January 3, 2014

INJ Facility # 159219
DOC #2614592

Mr. James Taloumis
Weld County Department of Public Health and Environment
PO Box 758
Greeley, CO 80632

Subject: **Site Groundwater Monitoring Plan Update**
Synergy Resources Corporation – 15-18 I Injection Well (Synergy 15-18 I) Facility
SE 1/4, NE 1/4, Sec. 18, T6N, R63W 05-123-25694
33525 HWY 392
Barnesville, Colorado
CGRS Project No. 1-10488-14367aa

Dear Mr. Taloumis:

This correspondence summarizes the water quality monitoring program located at the above-referenced active exploration & production water Class II injection/disposal facility. The baseline groundwater quality sampling activities began on November 23, 2011, and have generally been completed on a quarterly basis since that time per the Apollo Operating, LLC Groundwater Monitoring Plan dated March 26, 2009. Synergy Resources Corporation purchased the facility on November 12, 2013, and is submitting this Groundwater Monitoring Plan update to account for facility changes that have occurred since the submittal of the original plan. Site Location, Area Use, and Site Conditions maps are included as Figures 1 through 3, respectively.

Since the submittal of the original Groundwater Monitoring Plan on March 26, 2009, the following primary facility upgrades and additions have been completed:

- The quantity of tanks has increased to twelve production water tanks, six oil tanks, an unloading flat tank, and an unloading pad slop tank.
- The facility layout has changed to accommodate additional system tanks.
- Concrete diked and lined secondary containment has been installed for all tanks and above-ground piping at the facility.

The water quality monitoring program outlined in this Groundwater Monitoring Plan update provides baseline groundwater quality data, which will facilitate early detection of an unknown release of production water related to facility production water storage and injection operations. In addition to groundwater sampling, depth to groundwater will be measured in each monitoring well and the groundwater elevation, flow direction, and hydraulic gradient will be calculated using surveyed well elevations in order to monitor groundwater flow trends.

Water quality samples will be collected and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), total dissolved solids (TDS), and chlorides. Water quality sampling activities for the Synergy 15-18 I facility will be performed on a semi-annual basis, which has been adjusted from quarterly sampling based on eleven sampling events indicating no historic detection of BTEX, or concentrations of TDS and chlorides above historic baseline background levels. Furthermore, facility construction upgrades have included secondary containment of all aboveground storage tanks (ASTs) and process water piping within concrete walled and lined containment areas.

On November 18 and 19, 2011, a total of five permanent groundwater monitoring wells (MW-1 through MW-5) were installed up-gradient, adjacent to, and down-gradient of facility operation areas. The monitoring wells were installed to a depth of approximately 30 feet below ground surface (bgs). Pertinent information, such as soil sample descriptions of color, texture, consistency, moisture content, and soil vapor readings along with well construction details of each monitoring well are provided in Attachment A. Based on information collected during well installation activities, the

subsurface lithology generally consists of silty-sand with intermittent lenses of sandy lean clay from the surface to a depth of approximately 30 feet bgs.

The wells were constructed with approximately 20 feet of 2-inch diameter, 10-slot PVC screen and approximately 10 feet of solid PVC riser. 20/40 silica sand surrounds the screened portion of the wells to a depth of approximately 2 feet above the well screen, at which point the well borings are sealed with a hydrated bentonite/grout mixture to the surface. Monitoring wells have been finished with an 8-inch flush-mounted aluminum man-way with a locking j-plug well seal. Additional monitoring wells may be installed based on supplementary facility construction or changes in the groundwater flow.

A full description of CGRS' Methods and Procedures for field and reporting activities are provided in Attachment B. CGRS will begin semi-annual groundwater monitoring in January 2014. Should you have any questions or require additional information, please call Mr. Craig Mulica at (800) 288-2657.

Sincerely,
CGRS, Inc.,

Craig S. Mulica
Project Manager/Geologist

Reviewed by:

Randy Kenyon, P.G., P.E.
Mgr. Environmental Services

Enclosures:

Figures:

Figure 1 – Site Location Map
Figure 2A – Area Use Map
Figure 2B – Site Conditions Map

