

SPIRE Corp  
Form 11-K  
June 29, 2011

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

FORM 11-K

S Annual Report Pursuant to Section 15(d) of the Securities Exchange Act of 1934  
For the fiscal year ended December 31, 2010 or

o Transition Report Pursuant to Section 15(d) of the Securities Exchange Act of 1934  
For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number: 0-12742

A. Full title of the plan and the address of the plan, if different from that of the issuer named below:

Spire Corporation 401(k) Profit Sharing Plan

B. Name of issuer of the securities held pursuant to the plan and the address of its principal executive office:

Spire Corporation  
One Patriots Park  
Bedford, Massachusetts 01730-2396

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Spire Corporation  
401(k) Profit Sharing Plan  
Financial Statements and Supplemental Schedules  
As of December 31, 2010 and 2009 and for the Year Ended December 31, 2010

Table of Contents

	Page
Report of Independent Registered Public Accounting Firm	<u>1</u>
Financial Statements:	
Statements of Net Assets Available for Benefits	<u>3</u>
Statement of Changes in Net Assets Available for Benefits	<u>4</u>
Notes to Financial Statements	<u>5</u>
Supplemental Schedules:	
Schedule H, Line 4a - Form 5500, Schedule of Delinquent Contributions for the Year Ended December 31, 2010	<u>12</u>
Schedule H, Line 4i - Form 5500, Schedule of Assets (Held at End of Year)	<u>13</u>
Signature	<u>14</u>
Index to Exhibits	<u>15</u>
Exhibit 23.1	
Exhibit 23.2	

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Report of Independent Registered Public Accounting Firm

To the Plan Administrator and Participants of  
Spire Corporation 401(k) Profit Sharing Plan  
Bedford, Massachusetts

We have audited the accompanying statement of net assets available for benefits of Spire Corporation 401(k) Profit Sharing Plan (the Plan) as of December 31, 2010, and the related statement of changes in net assets available for benefits for the year ended December 31, 2010. These financial statements are the responsibility of the Plan's management. Our responsibility is to express an opinion on these financial statements based on our audit. The financial statements of the Plan as of and for the year ended December 31, 2009 were audited by other auditors whose report dated June 28, 2010 expressed an unqualified opinion on those financial statements.

We conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The Plan is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting.

In our opinion, the financial statements referred to above present fairly, in all material respects, the net assets available for benefits of the Plan as of December 31, 2010 and the changes in net assets available for benefits for the year ended December 31, 2010 in conformity with accounting principles generally accepted in the United States of America.

Our audit was performed for the purpose of forming an opinion on the basic financial statements taken as a whole. The accompanying supplemental schedule of assets (held at end of year) as of December 31, 2010 and the schedule of delinquent contributions for the year ended December 31, 2010 are presented for the purpose of additional analysis and are not a required part of the basic financial statements but are supplementary information required by the Department of Labor's Rules and Regulations for Reporting under the Employee Retirement Income Security Act of 1974. These supplemental schedules are the responsibility of the Plan's management. The supplemental schedules have been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, are fairly stated in all material respects in relation to the basic financial statements taken as a whole.

/s/ Moody, Famiglietti and Andronico, LLP

MOODY, FAMIGLIETTI AND ANDRONICO, LLP  
Tewksbury, Massachusetts  
June 29, 2011

Report of Independent Registered Public Accounting Firm

To the Plan Administrator and Participants of  
Spire Corporation 401(k) Profit Sharing Plan  
Bedford, Massachusetts

We have audited the accompanying statements of net assets available for benefits of Spire Corporation 401(k) Profit Sharing Plan (the Plan) as of December 31, 2009 and 2008, and the related statement of changes in net assets available for benefits for the year ended December 31, 2009. These financial statements and schedules are the responsibility of the Plan's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the net assets available for benefits of the Plan as of December 31, 2009 and 2008 and the changes in net assets available for benefits for the year ended December 31, 2009 in conformity with accounting principles generally accepted in the United States of America.

