

ENGINEERING AND GEOLOGICAL REPORT  
TO SUPPORT THE INITIAL GALLUP PARTICIPATING AREA "D"  
WITH FIRST AND SECOND ENLARGEMENTS  
GALLEGOS CANYON UNIT  
SAN JUAN COUNTY, NEW MEXICO

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Discovery of a new Gallup producing sand was made possible by Dakota development in the eastern part of the Gallegos Canyon Unit. Penetration of the Gallup in drilling to the Dakota gave log information from the Gallup which made it possible to evaluate the Gallup pay, to determine the areal extent of the reservoir, and to determine the best location for a wildcat well. The discovery well, Gallegos Canyon Unit Well No. 250, was drilled as a wildcat well after a net pay isopach map of the Gallup sand was prepared. The original isopach map, with changes to reflect development to date and the estimated productive limits of the Pool, is attached.

The proposed Initial Participating Area "D" for the Gallup formation is based on information obtained from the completion of Gallegos Canyon Unit Well No. 250, located 990' FSL and 1800' FWL of Section 14, T28N-R12W, San Juan County, New Mexico. Pertinent data for Unit Well No. 250 is attached as Attachment No. 1.

Gallegos Canyon Unit Well No. 250 was completed as a commercial oil well in the Gallup formation on May 14, 1966, with an initial flowing potential of 125 BOPD from perforations at 5646 to 5662 feet after a sand-oil fracture treatment.

The successful completion of Unit Well No. 250 in the Gallup formation indicates that an Initial Participating Area "D" should be established. All forty acre tracts, either directly or diagonally offsetting the discovery well, plus the forty acre tract on which said well is located, are recommended for inclusion in the initial participating area. Acreage proposed for inclusion consists of 360 acres, all of which is Federal acreage, being the SW/4 and E/2 SE/4 of Section 14 and the N/2 NW/4 and NW/4 NE/4 of Section 23, T28N-R12W.

The effective date of the Initial Gallup Participating Area is proposed as May 14, 1966, the date of first known production from Unit Well No. 250, the well on which the establishment of a Gallup Participating Area "D" is predicated.

The proposed first enlargement to Gallup Participating Area "D" is based on information obtained from the completion of Gallegos Canyon Unit Well No. 251, located 660' FNL and 2260' FWL of Section 24, T28N-R12W, and Gallegos Canyon Unit Well No. 252, located 790' FNL and 990' FEL of Section 15, T28N-R12W. Pertinent data for Unit Well No.'s 251 and 252 are attached as Attachments No.'s 2 and 3, respectively.

Gallegos Canyon Unit Well No. 251 was completed as a commercial oil well in the Gallup formation on July 5, 1966, with an initial flowing potential of 364 BOPD from perforations at 5606 to 5627 feet after a sand-oil fracture treatment.

Gallegos Canyon Unit Well No. 252 was completed as a commercial oil well in the Gallup formation on July 26, 1966, with an initial pumping potential of 54 BOPD, from perforations at 5536 to 5555 feet after a sand-oil fracture treatment.

The successful completion of Unit Well No.'s 251 and 252 in the Gallup formation indicates that Gallup Participating Area "D" should be enlarged. All forty acre tracts, which have one-half of their acreage within the zero isopach line surrounding Unit Well No.'s 251 and 252 are proposed for inclusion in the enlargement. Acreage proposed for inclusion in the first enlargement consists of 1,320 acres, 1,280 acres of which are Federal lands and 40 acres of State lands, being described as the S/2 SE/4 and SE/4 SW/4 Section 10; W1/2 SW/4, SE/4 SW/4, and SW/4 SE/4 Section 13; E/2 SE/4, SW/4 NE/4, and NW/4 Section 14; NE/4, E/2 NW/4, N/2 SE/4, and SE/4 SE/4 Section 14; E/2 NE/4 Section 23; and NW/4, W/2 NE/4, NW/4 SE/4, and NE/4 SW/4 Section 24, T28N-R12W, San Juan County, New Mexico. The Gallup Participating Area "D" after the first enlargement will contain a total of 1,680 acres, of which 1,640 acres are Federal lands and 40 acres State lands.

