[redacted]

DUVAL CORPORATION #28-A SANTA FE NO PERMIT
NW NW Sec. 10-T19N-R27E APACHE COUNTY 1-67

1-67

County Apache

Area Holbrook Basin

Lease No.

Well Name Duval Corporation #28-A Santa Fe

Location NW NW Sec 10 Twp 19N Range 27E Footage 77' FNL - 216' FWL

Elev 5880' Gr KB Spud Date 3-31-64 ~~Completed~~ Abandon 4-22-64 Total Depth 1908'?

Contractor

Drilled by Rotary
Cable Tool

Casing Size	Depth	Cement

Production Horizon

Initial Production

REMARKS This hole drilled as a potash test.

See file for Core Lithology. (Footage 1591' - 1908')

Elec Logs Sonic Log; Induction-Electrical Log; Gamma Ray Neutron;

Sample Log
Sample Descript.
Sample Set P-1314
Core Analysis
DSTs

Applic. to Plug ___ Plugging Record x Completion Report x

Water well accepted by

Bond Co. & No. None

Bond Am't $ Cancelled Date Organization Report None

Filing Receipt None Dated Well Book x Plat Book x

Loc. Plat ___ Dedication None (Strat)

API No. None

Permit Number None Date Issued

1-67

WELL COMPLETION OR RECOMPLETION REPORT AND WELL LOG

DESIGNATE TYPE OF COMPLETION:

New Well ☐ Work-Over ☐ Deepen ☐ Plug Back ☐ Same Reservoir ☐ Different Reservoir ☐ Oil ☐ Gas ☐ Dry ☐

DESCRIPTION OF WELL AND LEASE

Operator: Duval Corporation	Address: 4715 E FT Lowell Rd Tucson, Arizona
Lease Name	Well Number: 28-A / Field & Reservoir

Location: 77 FNL & 216 FWL Sec 10 T19N R27E (Sec.—TWP-Range or Block & Survey)

County	Permit number	Date Issued	Previous permit number	Date Issued
Apache				

Date spudded	Date total depth reached	Date completed, ~~ready to produce~~	Elevation (DF, RKB, RT or Gr.) feet	Elevation of casing hd. flange feet
3/31/64		4/22/64		

Total depth	P.B.T.D.	Single, dual or triple completion?	If this is a dual or triple completion, furnish separate report for each completion.
1895			

Producing interval (s) for this completion	Rotary tools used (interval)	Cable tools used (interval)

Was this well directionally drilled?	Was directional survey made?	Was copy of directional survey filed?	Date filed

Type of electrical or other logs run (check logs filed with the commission): Gamma Ray-Neutron, Induction-Electrical Log, Sonic Log — Date filed:

CASING RECORD

Casing (report all strings set in well—conductor, surface, intermediate, producing, etc.)

Purpose	Size hole drilled	Size casing set	Weight (lb./ft.)	Depth set	Sacks cement	Amt. pulled

TUBING RECORD			LINER RECORD				
Size in.	Depth set ft.	Packer set at ft.	Size in.	Top ft.	Bottom ft.	Sacks cement	Screen (ft.)

PERFORATION RECORD			ACID, SHOT, FRACTURE, CEMENT SQUEEZE RECORD	
Number per ft.	Size & type	Depth Interval	Am't. & kind of material used	Depth Interval

INITIAL PRODUCTION

Date of first production	Producing method (indicate if flowing, gas lift or pumping—if pumping, show size & type of pump:)

Date of test	Hrs. tested	Choke size	Oil prod. during test bbls.	Gas prod. during test MCF	Water prod. during test bbls.	Oil gravity ° API (Corr)

Tubing pressure	Casing pressure	Cal'ted rate of Production per 24 hrs.	Oil bbls.	Gas MCF	Water bbls.	Gas—oil ratio

Disposition of gas (state whether vented, used for fuel or sold):

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the ..... of the ..... (company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

Date ..... Signature .....

