Prather Spring Site Investigation Phase 1 - Interim Progress Meeting

COGCC and Joint Companies

September 29, 2008

Prepared for:

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Prepared by:

URS

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Overview of Phase I Investigation Activities

- Objectives - find source(s) of impacts to Prather Spring and Spring 2
  - Release to groundwater implied from wellpad operations or reserve pits
  - Companies response included alternative water supply, fencing, surface water monitoring
- 1st Round of Drilling (July, in Prather drainage)
  - 5 shallow colluvial wells, 1 deep (50') bedrock well
  - Wells completed in colluvium only are dry
  - Only BTEX detect was in 11D
  - Spring 2 became impacted following first investigation
  - Interim investigation report submitted to COGCC in August

Overview of Phase I Investigation Activities

- Phase I Investigation activities (continued)
  - 2nd Round of Drilling (Aug and Sept)
    - Focused on bedrock zone
    - Prather drainage
      - 6 deep bedrock wells
      - 6 shallow bedrock wells (completed across colluvium)
    - Spring 2
      - 4 shallow wells, penetrated upper bedrock
      - 3 deep wells, completed in deeper bedrock
    - Groundwater sample analyses included VOCs, major ions, and trace metals

Overview of Phase I Investigation Activities

- Laboratories used include:
  - Evergreen, majority of samples collected
  - Chem Solutions, Field lab for 2nd round of drilling
  - Paragon (24-hr TAT for VOCs)
- Surveying (3 rounds with WHS, 2 rounds URS)
- Compilation of data from all parties into Access database
  - Reconciliation of sample location Ids
  - Electronic submittal of validated data to COGCC
- Vegetation Survey - August

Overview – Preliminary Findings

- Understanding of site geology
- Definition of two groundwater flow zones
  - Upper and lower bedrock, fracture-dominated flow
- Definition of background water quality
  - Surface water
  - Groundwater flow zones
- Different sources of impacts interpreted for Prather Spring and Spring 2
- Wells installed to date do not identify sources of hydrocarbons to groundwater
- Additional wells proposed

Overview - Proposed Activities

- Proposed Additional Phase I Investigation Activities
  - Install additional S/M-zone wells in both drainages
    - Refined depth interval, fill-in flow lines to identify plumes
  - Soil gas survey at two condensate tanks and potentially along pipeline corridor
  - Reduce frequency of surface water and ground water sample collection
    - Baseline has been established
    - Absence of hydrocarbons in majority of surface water and groundwater locations

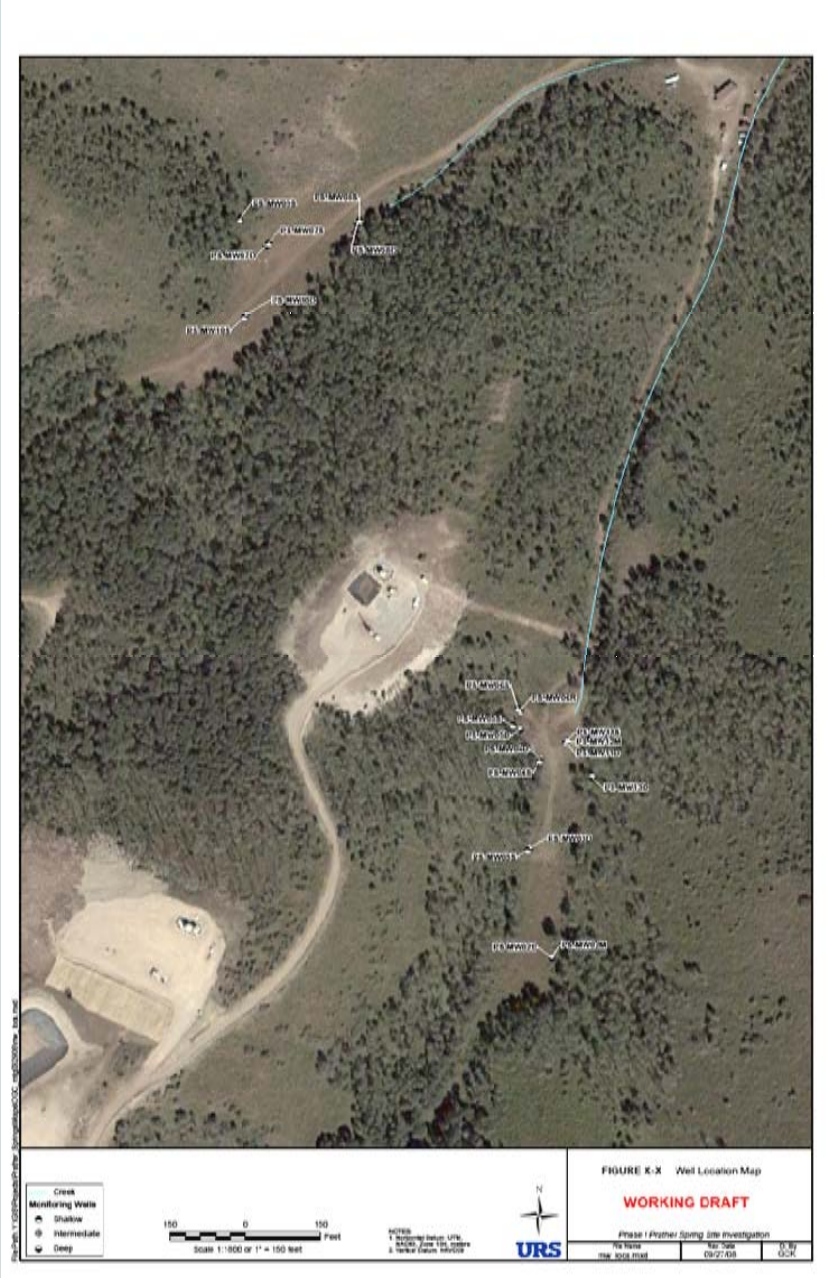
Interim Technical Summary

Preliminary Findings - Geology

- Geologic Conditions
  - Uinta Formation
    - Siltstone and sandstone
    - Present at top of watershed (well pads)
  - Green River Formation
    - Shale, marlstone, oil shale, carbonate rich zones
    - Encountered at all wells in valleys
  - Colluvium in valley and on slopes
    - Sandy clay matrix with shale and siltstone clasts
    - Encountered at all wells

Monitoring well locations

- Prather Spring drainage
- Spring 2 drainage



Preliminary Findings - Geology

- Geologic Conditions
  - Well total depth
    - Prather Drainage – 15 to 61 feet
    - Spring 2 – 18 to 49 feet
  - Well screen length – 5 to 20 feet
  - Depth to bedrock (colluvium thickness)
    - Prather Drainage – 6 to 22 feet
    - Spring 2 – 12 to 18 feet

Monitoring Well	Site	Flow Regime	MW Elevation (Feet)	Borehole Depth		Top of Bedrock		Bedrock Penetration (ft)	Screened Interval	
			Ground Surface	Total Depth (ft)	Elevation (ft)	Depth (ft)	Elevation (ft)		Depth to Top (ft)	Depth to Bottom (ft)
PS-MW02D	PS	D	8293.90	54.0	8239.90	11.0	8282.9	43.0	34.0	54.0
PS-MW02S	PS	M	8293.90	20.0	8273.90	11.0	8282.9	9.0	10.0	20.0
PS-MW03D	PS	D	8270.61	61.0	8209.61	22.0	8248.6	39.0	51.0	61.0
PS-MW03S	PS	M	8271.12	29.0	8242.12	22.0	8249.1	7.0	8.6	28.6
PS-MW04D	PS	D	8259.69	62.0	8197.69	17.5	8242.2	44.5	41.1	61.1
PS-MW04S	PS	C	8260.05	18.0	8242.05	17.5	8242.6	0.5	8.0	18.0
PS-MW05D	PS	D	8259.74	61.0	8198.74	13.0	8246.7	48.0	51.0	61.0
PS-MW05S	PS	C	8261.23	15.0	8246.23	13.0	8248.2	2.0	8.6	13.6
PS-MW06R	PS	M	8259.58	21.0	8238.58	15.7	8243.9	5.3	6.0	21.0
PS-MW06S	PS	C	8260.20	17.0	8243.20	15.7	8244.5	1.3	7.0	17.0
PS-MW11D	PS	D	8258.80	49.0	8209.80	18.5	8240.3	30.5	39.0	48.6
PS-MW11S	PS	C	8260.00	19.0	8241.00	18.5	8241.5	0.5	9.0	19.0
PS-MW12M	PS	M	8258.31	29.0	8229.31	18.5	8239.8	10.5	24.0	29.0
PS-MW13D	PS	D	8278.00	54.0	8224.00	6.0	8272.0	48.0	35.0	55.0
PS-MW07D	S2	D	8236.42	44.0	8192.42	16.5	8219.9	27.5	34.0	44.0
PS-MW07S	S2	M	8236.17	19.0	8217.17	16.5	8219.7	2.5	9.0	19.0
PS-MW08D	S2	D	8227.65	39.0	8188.65	12.0	8215.7	27.0	24.0	39.0
PS-MW08S	S2	M	8227.11	18.0	8209.11	12.0	8215.1	6.0	8.0	18.0
PS-MW09S	S2	M	8243.79	21.0	8222.79	17.7	8226.1	3.3	11.0	21.0
PS-MW10S	S2	M	8240.73	18.0	8222.73	14.0	8226.7	4.0	8.4	18.4

Preliminary Findings - Geology

- Geologic Conditions
  - Fractures prevalent in upper 10 feet of bedrock
  - Bedrock becomes more competent with depth
    - Review of core

PSMW3D

- 24’ to 34.5’
- Highly fractured core interval

PSMW3D

- 24’ to 34.5’ close-up

PSMW3D

- 55.5’ to 60’

PSMW3D

- 55.5’ to 60’
- Bedding plane fractures
- Carbonaceous seam

PSMW4D

- Photo of uppermost cored interval
- Note cores on left side of box
- This section is fractured, and shows oxidation surfaces on fractures, and mud/gravel filled fracture apertures
- More competent bedrock is below this on right side of box (light color)

PSMW4D

- Close up of same box
- Note fractured rock with mud and clast-filled apertures (3/8”)
- The aperture is the space between the fracture surfaces
- 30-degree fracture angles are common
- Oxidation surfaces are yellow/orange/reddish brown colored (rust)

PSMW4D

- 19.5’ to 29.5’
- Fracture dip approx 30-40 degrees
- Close-up of mud and clast-filled fracture apertures