The effective date of the First Enlargement of the Gallup Participating Area "D" is proposed as August 1, 1966, the first of the month following the completion of Unit Well No.'s 251 and 252, the wells on which the enlargement is predicated.

The proposed Second Enlargement of Gallup Participating Area "D" is based on information obtained from the completion of Gallegos Canyon Unit Well No. 253, located 2,140' FNL and 875' FWL of Section 19, T28N-R11W. Pertinent data for Unit Well No. 253 is attached as Attachment No. 4.

Gallegos Canyon Unit Well No. 253 was completed as a commercial oil well in the Gallup formation on August 1, 1966, with an initial flowing potential of 134 BOPD from perforations at 5546 to 5564 feet after a sand-oil fracture treatment.

The successful completion of Unit Well No. 253 in the Gallup formation indicates that Gallup Participating Area "D" should be enlarged. All forty acre tracts, with more than one-half of their acreage within the productive limits of the pool (the zero isopach line), surrounding Unit Well No. 253 are proposed for inclusion in the enlargement. Acreage proposed for inclusion in the Second Enlargement consists of 715.84 acres, 675.84 acres of which is Federal lands and 40 acres of State lands, being described as the NW/4, S/2 NE/4, and S/2 Section 19, T28N-R11W and SE/4 SE/4 of Section 13; E/2 NE/4, and NE/4 SE/4 Section 24, T28N-R12W, San Juan County, New Mexico. The Gallup Participating Area "D" after the second enlargement will contain a total of 2,395.84 acres, of which 2,315.84 acres are Federal lands and 80 acres are State lands.

The effective date of the Second Enlargement of Gallup Participating Area "D" is proposed as September 1, 1966, the first of the month following the completion of Unit Well No. 253, the well on which the enlargement is predicated.

A net pay isopach map of the Gallup, attached, shows that all of the acreage included in the proposed Gallup Participating Area "D" lies within the productive limits of the pool and that the producing formation is continuous and in communication

from well to well. All forty acre tracts, of which 50% or more of the surface acreage lies within the estimated productive limits (zero isopach line) are included in the proposed Gallup Participating Area "D". Also attached is a cross section A-A' which shows the Gallup sand from which the wells in the Participating Area are producing is continuous and in communication from well to well within the pool. The cross section also shows the Gallup sand from which wells in Gallup Participating Area "D" are producing to be a separate and distinct sand from the one from which wells in Gallup Participating Area "A" are producing. The sand member from which wells in Gallup Participating Area "D" are producing is colored yellow. The sand member from which the wells in Gallup Participating Area "A" are producing is colored blue.

Engineering and geological data both indicate that all of the acreage included in the proposed Initial Gallup Participating Area "D" with First and Second Enlargements in the Gallegos Canyon Unit is (1) productive of oil in paying quantities from the Gallup formation and lies within the productive limits of the Pool and (2) that the producing formation is continuous and in communication throughout the enlarged Participating Area "D" as well as between wells. Therefore, all acreage in the proposed Initial Gallup Participating Area "D" with First and Second Enlargements is reasonably proved productive of unitized substances in paying quantities and should be included in Gallup Participating Area "D".

ATTACHMENT NO. 1

PERTINENT WELL COMPLETION DATA  
INITIAL GALLUP PARTICIPATING AREA "D"  
GALLEGOS CANYON UNIT  
SAN JUAN COUNTY, NEW MEXICO

GALLEGOS CANYON UNIT WELL NO. 250

Location - 990' FSL and 1800' FWL Section 14, T28N-R12W, San Juan County,  
New Mexico

Elevation - 5751' RDB 5738' GL

Total Depth - 5712' Plugged Back Depth - 5677'

Top Pay - 5646' Gallup

Casing & Cementing Program - 8-5/8" CSA 213' with 150 sacks Class "A" with 2% calcium chloride. Circulated.  
4-1/2" CSA 5712' with stage tool at 4442'. Cemented  
1st stage with 200 sacks Class "C" with 6% gel and  
2 lb. Tuf plug per sack followed by 100 sacks Class  
"C" neat. Circulated. Cemented 2nd stage with 900  
sacks Class "C" with 6% gel and 2 lb. Tuf plug per  
sack followed by 50 sacks Class "C" neat. Circulated.