Table 1 – Summary of Historic Groundwater Elevation and Analytical Data

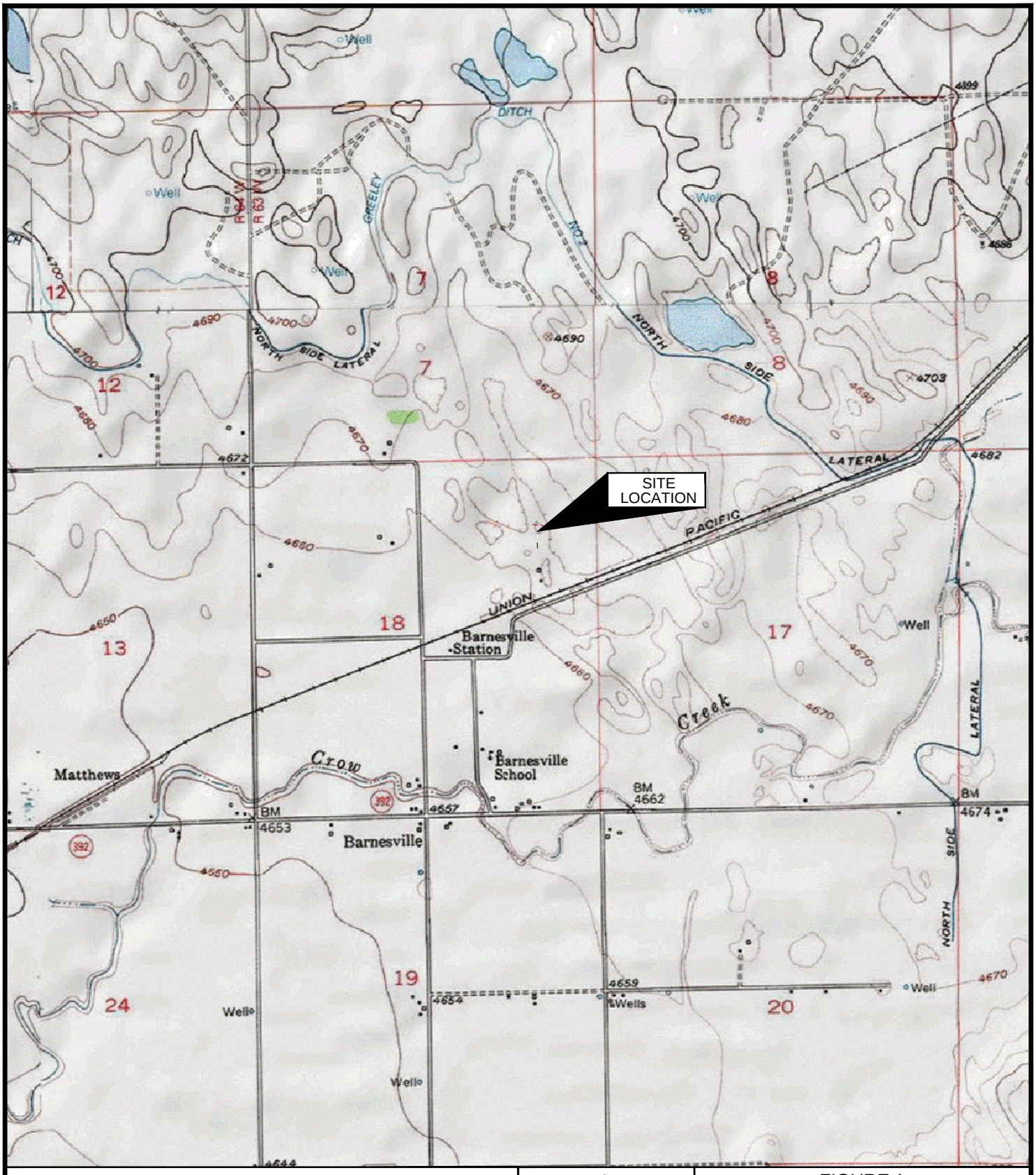
Attachments:

Attachment A: Synergy Resources Corporation 15-18 I Injection Facility Soil Boring Logs
Attachment B: CGRS' Field and Reporting Methods and Procedures

ec:

Ms. Rhonda Sandquist – Synergy Resources Corporation; rsandquist@syrginfo.com
Mr. James Taloumis – Weld County Department of Public Health and Environment; jtaloumis@co.weld.co.us
Ms. Lauren Light – Weld County Department of Public Health and Environment; llight@co.weld.co.us
Mr. Bob Chesson - Colorado Oil and Gas Conservation Commission (COGCC); robert.chesson@state.co.us

