,0 | ≤30 | NS | ≤20 | OK | None. |
| PCBs, Congeners | EPA 1668C | 14 | ≤365 | various<br>19.6-196 pg/L | NA | NA | 87-111 | 60-135 | LCS <1-6 | ≤50 | NS | ≤20 | OK | MB contamination, all < MRL, no action. PCB-209 > MRL in MB; flag result for PCB-209 "J" due to MB |
| OC Pesticides | HRGC/MS/MS | 6 | ≤7 | <0.5-5.0<br>0.5-5.0 ng/L | NA | 24-123 | 80-105 | 50-120 | LCS 1-8 | ≤30 | NS | ≤20 | OK | None |
| SVOCs | EPA 8270D LL | 3 | ≤7 | <0.19-4.8<br>0.99-20 µg/L | Batch 74-156 | 32-130 | 35-99 | 10-124 | Batch 1-7 | ≤30 | NS | ≤20 | OK | Several MS/MSD %, high, no flag because batch sample and all other QC okay. |
| PAHs | | 3 | ≤7 | <0.020<br>0.02-0.099 ug/L | NA | 32-139 | 85-109 | 39-134 | LCS 0-5 | ≤30 | NS | ≤20 | OK | None. |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / PAL (herbicides)

Checked: initials

Sample Date/Sample ID: 1/28/2014 / I5 Grab, HWY 30 Grab (K1400860)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 1 day | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NA | ≤20 | OK | "J" results due to holding time |
| *E. coli* bacteria | MF/ SM 9222D | 1 day | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NA | ≤20 | OK | "J" results due to holding time |
| Phthalates | GC/MS / EPA 8270 SIM | 2 | ≤7 | <RL<br>0.2-1.0 µg/L | Batch 91-104 | 20-150 | 85-99 | 20-150 | Batch 1-3 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 2 | ≤7 | <1.00<br>1.0 µg/L | Batch 101,99 | 24 - 147 | 56,55 | 10-100 | Batch 2 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 2 | ≤7 | <0.020<br>0.020 µg/L | Batch 75-117 | 26-137 | 85-111 | 26-137 | Batch 0-9 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 6 | ≤7 | <0.06-10<br>0.06-10 µg/L | NA | Surr 22-111 | 83-136 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 1/28/2014 / I5 Grab, HWY 30 Grab (K1400860)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 3 | ≤7 | <0.02-0.04<br>0.020-0.056 µ/L | NA | ±50 | 66-94 | 50-103 | 11,9 | ≤30 | NS | ≤35 | OK | None |
| Chloride | IC / EPA 300.0 | 2 | ≤28 | <0.20<br>2-20 mg/L | Batch 106,104 | ±20 | 91 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 2 | ≤14 | < 250-490<br>2000 ug/L | NA | ±50 | 82,100 | ±50 | Batch NC,13 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 7 | ≤28 | <5.0<br>5.0 mg/L | NA | 78-114 | 88-96 | 78-114 | 3,3 | ≤18 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 10/31/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, PCBs, SVOCs, OC pesticides)

Checked: initials

Sample Date/Sample ID: 1/29/2014 07:20 / Harbor WR-306 (K1400855)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | EPA 160.3 | 6 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 93,100 | ±15 | Batch NC | ≤10 | NS | ≤20 | OK | None |
| TOC | SM 2540D | 7 | ≤28 | <0.5mg/L<br>0.5 mg/L | 100 | 83-117 | 96,96 | 83-117 | 6 | ≤20 | NS | ≤20 | OK | None |
| Tributyltin | Krone | 12 | ≤28 | <0.050<br>1 mg/L | NA | ±25 | 114,106 | ±15 | LCS 8 | ≤20 | NS | ≤20 | OK | None |
| Total and Dissolved Metals | EPA 200.8 | 8 | ≤180 | <0.02-2<br>0.02-40 ug/L | 92-100 | ±30 | 98-102 | ±25 | 0-1.5 | ≤20 | NS | ≤40 | OK | None |
| Total and Dissolved Mercury | EPA 7470A | 7 | ≤28 | <0.2<br>0.2 ug/L | 106 | 71-125 | 100 | 77-123 | NC | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: Portland Harbor/ ODOT Compliance Monitoring / 05-03287-004

Date: 10/31/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental (TSS, Metals, TOC, PCBs, SVOCs, OC pesticides)