Tubing - 2-3/8" tubing landed at 5657'

Perforations - 5646 - 62' with 4 SPF

Stimulation - Spearheaded with 2000 gals oil containing 75 lb. Adomite Mark II per  
1000 gals and 5 gals. FR-1 per 1000 gals. Sand-oil fractured with  
33,690 gals oil containing 50 lb Adomite per 1000 gals and 5 lb  
FR-1 per 1000 gals and 20,000 lb - 20-40 mesh sand and 10,000 lb  
10-20 mesh sand. BDP 1000 psi. AIR 28.7 BPM @ 3500 psi

Potential - Flowed 125 BO and 0 BW in 24 hours. 25/64" choke GOR 3810 CF/Bbl  
TPF 155 psig CPF 400 psig

Completion Date - May 14, 1966

ATTACHMENT NO. 2

PERTINENT WELL COMPLETION DATA  
FIRST ENLARGEMENT GALLUP PARTICIPATING AREA "D"  
GALLEGOS CANYON UNIT  
SAN JUAN COUNTY, NEW MEXICO

GALLEGOS CANYON UNIT WELL NO. 251

Location - 660' FNL and 2260' FWL Section 24, T28N-R12W, San Juan County,  
New Mexico

Elevation - 5700' RDB, 5687' GL

Total Depth - 5699' Plugged Back Depth - 5659'

Top Pay - 5608' (Gallup)

Casing & Cementing Program - 8-1/8" CSA 230' with 150 sacks Class "A" with 2% calcium chloride. Circulated.  
5-1/2" CSA 5699' with DV Tool at 4283'. Cemented 1st stage with 175 sacks Class "C" with 6% gel and 2 lb Med Tuf Plug per sack followed by 100 sacks Class "C" neat. Cemented 2nd stage with 700 sacks Class "C" with 6% gel and 2 lb. Med Tuf Plug per sack followed by 100 sacks Class "C" neat.

Tubing - 2-3/8" tubing landed at 5621'

Perforations - 5606 - 5627' with 4 SPF

Stimulation - Spot 500 gals 15% Reg acid prior to perforating. Spearhead frac with 2000 gals oil with 75 lb. Adomite Mark II per 1000 gals, 5 gals G-6 per 100 gals oil, and 50 gals G-17 per 1000 gals oil. Sand-oil fractured with 33,558 gals oil with 50 lb Adomite Mark II per 1000 gals, 5 gals G-6 per 100 gals oil, and 50 gals G-17 per 1000 gals oil and 20,000 lb - 20-40 mesh sand and 10,000 lb 10-20 mesh sand. BDP 1500 psi AIR 40 BPM @ 2600 psi

Potential - Flowed 364 BO and 0 BW in 24 hours. 30/64" choke TPF 60-300  
psi CPF 700 psi GOR 924

Completion Date - July 5, 1966

ATTACHMENT NO. 3

PERTINENT WELL COMPLETION DATA  
FIRST ENLARGEMENT GALLUP PARTICIPATING AREA "D"  
GALLEGOS CANYON UNIT  
SAN JUAN COUNTY, NEW MEXICO

GALLEGOS CANYON UNIT WELL NO. 252

Location - 790' FNL and 990' FEL Section 15, T28N-R12W, San Juan County,  
New Mexico

Elevation - RDB 5613'

Total Depth - 5640'

Plugged Back Depth - 5605'

Top Pay - 5534'

Casing and Cementing Program - 8-5/8" CSA 229' and cemented with 150 sacks Class "A" with 2% calcium chloride. Circulated. 4-1/2" CSA 5640' with DV Tool at 4310'. Cemented 1st stage with 300 sacks "C" with 6% gel and 2 lb Tuf Plug per sack followed by 100 sacks Class "C" neat. Cemented 2nd stage with 1000 sacks Type "C" with 6% gel and 2 lb. Tuf Plug per sack followed by 50 sacks Type "C" neat.