FIGURES



COLORADO

■ QUADRANGLE LOCATION

0 1000 2000

SCALE IN FEET

FIGURE 1
SITE LOCATION MAP

SYNERGY RESOURCES CORPORATION
15-18 I INJECTION FACILITY
SE 1/4, NE 1/4, Sec. 18, T6N, R63W
BARNESVILLE, COLORADO

PROJECT:	DRAFT:
1-10488-14367aa	MSP
DATE:	REVIEW:
12/19/2013	

CGRS ENVIRONMENTAL CONSTRUCTION COMPLIANCE

0 50 100 150

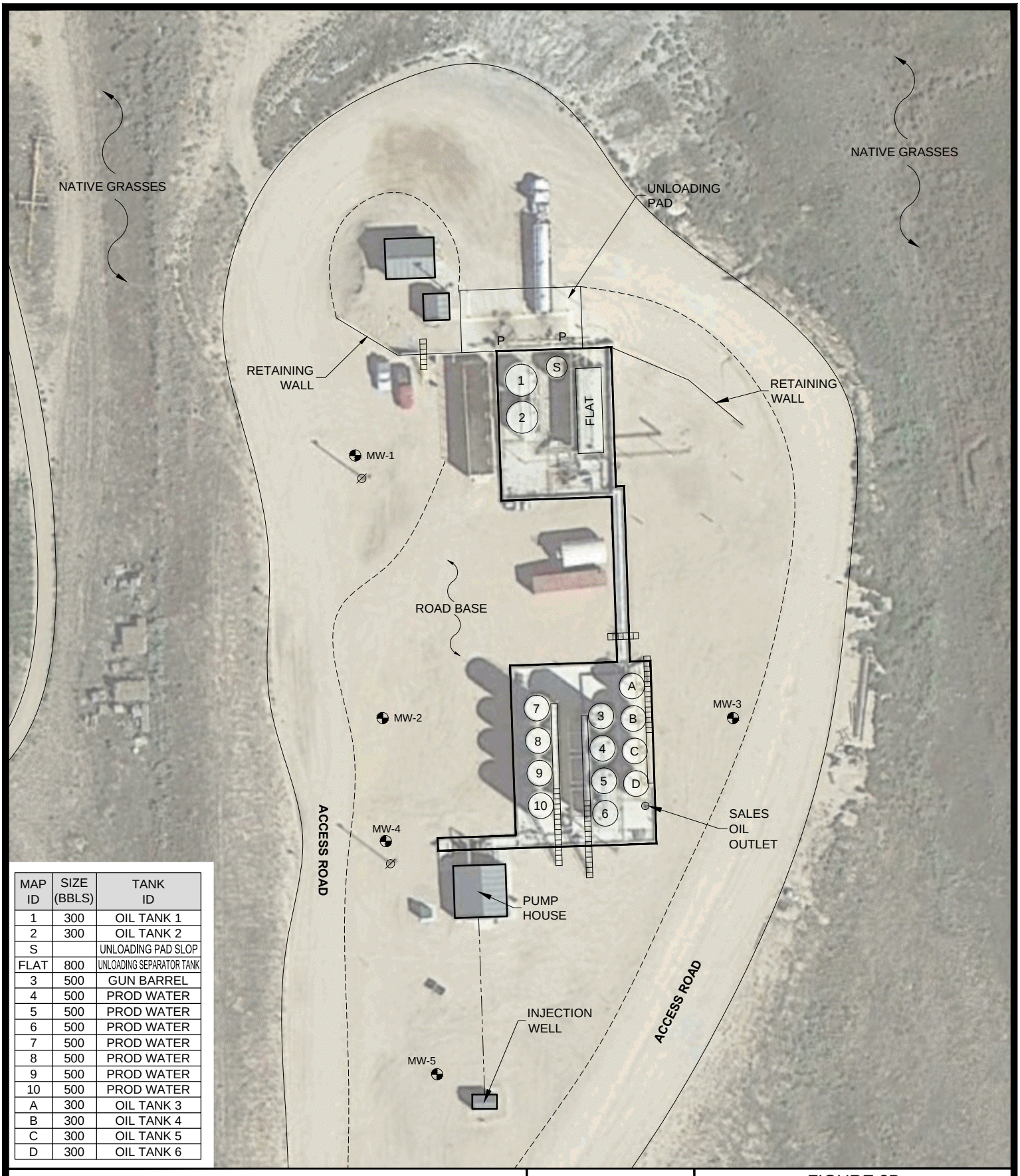
SCALE IN FEET

FIGURE 2A
AREA USE MAP

SYNERGY RESOURCES CORPORATION
15-18 I INJECTION FACILITY
SE 1/4, NE 1/4, Sec. 18, T6N, R63W
BARNESVILLE, COLORADO

PROJECT:	DRAFT:
1-10488-14367aa	MSP
DATE:	REVIEW:
12/20/2013	

CGRS ENVIRONMENTAL CONSTRUCTION COMPLIANCE



MAP ID	SIZE (BBLS)	TANK ID
1	300	OIL TANK 1
2	300	OIL TANK 2
S		UNLOADING PAD SLOP
FLAT	800	UNLOADING SEPARATOR TANK
3	500	GUN BARREL
4	500	PROD WATER
5	500	PROD WATER
6	500	PROD WATER
7	500	PROD WATER
8	500	PROD WATER
9	500	PROD WATER
10	500	PROD WATER
A	300	OIL TANK 3
B	300	OIL TANK 4
C	300	OIL TANK 5
D	300	OIL TANK 6

LEGEND

- MW-5 — GROUNDWATER MONITORING WELL
- ∅ — UTILITY POLE
- ○ — SALES OIL OUTLET
- P — TRANSFER PUMP
- STAIRS
- CONCRETE SECONDARY CONTAINMENT BERM
- SUBSURFACE FLOWLINE

0 10 20 30 40 50 60

SCALE IN FEET

FIGURE 2B
SITE CONDITIONS MAP

SYNERGY RESOURCES CORPORATION
15-18 I INJECTION FACILITY
SE 1/4, NE 1/4, Sec. 18, T6N, R63W
BARNESVILLE, COLORADO

PROJECT:	DRAFT:
1-10488-14367aa	MSP
DATE:	REVIEW:
1/2/2014	

CGRS ENVIRONMENTAL CONSTRUCTION COMPLIANCE

TABLES

TABLE 1

GROUNDWATER ANALYTICAL DATA
Synergy Resources Corporation 15-18 I Injection Facility
33525 HWY 392
Barnesville, Colorado