PSMW4D

- 29.5’ to 39.5’
- Competent rock, few fractures

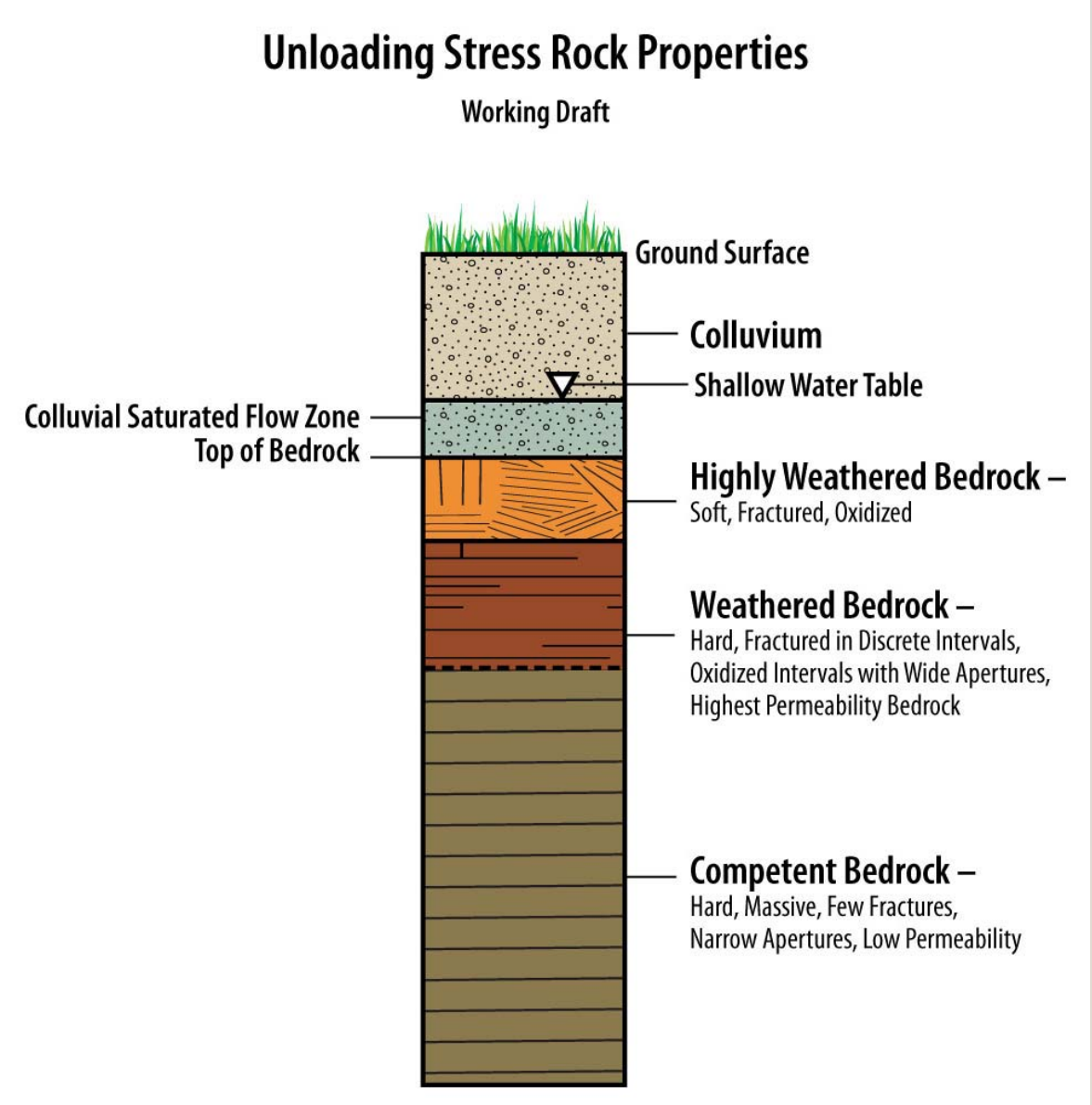
PSMW7D

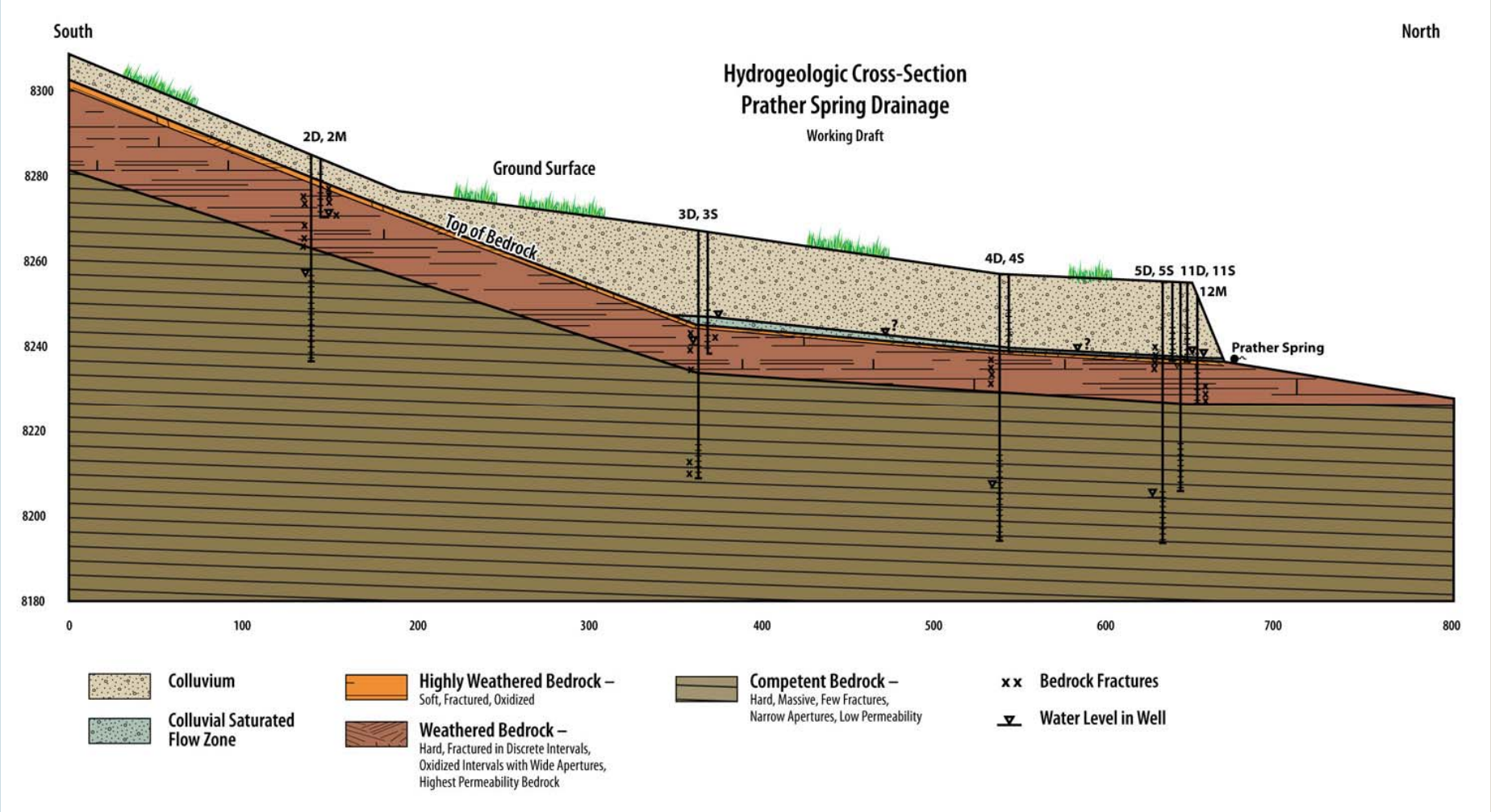
- 19’ to 29’
- Fractured from 19’ to 23’
- Carbon seam at 22’

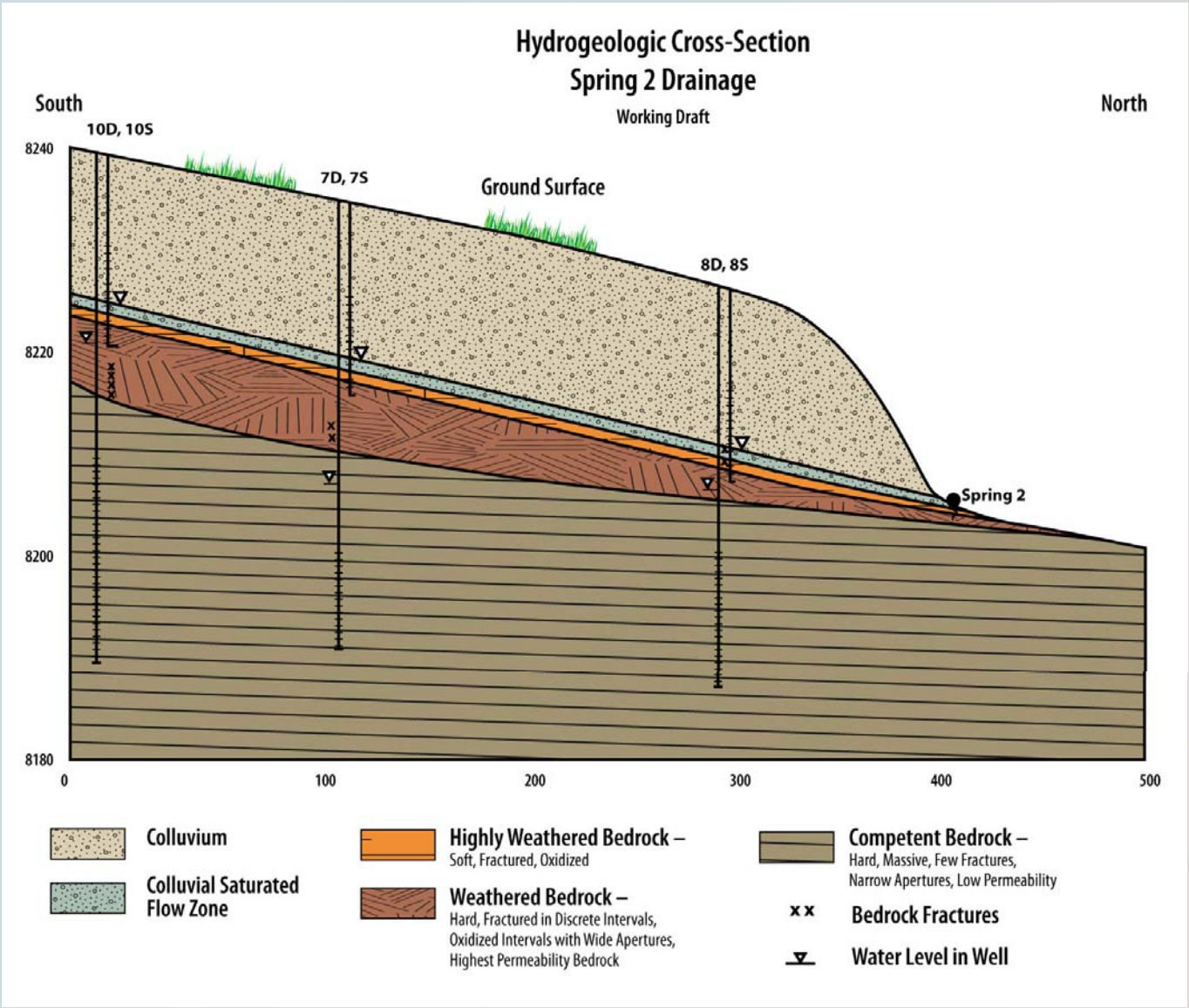
PSMW10D

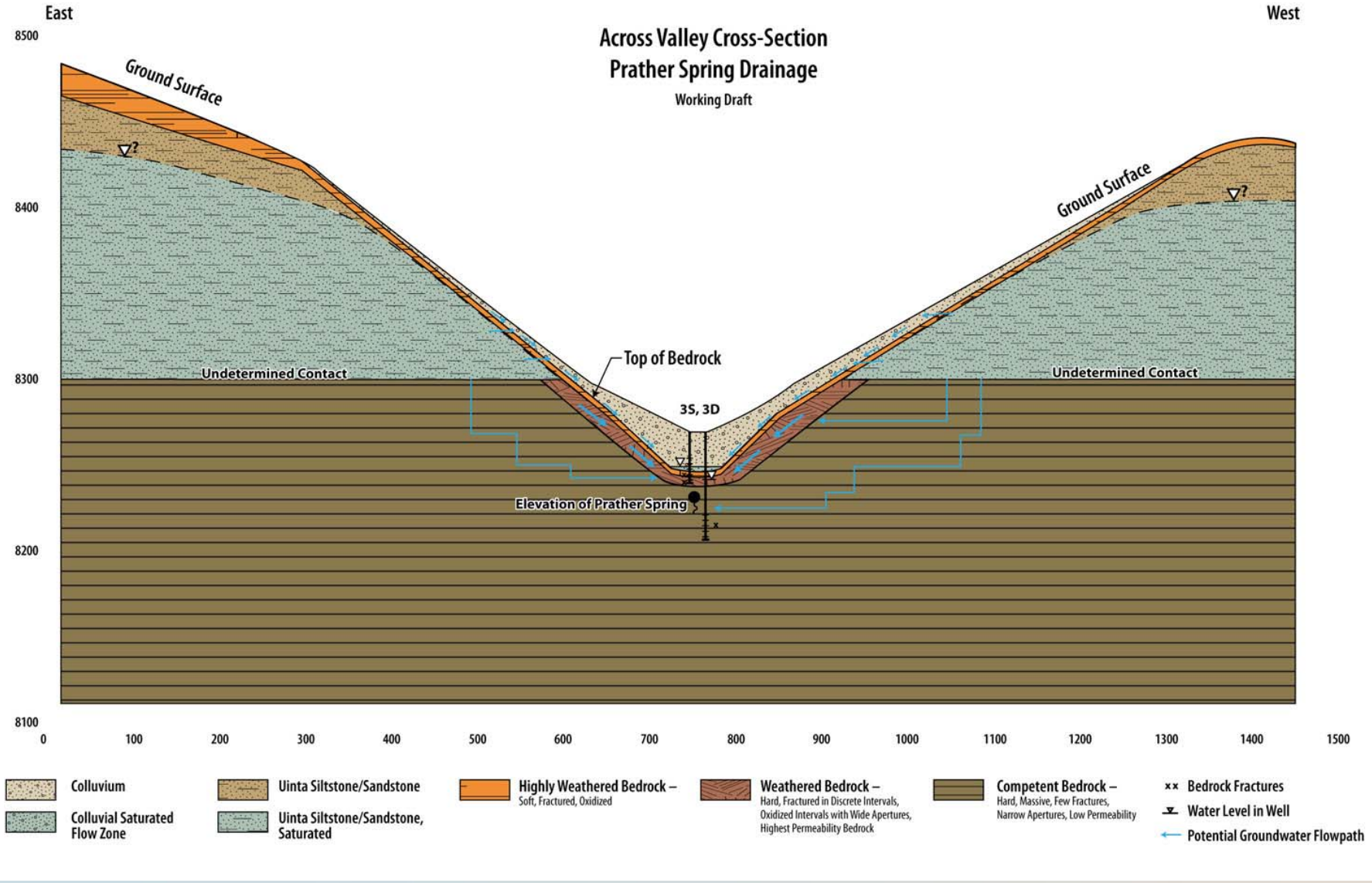
- 20’ to 30’
- Highly fractured from 20’ to 23’
- Carbon seam at 28’

- One explanation for observed fracture pattern variations with depth




South
North
Hydrogeologic Cross-Section
Prather Spring Drainage
Working Draft
8300
8280
8260
8240
8220
8200
8180
0
100
200
300
400
500
600
700
800
2D, 2M
Ground Surface
Top of Bedrock
3D, 3S
4D, 4S
5D, 5S
11D, 11S
12M
Prather Spring
Colluvium
Colluvial Saturated Flow Zone
Highly Weathered Bedrock – Soft, Fractured, Oxidized
Weathered Bedrock – Hard, Fractured in Discrete Intervals, Oxidized Intervals with Wide Apertures, Highest Permeability Bedrock
Competent Bedrock – Hard, Massive, Few Fractures, Narrow Apertures, Low Permeability
Bedrock Fractures
Water Level in Well

