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**Shell Exploration & Production Co., Inc.**

# **2009 Anvil Points Mine Core Recovery Program**

Piceance Creek Basin  
Rio Blanco County, Colorado

Anvil Points Mine Site

**Phillips P-20  
Core Hole**  
SEC. 26, T01S, R100W

2009

Summary Report and Well Data  
For  
United States Geological Survey



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### Phillips P-20 Core Hole

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Phillips P-20  
Anvil Points Mine Core Recovery  
Program Overview

## Boxed USGS Core from the Piceance Creek Basin Sample Processing Project Anvil Points Mine Repository, Colorado

In 2008, a project to remove and archive rock samples from the Anvil Points Mine was undertaken by Shell Exploration and Production Company (SEPCo) partnered with the U. S. Geological Survey (USGS) from the Denver Federal Center (DFC). The Anvil Points Mine (APM) is an abandoned oil shale mine located near Rifle, Colorado, and was the first experimental mine/extraction plant built as a result of the Synthetic Liquid Fuels Act of 1944 (J. H. East and E. D. Gardner, *Oil Shale Mining, Rifle, Colo., 1944-56*). Since 1997, the mine has served as a repository for multiple boxes of oil shale drill cores and cuttings (crushed samples) from Colorado, Wyoming and Utah. The decision to remove the boxes from the mine was made because of increased vandalism, deterioration of the core boxes and pallets due to atmospheric conditions in the mine, and degradation of the access road. The majority of the core will be catalogued and stored in the USGS Core Research Center at the DFC, and made available for study by the public and private sectors. The remaining core will be temporally used by SEPCo for shale oil research, and will be inventoried, described, photographed, re-boxed and stored at a core handling facility operated by Daub & Associates, Inc. in Grand Junction, CO. These cores will ultimately be shipped back to the USGS CRC at the DFC in Lakewood, Colorado.

In August 2008, Daub & Associates, Inc. (geological consulting firm), Johnson Construction of Rifle, and Berry Brothers Oilfield Services were contracted to perform the project. The project plan is as follows:

- Repair the mine access road to accommodate heavy truck traffic;
- Open the APM and inspect for safe working conditions, remediate any deficiencies, and assess amount and condition of boxes to be removed;
- Prepare pallets for shipping with the majority being transported to the USGS Core Research Center and the remainder being transported to a core facility in Grand Junction, CO;
- Leave the APM “as is” once all the items of interest have been removed

- Process and document the samples at their new respective locations; and
- Ship the core processed in Grand Junction, Colorado by Daub & Associates, Inc. back to the USGS Denver Federal Center.

Johnson Construction began road grading operations in September 2008 to repair and clear debris from the mine access road. This one-lane road is steep and consists of multiple switchbacks cut into incompetent soils. The grading and shoring operations lasted approximately one month. After remediation, the road was inspected and deemed safe for travel by trucks carrying the heavy equipment necessary to move the pallets out of the mine. Equipment and personnel were mobilized to the APM. The mine was opened and inspected for integrity. Once the integrity was found to be satisfactory, workers entered the APM.

Daub & Associates, Inc. (Daub) was tasked with assessment of boxes and pallets prior to removal from the mine, preparation of the boxes and pallets for shipping, and shipping coordination. The pallets were identified with the aid of a USGS OFR report and maps made during the previous storage operation. Most of the identification tags with the original USGS storage numbers were intact and visible on each pallet. However, some pallets had been moved to another location within the mine, vandalized, or weathered by exposure. These pallets were identified by inspecting their contents and re-labeled accordingly. A total of 712 pallets were identified, and included boxes of core, crushed FA bulk samples, and rotary drill cuttings. Once identified and marked, the pallets were grouped by destination in a staging area inside the mine. Each pallet was individually assessed for stability and durability. In some cases, pallets were entirely disassembled, re-stacked, and shrink-wrapped prior to shipping.

Pallets were taken out of the mine and transported to the staging area (Johnson Construction Yard) by eight one-ton flatbed trucks. Each truck carried two pallets per load. The trucks were loaded as a group and led slowly down the road in a convoy. At the staging area, pallets were unloaded and sorted by destination. Two Ryder cargo trucks were used for shipping, with 20–22 pallets included per load.