Tubing - 2-3/8" landed at 5561'

Perforation - 5536-55' with 4 SPF

Stimulation - Spearhead treatment with 2000 gals oil containing 75 lb Adomite Mark II per 1000 gals, 50 gal. G-6 per 1000 gals, and 5 gals G-17 per 100 gals. Sand-oil fractured with 34,860 gals oil containing 50 lb Adomite Mark II per 1000 gals, low friction loss additive, 20,000 lb 20-40 mesh sand, and 10,000 lb 10-20 mesh sand. BDP 1700 psi. AIR 39 BPM @ 3450 psi.

Potential - Pump 54 BO in 24 hours. GOR 1530

Completion Date - July 26, 1966

ATTACHMENT NO. 4

PERTINENT WELL COMPLETION DATA  
SECOND ENLARGEMENT GALLUP PARTICIPATING AREA "D"  
GALLEGOS CANYON UNIT  
SAN JUAN COUNTY, NEW MEXICO

GALLEGOS CANYON UNIT WELL NO. 253

Location - 2140' FNL and 875' FWL, Section 15, T28N-R11W, San Juan County, New Mexico

Elevation - RDB 5645'

Total Depth - 5660'

Plugged Back Depth - 5627

Top Pay - 5544'

Casing and Cementing Program - 8-5/8" CSA 223' and cemented with 150 sacks Class "C" and 2% Calcium Chloride. Circulated.  
4-1/2" CSA 5660' with DV tool at 4331. Cemented first stage with 350 sacks Type "C" with 6% gel and 2 lb. med. Tuf Plug per sack followed by 100 sacks Type "C" neat. Not circulated. Cemented second stage with 1100 sacks type "C" with 6% gel and 2 lb. med. Tuf Plug per sack followed by 50 sacks Type "C" neat. Circulated.

Tubing - 2-3/8" landed at 5571'

Perforations - 5546-5564'

Stimulation - Sand-oil fractured with 32,424 gals. oil with 50 lb. Adomite Mark IV per 1000 gal and 50 lb. G-17 per 1000 gal and 5 gal G-6 per 1000 gal and 20,000 lb. 20-40 mesh sand and 10,000 lb. 10-20 mesh sand. AIR 39 BPM at 3400 psi.

Potential - Flowed 134 BO in 24 hours. 18/64" choke, TPF 340 psi, CPF 800 psi, GOR 1336 CF/Bbl

Completion Date - August 1, 1966



ATTACHMENT NO. 5

Nov 7 1966

PERTINENT WELL COMPLETION DATA  
SECOND ENLARGEMENT GALLUP PARTICIPATING AREA "D"  
GALLEGOS CANYON UNIT  
SAN JUAN COUNTY, NEW MEXICO

GALLEGOS CANYON UNIT WELL NO. 254

Location - 1980' FSL and 720' FEL, Section 19, T28N-R11W, San Juan County, New Mexico

Elevation - RDB 5720'

Total Depth - 5742'

Plugged Back Depth - 5708'

Top Pay - 5625'

Casing and Cementing Program - 8-5/8" CSA 216' and cemented with 150 sacks Class "A" and 2% Calcium Chloride. Circulated.  
4-1/2" CSA 5742' with DV tool at 4380'. Cemented first stage with 400 sacks Class "C" with 6% gel and 2 lb. med. Tuf Plug per sack followed by 100 sacks Class "C" neat. Circulated. Cemented second stage with 1100 sacks Class "C" with 6% gel and 2 lb. med. Tuf Plug per sack followed by 50 sacks Class "C" neat. Circulated.