CGRS Project: 1-10488-14367aa

Sample ID	Date (mm/dd/yy)	Surveyed Well Elevation (ft)	Depth To Water (ft)	Groundwater Elevation (ft)	Benzene (mg/L)	Toluene (mg/L)	Ethyl-Benzene (mg/L)	Xylenes (mg/L)	TDS (mg/L)	Chlorides (mg/L)	Sulfate (mg/L)
MW-1	11/23/09	100.00	10.50	89.50	<0.0005	<0.0005	<0.0005	<0.0015	4,980	356	2,327
MW-1	03/08/10	100.00	9.50	90.50	<0.0005	<0.0005	<0.0005	<0.0015	3,060	176	1,910
MW-1	06/29/10	100.00	8.01	91.99	<0.0005	<0.0005	<0.0005	<0.0015	4,070	250	2,650
MW-1	09/30/10	100.00	11.00	89.00	<0.0005	<0.0005	<0.0005	<0.0015	4,900	295	2,670
MW-1	12/21/10	100.00	11.10	88.90	<0.0005	<0.0005	<0.0005	<0.0015	4,750	351	3,170
MW-1	03/23/11	100.00	10.63	89.37	<0.0005	<0.0005	<0.0005	<0.0015	4,770	260	2,400
MW-1	06/10/11	100.00	9.18	90.82	<0.0005	<0.0005	<0.0005	<0.0015	3,330	216	2,200
MW-1	09/12/11	100.00	10.93	89.07	<0.0005	<0.0005	<0.0005	<0.0015	4,010	275	2,220
MW-1	10/03/12	100.00	11.89	88.11	<0.0005	<0.0005	<0.0005	<0.0015	5,070	372	3,170
MW-1	04/12/13	100.00	11.08	88.92	<0.0005	<0.0005	<0.0005	<0.0015	3,810	230	2,280
MW-1	10/15/13	100.00	12.15	87.85	<0.0005	<0.0005	<0.0005	<0.0015	6,150	486	3,580
MW-2	11/23/09	98.70	10.32	88.38	<0.0005	<0.0005	<0.0005	<0.0015	4,880	265	2,424
MW-2	03/08/10	98.70	9.43	89.27	<0.0005	<0.0005	<0.0005	<0.0015	2,730	123	1,430
MW-2	06/29/10	98.70	7.92	90.78	<0.0005	<0.0005	<0.0005	<0.0015	5,510	346	2,940
MW-2	09/30/10	98.70	10.79	87.91	<0.0005	<0.0005	<0.0005	<0.0015	9,190	370	3,150
MW-2	12/21/10	98.70	10.99	87.71	<0.0005	<0.0005	<0.0005	<0.0015	6,100	393	3,830
MW-2	03/23/11	98.70	12.23	86.47	<0.0005	<0.0005	<0.0005	<0.0015	3,190	166	1,660
MW-2	06/10/11	98.70	9.13	89.57	<0.0005	<0.0005	<0.0005	<0.0015	3,200	155	1,550
MW-2	09/12/11	98.70	10.74	87.96	<0.0005	<0.0005	<0.0005	<0.0015	4,980	336	2,940
MW-2	10/03/12	98.70	11.75	86.95	<0.0005	<0.0005	<0.0005	<0.0015	6,390	443	3,890
MW-2	04/12/13	98.70	11.03	87.67	<0.0005	<0.0005	<0.0005	<0.0015	3,250	153	1,670
MW-2	10/15/13	98.70	12.08	86.62	<0.0005	<0.0005	<0.0005	<0.0015	6,870	516	4,230
MW-3	11/23/09	101.70	11.90	89.80	<0.0005	<0.0005	<0.0005	<0.0015	4,430	249	2,203
MW-3	03/08/10	101.70	10.87	90.83	<0.0005	<0.0005	<0.0005	<0.0015	4,750	217	2,520
MW-3	06/29/10	101.70	9.54	92.16	<0.0005	<0.0005	<0.0005	<0.0015	8,620	429	5,350
MW-3	09/30/10	101.70	12.80	88.90	<0.0005	<0.0005	<0.0005	<0.0015	8,380	453	4,670
MW-3	12/21/10	101.70	12.83	88.87	<0.0005	<0.0005	<0.0005	<0.0015	7,070	492	4,540
MW-3	03/23/11	101.70	10.51	91.19	<0.0005	<0.0005	<0.0005	<0.0015	5,960	329	3,330
MW-3	06/10/11	101.70	10.85	90.85	<0.0005	<0.0005	<0.0005	<0.0015	6,600	342	3,820
MW-3	09/12/11	101.70	12.64	89.06	<0.0005	<0.0005	<0.0005	<0.0015	7,770	476	4,760
MW-3	10/03/12	101.70	13.55	88.15	<0.0005	<0.0005	<0.0005	<0.0015	4,680	287	2,940
MW-3	04/12/13	101.70	10.93	90.77	<0.0005	<0.0005	<0.0005	<0.0015	3,520	163	1,990
MW-3	10/15/13	101.70	13.79	87.91	<0.0005	<0.0005	<0.0005	<0.0015	5,270	334	2,750
MW-4	11/23/09	99.40	10.18	89.22	<0.0005	<0.0005	<0.0005	<0.0015	3,890	232	1,987
MW-4	03/08/10	99.40	9.31	90.09	<0.0005	<0.0005	<0.0005	<0.0015	4,600	247	2,190
MW-4	06/29/10	99.40	7.80	91.60	<0.0005	<0.0005	<0.0005	<0.0015	4,960	338	3,110
MW-4	09/30/10	99.40	10.60	88.80	<0.0005	<0.0005	<0.0005	<0.0015	5,890	461	2,940
MW-4	12/21/10	99.40	10.85	88.55	<0.0005	<0.0005	<0.0005	<0.0015	5,850	439	3,620
MW-4	03/23/11	99.40	10.33	89.07	<0.0005	<0.0005	<0.0005	<0.0015	4,650	292	2,610
MW-4	06/10/11	99.40	9.03	90.37	<0.0005	<0.0005	<0.0005	<0.0015	4,610	257	2,640
MW-4	09/12/11	99.40	11.53	87.87	<0.0005	<0.0005	<0.0005	<0.0015	4,100	299	2,360
MW-4	10/03/12	99.40	12.05	87.35	<0.0005	<0.0005	<0.0005	<0.0015	5,180	334	3,090
MW-4	04/12/13	99.40	10.93	88.47	<0.0005	<0.0005	<0.0005	<0.0015	4,010	180	1,990
MW-4	10/15/13	99.40	11.94	87.46	<0.0005	<0.0005	<0.0005	<0.0015	4,620	311	2,880
MW-5	11/23/09	99.10	10.05	89.05	<0.0005	<0.0005	<0.0005	<0.0015	3,880	199	2,059
MW-5	03/08/10	99.10	9.26	89.84	<0.0005	<0.0005	<0.0005	<0.0015	4,520	224	2,150
MW-5	06/29/10	99.10	7.73	91.37	<0.0005	<0.0005	<0.0005	<0.0015	5,190	316	2,940
MW-5	09/30/10	99.10	10.46	88.64	<0.0005	<0.0005	<0.0005	<0.0015	5,630	317	3,010
MW-5	12/21/10	99.10	10.80	88.30	<0.0005	<0.0005	<0.0005	<0.0015	5,340	324	3,260
MW-5	03/23/11	99.10	10.31	88.79	<0.0005	<0.0005	<0.0005	<0.0015	6,350	368	3,580
MW-5	06/10/11	99.10	9.04	90.06	<0.0005	<0.0005	<0.0005	<0.0015	5,980	334	3,260
MW-5	09/12/11	99.10	10.39	88.71	<0.0005	<0.0005	<0.0005	<0.0015	4,570	244	2,590
MW-5	10/03/12	99.10	12.18	86.92	<0.0005	<0.0005	<0.0005	<0.0015	4,040	160	2,240
MW-5	04/12/13	99.10	12.68	86.42	<0.0005	<0.0005	<0.0005	<0.0015	3,560	189	2,180
MW-5	10/15/13	99.10	11.93	87.17	<0.0005	<0.0005	<0.0005	<0.0015	2,920	136	1,600
COGCC Allowable Concentration for sensitive area					0.005	0.56	0.7	1.4	-	-	-