Five hundred six (506) pallets were transported to the USGS Core Research Center in Lakewood, Colorado. Two hundred six (206) pallets were transported to the Daub Core Handling Facility, including 54 pallets of core samples collected by Phillips Petroleum between 1979 and 1981 from areas in the Piceance Creek Basin. Berry Brothers Oilfield Services was responsible for loading pallets and subsequent transportation by truck to the designated facility.

The Phillips Petroleum cores were handled as a special case in this operation due to their long-time storage at the mine, and the poor condition and organization of the boxes. All samples were inadequately wrapped and labeled. Core boxes from multiple core holes were stacked on each pallet. Re-used and re-marked boxes of two-foot crushed samples intended for Fischer Assay were intermingled with boxes of core. The unstable condition and disorganization of the boxes on the pallets was rectified by disassembling each pallet and sorting samples box-by-box. Crushed samples were sorted by core hole number and depth; inventoried; newly bagged and boxed; and re-stacked in numerical order on pallets. Each pallet was shrink-wrapped for shipping to maintain pallet integrity. After this process was completed, 16 pallets of Phillips Petroleum core were shipped to the DFC and 54 pallets were shipped to Grand Junction.

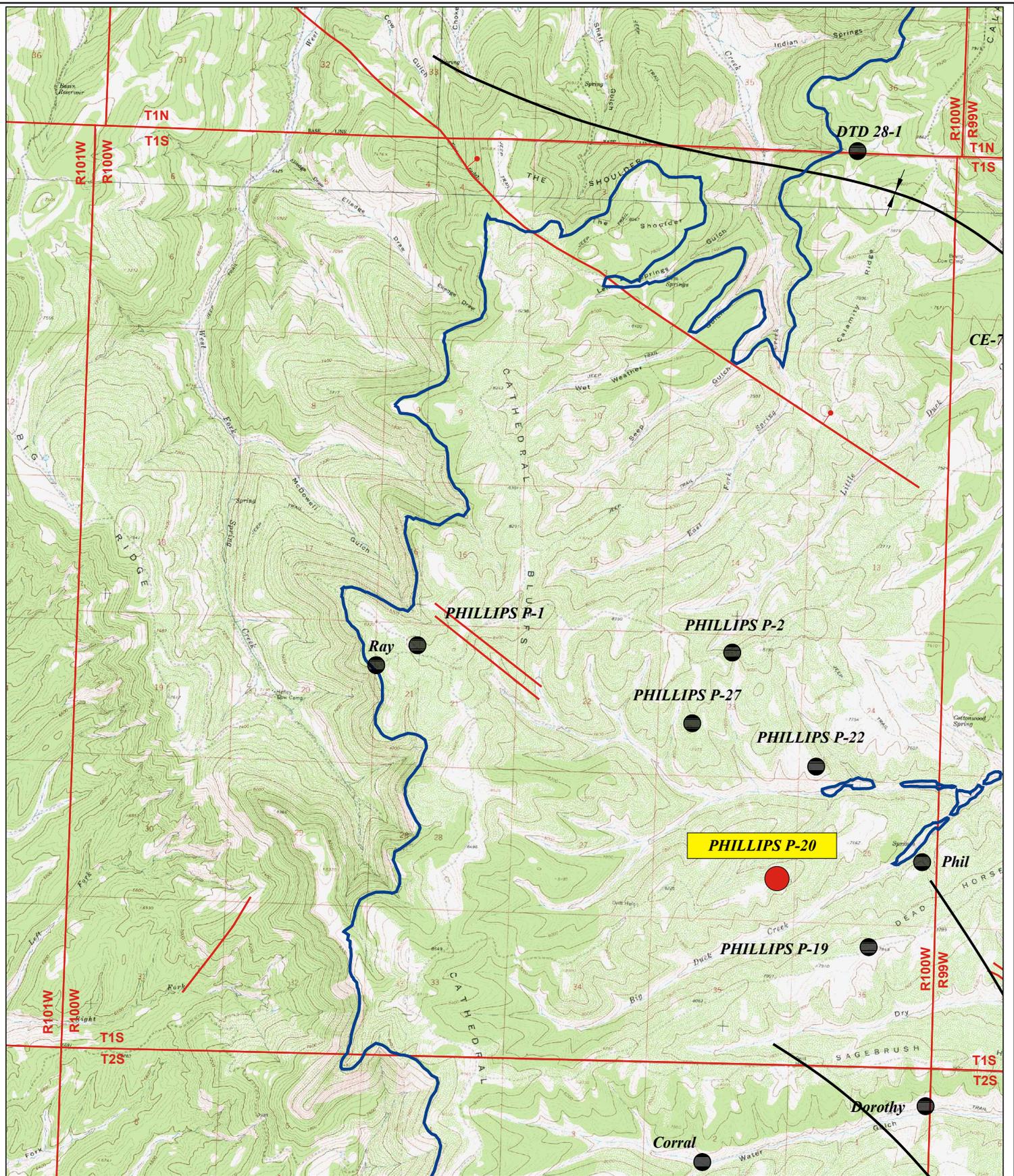
Daub geologists began organizing, logging, photographing, re-boxing and re-palletizing shale cores and selected cuttings in early November 2008. Boxes containing core samples were sorted by core hole number and depth onto new pallets. These pallets were sorted by descending core box number and inventoried. Most core samples had been marked with black footage marks, and blue (left) and red (right) orientation stripes (orientated downhole). The majority of the core had been split with a mechanical splitter or saw and continuous two foot samples taken for Fischer Assay. Mechanical splitting often destroyed the orientation and footage marks, so re-marking was required. Much of the sandstone, presumably of the Uinta Formation, was not split or sampled for Fischer Assay.