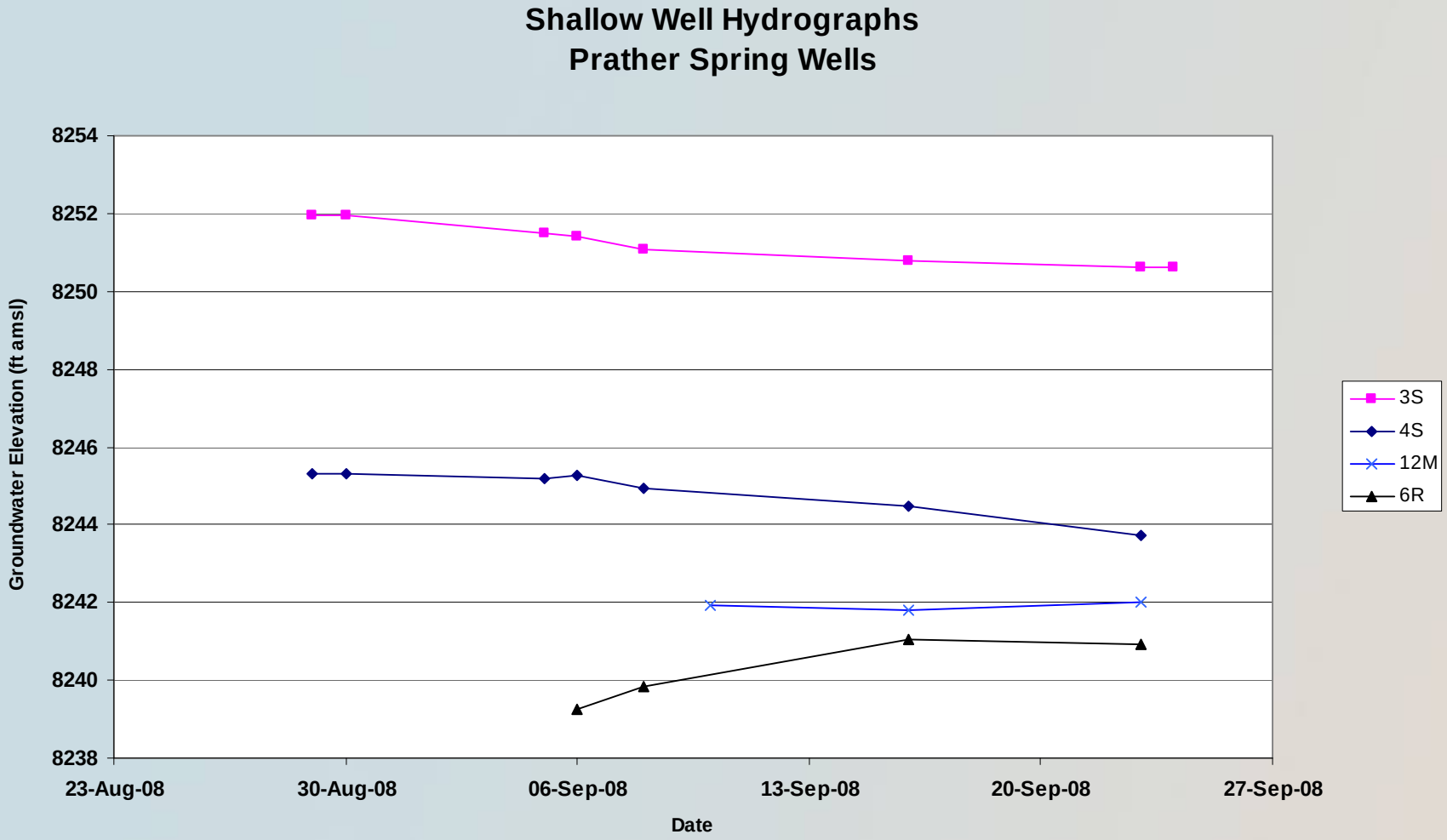

Hydrogeologic Cross-Section
Spring 2 Drainage
Working Draft
South
North
10D, 10S
7D, 7S
Ground Surface
8D, 8S
Spring 2
8240
8220
8200
8180
0
100
200
300
400
500
Colluvium
Colluvial Saturated Flow Zone
Highly Weathered Bedrock – Soft, Fractured, Oxidized
Weathered Bedrock – Hard, Fractured in Discrete Intervals, Oxidized Intervals with Wide Apertures, Highest Permeability Bedrock
Competent Bedrock – Hard, Massive, Few Fractures, Narrow Apertures, Low Permeability
Bedrock Fractures
Water Level in Well


East
West
Across Valley Cross-Section
Prather Spring Drainage
Working Draft
8500
8400
8300
8200
8100
Ground Surface
Ground Surface
Undetermined Contact
Undetermined Contact
Top of Bedrock
3S, 3D
Elevation of Prather Spring
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
Colluvium
Colluvial Saturated Flow Zone
Uinta Siltstone/Sandstone
Uinta Siltstone/Sandstone, Saturated
Highly Weathered Bedrock – Soft, Fractured, Oxidized
Weathered Bedrock – Hard, Fractured in Discrete Intervals, Oxidized Intervals with Wide Apertures, Highest Permeability Bedrock
Competent Bedrock – Hard, Massive, Few Fractures, Narrow Apertures, Low Permeability
Bedrock Fractures
Water Level in Well
Potential Groundwater Flowpath

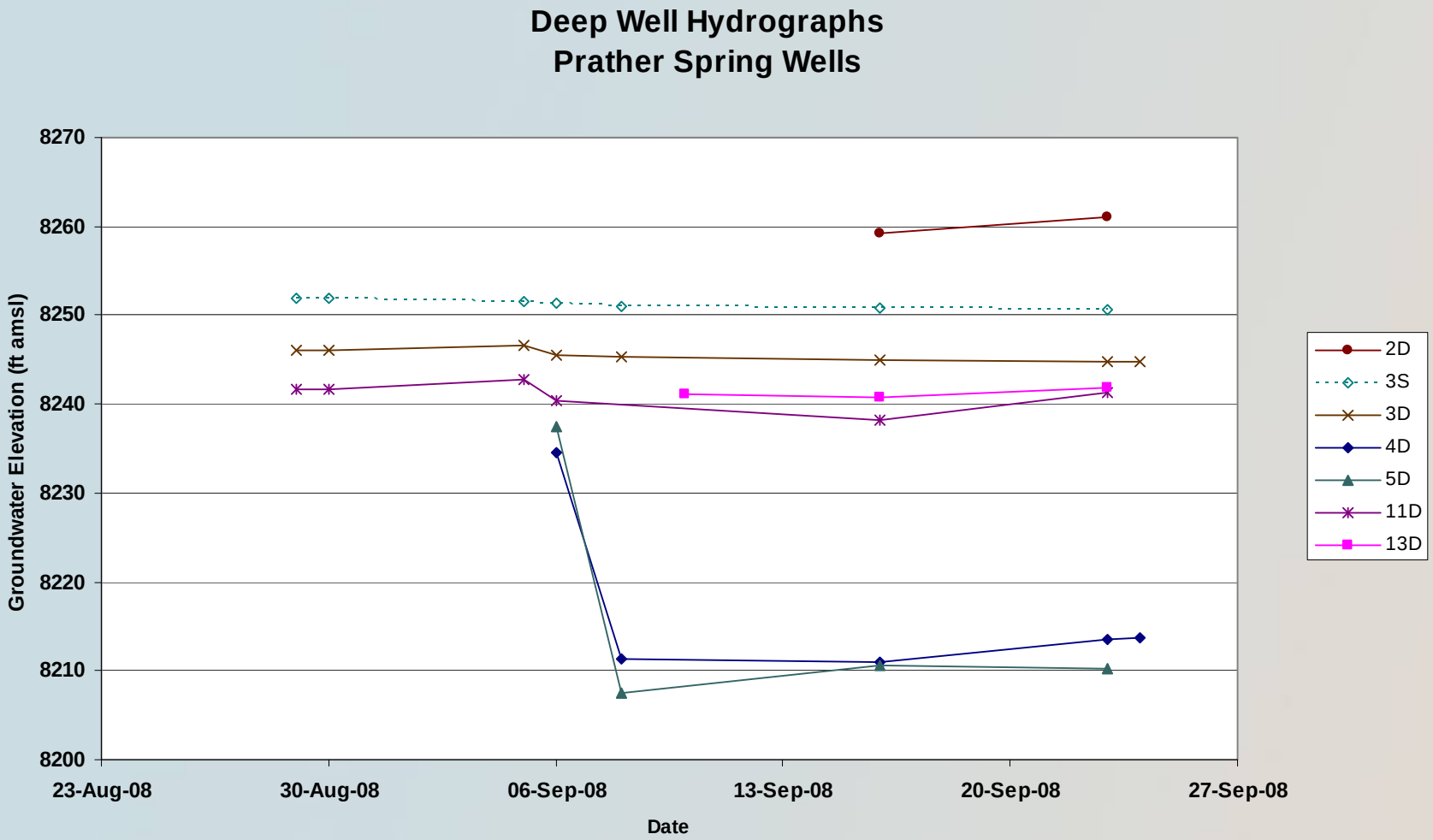
Hydrogeologic Conditions

- Depth to water
  - Prather drainage – 19 to 51 feet deep
  - Spring 2 drainage – 16 to 32 feet deep
- Colluvium saturated thickness
    - Dry to 2 feet maximum thickness
- Shallow wells screen upper bedrock
    - Shallow and “middle” versus deep flow zones
- Water levels are lower in the deeper zone
- Despite fracture flow conditions, appears to be relatively low permeability

Well Hydrographs



Well Hydrographs



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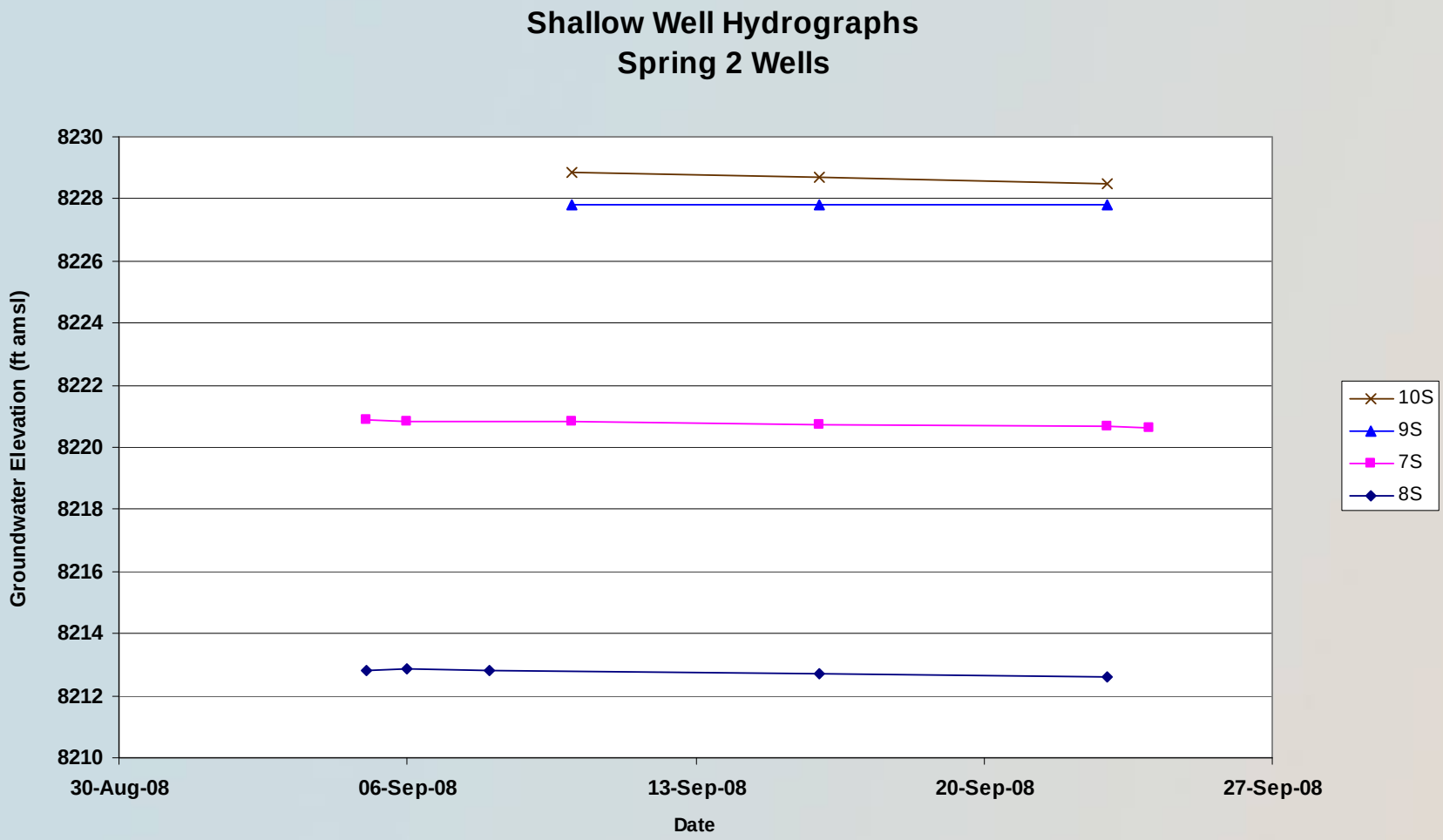
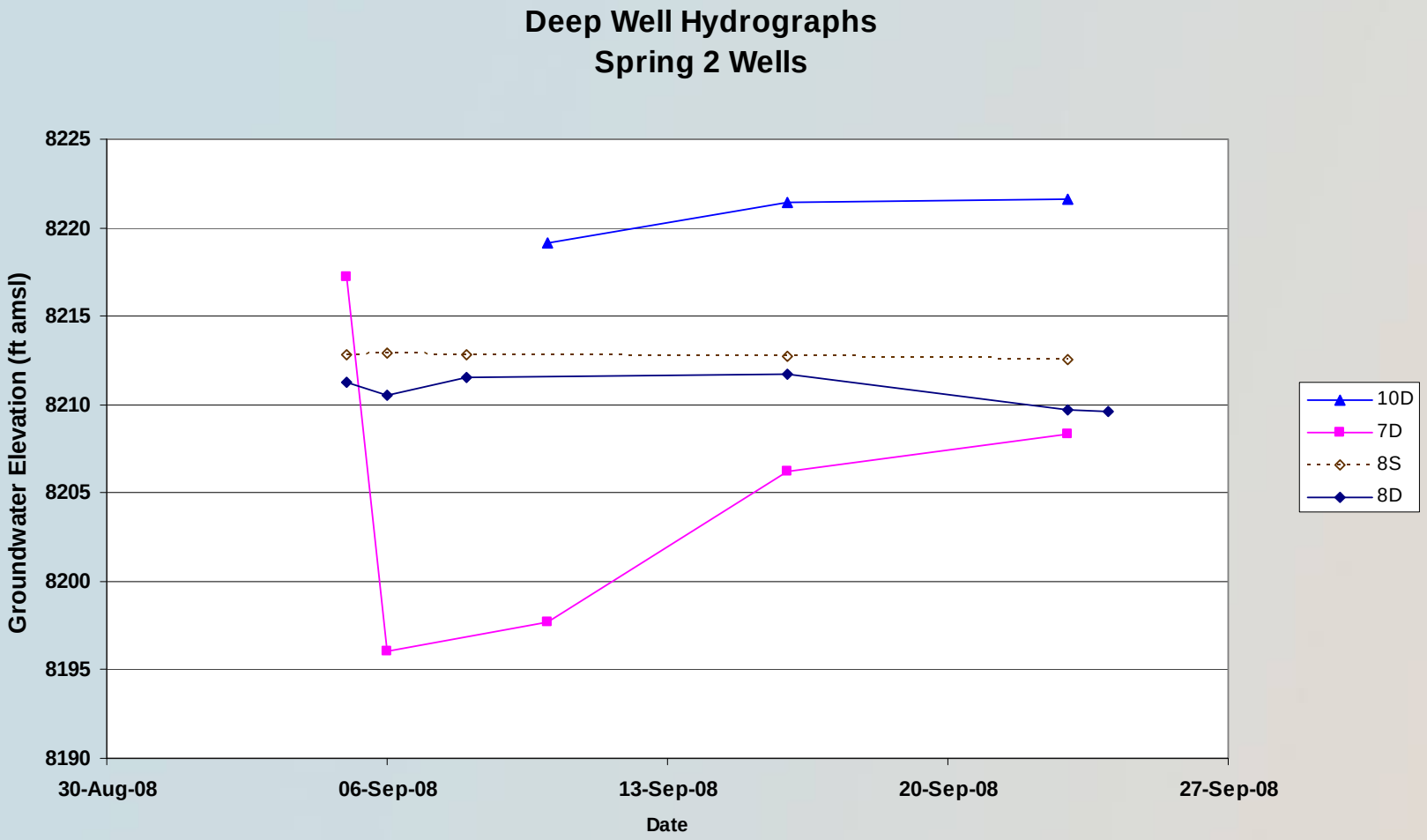
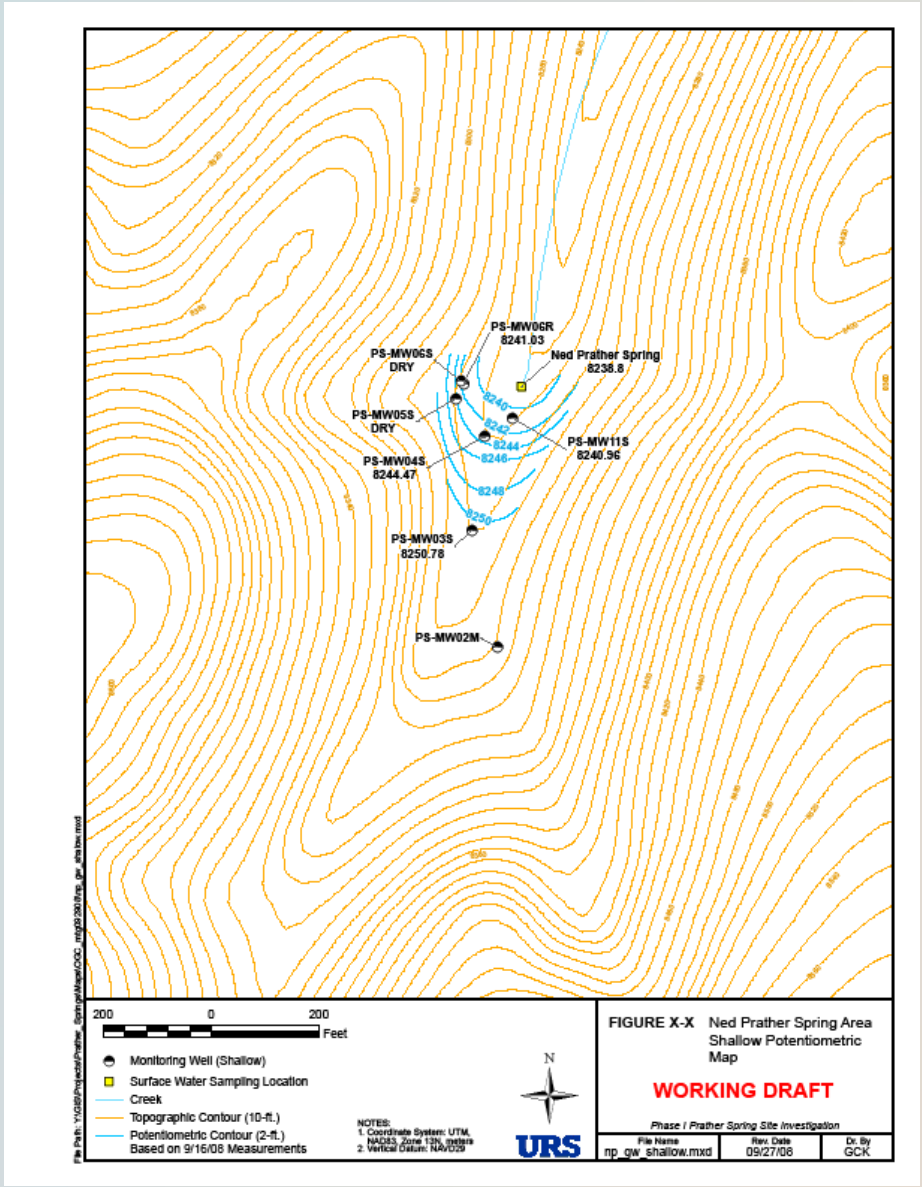