Our audits were performed for the purpose of forming an opinion on the basic financial statements taken as a whole. The supplemental schedule of assets (held at end of year) as of December 31, 2009 is presented for the purpose of additional analysis and is not a required part of the basic financial statements but is supplementary information required by the Department of Labor's Rules and Regulations for Reporting under the Employee Retirement Income Security Act of 1974. The supplemental schedule is the responsibility of the Plan's management. The supplemental schedule has been subjected to the auditing procedures applied in the audits of the basic financial statements and, in our opinion, is fairly stated in all material respects in relation to the basic financial statements taken as a whole.

/s/ Siegrist and Cree, CPAs, PC

SIEGRIST AND CREE, CPA, P.C.

Wellesley Hills, Massachusetts  
June 28, 2010

Spire Corporation 401(k) Profit Sharing Plan  
 Statements of Net Assets Available for Benefits  
 As of December 31, 2010 and 2009

	2010	2009
Assets		
Investments, at fair value	\$8,277,314	\$7,142,660
Receivables:		
Participant contributions	—	856
Employer contributions	39	312
Notes receivable from participants	206,930	164,818
Total receivables	206,969	165,986
Total assets	8,484,283	7,308,646
Liabilities		
Excess contributions payable	74,456	91,628
Net assets available for benefits	\$8,409,827	\$7,217,018

The accompanying notes are an integral part of these financial statements.

Spire Corporation 401(k) Profit Sharing Plan  
Statement of Changes in Net Assets Available for Benefits  
For the Year Ended December 31, 2010

Additions to net assets	
Investment Income:	
Net appreciation in fair value of investments	\$466,862
Interest and dividends	109,913
Interest on notes receivable from participants	9,792
Total investment income	586,567
Contributions:	
Participant	663,075
Employer	214,944
Participant Rollovers	215,449
Total contributions	1,093,468
Total additions	1,680,035
Deductions from net assets	
Benefits paid to participants	486,813
Administrative expenses	413
Total deductions	487,226
Net increase	1,192,809
Net assets available for benefits at beginning of year	7,217,018
Net assets available for benefits at end of year	\$8,409,827

The accompanying notes are an integral part of these financial statements.

Spire Corporation 401(k) Profit Sharing Plan  
Notes to Financial Statements  
For the Year Ended December 31, 2010

1. Plan Description

The following brief description of the Spire Corporation 401(k) Profit Sharing Plan (the "Plan") provides general information only. Participants should refer to the Plan agreement for a more complete description of the Plan's provisions.

General

The Plan is a defined contribution plan covering all eligible employees of Spire Corporation (the "Company"). The Plan was established January 1, 1985 and was restated using a prototype provided by American Funds when they assumed the position as plan services provider in 2009. The Plan was most recently amended in December 2010. Capital Bank and Trust Company serves as the trustee (the "Trustee") of the Plan's assets for the year ended December 31, 2010. The Plan is subject to the provisions of the Internal Revenue Code of 1986, as amended (the "Code"), and the provisions of the Employee Retirement Income Security Act of 1974 ("ERISA"), as amended.

Eligibility and Contributions

Employees of the Company become eligible to participate in the Plan with voluntary contributions to their 401(k) salary deferral account upon reaching the age of 21 and upon completion of ninety (90) days of service with the Company. The entry dates are the first of the month following eligibility. A participant may contribute up to the maximum amount of pre-tax annual compensation allowed by the Internal Revenue Code. Participants may contribute rollover distributions from other qualified plans. Participants direct the investment of their contributions into various investment funds offered by the Plan. Currently, the Plan offers to participants investments in the Company's common stock, mutual funds and a money market fund.

Matching Contribution and Profit Sharing Contribution Plan Component

The Company may contribute a discretionary matching contribution on the first 15% of compensation that a participant contributes to the Plan. In 2010, the Company made a matching contribution amounting to \$214,944. In addition, the Company may make a profit sharing contribution. In 2010, the Company did not make any profit sharing contribution.