Checked: initials

Sample Date/Sample ID: 1/29/2014 07:20 / Harbor WR-306 (K1400855)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs, Aroclors | EPA 8082 | 2 | ≤7 | <0.005-.010<br>0.005-0.010 µg/L | NA | 25-144 | 66-94 | 50-103 | LCS 11,9 | ≤30 | NS | ≤20 | OK | Flag Aroclor 1254 result "J" due to column RPD. |
| PCBs, Congeners | EPA 1668C | | ≤365 | various<br>19.6-196 pg/L | NA | NA | 90-115 | 60-135 | <1-14 | ≤50 | NS | ≤20 | OK | MB contamination, all < MRL, no action. |
| OC Pesticides | HRGC/MS/MS | 7 | ≤7 | <0.5-5.0<br>0.5-5.0 ng/L | NA | 24-123 | 92-104 | 50-120 | LCS 0-12 | ≤30 | NS | ≤20 | | None |
| SVOCs | EPA 8270D LL | 2 | ≤7 | <0.19-4.8<br>0.19-24 µg/L | Batch 49-135 | 32-130 | 25-108 | 10-124 | Batch 2-15 | ≤30 | NS | ≤20 | OK | MS %R for 2 compounds high, no flag because batch sample and MSD within control limits. RPD for LCS >305 for 3 compounds, no action because %R in control and compounds not detected in sample. |
| PAHs | | 2 | ≤7 | <0.020<br>0.02-0.038 ug/L | Batch 74-117 | 32-139 | 85-108 | 39-134 | Batch 0-7 | ≤30 | NS | ≤20 | OK | None. |