Well Hydrographs



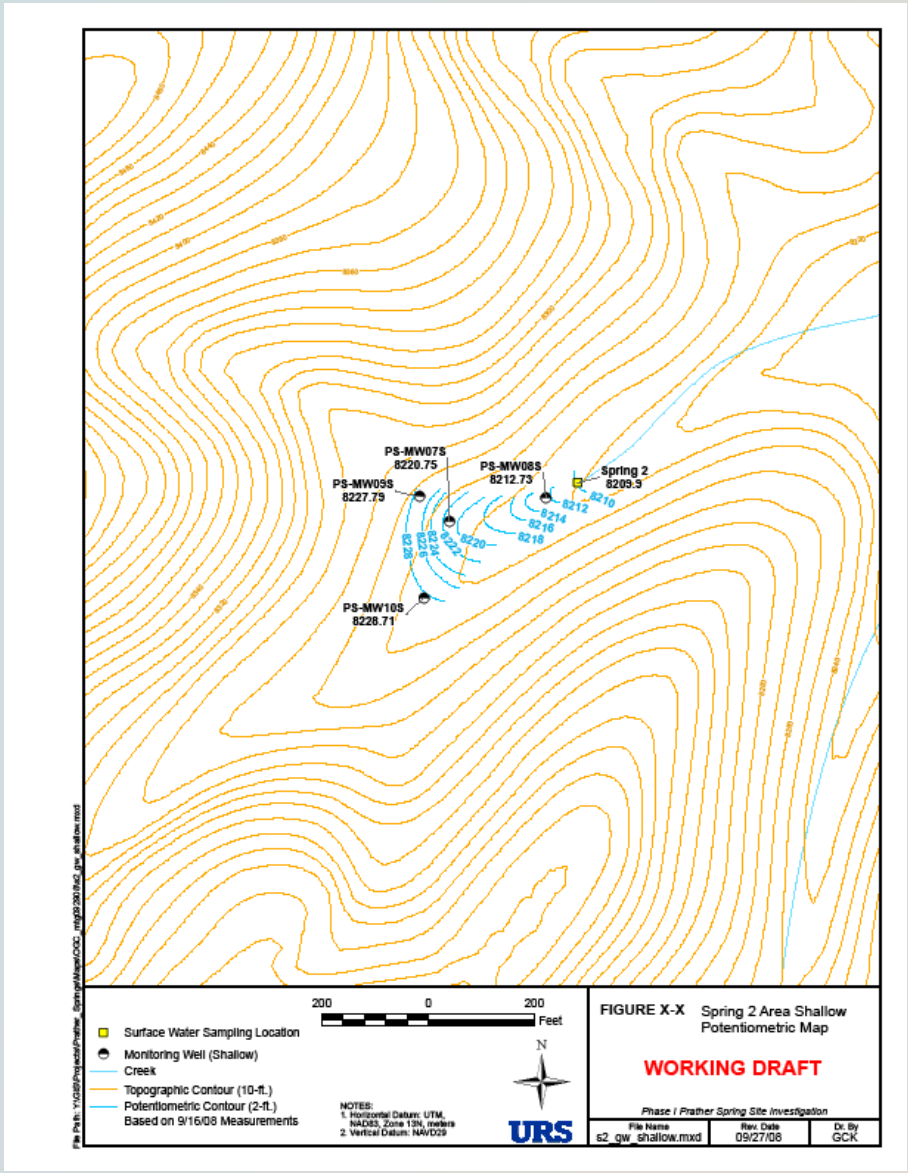
Potentiometric Surface Map

- Shallow wells - Prather Spring area
- Inferred curve to contours



Potentiometric Surface Map

- Shallow wells - Spring 2 area
- Inferred curve to contours



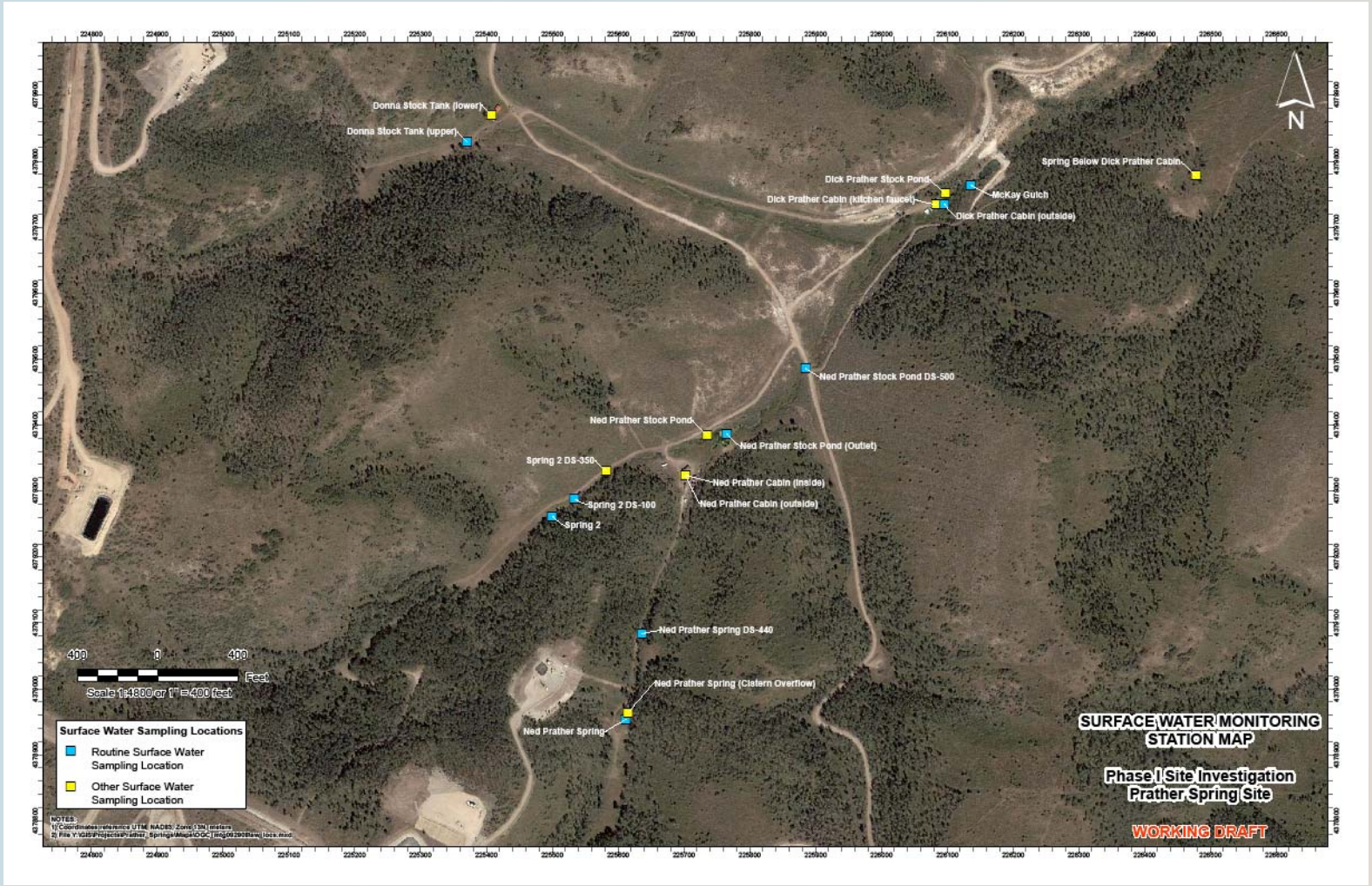
Water Quality

- Collection and analysis of surface water and groundwater samples, fewer soil samples
  - Joint Workplan Addenda #1 and #2
    - Surface water sampling locations, frequency, analytes
  - Over 30 sampling events between May 31 and September 24, 2008
    - HRL Compliance
    - LT Environmental
    - Marathon
    - COGCC

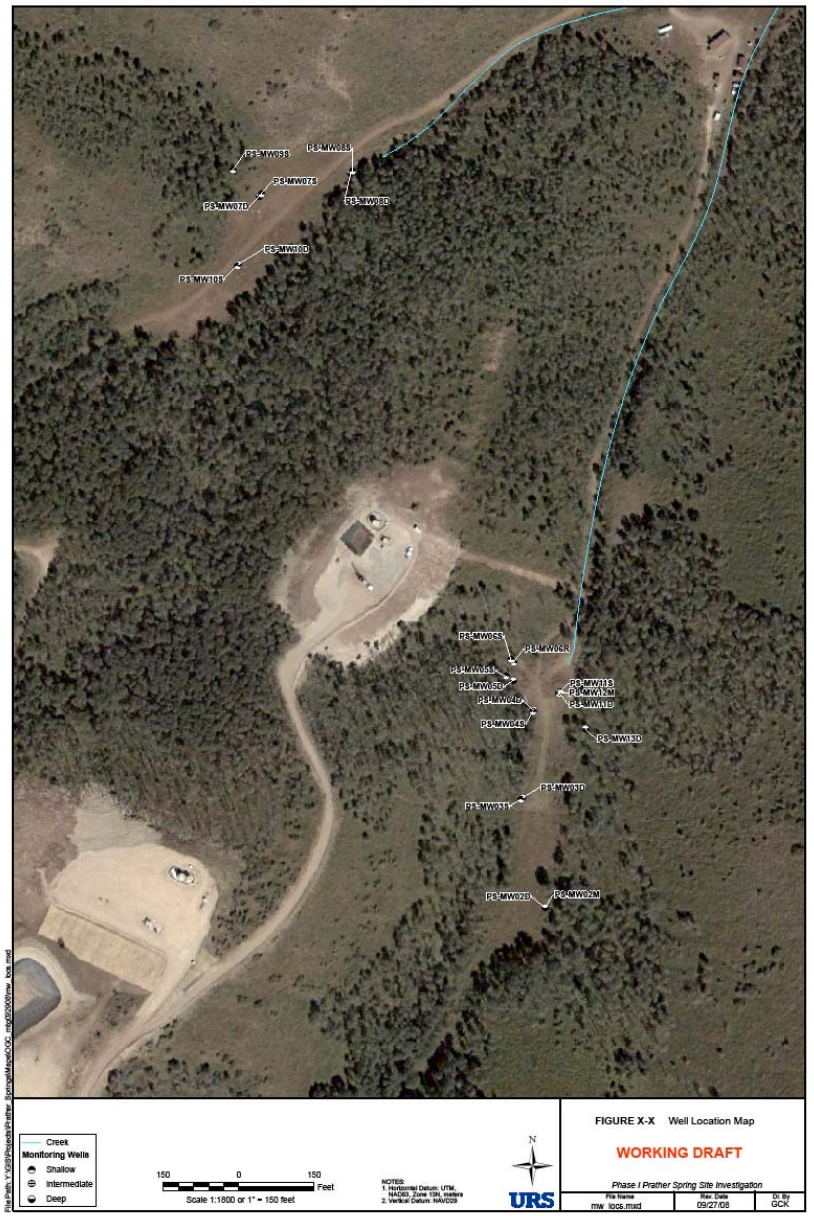
Background or Baseline Water Quality

- Major ion chemistry
  - Utilized to distinguish between and evaluate characteristics of groundwater flow zones
  - Interaction between groundwater and surface water
  - Evaluate source of impacts to surface water and groundwater
- Hydrocarbon constituent detections
  - Evaluate source of impacts to surface water and groundwater