STATE OF ARIZONA OIL & GAS CONSERVATION COMMISSION
Well Completion or Recompletion Report and Well Log
Form No. P-7 File two copies

Hole No.	Interval (feet)	Formation or Member
25	Ground elevation 6520'	
	0-110	(No samples)
	-652	Bidahochi
	652-	Upper Petrified Forest
	1495-	Lower Petrified Forest
	1660 (gradational)-	Top of greenish-grey unit
	1930-	Shinarump
	1965-2065	Lower Wupatki
	2065-2370	Coconino
	2370-	Supai
	2467	Top of 1st marker Anhydrite
26	Ground elevation 5740'	
	0-60	Upper Petrified Forest
	60-70	Sonsela
	70-	Lower Petrified Forest
	323	Top of greenish-grey unit
	745-	Shinarump
	823-908	Lower Wupatki
	908-1245	Coconino
	1245-	Supai
	1331	Top of 1st marker Anhydrite
27	Ground elevation 5390'	
	0-63	Bidahochi
	63-	Chinle, below greenish-grey unit
	142-	Shinarump
	160-438	Lower Wupatki
	435-800	Coconino
	800-	Supai
	902	Top of 1st marker Anhydrite
28	Ground elevation 5880'	
	0-	Upper Petrified Forest
	269-	Lower Petrified Forest
	458	Top of greenish-grey unit
	1023-	Shinarump
	1040-1176	Lower Wupatki
	1176-1493	Coconino
	1493-	Supai
	1576	Top of 1st marker Anhydrite

RECEIVED
STATE O & G
JNS. COMM.

1-67

PLUGGING RECORD

Operator: Duval Corporation		Address: 4715 E Ft Lowell Rd Tucson Arizona	
Name of Lease	Well No.: 28-A	Field & Reservoir	
Location of Well: 77 FNL & 216 FWL Sec 10 T19N R27E		Sec-Twp-Rge or Block & Survey	County: Apache
Application to drill this well was filed in name of	Has this well ever produced oil or gas	Character of well at completion (initial production): Oil (bbls/day)	Gas (MCF/day) / Dry?
Date plugged:	Total depth: 1895'	Amount well producing when plugged: Oil (bbls/day)	Gas (MCF/day) / Water (bbls./day)

Name of each formation containing oil or gas. Indicate which formation open to wellbore at time of plugging	Fluid content of each formation	Depth interval of each formation	Size, kind & depth of plugs used Indicate zones squeeze cemented, giving amount cement.

CASING RECORD

Size pipe	Put in well (ft.)	Pulled out (ft.)	Left in well (ft.)	Give depth and method of parting casing (shot, ripped etc)	Packers and shoes

Was well filled with mud-laden fluid, according to regulations?

Indicate deepest formation containing fresh water.

NAMES AND ADDRESSES OF ADJACENT LEASE OPERATORS OR OWNERS OF THE SURFACE

Name	Address	Direction from this well:

In addition to other information required on this form, if this well was plugged back for use as a fresh water well, give all pertinent details of plugging operations to base of fresh water sand, perforated interval to fresh water sand, name and address of surface owner, and attach letter from surface owner authorizing completion of this well as a water well and agreeing to assume full liability for any subsequent plugging which might be required.

Use reverse side for additional detail
File this form in duplicate with the State of Arizona Oil & Gas Conservation Commission

CERTIFICATE: I, the undersigned, under the penalty of perjury, state that I am the.....of the .....(company), and that I am authorized by said company to make this report; and that this report was prepared under my supervision and direction and that the facts stated therein are true, correct and complete to the best of my knowledge.

Date ..... Signature .....

STATE OF ARIZONA OIL & GAS CONSERVATION COMMISSION

Plugging Record — File two copies

Form No. P-15

1-67

FORM 159

DUVAL CORPORATION

INTER-OFFICE MEMORANDUM

FROM Navajo, Arizona DATE April 23, 1964

TO Esperanza ATTENTION B.G. Messer

SUBJECT: Duval # 28A Santa Fe

Location: 77 FNL, 216 FWL, sec.10, T.19N., R.27E.
Date Started: 3/31/64
Date Completed: 4/22/64
Elevation, G.L.: 5880
Casing Point: 1577
Depth, Top Coconino: 1176 (4704)
Depth, Top Halite: 1622 (4258)
Depth, Top Sylvite: None
T.D.: 1895

FORM 159

DUVAL CORPORATION

INTER-OFFICE MEMORANDUM

FROM Navajo, Arizona DATE April 29, 1964

TO Esperanza ATTENTION B.G. Messer

SUBJECT: Duval # 28A Santa Fe

Re: Correction for Depth, Top Halite

The correct depth is 1613 (4267), not 1622 as indicated on the memorandum dated 4/23/64.