The core description process for SEPCo is being conducted at the Daub Core Handling Facility in Grand Junction, CO. Personnel consist of four geologists and four technicians. Work schedule is ten hours per day, five days per week. The facility is arranged to flow systematically in an assembly line approach starting with a washing station, moving to the alignment and marking station, and through to the description and photography station. The final step is drying and re-boxing. All activities are documented and electronically recorded in a database. The facility is safe and secure, with the health, safety and well-being of personnel and property being the highest priority. All personnel are trained in proper handling procedures and wearing of appropriate PPE is enforced.

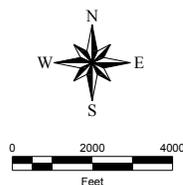
The processing array consists of two separate and parallel work lines, each processing core from different wells. A geologist describes and logs the core for a range of characteristics including but not limited to: general lithology (i.e. oil shale, mudstone, sandstone, and marlstone), noticeable stratigraphic features (i.e. laminations, fabric, pyrite, vug and fracture abundance, grain size, and calcite banding), and overall hydrocarbon richness. The core is digitally photographed in the PVC tray on a foot-by-foot basis using state-of-the-art computerized equipment. The split or cut side is photographed dry. The core is rotated within the tray 180° and the outer curved surface is photographed wet. The newly boxed core is padded with newspaper and bubble wrap to prevent movement within the box, stacked on pallets, shrink-wrapped, and labeled for future shipment.

All core, FA crushed samples, and rotary drill cutting boxes and pallets have been removed from the APM. The core processing portion of the project is currently (early 2009) on-going at both locations. As of January 19, 2009 approximately 5,200 feet of core have been processed at the Daub facility. Upon completion of this project, approximately 67,000 feet of core will have been processed.

**Phillips P-20**  
**General Core Hole Location Map**



- Core Hole Location
- +— Anticline
- - - Fault - dashed where approximate
- +— Syncline



**2009 Anvil Points Mine Core Recovery Program  
Well Location Map - Phillips P-20  
T1S, R100W, Section 26  
Rio Blanco County, Colorado**

Daub & Associates, Inc.

Date:  
April 15, 2009

**Phillips P-20**  
**Core Description Summary Report**

# Core Hole P-20 (Phillips) Core Description Summary Report

Piceance Creek Basin, Northwestern Colorado

Prepared by

**Daub & Associates, Inc.**

for

**Shell Exploration & Production Co., Inc.**

2009 Anvil Points Mine Recovered Core Description Program

## Introduction

The P-20 is a core hole originally drilled by Phillips Petroleum Company in 1981. The core hole is located in Township 1 South, Range 100 West, Section 26, in Rio Blanco County, Colorado (Figure 1). This location is on Shell Mahogany Full Interest property on the ridge north of Big Duck Creek in the NE quarter of the SE quarter of Section 26. Well information for this core hole is limited due to the fact that the core was obtained by the USGS from industry, stored in Denver, Colorado at the USGS core repository, and then subsequently moved into storage at the Anvil Points Mine near Rifle, Colorado. The core description referenced in this summary report was conducted post-removal (Fall 2008) from the Anvil Points Mine some 28 years after the core was originally drilled. Please refer to the Anvil Points Mine Boxed Core Processing Project document for information detailing the core handling and logging procedure (Appendix 1).