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 1/29/2014 / HWY 30 Comp (K1400877)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 6 | ≤7 | <4.0<br>5.0 mg/L | NA | NA | 93,100 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 7 | ≤180 | <4.0mg/L<br>20 mg/L | NA | ±25 | 104 | ±15 | Batch 2,<1 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 7 | ≤28 | <0.50<br>0.5 mg/L | 103 | ±25 | 96,96 | ±15 | 4 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 7 | ≤28 | <0.50<br>2.0 mg/L | 101 | ±25 | 96,96 | ±15 | 11 | ≤20 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 1 | ≤2 | <4<br>4.0 mg/L | NA | NA | 94 | ±15 | Batch 1,NC | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 2 | ≤28 | <0.010<br>0.01 mg/L | Batch 113,108 | 60-135 | 98 | ±15 | Batch 2 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 1/29/2014 / HWY 30 Comp (K1400877)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.010 / 0.01 mg/L | Batch 103,103 | ±20 | 102 | ±10 | Batch 17 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 1 | ≤28 | <0.20 / 0.4 mg/L | Batch 89,86 | 40-160 | 111 | ±10 | Batch 3 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 6 | ≤28 | <0.050 / 0.05 mg/L | 96,95 | ±10 | 95,95 | ±10 | 2 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | <1 | ≤2 | <0.050 / 0.1 mg/L | Batch 96,96 | ±10 | 92 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8 | 5.6 | ≤180 | <0.02-5 / 0.02-0.5 µg/L | 93-102 | ±30 | 100-106 | ±15 | 1.3-7.3 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 5,6 | ≤180 | <0.02-5 / 0.02-0.5 µg/L | 93-102 | ±30 | 100-106 | ±15 | 1.3-7.3 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 2/12/2014 / HWY 30 Comp (K1401401)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 7 | ≤7 | <4.0<br>6.7 mg/L | NA | NA | 97 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 15 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 101,102 | ±15 | 2 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 6 | ≤28 | <0.50<br>0.5 mg/L | 98 | ±25 | 96,96 | ±15 | 1 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 6 | ≤28 | <0.50<br>0.5 mg/L | 97,94 | ±25 | 95,94 | ±15 | 2 | ≤20 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 1 | ≤2 | <4<br>4.0 mg/L | NA | NA | 86 | ±15 | Batch 2 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 6 | ≤28 | <0.010<br>0.01 mg/L | Batch 108,106 | 60-135 | 101 | ±15 | Batch NC | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 2/12/2014 / HWY 30 Comp (K1401401)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.010 / 0.01 mg/L | Batch 105,105 | ±20 | 105 | ±10 | Batch 3 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 14 | ≤28 | <0.20 / 0.4 mg/L | Batch 89,94 | 40-160 | 101 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 9 | ≤28 | <0.050 / 0.05 mg/L | Batch 99-101 | ±10 | 109 | ±10 | Batch NC,NC | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050 / 0.1 mg/L | Batch 94-98 | ±10 | 94 | ±10 | Batch 1,1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8 | 9 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 92-114 | ±30 | 92-98 | ±15 | Batch 0-2.9 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 9 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 92-114 | ±30 | 92-98 | ±15 | Batch 0-2.9 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 2/14/2014 / HWY 30 Comp (K1401484)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 6 | ≤7 | <4.0<br>6.7 mg/L | NA | NA | 96 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 13 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 101,102 | ±15 | Batch NC-5 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 4 | ≤28 | <0.50<br>0.5 mg/L | 98 | ±25 | 96,96 | ±15 | 7 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 4 | ≤28 | <0.50<br>0.5 mg/L | Batch 97,94 | ±25 | 95,94 | ±15 | 4 | ≤20 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | <1 | ≤2 | <4<br>4.0 mg/L | NA | NA | 99 | ±15 | Batch NC,1 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 4 | ≤28 | <0.010<br>0.01 mg/L | Batch 93,91 | 60-135 | 99 | ±15 | Batch 9 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 2/14/2014 / HWY 30 Comp (K1401484)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.010 / 0.01 mg/L | Batch 97,99 | ±20 | 97 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 12 | ≤28 | <0.20 / 0.4 mg/L | Batch 89,94 | 40-160 | 101 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 7 | ≤28 | <0.050 / 0.05 mg/L | Batch 98,100 | ±10 | 99 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | <1 | ≤2 | <0.050 / 0.1 mg/L | Batch 107,108 | ±10 | 94 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8 | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 92-114 | ±30 | 92-98 | ±15 | Batch 0-2.9 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 92-114 | ±30 | 92-98 | ±15 | Batch 0-2.9 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 2/14/2014 / I-5 Composite (K1401483)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 6 | ≤7 | <4.0<br>40 mg/L | NA | NA | 96 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 13 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 101,102 | ±15 | Batch NC-5 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 4 | ≤28 | <0.50<br>0.5 mg/L | 99 | ±25 | 96,96 | ±15 | 5 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 4 | ≤28 | <0.50<br>0.5 mg/L | Batch 100,94 | ±25 | 95,94 | ±15 | <1 | ≤40 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | <1 | ≤2 | <4<br>12 mg/L | NA | NA | 99 | ±15 | Batch <1 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 6 | ≤28 | <0.010<br>0.10 mg/L | Batch 93,91 | 60-135 | 99 | ±15 | Batch 9 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 2/14/2014 / I-5 Composite (K1401483)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.0100 / 0.01 mg/L | 97,99 | ±20 | 97 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 12 | ≤28 | <0.20 / 0.4 mg/L | Batch 89,94 | ±10 | 101 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 7 | ≤28 | <0.050 / 0.05 mg/L | Batch 99-101 | ±10 | 99 | ±10 | Batch NC,NC | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | <1 | ≤2 | <0.050 / 0.10mg/L | Batch 107,108 | ±10 | 94 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 92-114 | ±30 | 92-99 | ±15 | Batch 0-2.9 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 10 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 92-114 | ±30 | 92-99 | ±15 | Batch 0-2.9 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / PAL (herbicides)