Form 3
2M Sheets 5-54

DUVAL SULPHUR & POTASH COMPANY
POTASH DIVISION
CARLSBAD, NEW MEXICO

WHILE WE BELIEVE THIS INFORMATION TO BE CORRECT, WE MAKE NO REPRESENTATION WITH RESPECT TO, NOR DO WE ASSUME ANY RESPONSIBILITY FOR, THE USE OF THIS INFORMATION.
DUVAL CORPORATION

CORE LITHOLOGY

WELL NO. 28-A

DEPTH (Feet) From		To		INTERVAL Feet		ESTIM. % Shale	% A	DESCRIPTION
				Abbreviations:				H - Halite / G - Gypsum
								A - Anhydrite / C-S - Clay-Silt
								P - Polyhalite / med.g. - medium grained
								S - Sylvite / clr - clear
								C - Carnallite / occ - occasional
								f.g. - fine grained / V - Very
								c.g. - coarse grained / Incr - increasing
								incl - inclusions / decr - decreasing
								irreg - irregular / brn - brown
1591	0							START CORING
1591	0	1597	6	6	6	-	100	A, lt. gray.
1597	6	1612	0	14	4	95	5	C-S, dk. red-brn, med hd.; few gray A & clr selenite stringers & veinlets, probable 0.2' gray A at base. (Core badly broken, recovered 3.0')
1612	0	1614	0	2	0	-	100	A, lt. gray; occ brn C-S incl in bottom 0.2'.
1614	0	1620	9	6	9	96	4	C-S, dk. red-brn, med.hd.; few irreg small-lg. white brecciated A incls, ½" band at 1620.4'.
1620	9	1622	0	1	1	22	78	A, lt. gray; 0.2' red-brn C-S band at 1621.4'.
1622	0							TOP OF SALT
1622	0	1622	8	0	8	1	15	H, clr, f.g.-med; irreg 0.1' gray A band at base, few other stringers; V few small red-brn C-S incls.
1622	8	1625	1	2	3	35	-	H, f.g.-med; many small-med red-brn C-S incls.
1625	1	1627	5	2	4	50	-	C-S, red-brn, med. soft; & H, f.g. to med, incr down from 30% at top to 70% at base.
1627	5	1628	4	0	9	80	-	C-S, red-brn, med soft; some H, med.-c.g.
1628	4	1630	8	2	4	5	-	H, fairly clr, med-c.g.; few small-lg. brn C-S incls, decr down from 8% at top to 2% at base.
1630	8	1639	8	9	0	1	3	H, clr-V.clr, c.g.; V few small brn C-S incls. In top & bottom fourths; few small-lg. white A stringers & blebs, thin parting at 1638.7'.(2.1' core missing)
1639	8	1642	9	3	1	60	3	C-S, red-brn, med soft; much H, f.g.-med, as irreg zones, blebs & fracture fillings; V few small white A stringers, 0.2' 80% zone at top.

m 3
4 Sheets 5-54

DUVAL SULPHUR & POTASH COMPANY
POTASH DIVISION
CARLSBAD, NEW MEXICO

CORE LITHOLOGY

WELL NO. 28-A

DEPTH (Feet) From		DEPTH (Feet) To		INTERVAL Feet		ESTIM. % Shale	ESTIM. % XA	DESCRIPTION
1642	9	1644	2	1	3	8	-	H, med; some small-med red-brn C-S incls.
1644	2	1652	2	8	0	2	-	H, clr, med-c.g.; few V small red-brn C-S incls, decr down from 3% at top to 1% at base.
1652	2	1656	0	3	8	80	3	C-S, red-brn, med soft; some H, f.g. in middle part; few small-med white A blebs. (Lost 2.7' Core)
1656	0	1658	4	2	4	4	2	H, clr, med-c.g.; few small brn C-S incls, 0.2' 25% zone at 1657.1'; few irreg. white A blebs.
1658	4	1658	7	0	3	50	6	H, c.g.; 0.2' steep dipping red-brn C-S band at top; few irreg lg. lg. white A stringers.
1658	7	1660	5	1	8	3	4	H, med-c.g.; few small-lg. white A stringers, ½" band at 1660.3'; few small brn C-S incls.
1660	5	1665	2	4	7	-	1	H, V clr, med-c.g.; V few white A stringers and tan A/P blebs.
1665	2	1666	3	1	3	-	10	H, V clr, f.g.-med ½" white A bands at top, 1665.8', 1666.0', and 1666.3', few other white A stringers.
1666	5	1667	9	1	4	2	70	A, lt. gray incr down from 40% at top to 100% at base; some H, f.g. as zones and irreg intergrowths; few brn C-S incls in bottom 0.2'.
1667	9	1668	4	0	5	94	3	C-S, red-brn, med hard; few small H, f.g. and white A stringers.
1668	4	1671	2	2	8	6	2	H, med; some small red-brn C-S incls decr down from ~~fro~~ 8% at top to 4% at base; few small white A strin. grading in down.
1671	2	1676	3	5	1	1	4	H, clr, med; few small-lg. white A stringers, ½" bands at 1673.8', 1674.8', & 1675.2'; few small brn C-S incls in bottom 0.4'.
1676	3	1677	0	0	7	-	80	A, gray; some H, f.g.-med as graphic intergrowths.
1677	0	1682	1	5	1	3	2	H, fairly clr, med-c.g.; few small red-brn C-S incls, grading out down; few small-lg. lt. gray A stringers.
1682	1	1685	1	3	0	-	-	H, V clr, med-c.g.; occ V small white A stringer.
1685	1	1686	1	1	0	-	25	H, tan, med-c.g.; many lg. white A stringers, 0.1' band at top & 1685.9'.

