

Form

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class="date">August 16, 2007

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

SCHEDULE 13G

Under the Securities Exchange Act of 1934

CF Industries Holdings, Inc.
(Name of Issuer)

Common Stock, \$0.01 par value
(Title of Class of Securities)

125269100
(CUSIP Number)

August 6, 2007
(Date of Event Which Requires Filing of this Statement)

Check the following box to designate the rule pursuant to which the Schedule is filed:

- Rule 13d-1(b)
- Rule 13d-1(c)
- Rule 13d-1(d)

*The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

CUSIP No. 125269100

1. **Names of Reporting Persons**
I.R.S. Identification Nos. of above persons (entities only)
 D. E. Shaw & Co., L.P.
 13-3695715

2. **Check the Appropriate Box if a Member of a Group (See Instructions)**
 (a)
 (b)

3. **SEC Use Only**

4. **Citizenship or Place of Organization**
 Delaware

**Number of
 Shares
 Beneficially
 Owned by
 Each
 Reporting
 Person With**

5. **Sole Voting Power**

-0-

6. **Shared Voting Power**
 2,659,087

7. **Sole Dispositive Power**
 -0-

8. **Shared Dispositive Power**
 2,868,887

9. **Aggregate Amount Beneficially Owned by Each Reporting Person**
 2,868,887

10. **Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)**

11. **Percent of Class Represented by Amount in Row (9)**
 5.2%

12. **Type of Reporting Person (See Instructions)**
 IA, PN

CUSIP No. 125269100

1. **Names of Reporting Persons**
I.R.S. Identification Nos. of above persons (entities only)
 David E. Shaw

2. **Check the Appropriate Box if a Member of a Group (See Instructions)**
 (a)
 (b)

3. **SEC Use Only**

4. **Citizenship or Place of Organization**
 United States

**Number of
 Shares
 Beneficially
 Owned by
 Each
 Reporting
 Person With**

5. **Sole Voting Power**

-0-

6. **Shared Voting Power**
 2,659,087

7. **Sole Dispositive Power**
 -0-

8. **Shared Dispositive Power**
 2,868,887

9. **Aggregate Amount Beneficially Owned by Each Reporting Person**
 2,868,887

10. **Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)**

11. **Percent of Class Represented by Amount in Row (9)**
 5.2%

12. **Type of Reporting Person (See Instructions)**
 IN

Item 1.

(a) Name of Issuer

CF Industries Holdings, Inc.

(b) Address of Issuer's Principal Executive Offices

4 Parkway North, Suite 400
Deerfield, Illinois 60015

Item 2.

(a) Name of Person Filing

D. E. Shaw & Co., L.P.
David E. Shaw

(b) Address of Principal Business Office or, if none, Residence

The business address for each reporting person is:
120 W. 45th Street, Tower 45, 39th Floor
New York, NY 10036

(c) Citizenship

D. E. Shaw & Co., L.P. is a limited partnership organized under the laws of the state of Delaware.
David E. Shaw is a citizen of the United States of America.

(d) Title of Class of Securities

Common Stock, \$0.01 par value

(e) CUSIP Number

125269100

Item 3. If this statement is filed pursuant to Rule 13d-1(b) or 13d-2(b) or (c), check whether the person filing is a:

Not applicable

Item 4.

Ownership

As of August 8, 2007:

(a) Amount beneficially owned:

D. E. Shaw & Co., L.P.:

2,868,887 shares

This is composed of (i) 1,383,922 shares in the name of D. E. Shaw Oculus Portfolios, L.L.C., (ii) 815,100 shares in the name of D. E. Shaw Valence Portfolios, L.L.C., (iii) 283,700 shares that D. E. Shaw Valence Portfolios, L.L.C. has the right to acquire through the exercise of listed call options, (iv) 1,265 shares in the name of D. E. Shaw Synoptic Portfolios 2, L.L.C., and (v) 384,900 shares under the

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management of D. E. Shaw Investment
Management, L.L.C.

David E. Shaw:

2,868,887 shares

This is composed of (i) 1,383,922 shares in the name of D. E. Shaw Oculus Portfolios, L.L.C., (ii) 815,100 shares in the name of D. E. Shaw Valence Portfolios, L.L.C., (iii) 283,700 shares that D. E. Shaw Valence Portfolios, L.L.C. has the right to acquire through the exercise of listed call options, (iv) 1,265 shares in the name of D. E. Shaw Synoptic Portfolios 2, L.L.C., and (v) 384,900 shares under the management of D. E. Shaw Investment Management, L.L.C.

(b) Percent of class:

D. E. Shaw & Co., L.P.:	5.2%
David E. Shaw:	5.2%

(c) Number of shares to which the person has:

(i)	Sole power to vote or to direct the vote:	
	D. E. Shaw & Co., L.P.:	-0- shares
	David E. Shaw:	-0- shares
(ii)	Shared power to vote or to direct the vote:	
	D. E. Shaw & Co., L.P.:	2,659,087 shares
	David E. Shaw:	2,659,087 shares
(iii)	Sole power to dispose or to direct the disposition of:	
	D. E. Shaw & Co., L.P.:	-0- shares
	David E. Shaw:	-0- shares
(iv)	Shared power to dispose or to direct the disposition of:	
	D. E. Shaw & Co., L.P.:	2,868,887 shares
	David E. Shaw:	2,868,887 shares

David E. Shaw does not own any shares directly. By virtue of David E. Shaw's position as President and sole shareholder of D. E. Shaw & Co., Inc., which is the general partner of D. E. Shaw & Co., L.P., which in turn is the investment adviser of D. E. Shaw Oculus Portfolios, L.L.C. and D. E. Shaw Synoptic Portfolios 2, L.L.C., the managing member and investment adviser of D. E. Shaw Valence Portfolios, L.L.C., and the managing member of D. E. Shaw Investment Management, L.L.C., and by virtue of David E. Shaw's position as President and sole shareholder of D. E. Shaw & Co. II, Inc., which is the managing member of D. E. Shaw & Co., L.L.C., which in turn is the managing member of D. E. Shaw Oculus Portfolios, L.L.C. and D. E. Shaw Synoptic Portfolios 2, L.L.C., David E. Shaw may be deemed to have the shared power to vote or direct the vote of 2,659,087 shares, and the shared power to dispose or direct the disposition of 2,868,887 shares, the 2,868,887 shares as described above constituting 5.2% of the outstanding shares and, therefore, David E. Shaw may be deemed to be the beneficial owner of such shares. David E. Shaw disclaims beneficial ownership of such 2,868,887 shares.

Item 5. Ownership of Five Percent or Less of a Class

Not Applicable

Item 6. Ownership of More than Five Percent on Behalf of Another Person.

Not Applicable

Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company or Control Person.

Not Applicable

Item 8. Identification and Classification of Members of the Group

Not Applicable

Item 9.

Not Applicable

Notice of Dissolution of Group

Item 10.

Certification

By signing below, each of D. E. Shaw & Co., L.P. and David E. Shaw certify that, to the best of such reporting person's knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having such purposes or effect.

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SIGNATURE

After reasonable inquiry and to the best of their knowledge and belief, the undersigned certify that the information set forth in this statement is true, complete and correct. A Power of Attorney, dated February 24, 2004, granted by David E. Shaw in favor of Anne Dinning, is attached hereto.

Dated: August 16, 2007

D. E. Shaw & Co., L.P.

By:

/s/ Anne Dinning

Anne Dinning
Managing Director

David E. Shaw

By:

/s/ Anne Dinning

Anne Dinning
Attorney-in-Fact for David E. Shaw