Checked: initials

Sample Date/Sample ID: 2/17/2014 / I5 Grab, HWY 30 Grab (K1401520)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 5 hours | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NA | ≤20 | OK | None |
| *E. coli* bacteria | MF/ SM 9222D | 5 hours | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NA | ≤20 | OK | None |
| Phthalates | GC/MS / EPA 8270 SIM | 3 | ≤7 | <RL<br>1.0-5.0 µg/L | NA | 20-150 | 86-96 | 20-150 | 0-4 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 3 | ≤7 | <1.00<br>5.0 µg/L | NA | 24 - 147 | 96,90 | 10-100 | 6 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 1 | ≤7 | <0.020<br>0.020 µg/L | NA | 26-137 | 76-106 | 26-137 | 0-4 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 4 | ≤7 | <0.06-10<br>0.06-10 µg/L | NA | Surr 22-111 | 55-108 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 2/17/2014 / I5 Grab, HWY 30 Grab (K1401520)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 3 | ≤7 | <0.02-0.04<br>0.020-0.04 µ/L | Batch 63-76 | ±50 | 70,70 | 50-103 | Batch 0,8 | ≤30 | NS | ≤35 | OK | None |
| Chloride | IC / EPA 300.0 | 2 | ≤28 | <0.20<br>1 mg/L | 100,101 | ±20 | 90 | ±10 | <1 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 9 | ≤14 | < 98-490<br>98-490 ug/L | NA | ±50 | 84-111 | ±50 | Batch 9,9 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 16 | ≤28 | <5.0<br>5.0 mg/L | Batch 98 | 78-114 | 85-101 | 78-114 | 2,10 | ≤18 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 2/18/2014 / HWY 30 Grab (K1401573)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 6.5 | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | None |
| *E. coli* bacteria | MF/ SM 9222D | 6.5 | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | None |
| Phthalates | GC/MS / EPA 8270 SIM | 2 | ≤7 | <RL<br>0.2-1.0 µg/L | NA | 20-150 | 86-96 | 20-150 | 0-4 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 2 | ≤7 | <1.00<br>1.0 µg/L | NA | 24 - 147 | 96,90 | 10-100 | 6 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 2 | ≤7 | <0.020<br>0.020 µg/L | NA | 26-137 | 77-101 | 26-137 | 0-8 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 3 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 55-108 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 2/18/2014 / HWY 30 Grab (K1401573)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 2 | ≤7 | <0.02-0.04 / 0.02-0.04 µ/L | Batch 63-76 | ±50 | 70,70 | 50-103 | Batch 0,8 | ≤30 | NS | ≤35 | OK | None |
| Chlorides | IC / EPA 300.0 | 2 | ≤28 | <0.20 / 1.0 mg/L | Batch 93,93 | ±20 | 90 | ±10 | Batch <1 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 5 | ≤14 | < 98-490 / 98-490 ug/L | NA | ±50 | 84-111 | ±50 | 9,9 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 14 | ≤28 | <5.0 / 5.0 mg/L | Batch 98 | 78-114 | 85-101 | 78-114 | 2,10 | ≤18 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
NA – not applicable or not available
NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 2/18/2014 / I-5 Composite (K1401655)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 7 | ≤7 | <4.0<br>10 mg/L | NA | NA | 93 | ±10 | Batch NC,<1 | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 9 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 101,102 | ±15 | Batch NC-5 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 9 | ≤28 | <0.50<br>0.5 mg/L | 101 | ±25 | 96 | ±15 | 2 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 9 | ≤28 | <0.50<br>0.5 mg/L | 101 | ±25 | 96 | ±15 | 3 | ≤40 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 1 | ≤2 | <4<br>4.0 mg/L | NA | NA | 108 | ±15 | Batch 3,3 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 3 | ≤28 | <0.010<br>0.10 mg/L | Batch 92,85 | 60-135 | 103 | ±15 | Batch 2 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, hardness, DOC, TOC, BOD, TP, TKN, Ammonia, Metals.

Checked: initials

Sample Date/Sample ID: 2/18/2014 / I-5 Composite (K1401655)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 2 | ≤2 | <0.0100 / 0.01 mg/L | 101,102 | ±20 | 102 | ±10 | NC | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 8 | ≤28 | <0.20 / 0.4 mg/L | Batch 89,94 | ±10 | 101 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 3 | ≤28 | <0.050 / 0.05 mg/L | Batch 98,100 | ±10 | 99 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050 / 0.10mg/L | Batch 93,93 | ±10 | 94 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8/7470 | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 91-93 | ±30 | 95-100 | ±15 | Batch 0-7.1 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 91-93 | ±30 | 95-100 | ±15 | Batch 0-7.1 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 2/4/2015 Page 1 of 2

Laboratory/Parameters: ALS / grain size, TOC, phenolics, metals, PAHs, herbicides (PAL), TPH, phthalates

