ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGUL WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE **Application Acronyms:** [NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication] [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement] [PC-Pool Commingling] [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion] [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase] [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response] [1] **TYPE OF APPLICATION** - Check Those Which Apply for [A] Location - Spacing Unit - Simultaneous Dedication NSL NSP SD Check One Only for [B] or [C] Commingling - Storage - Measurement [B] ☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery ☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR [D] Other: Specify [2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or Does Not Apply Working, Royalty or Overriding Royalty Interest Owners [B] Offset Operators, Leaseholders or Surface Owner [C] Application is One Which Requires Published Legal Notice [D] Notification and/or Concurrent Approval by BLM or SLO U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[3] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

For all of the above, Proof of Notification or Publication is Attached, and/or,

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is accurate and complete to the best of my knowledge. I also understand that no action will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement-roust be completed by an individual with managerial and/or supervisory capacity.

David Catanach			
Print or Type Name			

[E]

[F]

Daud (afanad)
Signature
9/18/09

Agent for Apache Corporation

Waivers are Attached

drcatanach@netscape.com E-Mail Address

September 18, 2009

Hand Delivered

New Mexico Oil Conservation Division 1220 S. St. Francis Drive Santa Fe, New Mexico 87505

Attention: Mr. Mark E. Fesmire, P.E.

Director

Re: Unorthodox Well Location

Livingston Well No. 26

350' FSL & 2500' FWL, SE/4 SW/4

Section 3, T-21 South, R-37 East, NMPM,

Lea County, New Mexico

Dear Mr. Fesmire:

Pursuant to Division Rule 19.15.15.13, Apache Corporation ("Apache") respectfully requests administrative approval of an unorthodox oil well location for its proposed Livingston Well No. 26. This well will be drilled as a development well in the Penrose Skelly- Grayburg Pool (Oil-50350). An existing 40-acre oil spacing and proration unit that is currently dedicated to the Apache Corporation Livingston No. 7 (API No. 30-025-06518) located 915' FSL & 2308' FWL, and the Livingston No. 21 (API No. 30-025-37726) located 330' FSL & 1650' FWL, is to be dedicated to the subject well. (Please note that Section 3, Township 21 South, Range 37 East is an irregular long section that contains twenty-four quarter-quarter sections).

The Penrose Skelly-Grayburg Pool is currently governed by Division Rule 19.15.15.9 which requires standard 40-acre oil spacing and proration units with wells to be located no closer than 330 feet to the outer boundary of the spacing unit.

The proposed unorthodox well location is based upon engineering considerations. The attached drainage data indicates that Grayburg producing wells in this area generally drain less than 40 acres. A well drilled at the proposed unorthodox location will maximize the recovery of oil and gas reserves from the Grayburg formation that would otherwise not be recovered by the existing surrounding Grayburg producers. It is estimated that the Livingston No. 26 will recover an additional 32,000 barrels of oil and 368 MMCF of gas from the Grayburg formation.

The attached production data shows that the offset Grayburg producing wells are currently producing at marginal rates that average 5 BOPD and 43 MCFGPD.

The affected offset acreage is the SW/4 SE/4 of Section 3. On this 40-acre tract, Apache currently operates the Livingston No. 3 which also produces from the Grayburg formation. The interest ownership between the proposed proration unit and the affected offset tract is common throughout. Consequently, Apache is not required to provide notice of this application to any party.

Also included in this application is a geologic and engineering discussion that provides support for the proposed unorthodox location.

In summary, approval of the application will provide Apache Corporation the opportunity to recover additional oil and gas reserves from the Grayburg formation underlying the SE/4 SW/4 of Section 3 that may otherwise not be recovered by the existing producing wells, thereby preventing waste, and will not violate correlative rights.

If you should have any questions, please call me at (505) 690-9453.