Surface Water Sample Locations

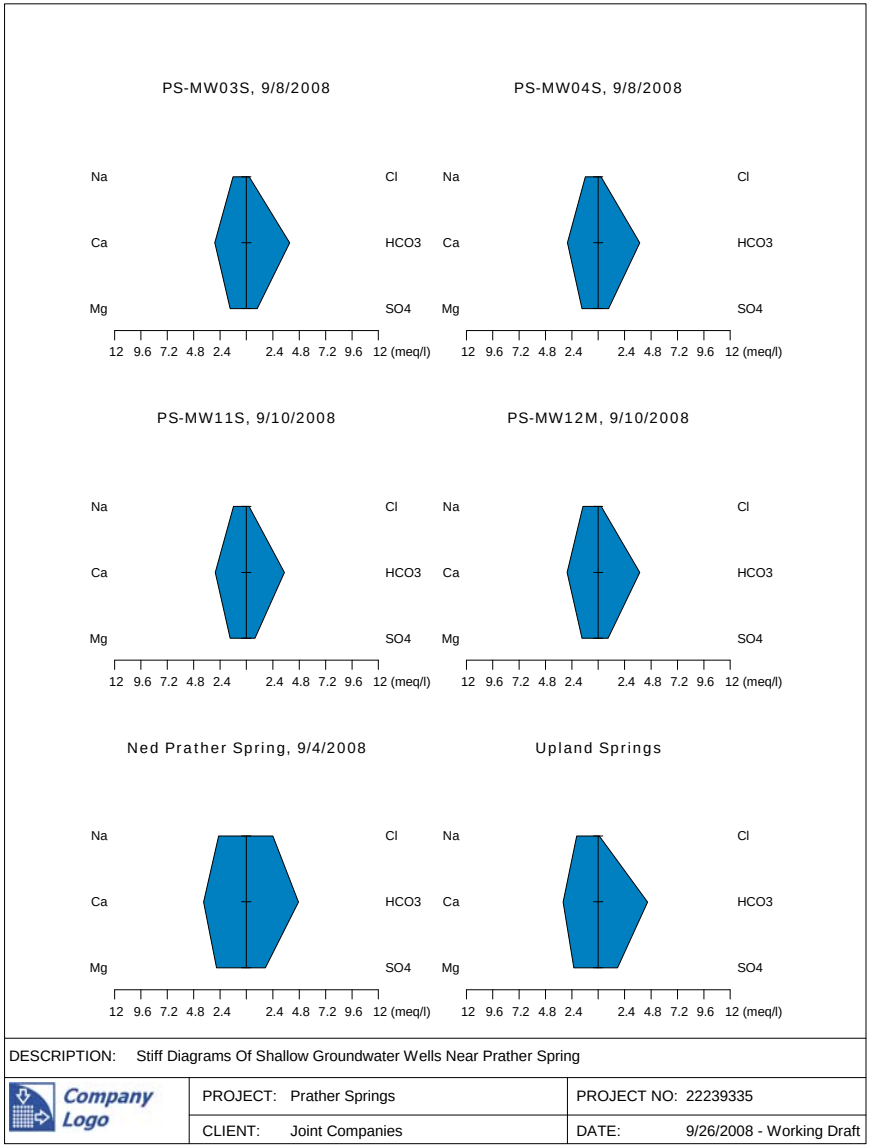


Groundwater Monitoring Well Locations



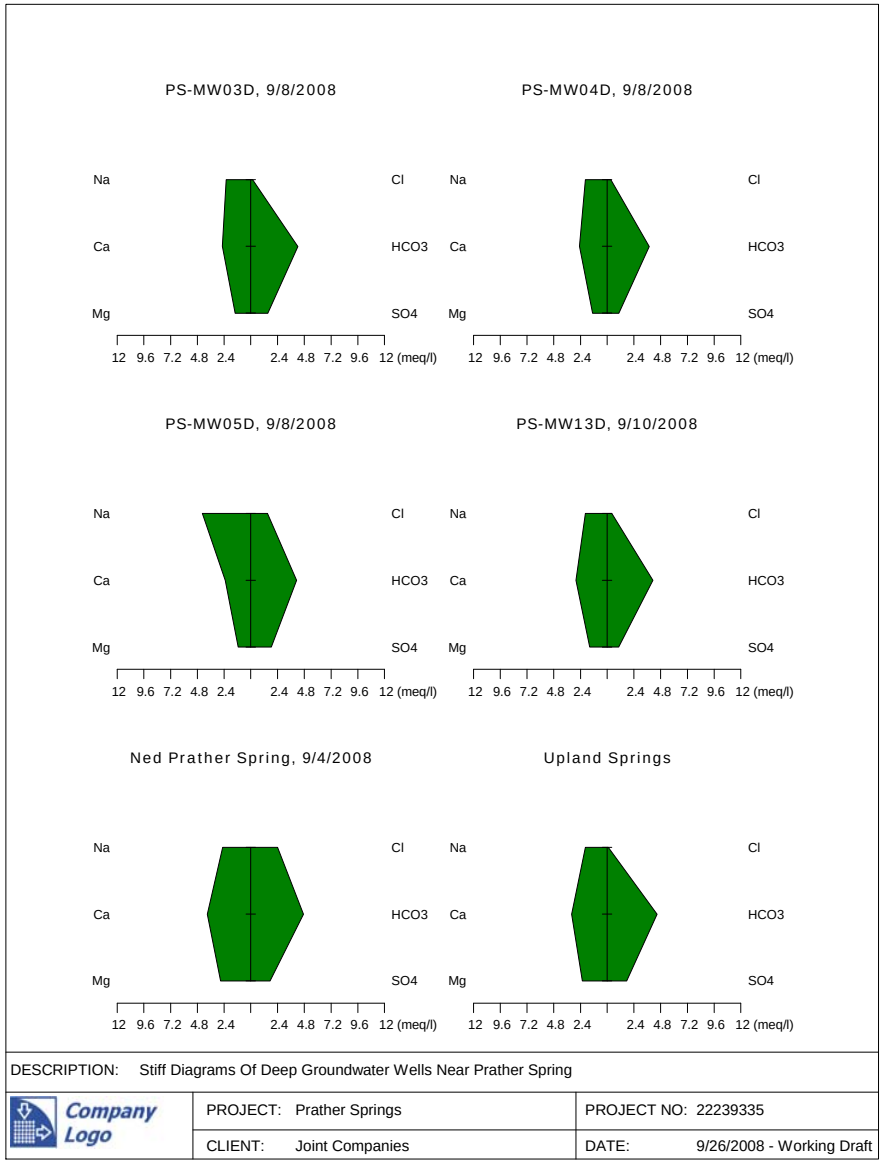
Major Ions

- Shallow wells in Prather Drainage
- Ca-HCO_3 water type
- Similar to USGS "Upland Springs" in the area
- Groundwater has low dissolved ion content and appears to be relatively young



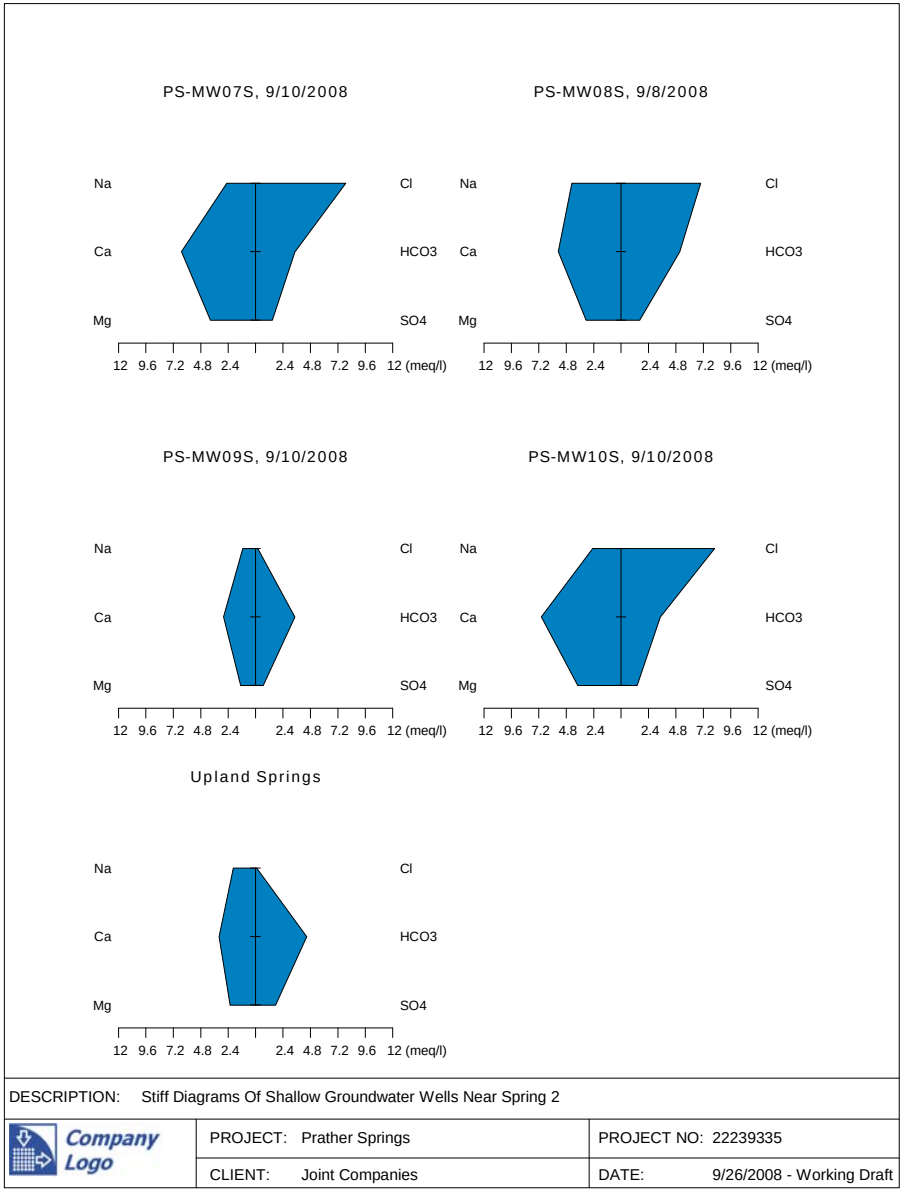
Major Ions

- Deep wells in Prather Drainage
- Ca-Na-HCO_3 water type
- Very similar to shallow well water type
- Deep wells may show relative increase in sodium, potassium, sulfate, arsenic, boron, and selenium concentrations compared to shallow wells
- Well 5D is different



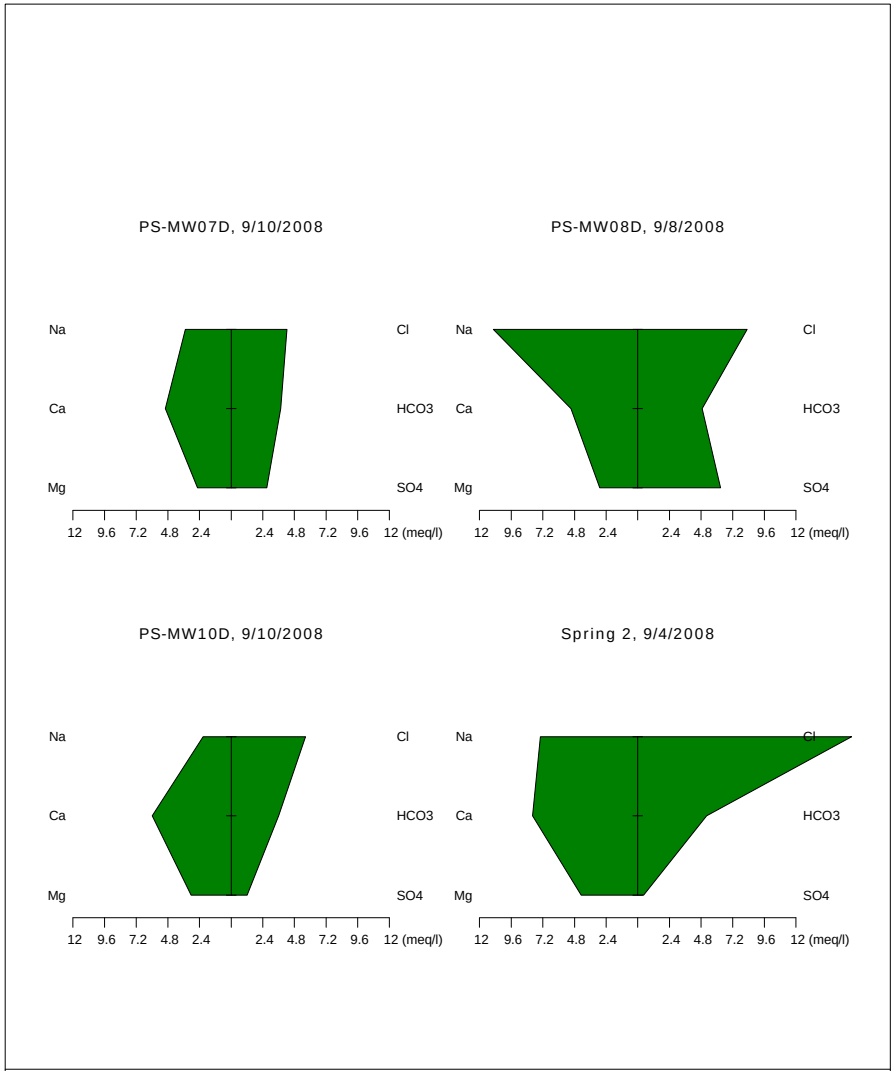
Major Ions

- Shallow wells in Spring 2 Drainage
- Ca-HCO_3 water type at MW-09S
  - Similar to USGS "Upland Springs" in the area
- Higher chloride content in other three well locations (Ca-Cl type)
- Samples from MW-07S and MW-10S are similar, ditto for BTEX