Notes:

*Monitoring wells MW-1 through MW-5 sampled by Terracon Consultants, Inc. between November 24, 2009 and October 15, 2013
ft = foot
mg/L = milligrams per Liter
Values in **bold face** exceed MCLs
TDS = Total Dissolved Solids
COGCC = Colorado Oil and Gas Conservation Commission
NS = Not Sampled

ATTACHMENT A

Synergy Resources Corporation 15-18 I Soil Boring Logs

LOG OF WELL NO. 1

CLIENT
Apollo Operating, LLC

SITE **33525 HWY 392**
Barnesville, Colorado

PROJECT
Apollo 15-18, Waste Water Disposal Facility

DESCRIPTION

--

BOREHOLE DIA.:	**6-1/4 in**
WELL DIA.:	**2 in**
TOP OF PROTECTOR PIPE:	**-- ft**
TOP OF CASING:	**99.74 ft**
APPROX. GROUND SURFACE ELEV.:	**100 ft**

Depth (ft)	Description	Elev. (ft)
0–13	**SILTY SAND** Brown, tan, medium dense to dense	87
13–16	**SANDY LEAN CLAY** Brown, tan, stiff	84
16–28	**SILTY SAND** Brown, tan	72
28–30	**SANDY LEAN CLAY** Brown, tan	70

USCS SYMBOL	NUMBER	TYPE	RECOVERY, in.	BLOWS / ft.	WATER CONTENT, %	FIELD VAPOR TEST (PPM)*
SM	1	SS	18	11		0
SM	2	SS	18	17		0
SM	3	SS	18	14		0
SM	4	SS	18	17		0
SM	5	SS	18	10		0
SM	6	SS	18	30		0
CL	7	SS	18	10		0

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft		
WL	▽ 12	WD ▼ 10.5 11/25/09
WL	▽	▽
WL		

Terracon

BORING STARTED			11-18-09
BORING COMPLETED			11-18-09
RIG	CME 75	FOREMAN	CMG
APPROVED	DLH	JOB #	20087043

LOG OF WELL NO. 2

CLIENT: **Apollo Operating, LLC**

SITE: **33525 HWY 392, Barnesville, Colorado**

PROJECT: **Apollo 15-18, Waste Water Disposal Facility**

DESCRIPTION	
BOREHOLE DIA.:	6-1/4 in
WELL DIA.:	2 in
TOP OF PROTECTOR PIPE:	-- ft
TOP OF CASING:	98.40 ft
APPROX. GROUND SURFACE ELEV.:	98.7 ft

SILTY SAND
Brown, tan, loose to medium dense

28 — 70.5

SANDY LEAN CLAY
Brown, tan

30 — 68.5

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES BLOWS / ft.	TESTS WATER CONTENT, %	TESTS FIELD VAPOR TEST (PPM)*
0	SM	1	SS	18	6		0
5	SM	2	SS	18	13		2
	SM	3	SS	18	14		0
	SM	4	SS	18	12		2
10	SM	5	SS	18	10		6
	SM	6	SS	18	22		0
15							
20							
25							
30							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 11	WD	▼ 10.3211/25/09
WL	▼		▼
WL			

Terracon

BORING STARTED	11-18-09
BORING COMPLETED	11-18-09
RIG CME 75	FOREMAN CMG
APPROVED DLH	JOB # 20087043

WELL 99 20087043.GPJ FORT COLLINS 110308.GDT 12/23/09

LOG OF WELL NO. 3

CLIENT: **Apollo Operating, LLC**

SITE: **33525 HWY 392, Barnesville, Colorado**

PROJECT: **Apollo 15-18, Waste Water Disposal Facility**

DESCRIPTION	
BOREHOLE DIA.:	6-1/4 in
WELL DIA.:	2 in
TOP OF PROTECTOR PIPE:	-- ft
TOP OF CASING:	101.42 ft
APPROX. GROUND SURFACE ELEV.:	101.7 ft