Vesting

Participants are vested immediately in their voluntary contributions to the Plan plus actual earnings thereon. Vesting in the Company matching contribution is based on continuous years of service and a participant is 100 percent vested after six years of credited service.

Participant Accounts

Each participant's account is credited with the participant's contributions and allocations of any Company matching contribution and the Plan earnings. The benefit to which a participant is entitled is the benefit that can be provided from the participant's vested account. The participant directs the investment of his or her individual account by selecting among various mutual funds, a money market fund or Company common stock. Each participant has the

ability to change the investment percentage at any time.

#### Forfeited Accounts

Termination of a participant who is not fully vested results in forfeiture of the non-vested portion of the participant's account balance. Forfeitures may be used to reduce future employer contributions. The forfeited amounts available at December 31, 2010 and 2009 amounted to \$68,943 and \$34,126 respectively.

#### Notes Receivable from Participants

Participants may borrow from their fund accounts a minimum of \$1,000 up to a maximum equal to the lesser of \$50,000 or fifty percent of their vested account balance. The loan terms range from 1 to 5 years or up to 10 years for the purchase of a primary residence. The loans are secured by the balance in the participant's account and bear interest at a rate commensurate with local prevailing rates as determined by the plan administrator. The participant may have two outstanding loans at any given time. Interest rates are fixed at prime plus one percent on the loan origination date. Principal and interest are repaid ratably through

Spire Corporation 401(k) Profit Sharing Plan  
Notes to Financial Statements (Continued)  
For the Year Ended December 31, 2010

payroll deductions. Notes receivable from participants outstanding were \$206,930 and \$164,818 at December 31, 2010 and 2009, respectively. As of December 31, 2010, interest rates on loans outstanding range between 4.25% and 9.25%.

#### Payments of Benefits

Employees are permitted to withdraw funds from their accounts upon attaining the age of 59-1/2, retirement, termination, financial hardship, disability or death. The participant or beneficiary may elect to receive lump-sum cash payments or installment payments over the participant's and beneficiary's assumed life expectancy determined at the time of distribution. Benefits are recorded when paid.

#### Plan Termination

Although management has not expressed any intent to do so, the Company has the right under the Plan to discontinue and terminate the Plan subject to the provisions of ERISA. In the event the Plan terminates, participants will become 100% vested in their accounts.

#### Administrative Expenses

Administrative expenses of the Plan are borne by the Company, except for fees related to administration of participant loans, which are deducted from the applicable participants' accounts.

## 2. Summary of Significant Accounting Policies

#### Basis of Accounting

The financial statements of the Plan are prepared on the accrual basis of accounting in conformity with U.S. generally accepted accounting principles ("U.S. GAAP"). Certain prior year amounts have been reclassified to conform to the current year's presentation. Such reclassifications did not affect net assets available for benefits.

#### Recent Accounting Pronouncements

In January 2010, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2010-06, Improving Disclosures about Fair Value Measurements (Topic 820) - Fair Value Measurements and Disclosures ("ASU 2010-06"). This update requires: (a) separate disclosures for significant transfers between Level 1 and Level 2 and the reasons for the transfers; (b) separate disclosure of purchases, sales, issuances, and settlements in the reconciliation of activity within Level 3; (c) the use of judgment in determining the appropriate classes of assets and liabilities; and (d) a description of the valuation techniques and inputs used to measure fair value for both recurring and nonrecurring fair value measurements. ASU 2010-06 is effective for interim and annual reporting periods beginning after December 15, 2009, except for the disclosures about purchases, sales, issuances, and settlements in the rollforward of activity in Level 3 fair value measurements. Those disclosures are effective for fiscal years beginning after December 15, 2010, and for interim periods within those fiscal years. The Plan adopted ASU 2010-06 for the year ended December 31, 2010 except for the provisions that are not effective until the year ended December 31, 2011. The Plan is currently evaluating the impact of the provisions of ASU 2010-06 that are not effective until the year ended December 31, 2011 on its financial statements.