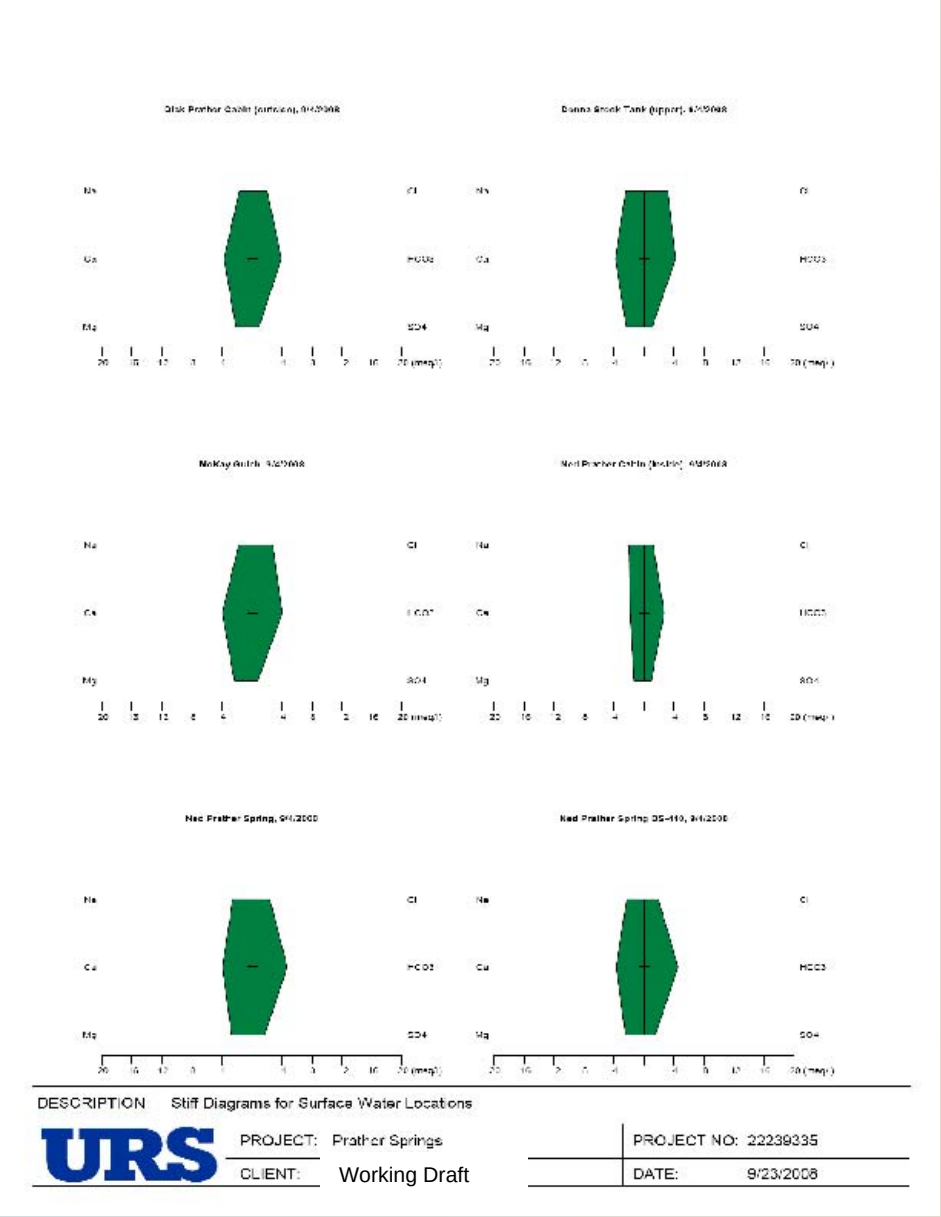
Major Ions

- Deep wells in Spring 2 Drainage
- Ca-Cl and Na-Cl water types
- All locations appear to be impacted from saline source



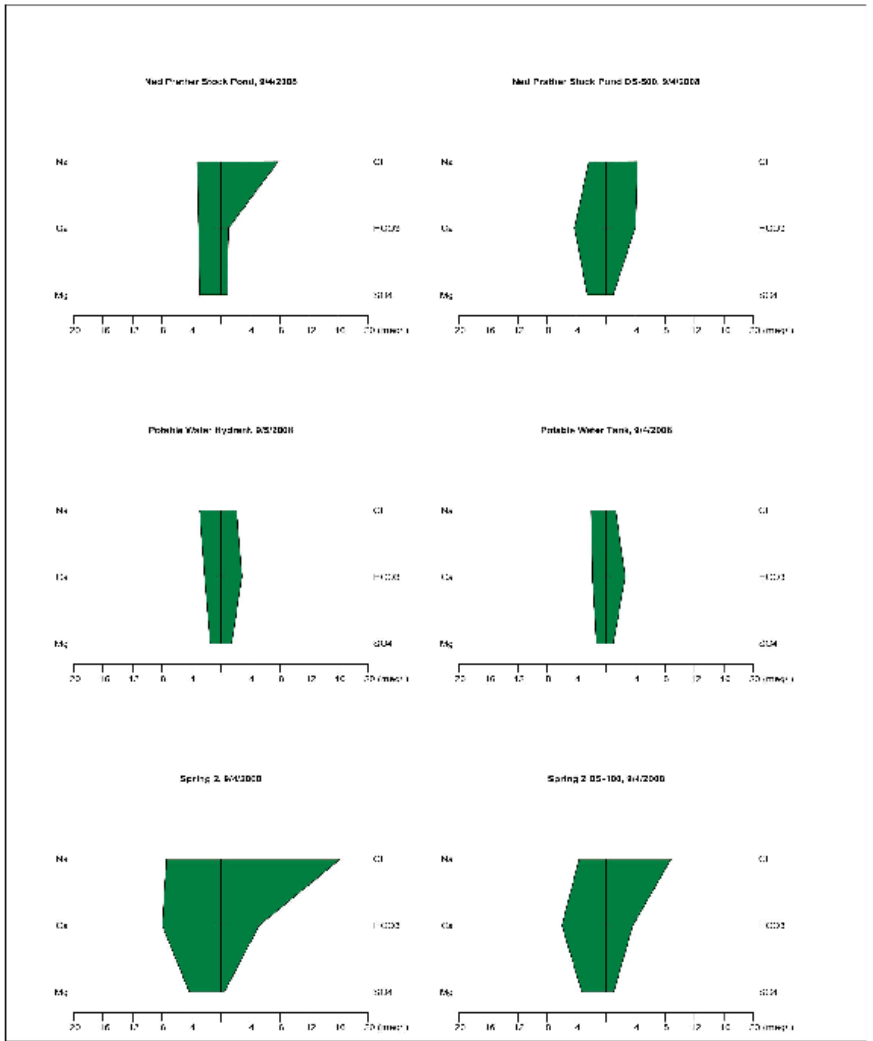
Major Ions

- Surface water samples
- Similar to background groundwater samples with increase in chloride