Sincerely,

David Catanach, Agent Apache Corporation 6120 S. Yale Suite 1500

Tulsa, Oklahoma 74136

Xc: OCD-Hobbs

Application of Apache Corporation for administrative approval of an unorthodox well location:

40 acres – 350' FSL & 2,500' FWL Section 3, Township 21 South, Range 37 East, NMPM Lea County, New Mexico

PRIMARY OBJECTIVES:

Grayburg

In support:

- 1. Apache Corporation (Apache) is the operator of the proposed Livingston #26 well (Exhibit 1).
- 2. Pool rules that apply to the proposed location is the Penrose Skelly; Grayburg. The proposed unorthodox location encroaches only on spacing unit 3O to the East which currently has one well producing from the Grayburg (Exhibit 1). All the wells displayed in Exhibit 1 penetrate at least part of the Grayburg interval. The cumulative and daily production values displayed on Exhibit 2 are only for the Grayburg reservoir.

API					Cum thru 5-09	Daily
30025	Op.	Well	Loc	Pool	O/G/W	O/G/W
37726	Apache Corp	Livingston #21	N-3	Penrose Skelly; Grayburg (50350)	18/130/39	13/134/34
06518	Apache Corp	Livingston #7	N-3	Penrose Skelly; Grayburg (50350)	51/181/27	5/25/8
06518	Apache Corp	Livingston #7	N-3	Wantz; Abo (62700)	6/15/31	TA'd
06514	Apache Corp	Livingston #3	O-3	Penrose Skelly; Grayburg (50350)	46/94/47	3/28/9
06514	Apache Corp	Livingston #3	0-3	Wantz, Abo (62700)	89/54/23	TA'd
35637	Apache Corp	Hawk B-10 #11	B-10	Penrose Skelly; Grayburg (50350)	0/41/0	0/20/0
06458	Apache Corp	Hawk B-10 #6	C-10	Penrose Skelly; Grayburg (50350)	25/57/54	5/9/37
06458	Apache Corp	Hawk B-10 #6	C-10	Wantz; Abo (62700)	36/148/8	TA'd

MBO BOPD MMCFG MCFGPD MBW BWPD

3. The proposed Livingston #26 location of 350' from south line and 2500' from west line is based upon drainage considerations.

a. Grayburg Reservoir

The Grayburg is a series of alternating subtidal and supratidal dolomites, with the subtidal rock having porosity and hydrocarbons and the supratidal rock being tight. The Grayburg environments varied rapidly so that porous and tight intervals do not necessarily correlate well-to-well. Tight dolomite and/or anhydrite intervals within the Grayburg create vertical hydraulic barriers between different zones of porosity. Average porosity of the Grayburg is less than 10%, and average permeability is less than 1 millidarcy. Grayburg wells are thus not usually capable of draining the 40 Acre proration unit.

The Grayburg formation in this area is comprised of three separate producing intervals. Apache routinely fracture stimulates perforations in each of the three intervals and then produces them as a single common source of supply. By producing all three Grayburg intervals, Apache is able to economically drill this well as a stand-alone Grayburg producer.

The reservoir was analyzed by mapping hydrocarbon pore volume (HCPV) (**Exhibit 3**) of the entire Grayburg interval. HCPV (a.k.a SophiH) is the product of feet of net pay (H) times average porosity (phiA) times oil saturation (So). The values were obtained as follows:

- 1. Net Pay was read either from modern neutron-density logs or estimated from a map developed from gross pay (clean dolomite) times net to gross ratio.
- 2. Average Porosity was calculated from modern well logs using a minimum of 6% crossplot porosity and a maximum of 20%.
- 3. Oil Saturation was calculated from a fractional flow curve using recent water cut values.