3 Sheets 5-54

DUVAL SULPHUR & POTASH COMPANY
POTASH DIVISION
CARLSBAD, NEW MEXICO

CORE LITHOLOGY

WELL NO. 28-A

DEPTH (Feet) From		DEPTH (Feet) To		INTERVAL Feet		ESTIM. % Shale	ESTIM. % XA	DESCRIPTION
1686	1	1692	5	6	4	45	3	H, med, & C-S, red-brn, med hd., as irreg V lg. zones, bottom 0.5' is 4% C-S; few med white A blebs.
1692	5	1693	2	0	7	80	-	C-S, red-brn, med soft; few f.g.-med H zones, as sharply angular incls & tan schistose veinlets.
1693	2	1696	9	3	7	15	1	H, med.g.; some small-med brn C-S incls & stringers; V few small white A stringers.
1696	9	1701	6	4	7	70	-	C-S, red-brn, med soft; some H, f.g.-med, as irreg 90% zones 0.3' thk., at 1698.5' & 1699.3', few irreg schistose veinlets.
1701	6	1703	6	2	0	25	3	H, med; numerous med-V lg. irreg brn C-S incls; 0.2' 90% zone at 1703.2'; few lg. white A blebs.
1703	6	1712	8	9	2	10	3	H, med-c.g.; some small-lg. brn C-S incls & stringers; few med white A stringers.
1712	8	1714	2	1	4	25	1	H, med.g.; some small-V lg. brn C-S incls, 0.3' 80% zone at 1713.1; V few small white A stringers.
1714	2	1717	9	3	7	4	2	H, clr in lower half, med-c.g.; few small brn C-S incls, decr down from 6% at top to 2% at base; few white A stringers, ¼" band at 1716.9'.
1717	9	1723	6	5	7	15	2	H, med.g.; some small-med brn C-S incls & stringers; middle third is clr-pink H, no C-S; few small white A stringers.
1723	6	1728	0	4	4	4	3	H, fairly clr, med; few small-lg. red-brn C-S incls, 0.2' 30% zone at 1725.4'; few med white A stringers.
1728	0	1729	5	1	5	2	-	H, clr, med; few small brn C-S incls (This & the 2 following intervals have been heavily saturated with circulating oils).
1729	5	1730	4	0	9	60	-	C-S, brn, decr down from 100% at top to 20% at base; some H, med.
1730	4	1734	5	4	1	2	1	H, clr, med-c.g.; few small brn C-S incls, grading out down; V few small white A stringers.