## Phillips P-20 General and Unique Findings Noted During Core Description

The P-20 well was cored from a depth of 10.0 to 1765.0 feet. Whole core was described from 10.0 to 79.0 feet. To be used for FA analysis, the core was slabbed approximately in half from 79.0'-1765.0'. This well had 240 intervals of core (between 0.2' and 1.6' thick, and found throughout the entirety of the well) that had previously been removed for laboratory testing, most of which correspond to spot Fischer Assay testing. Only one of these core intervals (830'-831') was listed as "taken for observation," while the rest were noted by Daub & Associates, Inc. geologists as "missing core." These samples were not present in their respective boxes, and were therefore not described. Box 58 (574.3'-584.1') was originally found to contain only 0.3' of core, but much of the rest of the interval was found later in Box 95 (939.9'-949.6') along with core from two other depth intervals (300's and 900's) of unknown origin. The interval for Box 95 itself was incomplete, jumbled, and took considerable effort to sort out and reconstruct. A large number of the boxes were in very poor shape, and contained core that was highly rearranged due to factors unknown. In these rearranged boxes of jumbled core, appropriate depths and core orientation were often indiscernible and the core was described as it lay in the original box, or was described after a best attempt at reconstruction was conducted. Box 98 (969.4'-979.1') was not received at the Daub & Associates Core Processing Facility in Grand Junction, Colorado. At the time of this report, the location of this box is still unknown.

Hydrocarbons predominantly in the form of **bitumen** (a reddish brown to black near-solid to solid hydrocarbon) and **oil stains** were noted weeping out of pores and laminae, as well as being present in fractures, tuffs, vugs, collapse breccia, soft sediment deformation and porous clastic bands at the depths and stratigraphic zones found in Table 1 below.

Major and minor fracture zones were largely comprised of high angle fractures with pyrite, calcite, or bitumen infilling, or a combination of the three and were present at the depths and stratigraphic zones found in Table 2 below. Major fracture intervals are especially notable for their abundant bitumen infilling and oil stains.

Vugs were more common in this well than many of the other Phillips wells described. Very small to large vugs were noted across the depths and stratigraphic zones found in Table 3 below. Nahcolite was not present in any form in this well.

The Mahogany Marker tuff bed was noted from 646.85'-647.3'. Additional tuff bands or series of tuffs greater than or equal to 0.3 feet thick were present at depths of 630.8'-631.2' (R-7 zone), 631.5'-632.0' (R-7 zone), 686.1'-686.55' (R-7 zone), 728.4'-729.5' (R-7 zone), 797.7'-798.0' (R-6 zone), 1021.5'-1022.5' (R-5 zone), 1691.2'-1691.6' (R-1 zone), and 1738.5'-1738.9' (R-0 zone).

A number of additional characteristics were notable for this well. Due to the high frequency of jumbled boxes of core, many of the core descriptions may not coincide directly with the Fischer Assay results. Care should be taken in attributing firm depths to many of the lithologies and stratigraphic top picks. Hydrocarbons were abnormally abundant in the R-6 stratigraphic zone. Vugs and tuff bands were more common than many of the other Phillips core holes. Though quite heavily fractured in some stratigraphic units, the UT was anomalously relatively unfractured. Only one fracture was logged between the depths of 1298' (L-3 zone) and TD at 1765' (R-0 zone). The R-8 stratigraphic zone was seen to be very lean, and was commonly sandy. The R-8 stratigraphic zone also included multiple sandstone clastic dikes or one continuous dike extending from at least 570.9'-598.3'. The A-Groove and B-Groove were found to be much more competent than they usually are in wells in other parts of the Piceance Basin. Pyrite was found to be heavily altered and decomposed in places, especially within and below the R-5 stratigraphic zone.