This analysis requires modern neutron-density and resistivity logs. Although water saturations can be adequately estimated from offsetting modern wells, many wells had to be excluded from analysis because of the vintage or type of porosity logs. SophiH isopach lines were modeled after cumulative production isopach lines where new well control is lacking. This procedure has proved successful for Apache in recent drilling in the area.

b. Drainage

The following table provides drainage areas extracted from the SophiH map and reserves of the offsetting wells. SophiH values are either from modern logs or estimated from the grid. Wells with values determined from modern logs will be in bold

	Well	21S 37E Loc	Reservoir	SophiH ft	Area ac	EUR MBO	EUR MMCFG
Oper.							
Apache	Livingston #21	N-3	Grayburg	7	18.42	72	581
Apache	Livingston #7	K-3	Grayburg	7	20	56	205
Apache	Livingston #3	0-3	Grayburg	7.5	20	65	144
Apache	Hawk B-10 #6	C-10	Grayburg	4.5	20	26	61
Marathon	Hawk B-10 #11	B-10	Grayburg	4	18.74	.083	37

The proposed **Livingston #26** was planned as a 20 acre infill location between existing Grayburg producers. The well location was placed generally in the center of the existing producing wells, thereby providing Apache the opportunity to recover additional oil and gas reserves from the Grayburg formation that would otherwise not be recovered by the existing wells.

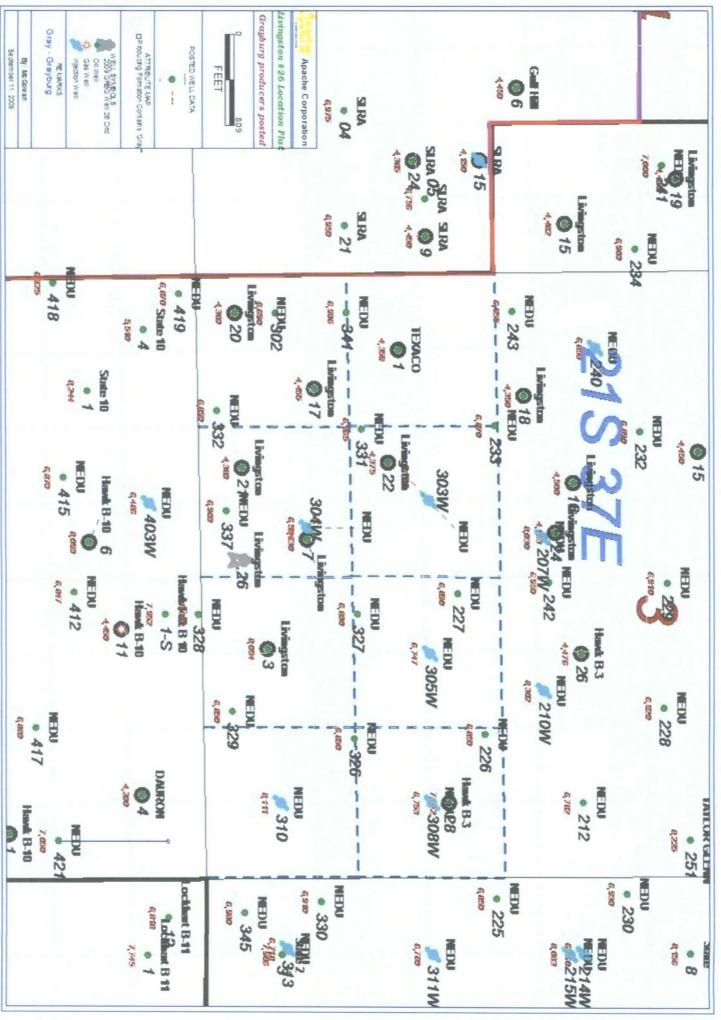
Reserves for the proposed location were calculated by planimetering the undrained area of the SophiH isopach which lies under a drainage circle (the size of which is the average of the direct offset drainage areas) centered on the proposed location. Any competitive drainage is shared between the proposed well and the existing offset wells. The results are as follows:

				SophiH	Area	EUR	EUR
Oper.	Well	Loc	Reservoir	ft	ac	MBO	MMCFG
Apache	Livingston #26	0-20	Grayburg	9.23	9.18	32	368

4. Notice

The proposed **Livingston #26** only encroaches toward Apache operated Grayburg wells.