In September 2010, the FASB issued ASU No. 2010-25, Plan Accounting – Defined Contribution Pension Plans (Topic 962): Reporting Loans to Participants by Defined Contribution Pension Plans (“ASU 2010-25”). The objective of this update is to clarify how loans to participants should be classified and measured by defined contribution pension benefit plans. ASU 2010-25 requires that participant loans be classified as notes receivable from participants, which are segregated from plan investments and measured at their unpaid principal balance plus any accrued but unpaid interest. This pronouncement is effective for fiscal years ending after December 15, 2010 and shall be applied retrospectively. The Plan adopted this pronouncement on a retrospective basis effective beginning on January 1, 2010. Prior to the adoption of this pronouncement, participant loans were held as an investment and carried at fair value. The Plan has reclassified amounts previously reported to conform to the current presentation. The adoption of this pronouncement did not have a material impact on the Plan’s financial statements.

In May 2011, the FASB issued Accounting Standards Update No. 2011-04, Amendments to Achieve Common Fair Value Measurement and Disclosure Requirements in U.S. GAAP and International Financial Reporting Standards (Topic 820)—Fair Value Measurement (“ASU 2011-04”). The objective of this update is to provide a consistent definition of fair value and ensure

Spire Corporation 401(k) Profit Sharing Plan  
Notes to Financial Statements (Continued)  
For the Year Ended December 31, 2010

that the fair value measurement and disclosure requirements are similar between U.S. GAAP and International Financial Reporting Standards. ASU 2011-04 changes certain fair value measurement principles and enhances the disclosure requirements particularly for level 3 fair value measurements. ASU 2011-04 is effective for the Plan prospectively for the year ending December 31, 2012. The Plan is currently evaluating the impact of pending adoption of ASU 2011-04 on its financial statements.

#### Investment Valuation and Income Recognition

The Plan's investments are valued at fair value. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Shares of mutual funds are valued at published market prices, which represent the net asset value of shares held by the Plan at year end.

The Company's common stock is held by participants in a unitized fund, which means participants do not own shares of the Company's common stock but rather own an interest in the unitized fund. The fund consists of common stock and cash equivalents to meet the fund's daily cash needs. Unitizing the fund allows for daily trades. The value of a unit reflects the combined value of the Company's common stock and cash held by the fund. The Plan owns the underlying assets of shares in common stock and the underlying cash.

Purchases and sales of investments and realized gains and losses are accounted for on the trade date. Interest income is recorded as earned and dividend income is recorded on the ex-dividend date. The Plan reports the net appreciation or decline in the fair value of its investments consisting of realized gains or losses and unrealized appreciation or depreciation on those investments in the statement of changes in net assets available for benefits.

#### Notes Receivable from Participants

Notes receivable from participants are measured at the unpaid principal balance plus any accrued but unpaid interest. Interest earned on notes receivable is accounted for in the statement of changes in net assets available for benefits.

#### Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of net assets, liabilities and changes in net assets in the financial statements and accompanying notes. Actual results could differ from those estimates.

#### Risks and Uncertainties

The Plan provides to participants various investment options consisting primarily of mutual funds, Company common stock and a money market fund. Mutual funds invest in securities, such as, stocks, bonds, and fixed rate income securities. Investment securities are exposed to risks including changing interest rates, market fluctuations and credit risks. Due to the level of risk associated with investment securities, it is reasonable to assume that changes in the values of the investment securities will occur and that such changes could materially affect participants' account balances and the amounts reported in the statements of net assets available for benefits.

