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SINGAPORE  
WASHINGTON

September 16, 2024

BKV Corporation  
1200 17th Street, Suite 2100  
Denver, Colorado 80202

Ladies and Gentlemen:

We have acted as counsel for BKV Corporation, a Delaware corporation (the “Company”), in connection with the proposed offer and sale (the “Offering”) by the Company of up to 17,250,000 shares of its Common Stock, par value \$0.01 per share (the “Common Stock”), including up to 2,250,000 shares of Common Stock issuable upon exercise by the underwriters of an option to purchase additional shares of Common Stock, pursuant to a prospectus (the “Prospectus”) forming a part of a registration statement on Form S-1 (File No. 333-268469) (such Registration Statement, as amended at the effective date thereof, being referred to herein as the “Registration Statement”), originally filed with the Securities and Exchange Commission (the “Commission”) on November 18, 2022 under the Securities Act of 1933, as amended (the “Securities Act”), as described in the Registration Statement. At your request, this opinion letter is being furnished to you for filing as Exhibit 5.1 to the Registration Statement.

The term “Common Stock” shall include any additional shares of common stock of the Company registered pursuant to Rule 462(b) under the Securities Act in connection with the offering contemplated by the Registration Statement.

In our capacity as your counsel in the connection referred to above and as a basis for the opinion hereinafter expressed, we have examined (i) the form of underwriting agreement filed as an exhibit to the Registration Statement, (ii) the form of Second Amended and Restated Certificate of Incorporation of the Company, filed as an exhibit to the Registration Statement, (iii) the form of Second Amended and Restated Bylaws of the Company, filed as an exhibit to the Registration Statement, (iv) records of proceedings of the Company’s Board of Directors, including committees thereof, with respect to the filing of the Registration Statement and the issuance of the Common Stock, (v) originals, or copies certified or otherwise identified, of certificates of public officials and of representatives of the Company, (vi) the Registration Statement and the Prospectus and (vii) statutes and other instruments and documents as we have deemed necessary or advisable for the purpose of rendering the opinion hereinafter expressed.

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In connection with the opinion hereinafter expressed, we have assumed that (i) the Registration Statement and any amendments thereto (including post-effective amendments) will have become effective; (ii) the Second Amended and Restated Certificate of Incorporation and the Second Amended and Restated Bylaws of the Company, in the forms filed as exhibits to the Registration Statement, will have become effective; (iii) all Common Stock will be issued and sold in the manner stated in the Registration Statement and the Prospectus; (iv) a definitive underwriting agreement, in the form filed as an exhibit to the Registration Statement, with respect to the sale of shares of Common Stock offered in the Offering will have been duly authorized and validly executed and delivered by the Company and the other parties thereto; and (v) the certificates, if any, for the Common Stock will conform to the specimens thereof examined by us and will have been duly countersigned by a transfer agent and duly registered by a registrar of the Common Stock, or, if uncertificated, valid book-entry notations will have been made in the stock register of the Company in accordance with the provisions of the governing documents of the Company.

In addition, in giving the opinion hereinafter expressed, we have relied, to the extent we deemed proper, without independent investigation, upon certificates, statements and other representations of officers and other representatives of the Company and of governmental and public officials with respect to the accuracy and completeness of the material factual matters contained therein or covered thereby, and we have assumed, without independent investigation, that the signatures on all documents examined by us are genuine, that all documents submitted to us as originals are accurate and complete, that all documents submitted to us as copies are true and correct copies of the originals thereof, that such original copies are authentic and complete and that all information submitted to us was accurate and complete.

Based upon and subject to the foregoing, we are of the opinion that when such Common Stock has been issued and delivered in accordance with the terms of a definitive underwriting agreement approved by the Board of Directors of the Company upon payment of the consideration therefor provided for therein, such Common Stock will be duly authorized, validly issued, fully paid and nonassessable.

The opinion set forth above is limited in all respects to matters of the General Corporation Law of the State of Delaware, and applicable reported judicial decisions, rules and regulations interpreting and implementing those laws, in each case, as in effect on the date hereof. We express no opinion as to the effect of the laws of any other jurisdiction.