5. Approval of this application will afford the interest owners in these spacing units an opportunity to recover oil and gas which would not otherwise be recovered and to do so without violating correlative rights.



From:

Brooks, David K., EMNRD

Sent:

Tuesday, September 22, 2009 11:35 AM

To:

'drcatanach@netscape.com'

Subject:

Apache Corporation Livingston #26; NSL Application

Dear David

It appears that this proposed location encroaches not only to the east, towards the SW/4 SE/4 of Section3, but also diagonally toward the unit adjoining the subject unit at its southeast corner. See definition of "adjoining spacing unit." 19.15.2.7.A(5) NMAC. My interpretation is that a location encroaches toward a diagonally adjacent unit if the location is closer to the common corner than a well located at the closest orthodox location would be.

I am not entirely clear in this case whether the proposed location is in Unit N of irregular Section 3 (Thanks for calling my attention to the irregular configuration of the section!) or in Unit V. OCD on-line locates the Livingston #7 and Livingston #21 in Unit N, but as best I can tell from comparing the maps attached to the application to Midland Map Co. maps, these wells, and thus the proposed location, are actually in Unit V. Thus the spacing unit adjoining to the southeast is the NW/4 NE/4 of Section 10. If this is correct, then notice will be required to the operator or other affected persons in the NW/4 NE/4 of Section 10 if ownership of that quarter/quarter section is different from ownership of the subject unit.

Sincerely

David K. Brooks Legal Examiner 505-476-3450

From:

David Catanach [drcatanach@netscape.com]

Sent:

Tuesday, September 22, 2009 1:43 PM

To:

Brooks, David K., EMNRD

Subject:

Re: Apache Corporation Livingston #26; NSL Application

Mr. Brooks,

My apologies, you are entirely correct. I have spoken with Apache, and it appears that the interest ownership between the subject proration unit and the NW/4 NE/4 of Section 10 is not common. We are in the process of putting together a list of parties to be notified, and we will proceed in that manner. Once these parties are notified, we will send you proof of notification, together with a list of notified parties.

With regards to the long section, it is very confusing. I spoke with Paul Kautz last week, and he explained how the quarter-quarter sections are being numbered in these long sections. It appears that this is the numbering system:

C3 B2 **A1** D4 B7 D5 C6 **A8** D12 C11 B10 A9 Ε F G Η L K J Ν 0

I thought A-X was adequate, but I guess someone thought of a better way to do it.

If you need anything else, please let me know.

Thanks,

David Catanach

--- david.brooks@state.nm.us wrote:

From: "Brooks, David K., EMNRD" < david.brooks@state.nm.us >

To: <drcatanach@netscape.com>

Subject: Apache Corporation Livingston #26; NSL Application

Date: Tue, 22 Sep 2009 11:35:18 -0600

Dear David

It appears that this proposed location encroaches not only to the east, towards the SW/4 SE/4 of Section3, but also diagonally toward the unit adjoining the subject unit at its southeast corner. See definition of "adjoining spacing unit." 19.15.2.7.A(5) NMAC. My interpretation is that a location encroaches toward a diagonally adjacent unit if the location is closer to the common corner than a well located at the closest orthodox location would be.

I am not entirely clear in this case whether the proposed location is in Unit N of irregular Section 3 (Thanks for calling my attention to the irregular configuration of the section!) or in Unit V. OCD on-line locates the Livingston #7 and Livingston #21 in Unit N, but as best I can tell from comparing the maps attached to the application to Midland Map Co. maps, these wells, and thus the proposed location, are actually in Unit V. Thus the spacing unit adjoining to the southeast is the NW/4 NE/4 of Section 10. If this is correct, then notice will be

required to the operator or other affected persons in the NW/4 NE/4 of Section 10 if ownership of that quarter/quarter section is different from ownership of the subject unit.
Sincerely
David K. Brooks
Legal Examiner
505-476-3450
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RECEIVED OCD

2009 SEP 23 A 10: 31

Hand Delivered

New Mexico Oil Conservation Division 1220 S. St. Francis Drive Santa Fe, New Mexico 87505