SILTY SAND
Brown, tan, loose

25

76.5

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES BLOWS / ft.	TESTS WATER CONTENT, %	TESTS FIELD VAPOR TEST (PPM)*
	SM	1	SS	18	4		0
5	SM	2	SS	18	8		0
	SM	3	SS	18	7		0
	SM	4	SS	18	4		0
10	SM	5	SS	18	4		0
	SM	6	SS	18	5		0
15							
20							
25							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 11	WD	▼ 11.90 11/25/09
WL	▼		▼
WL			

Terracon

BORING STARTED	11-19-09		
BORING COMPLETED	11-19-09		
RIG	CME 75	FOREMAN	CMG
APPROVED	DLH	JOB #	20087043

WELL 99 20087043.GPJ FORT COLLINS 110308.GDT 12/23/09

LOG OF WELL NO. 4

CLIENT **Apollo Operating, LLC**

SITE **33525 HWY 392, Barnesville, Colorado**

PROJECT **Apollo 15-18, Waste Water Disposal Facility**

DESCRIPTION	
BOREHOLE DIA.:	6-1/4 in
WELL DIA.:	2 in
TOP OF PROTECTOR PIPE:	-- ft
TOP OF CASING:	99.08 ft
APPROX. GROUND SURFACE ELEV.:	99.4 ft

SILTY SAND
Brown, tan, loose to dense

28 — 71.5

SANDY LEAN CLAY
Brown, tan

30 — 69.5

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES BLOWS / ft.	TESTS WATER CONTENT, %	TESTS FIELD VAPOR TEST (PPM)*
0	SM	1	SS	18	7		0
5	SM	2	SS	18	11		0
	SM	3	SS	18	10		0
	SM	4	SS	18	7		0
10	SM	5	SS	18	13		0
	SM	6	SS	18	30		2
15							
20							
25							
30							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 11	WD	▽ 10.18 11/25/09
WL	▽		▽
WL			

Terracon

BORING STARTED	11-19-09		
BORING COMPLETED	11-19-09		
RIG	CME 75	FOREMAN	CMG
APPROVED	DLH	JOB #	20087043

WELL 99 20087043.GPJ FORT COLLINS 110308.GDT 12/23/09

LOG OF WELL NO. 5

CLIENT: **Apollo Operating, LLC**

SITE: **33525 HWY 392, Barnesville, Colorado**

PROJECT: **Apollo 15-18, Waste Water Disposal Facility**

DESCRIPTION	
BOREHOLE DIA.:	6-1/4 in
WELL DIA.:	2 in
TOP OF PROTECTOR PIPE:	-- ft
TOP OF CASING:	98.84 ft
APPROX. GROUND SURFACE ELEV.:	99.1 ft

SILTY SAND
Brown, tan, loose to dense

30 69

DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES BLOWS / ft.	TESTS WATER CONTENT, %	TESTS FIELD VAPOR TEST (PPM)*
	SM	1	SS	18	10		28
5	SM	2	SS	18	11		0
	SM	3	SS	18	14		0
	SM	4	SS	18	13		0
10	SM	5	SS	18	9		0
	SM	6	SS	18	23		0
15							
20							
25							
30							

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

* ND indicates a reading of less than the field detection limit (FDL) of one (1) part per million isobutylene equivalents (ppmi).

WATER LEVEL OBSERVATIONS, ft			
WL	▽ 14	WD	▼ 10.0511/25/09
WL	▼		▼
WL			

Terracon

BORING STARTED	11-18-09		
BORING COMPLETED	11-19-09		
RIG	CME 75	FOREMAN	CMG
APPROVED	DLH	JOB #	20087043

WELL 99 20087043.GPJ FORT COLLINS 110308.GDT 12/23/09

ATTACHMENT B

CGRS' Field and Reporting Methods and Procedures

METHODS AND PROCEDURES

Synergy Resources Corporation 15-18I Production Water Injection Facility

33525 HWY 392
Barnesville, Colorado
CGRS Project # 1-10488-14367aa

Soil Borings

Soil sampling will be conducted in accordance with ASTM:D 1586-08a. Using this procedure, a 2-inch O.D. split-spoon sampler will be driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sample an additional 12 inches, known as the penetration resistance (N value), will be recorded. The N value is an index of the relative density of cohesionless soils and the consistency of cohesive soils.

Soil Classification/Characterization

As samples are obtained in the field, they will be visually inspected and classified in accordance with ASTM:D 1488-84. Representative portions of the samples will then be retained for further examination and for verification of the various strata, the N value, water level data, and pertinent information regarding the method of maintaining and advancing the boring will be provided. Charts illustrating the soil classification procedure, descriptive terminology and symbols used on the logs will be provided. As samples are collected they will be examined for evidence of petroleum hydrocarbons using visual appearance, and by screening with portable photoionization detection equipment.

Decontamination

To avoid potential transport of contaminated materials to the project site, all drilling equipment and down-hole tools will be steam cleaned prior to mobilization. To prevent cross contamination between soil borings or monitoring wells all down-hole equipment will also be steam cleaned and rinsed with water between soil borings.