We hereby consent to the filing of this opinion letter with the Commission as Exhibit 5.1 to the Registration Statement. We also consent to the reference to our Firm under the heading "Legal Matters" in the Prospectus. In giving this consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission thereunder.

Very truly yours,  
/s/ Baker Botts L.L.P.

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CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the use in this Registration Statement on Form S-1 of BKV Corporation of our report dated April 29, 2024, relating to the financial statements of BKV Corporation, which appears in this Registration Statement. We also consent to the reference to us under the heading “Experts” in such Registration Statement.

/s/ PricewaterhouseCoopers LLP

Dallas, Texas  
September 16, 2024

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TBPELS REGISTERED ENGINEERING FIRM F-1580  
633 17TH STREET SUITE 1700

DENVER, COLORADO 80202

TELEPHONE (303) 339-8110

### CONSENT OF INDEPENDENT PETROLEUM ENGINEERS

We hereby consent to the references to our firm in this Registration Statement on Form S-1 for BKV Corporation, and to the use of information from, and the inclusion of, our reports, (i) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold and royalty interests of BKV Corporation referred to as the Barnett Assets as of December 31, 2021, (ii) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold interests of BKV Corporation referred to as the Chaffee Corners Assets as of December 31, 2021, (iii) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold interests of BKV Corporation referred to as the Chelsea Assets as of December 31, 2021, (iv) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold interests of BKV Corporation referred to as the BKV Assets as of December 31, 2021, (v) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold and royalty interests of BKV Corporation referred to as the Barnett Assets as of December 31, 2022, (vi) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold interests of BKV Corporation referred to as the Chaffee Corners Assets as of December 31, 2022, (vii) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold and royalty interests of BKV Corporation referred to as the Chelsea Assets as of December 31, 2022, (viii) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold and royalty interests of BKV Corporation referred to as the BKV Assets as of December 31, 2022, (ix) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold and royalty interests of BKV Corporation referred to as the North Texas Assets as of December 31, 2022, (x) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold and royalty interests of BKV Corporation referred to as the Total Company Assets as of December 31, 2023, and (xi) dated August 7, 2024, with respect to the estimates of proved reserves, future production and income attributable to certain leasehold and royalty interests of BKV Corporation referred to as the Total Company Assets, using a NYMEX Alternate Pricing Scheme, as of December 31, 2023, each in this Registration Statement. We further consent to the reference to our firm under the heading "Experts" in this Registration Statement and related prospectus.

/s/ Ryder Scott Company

**RYDER SCOTT COMPANY, L.P.**

TBPELS Firm Registration No. F-1580

Denver, Colorado  
September 16, 2024

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## Calculation of Filing Fee Table

Form S-1  
(Form Type)BKV Corporation  
(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered Securities

	Security Type	Security Class Title	Fee Calculation or Carry Forward Rule	Amount Registered	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee
<b>Fees to Be Paid</b>	Equity	Common Stock, par value \$0.01 per share	457(a)	17,250,000(1)	\$ 21.00	\$ 362,250,000(2)	\$ 0.00014760	\$ 53,468.10
<b>Fees Previously Paid</b>	Equity	Common Stock, par value \$0.01 per share	457(o)	—	—	\$ 100,000,000(3)	\$ 0.00011020	\$ 11,020.00
<b>Total Offering Amounts</b>						<b>\$ 362,250,000</b>		<b>\$ 53,468.10</b>
<b>Total Fees Previously Paid</b>								<b>\$ 11,020.00</b>
<b>Total Fee Offsets</b>								<b>—</b>
<b>Net Fee Due</b>								<b>\$ 42,448.10</b>

(1) Includes common stock issuable upon exercise of the underwriters' option to purchase up to 2,250,000 additional shares of common stock.

(2) Estimated solely for the purpose of calculating the amount of the registration fee pursuant to Rule 457(a) under the Securities Act of 1933, as amended.

(3) Estimated solely for the purpose of calculating the amount of the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended.