

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP

Check this box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. See Instruction 1(b).

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934 or Section 30(h) of the Investment Company Act of 1940

| OMB APPROVAL | |
|--|-----------|
| OMB Number: | 3235-0287 |
| Estimated average burden hours per response: | 0.5 |

| | | |
|---|---|--|
| 1. Name and Address of Reporting Person* <u>LEER STEVEN F</u> (Last) (First) (Middle) <u>ONECITYPLACE DRIVE</u> (Street) <u>ST. LOUIS MO 63141</u> (City) (State) (Zip) | 2. Issuer Name and Ticker or Trading Symbol <u>ARCH COAL INC [ACI]</u> | 5. Relationship of Reporting Person(s) to Issuer (Check all applicable) <input checked="" type="checkbox"/> Director 10% Owner <input checked="" type="checkbox"/> Officer (give title below) Other (specify below) <u>Chairman and CEO</u> |
| | 3. Date of Earliest Transaction (Month/Day/Year) <u>02/21/2011</u> | |
| | 4. If Amendment, Date of Original Filed (Month/Day/Year) | |
| | | 6. Individual or Joint/Group Filing (Check Applicable Line) <input checked="" type="checkbox"/> Form filed by One Reporting Person <input type="checkbox"/> Form filed by More than One Reporting Person |

Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned

| 1. Title of Security (Instr. 3) | 2. Transaction Date (Month/Day/Year) | 2A. Deemed Execution Date, if any (Month/Day/Year) | 3. Transaction Code (Instr. 8) | | 4. Securities Acquired (A) or Disposed Of (D) (Instr. 3, 4 and 5) | | | 5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4) | 6. Ownership Form: Direct (D) or Indirect (I) (Instr. 4) | 7. Nature of Indirect Beneficial Ownership (Instr. 4) |
|---------------------------------|--------------------------------------|--|--------------------------------|---|---|------------|-------|---|--|---|
| | | | Code | V | Amount | (A) or (D) | Price | | | |
| Common Stock | 02/21/2011 | | D | | 16,275 | D | (1) | 2,020 | D | |
| Common Stock | | | | | | | | 62,512 | I | By 401(k) plan |

Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)

| 1. Title of Derivative Security (Instr. 3) | 2. Conversion or Exercise Price of Derivative Security | 3. Transaction Date (Month/Day/Year) | 3A. Deemed Execution Date, if any (Month/Day/Year) | 4. Transaction Code (Instr. 8) | | 5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4 and 5) | | 6. Date Exercisable and Expiration Date (Month/Day/Year) | | 7. Title and Amount of Securities Underlying Derivative Security (Instr. 3 and 4) | 8. Price of Derivative Security (Instr. 5) | 9. Number of derivative Securities Beneficially Owned Following Reported Transaction(s) (Instr. 4) | 10. Ownership Form: Direct (D) or Indirect (I) (Instr. 4) | 11. Nature of Indirect Beneficial Ownership (Instr. 4) | |
|--|--|--------------------------------------|--|--------------------------------|---|--|-----|--|-----------------|---|--|--|---|--|-------|
| | | | | Code | V | (A) | (D) | Date Exercisable | Expiration Date | | | | | | Title |
| Phantom Stock | (2) | 02/21/2011 | | A | | 16,275 | | (3) | (3) | Common Stock | 16,275 | (1) | 16,275 | D | |

Explanation of Responses:

- Upon the vesting of restricted stock units granted to the reporting person on February 21, 2008, the reporting person deferred the receipt of 16,275 shares of common stock and received instead 16,275 shares of phantom stock pursuant to the Arch Coal, Inc. Executive Deferred Compensation Plan. As a result, the reporting person is reporting the disposition of 16,275 shares of common stock in exchange for an equal number of shares of phantom stock.
- Each share of phantom stock represents a right to receive one share of common stock unless otherwise deferred, at the reporting person's election, pursuant to the Arch Coal, Inc. Executive Deferred Compensation Plan.
- The phantom stock becomes payable upon the reporting person's termination of employment with Arch Coal, Inc.

Remarks:

/s/ Jon S. Ploetz, Attorney-in-Fact 02/21/2011

** Signature of Reporting Person Date

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

* If the form is filed by more than one reporting person, see Instruction 4 (b)(v).

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations See 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, see Instruction 6 for procedure.

Persons who respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB Number.