Tubing - 2-3/8" landed at 5687'

Perforations - 5628-48'

Stimulation - Spearheaded frac with 2000 gals. oil with 75 lb. adomite Mark II per 1000 gals, 50 gal G-17 per 1000 gals, and 5 gals G-6 friction reducer per 1000 gals. Sand-oil fractured with 30,000 gals oil with 50 lb. Adomite Mark II per 1000 gal and 50 lb. G-17 per 1000 gals and 5 gal G-6 per 1000 gals and 20,000 lb. 20-40 mesh sand and 10,000 lb. 10-20 mesh sand. AIR 36.4 BPM at 3500 psi.

Potential - Flowed 128 BO in 24 hours. 23/64" choke, TPF 120 psi, CPF 475 psi

Completion Date - October 15, 1966

E X H I B I T    "B"            (Revised)

OWNERSHIP SCHEDULE

SECOND ENLARGED GALUP PARTICIPATING AREA "D"

GALLEGOS CANYON UNIT

SAN JUAN COUNTY, NEW MEXICO

EFFECTIVE SEPTEMBER 1, 1966

Tract No.	Description of Land	Serial No. & Lease Date	Basic Royalty		Owner of Record	Overrides %	Working Interest		Acres	Percent Participation
			Owner	% of 8/8			Owner	% of Lease		
Pt 9	NE/4, N/2 SE/4, SE/4 SE/4, E/2 NW/4 Sec. 15, T28N-R12W	SF-078106 12-1-47	USA	12.50	Sunray Oil Co.	None	Sunray Mid-Cont. Oil Co.	100.00	360.00	15.02605
Pt 10	S/2 SE/4, SE/4 SW/4 Sec. 10, T28N-R12W	SF-078109 2-1-48	USA	12.50	Sunray Oil Co.	None	Sunray Mid-Cont. Oil Co.	100.00	120.00	5.00868
Pt 17	NW/4 NW/4 Sec. 23 SW/4 NE/4 Sec. 14 T28N-R12W	SF-078828 8-1-49	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	80.00	3.33912
Pt 17-A	SW/4 Sec. 14 T28N-R12W	SF-078828-A 8-1-49	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	160.00	6.67824
Pt 19	NE/4 NW/4, N/2 NE/4, SE/4 NE/4 Sec. 23; N/2, N/2 SE/4, NE/4 SW/4 Sec. 24, T28N-R12W	SF-078904 2-1-48	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	600.00	25.04341
Pt 20	S/2 SW/4, NW/4 SW/4 Sec. 13; NW/4, SE/4 Sec. 14, T28N-R12W	SF-078905 7-1-48	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	440.00	18.36517
Pt 35	Lots 1, 2, 3, 4, E/2 NW/4, S/2 NE/4, E/2 SW/4, SE/4 Sec. 19 T28N-R11W	SF-080844-A 10-1-51	USA	12.50	Pan American	5.00	Pan American	100.00	555.84	23.20021
Pt 46	S/2 SE/4 Sec. 13 T28N-R12W	E-2447 2-10-49	State of New Mexico	12.50	Skelly Oil Co.	None	Skelly Oil Co.	100.00	80.00	3.33912
				Type of Acreage		Committed Acreage		Percent Participation		
				Federal		2315.84		96.66088		
				State of New Mexico		80.00		3,33912		
						2395.84		100.00000		

E X H I B I T "B"

OWNERSHIP SCHEDULE

FIRST ENLARGED GALLUP PARTICIPATING AREA "D"