<b>Feature</b>	<b>Depth Interval (ft)</b>	<b>Stratigraphic Zone</b>
Bitumen	550-592	R-8
Bitumen	608-634	A-Groove and R-7
Bitumen/Oil Stains	646-652	R-7
Bitumen	692-694	R-7
Bitumen	716-718	R-7
Bitumen	735-756	R-7 and B-Groove
Bitumen/Oil Stains	771-836	R-6
Bitumen	843-893	R-6
Bitumen	903-905	R-6
Bitumen	914-916	R-6
Bitumen	928-942	R-6 and L-5
Bitumen	957-958	L-5
Bitumen	1025-1042	R-5
Bitumen	1054-1057	R-5
Bitumen	1074-1080	R-5
Bitumen	1159-1160	L-4
Bitumen	1171-1172	L-4
Bitumen	1220-1221	R-4
Bitumen	1261-1262	R-4
Bitumen	1405-1406	R-2

**Table 1.** Hydrocarbon occurrence in the P-20 well.

<b>Feature</b>	<b>Depth Interval (ft)</b>	<b>Stratigraphic Zone</b>
Major	539-592	R-8
Major	608-629	A-Groove and R-7
Major	734-747	R-7 and B-Groove
Major	859-882	R-6
Minor	221-225	UT

Minor	473-477	UT
Minor	508-523	R-8
Minor	843-854	R-6
Minor	889-910	R-6
Minor	941-969	L-5
Minor	989-995	L-5
Minor	1168-1179	L-4 and R-4

**Table 2.** Major and minor fracture interval in the P-20 well.

<b>Feature</b>	<b>Depth Interval (ft)</b>	<b>Stratigraphic Zone</b>
Vug	612-615	A-Groove
Vug	697-698	R-7
Vug	705-706	R-7
Vug	741-749	B-Groove
Vug	778-779	R-6
Vug	798-801	R-6
Vug	821-830	R-6
Vug	843-846	R-6
Vug	871-882	R-6
Vug	916-923	R-6
Vug	952-953	L-5
Vug	996-997	L-5
Vug	1030-1034	R-5
Vug	1047-1064	R-5
Vug	1081-1106	R-5
Vug	1133-1135	R-5
Vug	1147-1148	R-5
Vug	1178-1221	R-4

**Table 3.** Vug occurrence in the P-20 well.

# Phillips P-20 Core Data Examples

# Anvil Points Mine Core Description Legend

FEATURES	
CODE	DESCRIPTION
BIT	bitumen
CB	collapsed breccia
CLB	clay band
CV	collapsed vug
DZ	dissolution zone
F	featureless rock
FxS	fracture swarm
FZ	fissile zone
LB	lean band
MARL	marlstone band
MB	massive band
MF	microfaults
NB	nahcolite band/bedded
NM	nahcolite microcrystalline
NN	nahcolite nodules
O	other
OF	oxidation feature
ORG	organic band
PB	porous band
R	rubble
RB	rich band
SBB	streaked-blebby band
SLTB	siltstone band
SLTL	siltstone lens
SSB	sandstone band
SSD	soft sediment deformation
SSL	sandstone lens
TB	tuff band
TL	tuff lens
V	vug

LITHOLOGY	
CODE	DESCRIPTION
CB	collapsed breccia
CLYST	claystone
CS	crushed sample
CSR	core sample removed
INTRBD	interbedded
LC	lost core
MARL	marlstone
MRLSS	marly sandstone
MC	missing core
MS	mudstone
NAHC	nahcolite
OS	oil shale
SLTCS	silty claystone
SLTMRL	silty marlstone
SLTMS	silty mudstone
SLTST	siltstone
SS	sandstone

RICHNESS	
CODE	DESCRIPTION
L	lean (0-10 gal/ton)
M	moderate (10-20 gal/ton)
MR	moderately rich (20-30 gal/ton)
R	rich (30-40 gal/ton)
VR	very rich (40-50 gal/ton)

LITHOLOGIC FABRIC	
CODE	DESCRIPTION
B	blebby
L	laminated
M	massive
S	streaked

FRACTURE STATUS	
CODE	DESCRIPTION
C	closed
O	open
PO	partially open

FRACTURE INFILLING	
CODE	DESCRIPTION
BIT	bitumen
Ca	calcite
CaP	calcite/pyrite
Cl	clay
D	dolomite
FeO	Fe oxide
GIL	gilsonite
N	none
NAHC	nahcolite
O	other
Org	organic
P	pyrite
UNK	unknown