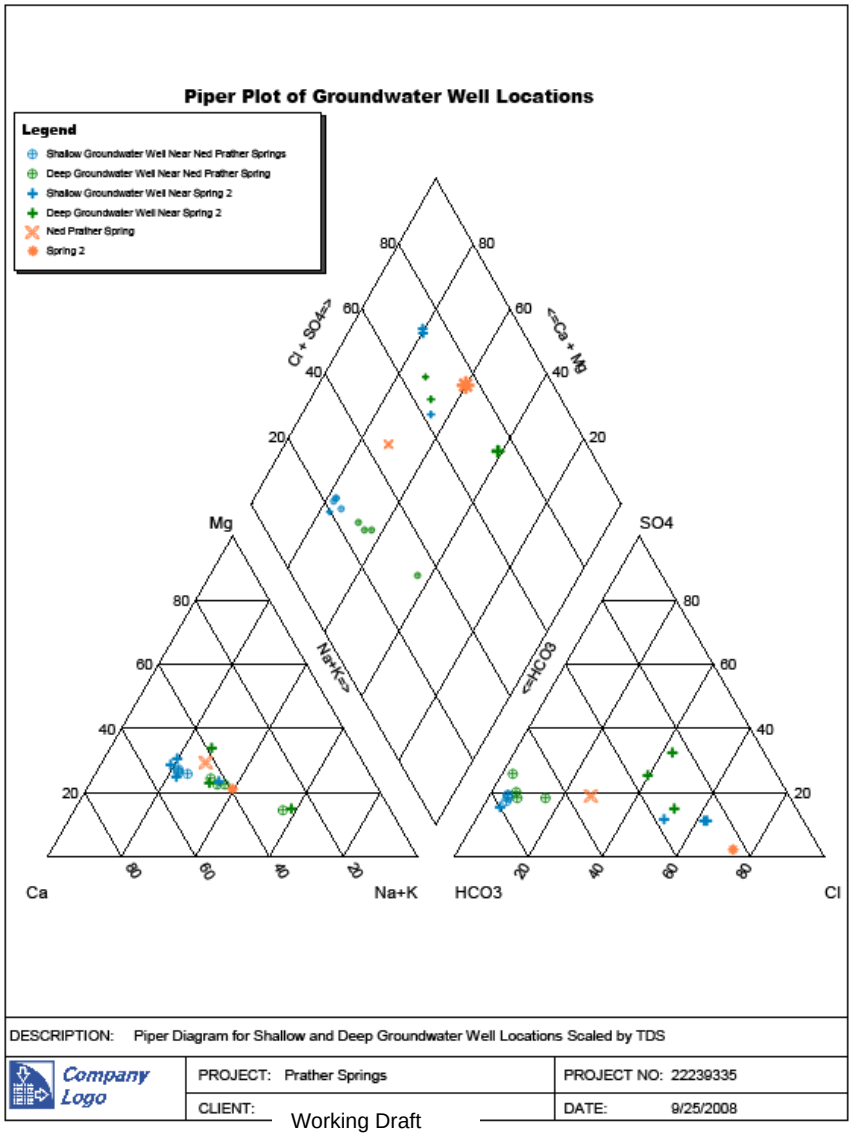
Major Ions

- Surface water samples
- Increase in chloride ion percentage begins at Spring 2



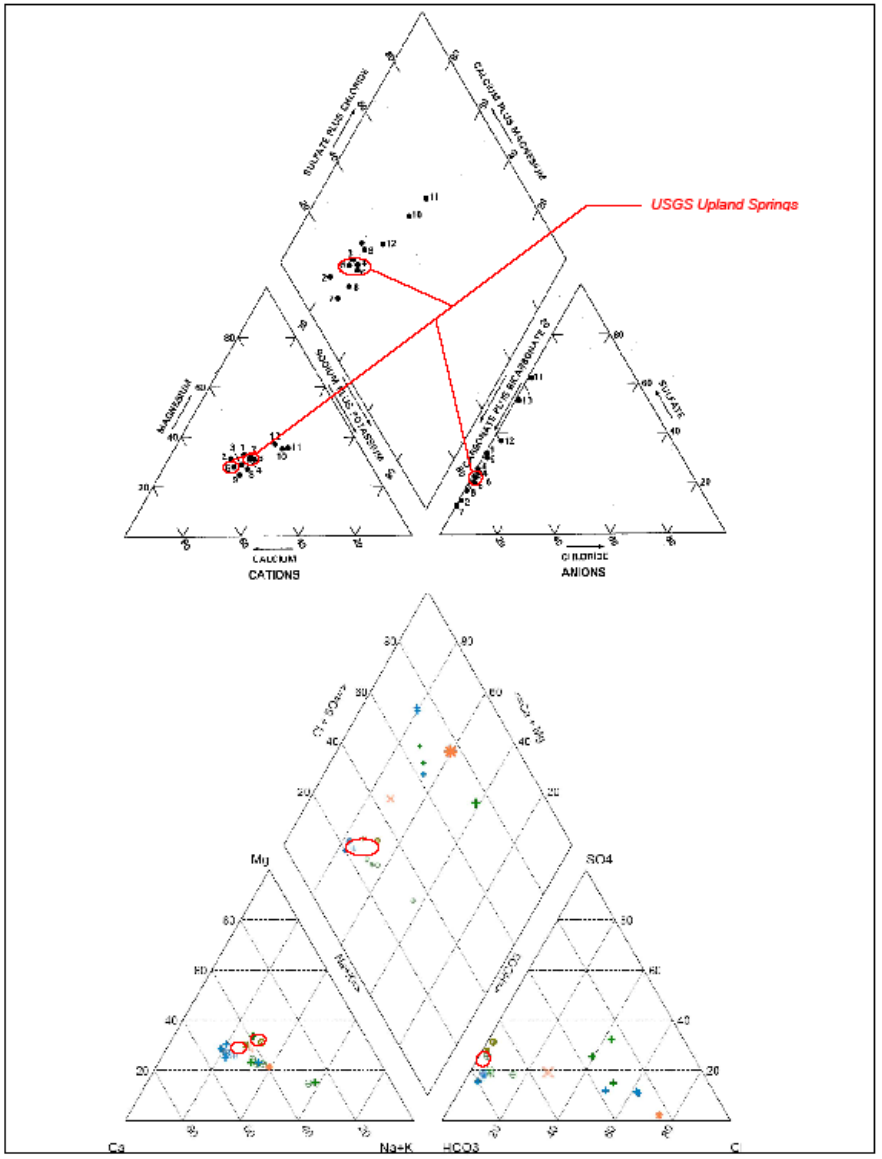
Major Ions

- Piper Diagram for groundwater
- Cation and anion trends suggest mixing



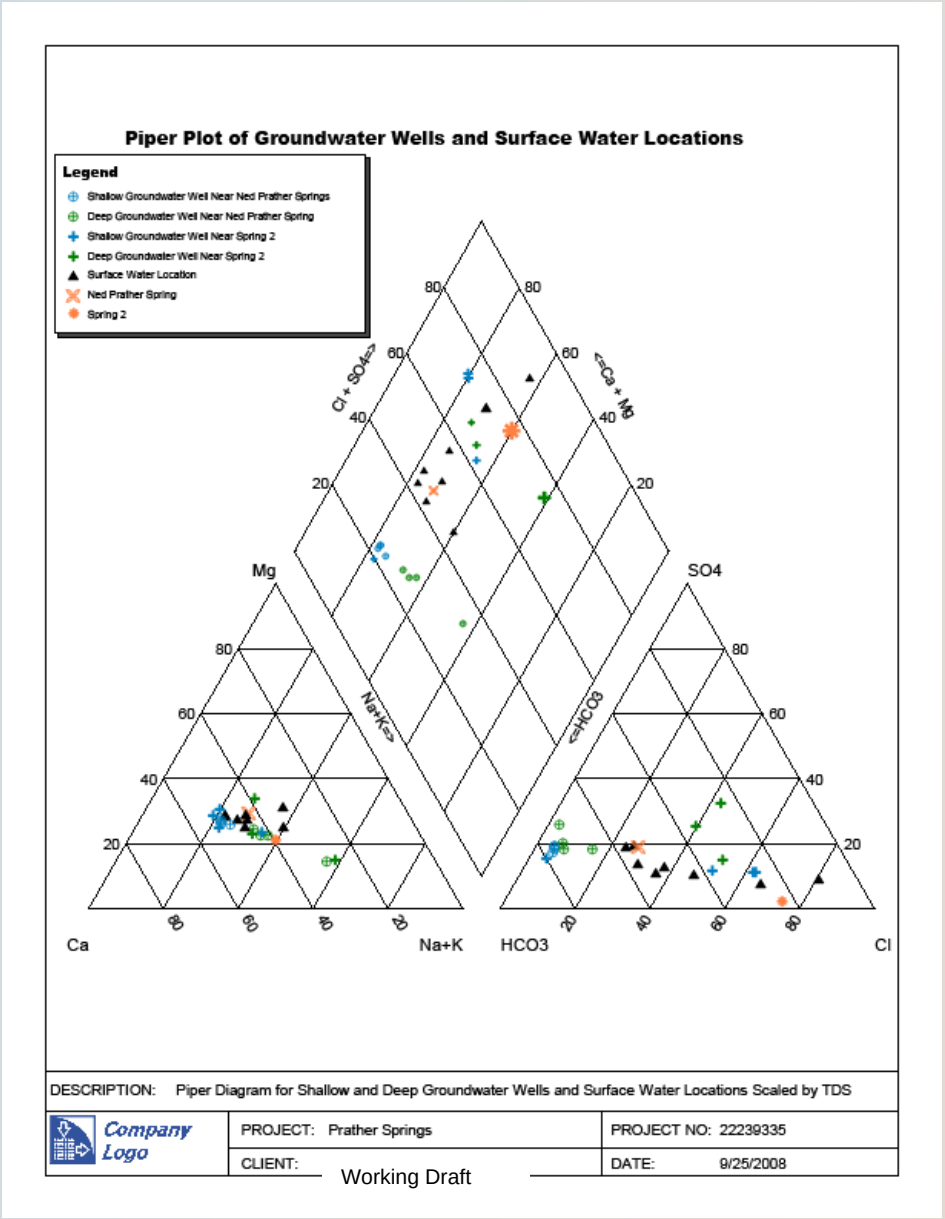
Major Ions

- Piper Diagram for groundwater
- Comparison to USGS study results (1985)
  - We know what background water quality looks like for this area



Major Ions

- Piper Diagram for surface water and groundwater samples



Sample Collection and Analysis Summary

- 54 data packages (June through September)
- Multiple Labs: Evergreen, Test America, ChemSolutions, Paragon Analytical, and Key
- Multiple Parties: COGCC, URS, HRL, LTE
- Matrices predominately springs and surface water, but also groundwater, and limited soil
- Mostly VOCs, but some TVPH, methane, metals, anions, inorganics
- Binder contains data summary, detects summaries, maps posting data, and all data results

Sample Collection and Analysis Summary

- Data package summary table includes who collected data, laboratory, date collected, analyses, and matrices

Working Draft

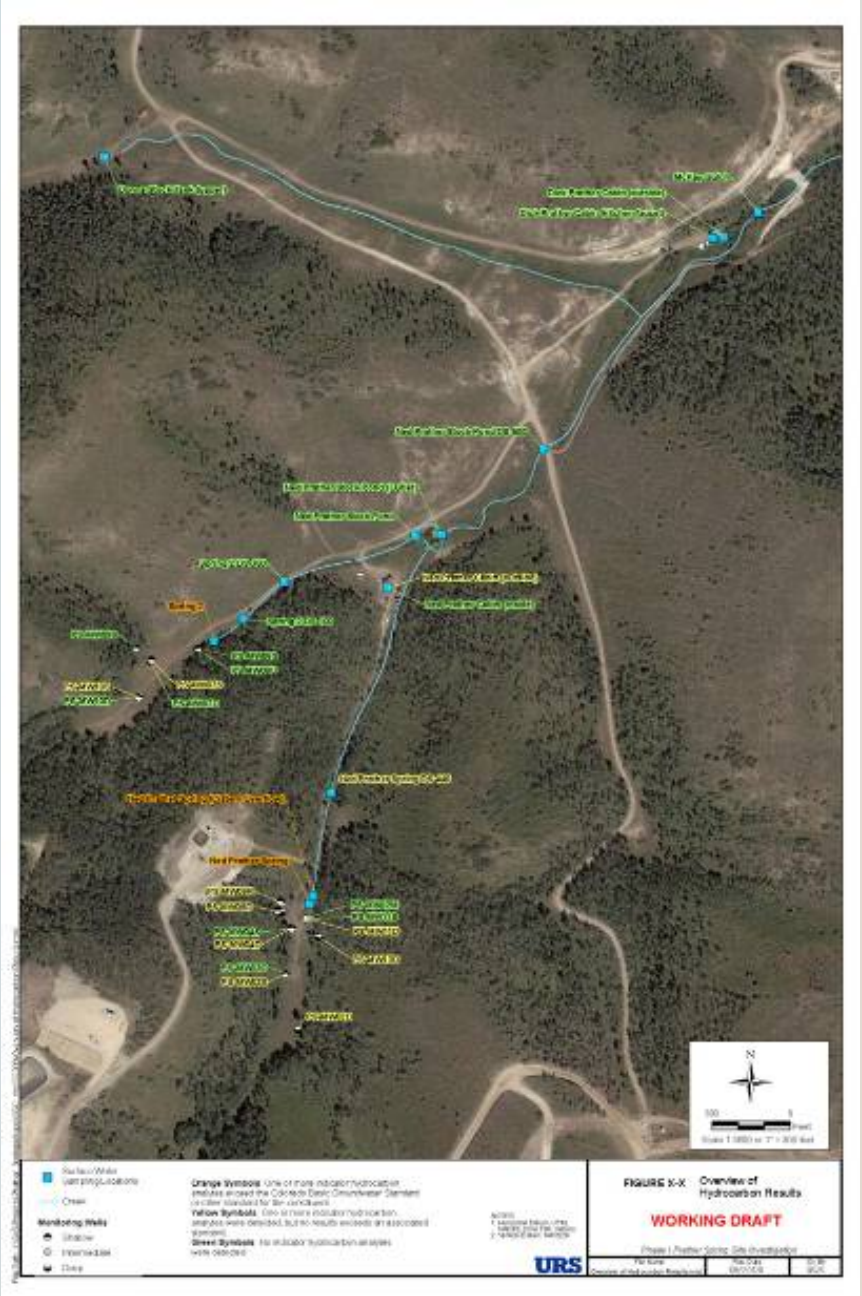
SUMMARY OF KNOWN DATA FOR PRATHER SPRING INVESTIGATION

Collected By?	Lab	Pkg #	Contents	Collection Period	Analyses
COGCC	Test America	D8F050387	6 SFW 1 Produced Water 1 SED	4-Jun-08	soil: GRO, DRO aqueous: VOCs, CH4, major cations, trace metals, major anions, SC, pH
LTE/PDC	Evergreen	08-4070	2 SOIL 1 SFW (NPS)	12-Jun-08	soil: GRO, DRO, MRO sfw: GRO, CH4, major cations, trace metals, major anions, SC, pH, O&G
Marathon	Key Laboratory	060608-1382	4 AQ (NP and DP cabin taps, NP cistern, Spring 2)	6-Jun-08	VOCs
Marathon	Key Laboratory	062008-1382	2 SFW (NPS, NP stock pond)	20-Jun-08	VOCs
Marathon	Key Laboratory	062308-1668	1 SFW (NP stock pond DS-440)	23-Jun-08	VOCs
URS	Evergreen	08-5065 08-5101 08-5151 08-5175 08-5116	**1st Drilling Field Effort** 6 SOIL 6 GRW	7/15, 7/16, 7/17 for soils; 7/17, 7/18, 7/21 for water	GRO, DRO, VOCs; methane for GRW; 1 soil for SVOCs also
LTE/PDC	Test America	NRG-1655 NRG-1800 NRG-1903	**1st Drilling Field Effort Splits** SOIL GRW	same as above	GRO, DRO, VOCs; methane for GRWs
HRL/Williams	Evergreen	08-3744	Cabin Tap and Spring	5-31-08 6-01-08 6-02-08	GRO, BTEX, Anions, TDS, CH4
HRL/Williams	Evergreen	08-3842	Cabin Tap and Spring	3-Jun-08	GRO, BTEX, Anions, TDS, CH4
HRL/Williams	Evergreen	08-4235	3 locations	18-Jun-08	BTEX
HRL/Williams	Evergreen	08-4339	6 SFWs	23-Jun-08	BTEX, NO2, NO3, Cl
HRL/Williams	Evergreen	08-4611	6 SFWs	1-Jul-08	BTEX, NO2, NO3, Cl
HRL/Williams	Evergreen	08-4774	6 SFWs	8-Jul-08	BTEX, NO2, NO3, Cl
HRL/Williams	Evergreen	08-5011	9 SFW	15-Jul-08	VOCs-Short; some anions
HRL/Williams	Evergreen	08-5117	9 SFW	17-Jul-08	VOCs-Short; some anions
HRL/Williams	Evergreen	08-5218	9 SFW	22-Jul-08	VOCs-Short; some anions CH4 for Prather Spg
HRL/Williams	Evergreen	08-5309	9 SFW	24-Jul-08	VOCs-Short; some anions
HRL/Williams	Evergreen	08-5418	9 SFW	29-Jul-08	VOCs-Short; some anions
HRL/Williams	Evergreen	08-5544	10 SFW	1-Aug-08	VOCs-Short; some anions
HRL/Williams	Evergreen	08-5576	10 SFW	4-Aug-08	VOCs-Short; some anions

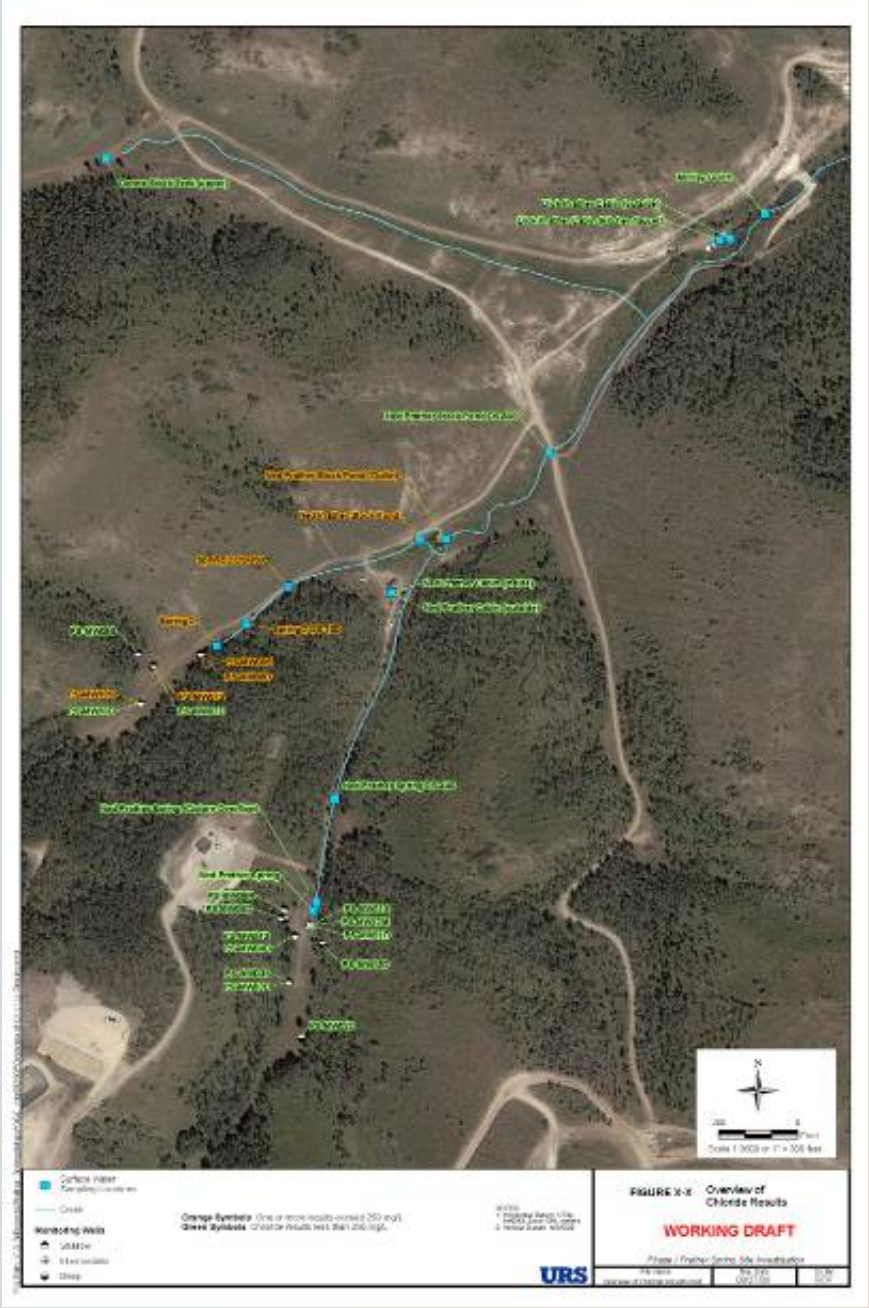
Potential Indicator Analytes

- Potential Indicator Analytes
  - BTEX
  - 1,3,5-TMB and 1,2,4-TMB
  - Naphthalene
  - PHC as gasoline
  - Chloride
- Results posted to maps