GALLEGOS CANYON UNIT

SAN JUAN COUNTY, NEW MEXICO

EFFECTIVE AUGUST 1, 1966

Tract No.	Description of Land	Serial No. & Lease Date	Basic Royalty		Owner of Record	Overrides %	Working Interest		Acres	Percent Participation
			Owner	% of 8/8			Owner	% of Lease		
Pt 9	NE/4, N/2 SE/4, SE/4 SE/4, E/2 NW/4 Sec. 15, T28N-R12W	SF-078106 2-1-47	USA	12.50	Sunray Mid-Cont. Oil Co.	None	Sunray Mid-Cont. Oil Co.	100.00	360.00	21.42857
Pt 10	S/2 SE/4, SE/4 SW/4 Sec. 10, T28N-R12W	SF-078109 2-1-48	USA	12.50	Sunray Mid-Cont. Oil Co.	None	Sunray Mid-Cont. Oil Co.	100.00	120.00	7.14286
Pt 17	NW/4 NW/4, Sec. 23; SW/4 NE/4 Sec. 14, T28N-R12W	SF-078828 8-1-49	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	80.00	4.76190
Pt 17-A	SW/4 Sec. 14 T28N-R12W	SF-078828-A 8-1-49	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	160.00	9.52381
Pt 19	NE/4 NW/4, N/2 NE/4, SE/4 NE/4 Sec. 23; NW/4, 2-1-48 W/2 NE/4, NW/4 SE/4, NE/4 SW/4 Sec. 24 T28N-R12W	SF-078904 2-1-48	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	480.00	28.57143
Pt 20	S/2 SW/4, NW/4 SW/4 Sec. 13, NW/4, SE/4 Sec. 14, T28N-R12W	SF-078905 7-1-48	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00	440.00	26.19048
Pt 46	SW/4 SE/4 Sec. 13 T28N-R12W	E-2447 2-10-49	State of New Mexico	12.50	Skelly Oil Co.	None	Skelly Oil Co.	100.00	40.00	2.38095

Type of Acreage Committed Acres Percent Participation

Federal	1640.00	97.61905
State of New Mexico	40.00	2.38095
TOTAL	1680.00	100.00000

E X H I B I T    "B"  
OWNERSHIP SCHEDULE  
SECOND ENLARGEMENT GALLUP PARTICIPATING AREA "D"  
GALLEGOS CANYON UNIT  
SAN JUAN COUNTY, NEW MEXICO  
EFFECTIVE SEPTEMBER 1, 1966

Tract No.	Description of Land	Serial No. & Lease Date	Basic Royalty		Owner of Record	Overrides %	Owner	Working Interest		Acres	Percent Participation
			Owner	% of 8/8					% of Lease		
Pt 9	NE/4, N/2 SE/4, SE/4 SE/4, E/2 NW/4, Sec. 15, T28N-R12W	SF-078106 12-1-47	USA	12.50	Sunray Mid-Cont. Oil Co.	None	Sunray Mid-Cont. Oil Co.	100.00		360.00	15.01953
Pt 10	S/2 SE/4 SE/4 SW/4 Sec. 10, T28N-R12W	SF-078109 2-1-48	USA	12.50	Sunray Mid-Cont. Oil Co.	None	Sunray Mid-Cont. Oil Co.	100.00		120.00	5.00651
Pt 17	NW/4 NW/4 Sec. 23 SW/4 NE/4 Sec. 14 T28N-R12W	SF-078828 8-1-49	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00		80.00	3.33767
Pt 17-A	SW/4 Sec. 14 T28N-R12W	SF-078828-A 8-1-49	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00		160.00	6.67534
Pt 19	NE/4 NW/4, N/2 NE/4, SE/4 NE/4 Sec. 23; N/2, N/2 SE/4, NE/4 SW/4 Sec. 24, T28N-R12W	SF-078904 2-1-48	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00		600.00	25.03254
Pt 20	S/2 SW/4, NW/4 SW/4 Sec. 13; NW/4, SE/4 Sec. 14, T28N-R12W	SF-078905 7-1-48	USA	12.50	Pan American Geo. J. Darneille	2.00	Pan American National Drlg. Co.	75.00 25.00		440.00	18.35720
Pt 35	Lots 1, 2, 3, 4, E/2 NW/4, S/2 NE/4, E/2 SW/4, SE/4 Sec. 19 T28N-R11W	SF-080844-A 10-1-51	USA	12.50	Pan American	5.00	Pan American	100.00		556.88	23.23354
Pt 46	S/2 SE/4 Sec. 13 T28N-R12W	E-2447 2-10-49	State of New Mexico	12.50	Skelly Oil Co.	None	Skelly Oil Co.	100.00		80.00	3.33767
						<u>Committed Acreage</u>		<u>Percent Participation</u>			
						Federal		96.66233			
						State of New Mexico		3.33767			
						TOTAL		100.00000			