PYRITE AMOUNT	
CODE	DESCRIPTION
N	none
SL	slight
M	moderate
A	abundant

Company: Phillips  
Well: P-20  
Elevation, ft: 7963.0

Section: 26  
Township: 1 South  
Range: 100 West  
County: Rio Blanco, CO

Date: 1/27/09  
Geologist: PED



Depth, ft.	Box No.	Strat	FA Oil g/ton 0 50	Graphic	Feature	Top Depth, ft	Bottom Depth, ft	Comments	Fx Open	Fx Angle	Fx Infill	Fx, # per ft	Vug Poros, %	Nahcolite, %	Pyrite Amt.	Top Depth, ft	Bottom Depth, ft	Lithology	Richness	Fabric	Color	Comments	
625			23.9		SLTL	625.05	626.13	Abt bands & lenses; some w/ bit infilling				0			SL								
626		R-7			SLTL	626.56	626.6					0			SL	625.65	628.6	OS MR L			5YR 3/2 10YR 5/4	* R-7 top: 625.65 Well to discontinuously laminated w/ occ silty streaks & lenses; richness increases with depth	
627			17.3		SBB	627.33	627.54	V thin streaks	PO	84	BIT				SL								
628					PB	627.8	627.83	Band & lenses w/ abt bitumen infilling							SL								
629	Box 63		11.1		SLTB	628.28	628.3		0	46	P				SL								
629			14.7		SLTL	628.9	628.92	Thin, msu ellipsoid							SL	628.6	629.0	OS M L			10YR 5/4 10YR 4/2	Well laminated; occ silty bands & lenses	
629			8.7									0				629.0	629.7	MC					
630			8.6		PB	629.85	630.0	Mult bands & lenses; abt bitumen in places							SL	629.7	630.15						Same as lithology above MC

Company: Phillips

Well: P-20

Elevation, ft: 7963.0

Section: 26

Township: 1 South

Range: 100 West

County: Rio Blanco, CO

Date: 1/27/09

Geologist: PED

Daub and Associates, Inc.



Depth, ft.	Box No.	Strat	FA Oil g/ton 0 50	Graphic	Feature	Top Depth, ft	Bottom Depth, ft	Comments	Fx Open	Fx Angle	Fx Infill	Fx, # per ft	Vug Poros, %	Nahcolite, %	Pyrite Amt.	Top Depth, ft	Bottom Depth, ft	Lithology	Richness	Fabric	Color	Comments	
630					SLTB	630.03	630.34	Abt thin bands & lenses				0			SL	630.15	632.8	OS MR L			5YR3/2 10YR4/2	Well laminated; mult tuff bands w/ bitumen infilling; occ silty lenses	
631		R-7	15.5		MSV MB SLTL TB	630.7 630.78 630.84	630.77 630.82 631.01	Bitumen infilling				0			SL								
					TB	631.12	631.17	Highly altered; some bitumen infilling				0			SL								
632					TB	631.54	632.02	Mahogany Marker w/abt bitumen infilling; thin os interbed @ base				0			SL								
					SLTL	632.25	632.6	Abt lenses; some w/ bitumen infilling				0			SL								
633			20.2		SLTL	633.2	633.64	Mult bands & lenses; poss bitumen fill in some				0			SL	632.8	638.2	OS M L			10YR5/4 10YR4/2	Discontinuously laminated; occ silty lenses	
												0			SL							Generally homogeneous	
634												0			SL							Common pyr bands + lenses	
												0			SL							Occ on zones w/ x-talline pyr.	
635												0			SL								



Phillips P-20  
Sec.26, T01S, R100W  
Box 63 (623.8-633.7)  
631 - 632 Dry



DAUB & ASSOCIATES, INC.  
  
GRAND JUNCTION, CO - ESTABLISHED IN 1982  
Geology, Hydrology & Project Management



Phillips P-20  
Sec.26, T01S, R100W  
Box 63 (623.8-633.7)  
631 - 632 Wet



DAUB & ASSOCIATES, INC.  
  