Attention: Mr. David Brooks, Legal Examiner

Re: Supplemental Information & Proof of Notice

Apache Corporation Unorthodox Well Location Livingston Well No. 26 350' FSL & 2500' FWL, SE/4 SW/4

Section 3, T-21 South, R-37 East, NMPM,

Lea County, New Mexico

Dear Mr. Brooks:

On September 18, 2009, Apache Corporation ("Apache") filed an administrative application for approval of an unorthodox well location for its Livingston Well No. 26, to be drilled 350 feet from the South line and 2500 feet from the West line (SE/4 SW/4) of Section 3, Township 21 South, Range 37 East, NMPM, Lea County, New Mexico, to test the Penrose Skelly-Grayburg Pool. In that application, Apache stated that the only affected offset acreage was the SW/4 SE/4 of Section 3. Apache further stated that the ownership between the subject proration unit and the affected offset acreage was common throughout. In your E-mail to Apache dated September 22, 2009, you correctly pointed out that the NW/4 NE/4 of Section 10, being the southeast diagonal offset tract, was also affected offset acreage. Apache agrees that this tract is affected offset acreage as defined by Division rules. Consequently, Apache hereby advises the Division that the additional affected offset tract comprising the NW/4 NE/4 of Section 10 is operated by Apache, but that the interest ownership between the subject proration unit and this offset tract is not common.

Pursuant to Division Rule 19.15.15.13, Apache has provided a complete copy of the administrative application, by certified mail, to the following affected interest owners in the NW/4 NE/4 of Section 10:

Legacy Reserves Operating, LP 303 W. Wall Street, Suite 1400 Midland, Texas 79701 Apache Corporation Supplemental Information & Proof of Notice Unorthodox Location Application Livingston No. 26 Page 2

> Devon Energy Production Company, LP 20 N. Broadway Oklahoma City, OK 73102-8260

> > Minerals Management Service Royalty Management Program P.O. Box 5810 TA Denver, Colorado 80217-5810

Enclosed please find a copy of the letter accompanying the application, and the certified mail receipts. If you should have any additional questions, please call me at (505) 690-9453.

Sincerely,

David Catanach, Agent Apache Corporation

6120 S. Yale Suite 1500

Tulsa, Oklahoma 74136

<u>CERTIFIED MAIL</u> RETURN RECEIPT REQUESTED

TO: AFFECTED INTEREST OWNERS: NW/4 NE/4 Section 10, T-21S, R-37E

Re: Apache Corporation

Unorthodox Well Location Livingston Well No. 26 350' FSL & 2500' FWL, SE/4 SW/4 Section 3, T-21 South, R-37 East, NMPM, Lea County, New Mexico

Ladies and Gentlemen:

Enclosed please find a copy of the application filed by Apache Corporation ("Apache") for approval of an unorthodox well location for its proposed Livingston No. 26 to be drilled 350 feet from the South line and 2500 feet from the West line (SE/4 SW/4) of Section 3, Township 21 South, Range 37 East, NMPM, to test the Penrose Skelly-Grayburg Pool. The SE/4 SW/4 of Section 3 is to be dedicated to the well forming a standard 40-acre oil spacing and proration unit.

This application was originally filed with the Oil Conservation Division on September 18, 2009. Subsequently, it was discovered that Apache inadvertently failed to provide notice to the interest owners within the affected offset diagonal tract to the southeast comprising the NW/4 NE/4 of Section 10.

As the owner of an interest in that tract that may be affected by the proposed unorthodox location, you are being provided notice as per Division rules and regulations. Objections must be filed in writing at the Division's Santa Fe office within 20 days from the date this notice was sent to you. If no objection is received within 20 days from the date this notice was sent to you, the application may be approved.