Form 3
Sheets 5-54

DUVAL SULPHUR & POTASH COMPANY
POTASH DIVISION
CARLSBAD, NEW MEXICO

CORE LITHOLOGY

WELL NO. 28-A

DEPTH (Feet) From	DEPTH (Feet) To	INTERVAL Feet	ESTIM. % Shale	ESTIM. % RA	DESCRIPTION
1734.5 5	1738 6	4 1	40	-	H, med.g.; many small-V lg. red-Brn C-S incls & zones.
1738 6	1740 3	1 7	96	-	Siltstone, lt. red-brn, V hd., grading into soft brn C-S in lower 0.5', V little H, as f.g. blebs.
1740 3	1750 1	9 8	20	1	H, med-c.g.; some small-med red-brn C-S incls, 0.2' band at about 1745.4'; V few small gray A stringers. (About 3' Core Lost)
1750 1	1753 4	3 3	4	2	H, med-c.g.; few small brn C-S incls; decr down from 6% at top to 2 % at base; few V small white A stringers.
1753 4	1755 8	2 4	1	10	H, clr, med-c.g.; some A, lt. gray-white, as stringers & ½" bands at 1754.7', 1755.0' & 1755.4'; 0.2' 25% C-S zone at base.
1755 8	1760 3	4 5	-	90	A, lt. gray; few H, med incls.
1760 3	1770 0	9 7	40	1	H, med-c.g.; many small-V lg. red-brn C-S incls & zones; few small white A stringers in lower half. (About 3' of core lost)
1770 0	1782 7	12 7	1	2	H, clr, med-V c.g.; few V small white A stringers, parting at 1782.2'; V few brn C-S incls. (About 6.3' of core lost)
1782 7	1784 1	1 4	70	3	C-S, red-brn, med soft, incr down from 50% at top to 90% at base; some H, med; few small white A stringers.
1784 1	1788 0	3 9	2	4	H, fairly clr, med-c.g.; few small-med white A stringers, 0.1' band at 1785.3'; few small brn C-S incls.
1788 0	1791 5	3 5	15	-	H, med-c.g.; some small-lg. brn C-S incls.
1791 5	1796 5	5 0	2	-	H, clr, med-c.g.; few small brn C-S incls, grading out down; occ V small white A stringer.
1796 5	1809 2	12 7	1	1	H, V clr, med-V c.g.; V few small-med brn C-S incls & white A blebs in lower half.
1809 2	1810 7	1 5	6	15	H, clr-pink, f.g.-med; some A, white as lg. blebs & irreg stringers; few lg. brn hard C-S zones in top half.

Sheets 5-54

DUVAL SULPHUR & POTASH COMPANY
POTASH DIVISION
CARLSBAD, NEW MEXICO

CORE LITHOLOGY

WELL NO. 28-A

DEPTH (Feet) From		To		INTERVAL Feet		ESTIM. % Shale	RA	DESCRIPTION
1810	7	1811	4	0	7	-	80	A, lt. gray; some H, as irreg f.g. zones.
1811	4	1818	0	6	6	85	10	Siltstone, lt. Brn, hd., grading into hd. C-S in lower half; some A, lt. gray, as irreg zones & blebs; few small H, f.g. zones. (About 3.5' Core lost)
1818	0	1820	2	2	2	90	2	C-S, brn, hd.; some H, f.g.-c.g.; few small white A blebs.
1820	2	1823	6	3	4	60	2	C-S, brn, hd.; many f.g.-c.g. H blebs & zones; few small white A blebs.
1823	6	1826	3	2	7	40	5	H, c.g.; many V lg. brn hd. C-S incls & zones; some small-med lt. gray A stringers.
1826	3	1827	1	0	8	50	40	C-S, brn, V hd., & A, lt. gray, 0.1' irreg bands at top & base; few small H, f.g., incls.
1827	1	1833	5	6	4	80	3	C-S, brn, hd.; some H, f.g.-c.g., 40% in middle third, 5% in remainder; few small white A blebs.
1833	5	1836	2	2	7	85	2	C-S, brn-gray-green, med hd.; few lg. H, c.g., zones; few small white A blebs, grading in down.
1836	2	1847	0	10	8	-	85	A, lt.-dk. gray, mottled; few H, f.g., intergrowths; little dolomite grading in from 0% at 1845.0' to 25% at base.
1847	0	1852	0	5	0	5	-	Dolomite, dk. gray; little dolomitic clay in lower 2'; about 5% H, f.g.
1852	0	1858	9	6	9	35	30	Dolomite, dk. gray in f.g. mixture w/ clays, siltstone, & A; few V small H, f.g., veinlets (about 2%)
1858	9	1869	3	10	4	85	3	C-S to siltstone, brn, hd; some H, f.g. veinlets & c.g. zones 1.2' 60% H zones 1864.3'; few lg. A stringers.
1869	3	1908	0	38	7	60	2	C-S, brn, hd, some H, med-c.g.; few small white A blebs. (About 2' of broken pieces recovered).
1908	0							TOTAL DEPTH

LOGGED BY Karl E. Ehlers
Karl E. Ehlers