GRAND JUNCTION, CO - ESTABLISHED IN 1982  
Geology, Hydrology & Project Management

**Phillips P-20  
Electronic Data CDs**

# Phillips P-20

## List of Abbreviations

## Abbreviations Commonly Found in Daub & Associates, Inc. Reports

### Abbreviations Commonly Found with Survey Information

FEL	From East Section Line
FNL	From North Section Line
FSL	From South Section Line
FWL	From West Section Line
GL	Ground Level
NAD	North American Datum
TOC	Top of Casing

### Abbreviations Commonly Found in Daily Drilling Reports

Circ	Circulation or Circulate
Cmt	Cement
Csg	Casing
gpm	gallons per minute
LEL	Lower Explosion Limit
Prog	Prognosis
psi	pounds per square inch
rpm	revolutions per minute
TD	Total Depth
TIH	Trip in Hole
TOC	Top of Cement
TOH/TOOH	Trip out of Hole

### Abbreviations Commonly Found in Diagrams or Data Sheets

#	Number	MB	Mahogany Bed
API#	American Petroleum Institute number	MD	Measured Depth
BHP	Bottom Hole Pressure	N/A or na	not applicable
BHT	Bottom Hole Temperature	nd	no data
BST	Bottom Seal Test	nr	not recorded
BTC	Bellaire Technology Center	OD	Outside Diameter
D & A	Daub & Associates, Inc	P&A	Plugged and Abandoned
Deg C	Degrees Celsius	P atm	Pressure, atmospheric
Dirr Thick	Directional Thickness	R/L Zone	Rich/Lean Zone
DS	Dissolution Surface	RQD	Rock Quality Designation
Est	Estimated	sks	sacks
FA Grade (Gal/Ton)	Fischer Assay Grade	T amb	Temperture, ambient
Grv	Groove	TI	TI Nahcolite Bed
GW	Groundwater		
HD	High Density Marker	TVD	True Vertical Depth
ID	Inside Diameter	UT	Uinta Transition
in Hg	inches Mercury	Vert	Vertical
lb/ft	pounds per foot		

## Abbreviations Commonly Found in Daub & Associates, Inc. Reports

### Abbreviations used for Rock Descriptions (Core, cuttings and outcrop)

abt	abundant	com	common
agg	aggregate	cont	contorted
ang	angular	crm	cream
app	appearance	xln	crystalline
ard	around	xtals	crystals
aa	as above	def	deformed
band	banded	dk	dark
bed	bedded, bedding	descr	description
biot	biotite	difus	diffuse
bit	bitumen	dissem	disseminated
blb	blebby	dissl	dissolved
blk	black	discont	discontinuous
blu	blue	dis	disturbed
brec	breccia, brecciated	dol	dolomite
br	bright	f	fine-grained
brn	brown	fx	fracture
calc	calcareous, calcite	gy	gray
carb	carbonaceous	grn	green
cmt	cement, cementing	hd	hard
clayst	claystone	HC	honeycomb
c	coarse-grained	indst	indistinct
coat	coatings	intbd	interbedded
CB	collapse breccia	IB	interbedded
incr	increasing	spl	sample
IP	in part	ss	sandstone
lam	laminations	scat	scattered
ln	lean	sh	shale
lt	light	shle	shale
mkr	marker	slt	silt
med	medium	sltst	siltstone
m	medium-grained	mrlst	marlstone
MFlt	microfaulted	mass	massive
Mfrac	microfractured	mat	material
mod	moderate	sl	slight
mudst	mudstone	sp	specks
nahc	nahcolite	str	streaky, streaked
occ	occasional	strless	structureless
os	oil shale	tan	tan
orn	orange	tx	texture, textured
org	organic	thru	throughout
ox	oxidized	tt	tight
pale	pale	tr	trace
pnk	pink	v	very
por	porous	vf	very fine
poss	possibly	vv	very, very
pyr	pyrite	vvf	very, very fine
Qtz	quartz	wav	wavy
rr	rare	wk	weak
red	red	wht	white
rch	rich	xln	crystalline
rgh	rough	xtals	crystals
rnd	round	ylw	yellow