Checked: initials

Sample Date/Sample ID: 2/28/2014 / I-5 Fremont East Sediment (K1402061)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Grain size | ASTM D422 | 13 | ≤180 | NA<br>NA | NA | NA | NA | NA | OK | ≤20 | NS | ≤20 | OK | None |
| TOC | Combustion / EPA 9060 | 13 | ≤28 | <0.050<br>0.050 % | Batch 98,98 | 76-128 | 99 | 34-166 | Batch <1 | ≤40 | NS | ≤40 | OK | None |
| Metals | ICP-MS / EPA 6020 | 18 | ≤180 | <0.02-0.5<br>0.015-0.4 mg/kg | Batch 89-106 | ±25 | 93-111 | ±20 | Batch 5.1-7.0 | ≤40 | NS | ≤35 | OK | Cu in MB = 0.15; result >10x MB, no flag. |
| PAHs | GC/MS / EPA 8270SIM | 4 | ≤14 | <5.0<br>180 mg/kg | Batch 37,69 | 39-138 | OK | 39-138 | Batch 38,39 | ≤40 | NS | ≤50 | OK | SIM not used – elevated RLs. |
| Phthalates | GC/MS / EPA 8270SIM | 4 | ≤14 | <10<br>180 mg/kg | Batch 25,45 | 10-150 | OK* | 20-150 | Batch 56 | ≤40 | NS | ≤50 | OK | SIM not used – elevated RLs. No flag for dup RPD – batch sample. Di-ethyl phthalate high in LCAD, sample ND so no flag. |
| Phenolics | Spectrophotometric / EPA 9065 | 13 | ≤28 | <0.20<br>0.28 mg/kg | 90,91 | ±30 | 97,96 | ±20 | 16 | ≤23 | NS | ≤50 | OK | None |

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 2/4/2015 Page 2 of 2

Laboratory/Parameters: ALS / grain size, TOC, phenolics, metals, PAHs, herbicides (PAL), TPH, phthalates

Checked: initials

Sample Date/Sample ID: 2/28/2014 / I-5 Fremont East Sediment (K1402061)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 11,12 | ≤14 | <0.0067-0.2<br>0.0067-0.2 mg/kg | 6-121 | 0-190 | 89,81 | 38-128 | NA | NA | NS | ≤50 | OK | MS %R low for oryzalin, sulfometuron methyl, and pentachlorophenol. "J" results due to low MS recovery. |
| TPH | GC/FID / NWTPH-Dx | 11 | ≤14 | <25-99<br>1800-7100 mg/kg | NA | ±25 | 91,99 | ±50 | Batch NC,10 | ≤40 | NS | ≤50 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 3/2/2014 / HWY 30 Grab (K1402063)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | | ≤20 | | Not requested |
| *E. coli* bacteria | MF/ SM 9222D | | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NS | ≤20 | OK | Not requested |
| Phthalates | GC/MS / EPA 8270 SIM | 9 | ≤7 | <RL<br>0.2-1.0 µg/L | NA | 20-150 | 77-90 | 20-150 | 4-9 | ≤35 | NS | ≤35 | OK | None |
| PCP | GC/MS / EPA 8270 SIM | 9 | ≤7 | <1.00<br>1.0 µg/L | NA | 24 - 147 | 67,74 | 10-100 | 9 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 3 | ≤7 | <0.020<br>0.020 µg/L | Batch 89-123 | 26-137 | 94-126 | 26-137 | Batch 1-11 | ≤35 | NS | ≤35 | OK | Some %R high, associated sample results ND, no flag. |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 4 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 54-120 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 3/2/2014 / HWY 30 Grab (K1402063)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 2 | ≤7 | <0.02-0.04 / 0.02-0.04 µ/L | NA | ±50 | 71-90 | 50-103 | 2,1 | ≤30 | NS | ≤35 | OK | None |
| Chlorides | IC / EPA 300.0 | 2 | ≤28 | <0.20 / 0.4 mg/L | Batch 96,97 | ±20 | 98 | ±10 | Batch <1,7 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 4 | ≤14 | < 96-480 / 96-480 ug/L | NA | ±50 | 69-88 | ±50 | Batch 12,8 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 18 | ≤28 | <5.0 / 5.0 mg/L | Batch 98 | 78-114 | 95,92 | 78-114 | 3 | ≤18 | NS | ≤20 | OK | None |

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NA – not applicable or not available
NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 3/03/2014 / HWY 30 Comp (K1402110)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 3 | ≤7 | <5.0<br>10 mg/L | NA | NA | 90 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 3 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 103 | ±15 | 5 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.2 | 2 | ≤28 | <0.50<br>0.5 mg/L | 102 | ±25 | 94 | ±15 | 3 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 2 | ≤28 | <0.50<br>0.5 mg/L | 102 | ±25 | 97 | ±15 | 3 | ≤20 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 2 | ≤2 | <4<br>4.0 mg/L | NA | NA | 87 | ±15 | Batch <1,1 | ≤35 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 2 | ≤28 | <0.010<br>0.01 mg/L | Batch 110,103 | 60-135 | 101 | ±15 | Batch 7 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / TSS, DOC, Hardness, TOC, BOD, TP, TKN, Ammonia, Metals