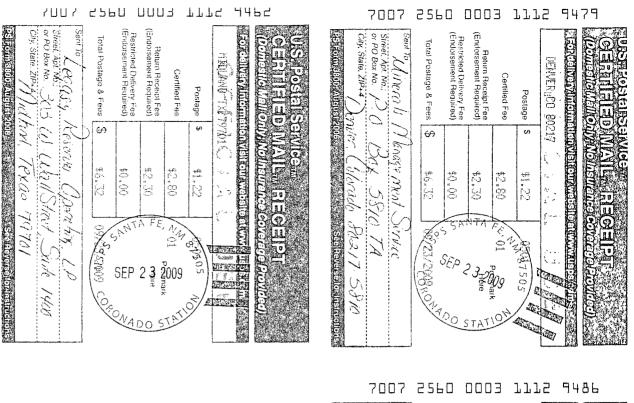
If you should have any questions, please call me at (505) 690-9453.

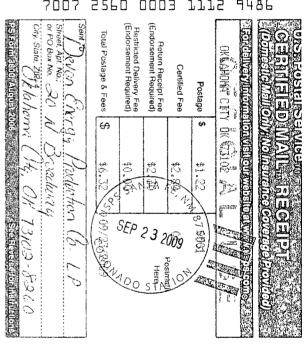
Sincerely,

David Catanach

Agent, Apache Corporation 6120 S. Yale, Suite 1500 Tulsa, Oklahoma 74136

Enclosure





From:

Brooks, David K., EMNRD

Sent:

Tuesday, September 22, 2009 1:56 PM

To:

'David Stewart@oxv.com'

Subject:

RE: Federal 29 #5 NSL Application - Federal 29 #1

Dear Mr. Stewart

Our interpretation is that, in the case of a diagonal encroachment, a proposed non-standard location encroaches if it is closer to the common corner than the nearest standard location. Since the nearest standard location to the common corner would be 330 feet from each unit boundary, it would be the square root of two time 330 feet squared, or 467 feet from the common corner.

Sincerely

David K. Brooks Legal Examiner 505-476-3450

From: David_Stewart@oxy.com [mailto:David_Stewart@oxy.com]

Sent: Tuesday, September 22, 2009 12:31 PM

To: Brooks, David K., EMNRD

Subject: RE: Federal 29 #5 NSL Application - Federal 29 #1

Dear Mr. Brooks

I was going by 19.15.4.12.A(2)(c) where it talks about adjoining spacing units that are being encroached upon by the unorthodox location. So I calculated the distance from the proposed surface location and came up with well #1 being +/-354' and #5 being +/-376' from the spacing unit in the SW/4SE/4 of Sec 21. If this is not correct, please let me know and I will get with our land department to find out about that spacing unit. I appreciate the help.

Thanks, David Stewart Sr. Regulatory Analyst OXY Permian 432-685-5717 Fax-432-685-5742

From: Brooks, David K., EMNRD [mailto:david.brooks@state.nm.us]

Sent: Tuesday, September 22, 2009 11:26 AM

To: Stewart, David

Subject: Federal 29 #5 NSL Application

Dear Mr. Stewart

In addition to the encroachment toward the NW/4 NE/4 of Section 29, this proposed location also encroaches diagonally toward the SW/4 SE/4 of Section 21, to the northeast. See definition of "adjoining spacing unit. 19.15.2.7.A(5) NMAC.

According to NMOCD records, it seems that OXY is operator of the Delaware well in the SW/4 SE/4 of Section 21. However, if there are other working interest owners who own no interest in the proposed Federal 29 #5 well, or own a smaller interest in the well than there interest in the SW/4 SE/4 of Section 21, notice of this application to those working interest owners will be required.

Sincerely

David K. Brooks Legal Examiner 505-476-3450

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From:

Brooks, David K., EMNRD

Sent:

Monday, October 19, 2009 8:48 AM

To:

'dcatanach@netscape.com'

Cc:

Subject:

Hill, Larry, EMNRD
Apache Corporation - Livingston #26; NSL Application

Dear David

The referenced application was granted under date of October 14, as Administrative Order NSL 6101. The signed original order will soon be available on OCD's website.

Sincerely

David K. Brooks