Monitoring Well Construction

Monitoring wells will be installed utilizing the following general construction criteria:

- borehole diameter: minimum 2.0 inches push probe / 6.25 inches conventional boring
- well diameter: 1 inch for push probe / 2 inches for conventional boring
- estimated depth: $\geq$ 5 feet below static groundwater table
- casing material: schedule 40, flush thread PVC

- well screen: 1 inch inside diameter (I.D.) for push probe / 2 inch I.D. for conventional boring, # 0.01 slot PVC
- estimated screened interval: 10 feet above and 10 feet below the groundwater table (may be adjusted based on total depth and water table position)
- annular pack: 10-20 silica sand
- protective casing: 4" aluminum above grade mount, locking cap; or 8" steel flush mount traffic rated manway.
- annular seal: cement grout and bentonite pellets.

Groundwater Sampling

All borings where groundwater is encountered will be sampled from the suspected cleanest to the most contaminated according to the protocols listed below. All pertinent information will be recorded on a sampling information form.

Field Protocol

Step 1 - Measure water level.

Step 2 - A dedicated polyethylene bailer will be used to develop each well. Three bore volumes will be evacuated from each well prior to sampling.

Step 3 - Collect water samples. Water samples will be collected using a polyethylene bailer.

Step 4 - Store samples in a cooler on ice (~4° Celsius) for transport to the laboratory. Follow all documentation and chain-of-custody procedures.

Step 5 - Clean equipment. Water level measurement equipment will be cleaned with ethanol followed by a distilled water rinse.

Upon completion of soil or groundwater sampling, a chain of custody log will be initiated. A copy of the chain of custody will be returned to the project manager.

Chemical Analysis

An approved contract laboratory will provide stationary laboratory analysis. The following analyses will be performed:

Soil Analyses

Chemical Parameters	Method Used
Benzene/Toluene/Ethylbenzene/Total Xylenes (BTEX)	EPA - 8260 B

Soil Analyses *(continued)*

Total Volatile Petroleum Hydrocarbons	EPA – 8260B

Water Analyses

Benzene/Toluene/Ethylbenzene/Total Xylenes (BTEX)	EPA - 8260 B
Total Dissolved Solids (TDS)	EPA - 160.1
Chlorides	EPA - 300.1

Groundwater Trend Analyses

Groundwater concentrations are measured in site monitoring wells on a semi-annual basis. Upon receiving groundwater analytical data from the laboratory the data is inserted into an historic groundwater analytical data table. Chlorides and TDS concentrations will be evaluated to ensure that the current concentrations in each well do not exceed 1.25 times the average background conditions. If results indicate that this threshold is exceeded, then further analyses or investigation will be conducted. Any BTEX constituents above the Colorado Oil and Gas Conservation Commission (COGCC) levels discovered in a monitoring well water quality sample will be reanalyzed at the laboratory. The presence of BTEX will prompt a complete evaluation of site operations since the last sampling event, and prompt further subsurface investigation if warranted.

Groundwater Elevation Measurements

The following outlines our standard groundwater quality sampling methodology. Before purging any of the soil test borings or monitoring wells, water level measurements must be taken.

Measuring Point

Establish the measuring point for the well. The measuring point is marked on the north side of the top of the monitoring well riser. The top of the riser is normally a 2-inch schedule 40 PVC casing inside a locked protective casing. The measuring point should be described on the groundwater sample collection record.

Access

After unlocking or opening a monitoring well, the first task will be to obtain a water level measurement. Water level measurements will be made using an electronic water level indicator. Depth to water and total depth of the well will be measured for calculation of purge volume.

Measurement

To obtain a water level measurement, lower a decontaminated electronic water level probe into the monitoring well. Care must be taken to assure that the electronic probe hangs freely in the monitoring well and is not adhering to the well casing. The electronic probe will be lowered into the well until the audible sound of the unit is detected and the light on the electronic sounder illuminates. At this time, the precise measurement should be determined by repeatedly raising and lowering the probe to obtain an exact measurement. The water level measurement is then entered on the groundwater sampling collection record sheet or groundwater level data sheet to the nearest 0.01 feet.

Decontamination

The electronic probe shall be decontaminated immediately after use by wiping with isopropyl alcohol-soaked paper towels and rinsed with distilled water. Always proceed in order from the suspected cleanest well or soil test boring to the suspected most contaminated one.

Purge Volume Computation

All soil test borings, monitoring wells, and temporary monitoring wells will be purged prior to sample collection. Depending upon the rate of recovery, three to five volumes of groundwater present in a well or borehole shall be withdrawn prior to sample collection. If a well or borehole bails dry, the well or borehole should be allowed to recharge and a sample taken as soon as there is sufficient volume for the intended analysis. The volume of water present in each well or borehole shall be computed using the two measurable variables, length of water column in soil boring or monitoring well depth and diameter.

Purging and Sample Collection Procedures

Bailing

- Obtain a laboratory decontaminated disposable bailer and a spool of nylon rope or equivalent bailer cord. Tie a bowline knot or equivalent through the bailer loop. Test the knot for adequacy by creating tension between the line and the bailer. Tie again if needed. New rope and bailer will be used for every sample or purge event. New clean latex gloves will be used when touching the rope or bailer.
- Spread a clean plastic sheet near the base of the well. The plastic sheet should be of sufficient size to prevent bailer or bailer rope from contacting the ground surface.
- Place the bailer inside the well to verify that an adequate annulus is present between the bailer and the well casing to allow free movement of the bailer.

- Lower the bailer carefully into the well casing to remove the sample from the top of the water column, taking care not to agitate the water in the well.
- Pour the bailed groundwater into a bucket. Once the bucket is full, transfer the water to a barrel and contain on-site. In lieu of purge water collection, and if adequate documentation of clean subsurface conditions exists, purged groundwater may be purged onto the ground surface where it may evaporate.
- Raise the bailer by grasping a section of cord, using each hand alternately. This bailer lift method will assure that the bailer cord will not come into contact with the ground or other potentially contaminated surfaces.