Checked: initials

Sample Date/Sample ID: 3/03/2014 / HWY 30 Comp (K1402110)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks / Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 1 | ≤2 | <0.010 / 0.01 mg/L | 106,107 | ±20 | 102 | ±10 | 4 | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 9 | ≤28 | <0.20 / 0.4 mg/L | Batch 90,85 | 40-160 | 98 | ±10 | Batch NC,6 | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 17 | ≤28 | <0.050 / 0.05 mg/L | Batch 102,103 | ±10 | 100 | ±10 | Batch 1 | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.050 / 0.1 mg/L | Batch 98,97 | ±10 | 94 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8 | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 97-107 | ±30 | 105-109 | ±15 | Batch 0-0.5 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 7 | ≤180 | <0.02-0.5 / 0.02-0.5 µg/L | Batch 97-107 | ±30 | 105-109 | ±15 | Batch 0-0.5 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 1 of 2

Laboratory/Parameters: ALS Environmental / PAL (herbicides)

Checked: initials

Sample Date/Sample ID: 3/25/2014 / I5 Grab (K1402926)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Fecal Coliform | MPN / SM 9223B | 7 hours | ≤6 hours | <2.0<br>1.8 MPN | NA | NA | NA | NA | NA | ≤20 | NA | ≤20 | OK | None |
| *E. coli* bacteria | MF/ SM 9222D | 7 hours | ≤6 hours | <1.0<br>1 MPN | NA | NA | NA | NA | NA | ≤20 | NA | ≤20 | OK | None |
| Phthalates | GC/MS / EPA 8270 SIM | 6 | ≤7 | <RL<br>1.4-5.0 µg/L | Batch 102-136 | 20-150 | 81-87 | 20-150 | Batch 3-5 | ≤35 | NS | ≤35 | OK | %R high, associated sample result ND, no flag. |
| PCP | GC/MS / EPA 8270 SIM | 6 | ≤7 | <1.00<br>5.0 µg/L | Batch 116,111 | 24 - 147 | 84,85 | 10-100 | 5 | ≤35 | NS | ≤35 | OK | None |
| PAHs | GC/MS / EPA 8270-SIM | 6 | ≤7 | <0.020<br>0.020 µg/L | Batch 80-105 | 26-137 | 68-96 | 26-137 | Batch 0-8 | ≤35 | NS | ≤35 | OK | None |
| Herbicides | HPLC/MS / EPA 8321B / 8270D, Dupont, and Dow methods | 7 | ≤7 | <0.008-10<br>0.008-10 µg/L | NA | Surr 22-111 | 43-110 | 40-151 | NA | ≤20 | NS | ≤35 | NA | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

HERRERA
ENVIRONMENTAL
CONSULTANTS

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 11/24/2014 Page 2 of 2

Laboratory/Parameters: ALS Environmental / Pacific Agricultural Laboratory (herbicides)

Checked: initials

Sample Date/Sample ID: 3/25/2014 / I5 Grab (K1402926)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| PCBs | GC/ECD / EPA 8082 | 6 | ≤7 | <0.02-0.04<br>0.020-0.04 µ/L | Batch 63-76 | ±50 | 67-84 | 50-103 | 9,7 | ≤30 | NS | ≤35 | OK | None |
| Chloride | IC / EPA 300.0 | 3 | ≤28 | <0.20<br>1 mg/L | 100,101 | ±20 | 99 | ±10 | 2 | ≤20 | NS | ≤20 | OK | None |
| TPH | GC/FID / NWTPH-Dx | 2 | ≤14 | < 38-95<br>410-1100 ug/L | NA | ±50 | 106,122 | ±50 | Batch 8.0 | ≤35 | NS | ≤35 | OK | None |
| Oil&Grease | IS / EPA 413.2, 1664 | 8 | ≤28 | <5.0<br>5.7 mg/L | Batch 94,91 | 78-114 | 86-99 | 78-114 | 3,5 | ≤18 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