**Munsell Color Code Abbreviations Commonly Found in Daub and Associates, Inc.  
Reports**

<b>CODE</b>	<b>DESCRIPTION</b>		<b>5BG 3/2</b>	<b>DUSKY BLUE GREEN</b>
5R 8/2	GRAYISH PINK		5B 8/2	VERY PALE BLUE
5R 7/4	MODERATE PINK		5B 7/6	LIGHT BLUE
5R 6/2	PALE RED		5B 6/2	PALE BLUE
5R 6/6	LIGHT RED		5B 5/6	MODERATE BLUE
5R 5/4	MODERATE RED		5PB 7/2	PALE BLUE
5R 4/2	GRAYISH RED		5PB 5/2	GRAYISH BLUE
5R 4/6	MODERATE RED		5PB 3/2	DUSKY BLUE
5R 3/4	DUSKY RED		5RP 8/2	PALE PINK
5R 2/2	BLACKISH RED		5RP 6/2	PALE RED PURPLE
5R 2/6	VERY DARK RED		5RP 4/2	GRAYISH RED PURPLE
5R 8/4	MODERATE ORANGE PINK		5RP 2/2	VERY DUSKY PURPLE
5YR 7/2	GRAYISH ORANGE PINK		10R 8/2	GRAYISH ORANGE PINK
5YR 6/4	LIGHT BROWN		10R 7/4	MODERATE ORANGE PINK
5YR 5/2	PALE BROWN		10R 6/2	PALE RED
5YR 5/6	LIGHT BROWN		10R 6/6	MODERATE REDDISH ORANGE
5YR 3/4	MODERATE BROWN		10R 5/4	PALE REDDISH BROWN
5YR 4/4	MODERATE BROWN		10R 4/2	GRAYISH RED
5YR 3/2	GRAYISH BROWN		10R 4/6	MODERATE REDDISH BROWN
5YR 2/2	DUSKY BROWN		10R 3/4	DARK REDDISH BROWN
5YR 8/1	PINKISH GRAY		10R 2/2	VERY DUSKY RED
5YR 6/1	LIGHT BROWNISH GRAY		10YR 8/2	VERY PALE ORANGE
5YR 4/1	BROWNISH GRAY		10YR 8/6	PALE YELLOWISH ORANGE
5YR 2/1	BROWNISH BLACK		10YR 7/4	GRAYISH ORANGE
5Y 8/4	GRAYISH YELLOW		10YR 6/2	PALE YELLOWISH BROWN
5Y 7/2	YELLOWISH GRAY		10YR 6/6	DARK YELLOWISH ORANGE
5Y 7/6	MODERATE YELLOW		10YR 5/4	MODERATE YELLOW BROWN
5Y 6/4	DUSKY YELLOW		10YR 4/2	DARK YELLOWISH BROWN
5Y 5/2	LIGHT OLIVE GRAY		10YR 2/2	DUSKY YELLOWISH BROWN
5Y 5/6	LIGHT LIVE BROWN		10Y 8/2	PALE GREENISH YELLOW
5Y 4/4	MODERATE OLIVE BROWN		10Y 7/4	MODERATE GREENISH YELLOW
5Y 3/2	OLIVE GRAY		10Y 6/2	PALE OLIVE
5Y 8/1	YELLOWISH GRAY		10Y 6/6	DARK GREENISH YELLOW
5Y 6/1	LIGHT OLIVE GRAY		10Y 5/4	LIGHT OLIVE
5Y 4/1	OLIVE GRAY		10Y 4/2	GRAYISH OLIVE
5Y 2/1	OLIVE BLACK		10GY 7/2	PALE YELLOWISH GREEN
5GY 7/2	GRAYISH YELLOW GREEN		10GY 6/4	MODERATE YELLOWISH GREEN
5GY 7/4	MODERATE YELLOW GREEN		10GY 5/2	GRAYISH GREEN
5GY 5/2	DUSKY YELLOW GREEN		10GY 4/4	DARK YELLOWISH GREEN
5GY 3/2	GRAYISH OLIVE GREEN		10GY 3/2	DUSKY YELLOWISH BROWN
5GY 8/1	LIGHT GREENISH GRAY		10G 8/2	VERY PALE GREEN
5GY 6/1	GREENISH GRAY		10G 6/2	PALE GREEN
5GY 4/1	DARK GREENISH GRAY		10G 4/2	GRAYISH GREEN
5G 7/2	PALE GREEN		N 9	WHITE
5G 7/4	LIGHT GREEN		N 8	VERY LIGHT GRAY
5G 6/6	BRILLIANT GREEN		N 7	LIGHT GRAY
5G 5/2	GRAYISH GREEN		N 6	MEDIUM LIGHT GRAY
5G 5/6	MODERATE GREEN		N 5	MEDIUM GRAY
5G 3/2	DUSKY GREEN		N 4	MEDIUM DARK GRAY
5G 2/1	GREENISH BLACK		N 3	DARK GRAY
5BG 5/2	GRAYISH BLUE GREEN		N 2	GRAYISH BLACK
5BG 4/6	MODERATE BLUE GREEN		N 1	BLACK