Sampling

- Instructions for obtaining samples for parameters are reviewed with the laboratory coordinator to insure that proper preservation and filtering requirements are met.
- Appropriate sample containers will be obtained from the contract laboratory for each individual analyses requested. After samples are collected, they will be put on ice in coolers (4°C). Care will be taken to prevent breakage during transportation or shipment.
- Samples collected by bailing will be poured directly into sample containers from bailers. The sample should be poured slowly to minimize air entrapment into the sample bottle. During collection, bailers will not be allowed to contact the sample containers.
- Upon completion of sampling a chain-of-custody log will be initiated. Chain-of-custody records will include the following information: project name and number, shipped by, shipped sampling point, location, field ID number, date, time, sample type, number of containers, analysis required and sampler's signature. The samples and chain-of-custody will be delivered to the laboratory. Upon arrival at the laboratory the appropriate laboratory personnel will check in the samples. Laboratory identification numbers will be noted on the chain-of-custody record. Upon completion of the laboratory analysis, the completed chain-of-custody record will be returned to the project manager.

Field Cleaning Procedures

For all equipment to be reused in the field, the following cleaning procedures must be followed:

- Disassemble the equipment to the extent practical.
- Wash the equipment with distilled water and laboratory-grade detergent.
- Rinse with distilled water until all detergent is removed.

- Rinse the equipment with isopropyl alcohol, making sure all surfaces, inside and out, are rinsed.
- Triple rinse the equipment with distilled water.

Laboratory Selection

The project manager should consider the following factors when selecting a laboratory:

- Capabilities (facilities, personnel, instrumentation), including:
- Participation in inter-laboratory studies (e.g., EPA or other Federal or State agency sponsored analytical programs);
- Certifications (e.g., Federal or State);
- References (e.g. other clients); and
- Experience (UST, RCRA, oil & gas and other environmentally related projects).
- Service
- Turnaround time; and
- Technical input (e.g., recommendations on analytical procedures).

The project manager is encouraged to gather pertinent laboratory-selection information prior to extensively defining analytical requirements under the project. A request may be made to a laboratory to provide a qualifications package that should address the points listed above. Once the project manager has reviewed the various laboratory qualifications, further specific discussions with the laboratory or laboratories should take place. In addition, more than one laboratory should be considered. For large-scale investigations, selection of one laboratory as a primary candidate and one or two laboratories as fall-back candidates should be considered.

The quality of the laboratory service provided is dependent on various factors. The project manager should be able to control the quality of the information (e.g., samples) provided to the laboratory. It is extremely important that the project manager communicate to the laboratory all the requirements relevant to the project. This includes the number of samples and their matrices, sampling schedule, parameters and constituents of interest, required analytical methodologies, detection limits, holding times, deliverables, level of QA/QC, and required turnaround of analytical results.

Field and Laboratory Quality Control

General

Quality control checks are performed to ensure that the data collected is representative and valid data. Quality control checks are the mechanisms whereby the components of QA objectives are monitored.

Examples of items to be considered are as follows:

1. *Field Activities:*

- Use of standardized checklists and field notebooks;
- Verification of checklist information by an independent person;
- Strict adherence to chain-of-custody procedures;
- Calibration of field devices;
- Collection of replicate samples where applicable; and
- Submission of field blanks, where appropriate.

2. *Analytical Activities:*

- Method blanks;
- Laboratory control samples:
- Calibration check samples;
- replicate samples;
- Matrix-spiked samples;
- "Blind" quality control samplers;
- Control charts;
- Surrogate samples;
- Zero and span gases; and
- Reagent quality control checks.

Management of Waste Material

During the advancement of soil borings, decontamination of field equipment and development of soil borings or temporary monitoring wells, waste materials may be generated. This section addresses both the management of solid waste (soils) and the liquid wastes generated.

Soil generated during remedial activities will be containerized in 55-gallon drums or stockpiled on an impermeable membrane and covered with plastic, which ever is most appropriate. The waste characteristics of the soil will be determined by appropriate analytical methods and the soil disposed of in accordance with state and federal regulations. Water generated during field activities will be containerized in storage vessels, which are compatible with the suspected or identified contaminant(s). If required, the water will be analyzed by appropriate analytical methods to determine its waste characteristics. If a water treatment system is available wastewater will be treated on-site, thus eliminating the need for disposal. A portable

aeration system can also be utilized to eliminate volatile contaminants in wastewater. In any event, the ultimate disposition of water will be in accordance with all applicable regulations.

Reporting

After data has been compiled and analyzed, CGRS submits a summary report to Synergy Resources Corporation at the following address:

Synergy Resources Corporation
20203 Highway 60
Platteville, Colorado 80651

An electronic copy of the report may be submitted via email in lieu of a hard copy report as requested by the client.

Furthermore, CGRS submits an electronic copy to the following recipients and email addresses:

Ms. Rhonda Sandquist – Synergy Resources Corporation; rsandquist@syrginfo.com
Mr. James Taloumis – Weld County Department of Public Health and Environment; jtaloumis@co.weld.co.us
Ms. Lauren Light – Weld County Department of Public Health and Environment; llight@co.weld.co.us
Mr. Bob Chesson – Colorado Oil and Gas Conservation Commission (COGCC); robert.chesson@state.co.us

Additional reports may be submitted upon the request of, or permission from, Synergy Resources Corporation.