Date: 1/29/2015 Page 1 of 2

Laboratory/Parameters: ALS / TP, OP, metals, TKN, ammonia, hardness, TOC, DOC, TSS, nitrate, BOD

Checked: initials

Sample Date/Sample ID: 3/25/2014 / Wemme Comp, I-5 Comp (K1403016)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| TSS | Gravimetric / EPA 160.2 | 7 | ≤7 | <5.0<br>5.0 mg/L | NA | NA | 96 | ±15 | Batch 6,NC | ≤20 | NS | ≤20 | OK | None |
| Hardness | Calculation / SM18 2340C | 10 | ≤180 | <2.0mg/L<br>2.0 mg/L | NA | ±25 | 104 | 90-116 | Batch <1,10 | ≤20 | NS | ≤20 | OK | None |
| DOC | UV Promoted, Persulfate Oxidation / EPA 415.1 | 16 | ≤28 | <0.50<br>0.50 mg/L | Wemme 96 | 83-117 | 92,92 | 83-117 | Wemme <1 | ≤20 | NS | ≤20 | OK | None |
| TOC | | 16 | ≤28 | <0.50<br>0.50 mg/L | Wemme 98 | 83-117 | 92 | 83-117 | Wemme <1<br>I-5 3 | ≤20 | NS | ≤40 | OK | None |
| $BOD_5$ | Dissolved Oxygen Depletion / SM 5210B | 2 | ≤2 | <2.0<br>4.0 mg/L | NA | NA | 105 | ±15 | Batch 2,NC | ≤20 | NS | ≤35 | OK | None |
| Total P | Colorimetric / EPA 365.1 | 2 | ≤28 | <0.010<br>0.010 mg/L | Batch 62,70 | 60-135 | 99 | ±15 | Batch <1 | ≤20 | NS | ≤20 | OK | None |

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NA – not applicable or not available NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# Data Quality Assurance Worksheet

HERRERA ENVIRONMENTAL CONSULTANTS

By: Gina Catarra

Project Name/No./Client: ODOT 5-YR Highway Runoff Compliance Monitoring 2011-2015 / 05-03287-004

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Laboratory/Parameters: ALS / TP, OP, metals, TKN, ammonia, hardness, TOC, DOC, TSS, nitrate, BOD

Checked: initials

Sample Date/Sample ID: 3/25/2014 / Wemme Comp, I-5 Comp (K1403016)

date

| Parameter | Completeness/ Methodology | Total Holding Times (Days) | | Method Blanks Reporting Limit | Matrix Spikes Recovery (%) | | Lab Control Samples Recovery (%) | | Lab Duplicates RPD (%) | | Field Duplicates RPD (%) | | Instrument Calibration/ Performance | ACTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported | Goal | | Reported | Goal | Reported | Goal | Reported | Goal[1] | Reported | Goal[1] | | |
| Ortho-phosphate | Colorimetric / EPA 365.1 | 2 | ≤2 | <0.010<br>0.010 mg/L | Wemme 109,106 | 60-130 | 98 | ±10 | Wemme NC | ≤20 | NS | ≤20 | OK | None |
| TKN | Colorimetric / EPA 351.2 | 17 | ≤28 | 0.20<br>0.4 mg/L | Batch 78,83 | ±60 | 95 | ±25 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Ammonia nitrogen | Colorimetric / EPA 350.1 | 16 | ≤28 | <0.050<br>0.050 mg/L | Batch 105,103 | ±10 | 106 | ±10 | Batch NC | ≤20 | NS | ≤20 | OK | None |
| Nitrate | IC / EPA 300.0 | 1 | ≤2 | <0.05<br>0.10 mg/L | Batch 104,103 | ±10 | 94 | ±10 | Batch 1 | ≤20 | NS | ≤20 | OK | None |
| Total metals | ICP-MS / EPA 200.8 | 9 | ≤180 | <0.02-0.5<br>0.02-0.5µg/L | Batch 97-108 | ±30 | 105-109 | ±15 | Batch 0-15 | ≤20 | NS | ≤20 | OK | None |
| Dissolved metals | | 9 | ≤180 | <0.02-0.5<br>0.02-0.5µg/L | Batch 97-108 | ±30 | 105-109 | ±15 | Batch 0-15 | ≤20 | NS | ≤20 | OK | None |

[1] If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available

NC – not calculable due to one or more values below the detection limit

NS – field duplicate not sampled.

# ATTACHMENT C

# Laboratory Reports