Location of Potential Hydrocarbon Indicator Analytes



Location of Non-Hydrocarbon Potential Indicator Analytes



Magnitude of Potential Indicator Analytes

Magnitude of Potential Indicator Analytes

Spring 2					
Analyte	Value	Units	Collection Date of Max Value	Collection Date of Min Value	Detect Freq.
CHLORIDE (AS CL)	795	mg/L	15-Jul-08	10-Sep-08	17 / 17
1,2,4-TRIMETHYLBENZENE	13	ug/L	06-Jun-08	10-Sep-08	12 / 12
1,3,5-TRIMETHYLBENZENE	11	ug/L	06-Jun-08	10-Sep-08	12 / 12
BENZENE	71	ug/L	17-Jul-08	10-Sep-08	19 / 21
ETHYLBENZENE	5.4	ug/L	29-Jul-08	10-Sep-08	17 / 21
NAPHTHALENE	0.33	ug/L	10-Sep-08	10-Sep-08	1 / 12
PHC AS GASOLINE	< 2000	ug/L	04-Sep-08	04-Sep-08	0 / 1
TOLUENE	< 1	ug/L	06-Jun-08	10-Sep-08	0 / 21
XYLENES, TOTAL	53	ug/L	17-Jul-08	10-Sep-08	19 / 21

Spring 2 DS-100					
Analyte	Value	Units	Collection Date of Max Value	Collection Date of Min Value	Detect Freq.
CHLORIDE (AS CL)	330	mg/L	29-Aug-08	10-Sep-08	3 / 3
1,2,4-TRIMETHYLBENZENE	< 0.2	ug/L	29-Aug-08	10-Sep-08	0 / 4
1,3,5-TRIMETHYLBENZENE	< 0.3	ug/L	29-Aug-08	10-Sep-08	0 / 4
BENZENE	< 0.2	ug/L	29-Aug-08	10-Sep-08	0 / 4
ETHYLBENZENE	< 0.2	ug/L	29-Aug-08	10-Sep-08	0 / 4
NAPHTHALENE	< 1	ug/L	29-Aug-08	10-Sep-08	0 / 4
PHC AS GASOLINE	< 2000	ug/L	04-Sep-08	04-Sep-08	0 / 1
TOLUENE	< 0.2	ug/L	29-Aug-08	10-Sep-08	0 / 4
XYLENES, TOTAL	< 0.4	ug/L	29-Aug-08	10-Sep-08	0 / 4

PS-MW07S					
Analyte	Value	Units	Collection Date of Max Value	Collection Date of Min Value	Detect Freq.
CHLORIDE (AS CL)	280	mg/L	10-Sep-08	10-Sep-08	1 / 1
1,2,4-TRIMETHYLBENZENE	< 1	ug/L	05-Sep-08	10-Sep-08	0 / 3
1,3,5-TRIMETHYLBENZENE	< 1	ug/L	05-Sep-08	10-Sep-08	0 / 3
BENZENE	2.6	ug/L	06-Sep-08	06-Sep-08	3 / 3
ETHYLBENZENE	< 1	ug/L	05-Sep-08	10-Sep-08	0 / 3
NAPHTHALENE	< 1	ug/L	05-Sep-08	10-Sep-08	0 / 3
PHC AS GASOLINE	< 2000	ug/L	05-Sep-08	05-Sep-08	0 / 1
TOLUENE	2.9	ug/L	06-Sep-08	06-Sep-08	3 / 3
XYLENES, TOTAL	0.21	ug/L	10-Sep-08	10-Sep-08	1 / 3

PS-BH07S 14-16					
Analyte	Value	Units	Collection Date of Max Value	Collection Date of Min Value	Detect Freq.
1,2,4-TRIMETHYLBENZENE	< 2.6	ug/Kg	04-Sep-08	04-Sep-08	0 / 1
1,3,5-TRIMETHYLBENZENE	< 2.6	ug/Kg	04-Sep-08	04-Sep-08	0 / 1
BENZENE	< 2.6	ug/Kg	04-Sep-08	04-Sep-08	0 / 1
ETHYLBENZENE	< 2.6	ug/Kg	04-Sep-08	04-Sep-08	0 / 1
NAPHTHALENE	< 6.4	ug/Kg	04-Sep-08	04-Sep-08	0 / 1
PHC AS GASOLINE	1130	ug/Kg	04-Sep-08	04-Sep-08	1 / 1
TOLUENE	< 2.6	ug/Kg	04-Sep-08	04-Sep-08	0 / 1
XYLENES, TOTAL	< 6.4	ug/Kg	04-Sep-08	04-Sep-08	0 / 1

Working Draft

VOCS SAMPLING SUMMARY FOR SPRINGS AND STREAM SAMPLES
09-29-08

Surface Water Sampling Stations	COGCC Facility ID	VOCs			
		Sampling Frequency[2]	# VOC data pts[1]	Proposed Revision[2]	Justification for Modification
Ned Prather Spring	705381	~1x/wk Jun (5x) 2x/wk Jul/Aug (14x) 1x/wk Sep (2x)	21	2x/month	Condition established
Ned Prather Spring DS 440	705436	1x/wk early July (2x) 2x/wk Jul/Aug (14x) 1x wk Sep (2x)	18		
Spring 2	705382	2x/wk Jul/Aug (14x) 1x/wk Sep (2x)	16		
Spring 2 DS 100	705444	1x/wk (3x)	3		
Spring 2 DS 350	705445	2x/wk Aug (8x) (replaced by Spring 2 DS100)	8	NA, location discontinued	Monitoring point moved to end of fence line
Ned Prather Cabin	705394 (in) 705386 (out)	2x/wk Jul/Aug (14x) 1x/wk Sep (2x)	16	1x/month while on city water	Cabin supplied by city water
Ned Prather Stock Pond	705390 (general) 705384 (outlet)	various times Jun (2x) 2x/wk Jul/Aug (14x) 1x/wk Sep (2x)	18	Collect and hold; analyze only if HCs detected in the upgradient stream sample	No HC detections to date
Ned Prather Stock Pond DS 500	705437	once Jun (1x) 2x/wk Jul/Aug (14x) 1x/wk Sep (2x)	17		
Donna Stock Tank	705433 (upper) 705385 (lower)	2x/wk Jul/Aug (14x) 1x/wk Sep (2x)	16		
Dick Prather Cabin	705383 (in) 705395 (out)	1x/wk early July (2x) 2x/wk Jul/Aug (14x) 1x wk Sep (2x)	18		
McKay Gulch	705434	2x/wk Jul/Aug (14x) 1x/wk Sep (2x)	16		

[1] Does not include sampling event on September 17, 2008 because those surface water data have not been received as of 09-29-08.

[2] **Due to hazardous winter conditions and concern for the safety of field personnel, routine sampling will be discontinued between Nov. 1 and Mar. 1.**

Split samples not included in total number of data points.

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Working Draft **MAJOR CATIONS AND ANIONS, TRACE METALS, AND OTHER WATER QUALITY PARAMETER SAMPLING SUMMARY FOR SPRINGS AND STREAM SAMPLES**
09-29-08

Surface Water Sampling Stations	COGCC Facility ID	Major Cations and Anions, Trace Metals, and Other Water Quality Parameters			
		Sampling Frequency[1]	# data pts	Proposed Revision[2]	Justification for Modification
Ned Prather Spring	705381	08-29-08 09-04-08 09-10-08	3	Discontinue	Baseline Water Quality Established
Ned Prather Spring DS 440	705436				
Spring 2	705382				
Spring 2 DS 100	705444				
Spring 2 DS 350	705445				
Ned Prather Cabin	705394 (in) 705396 (out)				
Ned Prather Stock Pond	705390 (general) 705384 (outlet)				
Ned Prather Stock Pond DS 500	705437				
Donna Stock Tank	705433 (upper) 705385 (lower)				
Dick Prather Cabin	705393 (in) 705395 (out)				
McKay Gulch	705434				

[1] Does not include sampling event on September 17, 2008 because those surface water data have not been revceived as of 09-29-08.

[2] **Due to hazardous winter conditions and concern for the safety of field personnel, routine sampling will be discountinued between Nov. 1 and Mar. 1.**

Split samples not included in total number of data points.

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Working Draft

SUMMARY OF GROUNDWATER SAMPLING FOR VOLATILE ORGANIC ANALYTES

Report Date: 09-29-08

Monitoring Well	COGCC Facility ID	VOCs and Methane			
		Number of Data Points	Comment on Results	Proposed Revision[3]	Justification for Modification
PS-MW02D		2	split naphthalene 3.48 J	1x/month (VOCs only)	Hydrocarbon concentrations low relative to spring concentrations
PS-MW02S		1	common lab contaminants only		
PS-MW03D		4	common lab contaminants only		
PS-MW03S	705438	6	1,2,4-TMB (9.1); X (4.2 J), in 9-09-08 sample		
PS-MW04D		3	T (0.17 J) in 8-06-09 sample		
PS-MW04S	705439	5	common lab contaminants only		
PS-MW05D		3	T (0.5 J), E (0.21 J), X (0.8 J) in 8-05-08 sample; split T (0.93 J) only		
PS-MW06R		3	X (0.33 J) and T (0.21 J) in 8-07-08 sample		
PS-MW07D		3	common lab contaminants only		
PS-MW07S		4	B (4x), X (2x), T (4x), with highest B (2.8 J) and T (2.9 J) on 9-05-08		
PS-MW08D		3	single detection of methane and chloroform		
PS-MW08S		3	common lab contaminants only		
PS-MW09S		2	single methane detection		
PS-MW10D		2	single detection of methane and other lab contaminants		
PS-MW10S		2	B (0.37 J, 0.76 J), T (1.01, 1.3), X (0.73 J)		
PS-MW11D	705442	4	B (3x), T (3x), X (1x), methane		
PS-MW11S	705443	5	common lab contaminants only		
PS-MW12M		2	no VOCs detected		
PS-MW13D		2	T (0.33 J and 0.23 J)		

Indicator hydrocarbons detected over 5 ppb.
Indicator hydrocarbons detected over 2 ppb.
Trace levels of indicator hydrocarbons detected.
No indicator hydrocarbons detected.

osl = on-site laboratory (i.e., ChemSolutions)
all results presented in ug/l (i.e., parts per billion)
J indicates and estimated value
Split samples are included in total number of data points.
[1] VOCs only; no methane analysis.
[2] TVPH and TEPH also requested.
[3] Due to hazardous winter conditions and concern for the safety of field personnel, routine sampling will be discountinued between Nov. 1 and Mar. 1.

Working Draft

SUMMARY OF GROUNDWATER SAMPLING FOR MAJOR CATIONS AND ANIONS, TRACE METALS, AND OTHER WATER QUALITY PARAMETERS

Report Date: 09-29-08

Monitoring Well	COGCC Facility ID	Major Cations and Anions, Trace Metals, and Other Water Quality Parameters			
		Sampling Dates[1]	Number of Data Points[1]	Proposed Revision	Justification for Modification
PS-MW02S		NA	0	NA	insufficient sample volume
PS-MW06R		NA	0		
PS-MW11D	705442	NA	0		non-target screen interval
PS-MW02D		09/17/08 (+split)	2	1x/month until 3 sets of results generated[2] (NA if insufficient sample volume)	3 sets of data are considered sufficient to establish Baseline Water Quality
PS-MW03D		09/08/08 (+split)	2		
PS-MW03S	705438	09/08/08	1		
PS-MW04D		09/08/08 (+split)	2		
PS-MW04S	705439	09/08/08	1		
PS-MW05D		09/08/08 (+split)	2		
PS-MW07D		09/10/08	1		
PS-MW07S		09/09/08 (split only) 09/10/08	2		
PS-MW08D		09/08/08 (+split)	2		
PS-MW08S		09/08/08 (+split)	2		
PS-MW09S		09/09/08 (split only) 09/10/08	2		
PS-MW10D		09/09/08 (split only) 09/10/08	2		
PS-MW10S		09/09/08 (split only) 09/10/08	2		
PS-MW11S	705443	09/10/08	1		
PS-MW12M		09/09/08 (split only) 09/10/08	2		
PS-MW13D		09/10/08	1		

NA = Not Applicable

Split samples are included in total number of data points.

[1] Does not account for sampling on September 17 and 24, 2008 because those results have not been received.

[2] If extended list analyzed for outstanding samples, then sampling progam is complete.

[3] **Due to hazardous winter conditions and concern for the safety of field personnel, routine sampling will be discountinued between Nov. 1 and Mar. 1.**

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Proposed Additional Work

- Install additional S/M-zone wells in both drainages
  - Refined depth interval, fill-in flow lines to identify plumes
- Soil gas survey at two condensate tanks and potentially along pipeline corridor
- Reduce frequency of surface water and ground water sample collection
  - Baseline has been established
  - Absence of hydrocarbons in majority of surface water and groundwater locations

Proposed Additional Monitoring Well Locations

Proposed Soil Gas Survey Area

- Condensate tank at head of Prather drainage