### 3. Investments

Investments that represent five percent (5%) or more of the Plan's net assets are as follows at December 31:

2010	2009
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Mutual funds:

American Funds Investment Co of America R3	\$ 1,459,037	\$ 1,334,578
American Funds Money Market Fund R3	1,349,191	1,433,694
American Funds Growth Fund of America R3	1,250,833	1,245,837
American Funds Capital World Gr & Inc R3	915,015	964,016

Common stock:

Spire Corporation	828,541	925,985
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7

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Spire Corporation 401(k) Profit Sharing Plan  
 Notes to Financial Statements (Continued)  
 For the Year Ended December 31, 2010

During 2010, the Plan's investments (including investments bought, sold, and held during the year) appreciated in value by \$466,862 as follows:

Mutual funds	\$495,916	
Common Stock	(29,054	)
Net appreciation in fair value of investments	\$466,862	

4. Fair Value Measurements

The Plan follows Accounting Standards Codification ("ASC") 820-10, Fair Value Measurements and Disclosures ("ASC 820-10"), for fair value measurements. ASC 820-10 defines fair value, establishes a framework for measuring fair value, and expands disclosures about fair value measurements. The standard provides a consistent definition of fair value, which focuses on an exit price, which is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The standard also prioritizes, within the measurement of fair value, the use of market-based information over entity specific information and establishes a three-level hierarchy for fair value measurements based on the nature of inputs used in the valuation of an asset or liability as of the measurement date.

The hierarchy established under ASC 820-10 gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). As required by ASC 820-10, the Plan's investments are classified within the fair value hierarchy based on the lowest level of input that is significant to the fair value measurement. The three levels of the fair value hierarchy under ASC 820-10, and their applicability to the Plan's investments, are described below:

Level 1 - Quoted Prices in active markets for identical assets or liabilities.

Level 2 - Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices in active markets for similar assets or liabilities, quoted prices for identical or similar assets or liabilities in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3 - Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

Fair value is a market-based measure considered from the perspective of a market participant who would buy the asset or assume the liability rather than the Plan's own specific measure. The Plan's valuation methodology used to measure the fair values of mutual funds, money market funds and common stock were derived from quoted market prices as substantially all of these instruments have active markets. In periods of market inactivity, the observability of prices and inputs may be reduced for certain instruments. This condition could cause an instrument to be reclassified from Level 1 to Level 2 or from Level 2 to Level 3. During the twelve months ended December 31, 2010, none of the Plan's instruments were reclassified between Level 1, Level 2 or Level 3.

Investments measured at fair value on a recurring basis consisted of the following types of instruments (Level 1 and 2 inputs are defined above):



Spire Corporation 401(k) Profit Sharing Plan  
Notes to Financial Statements (Continued)  
For the Year Ended December 31, 2010

	Balance as of December 31, 2010		
	Total	Fair Value Measurements Using	
		Level 1	Level 2
Mutual Funds:			
Growth and income funds	\$2,456,113	\$2,456,113	\$—
Growth funds	2,145,653	2,145,653	—
Bond funds	1,062,467	1,062,467	—
Growth, income and bond funds	435,349	435,349	—
Money Market Fund	1,349,191	1,349,191	—
Common Stock - Spire Corporation	828,541	—	828,541
Total investments measured at fair value	\$8,277,314	\$7,448,773	\$828,541

	Balance as of December 31, 2009		
	Total	Fair Value Measurements Using	
		Level 1	Level 2
Mutual Funds:			
Growth and income funds	\$2,301,998	\$2,301,998	\$—
Growth funds	1,669,049	1,669,049	—
Bond funds	795,451	795,451	—
Growth, income and bond funds	14,266	14,266	—
Money Market Fund	1,435,911	1,435,911	—
Common Stock - Spire Corporation	925,985	—	925,985
Total investments measured at fair value	\$7,142,660	\$6,216,675	\$925,985

## 5. Income Tax Status

The Internal Revenue Service has determined and informed the Company by a letter dated May 23, 1995, that the Plan and related trust are designed in accordance with applicable sections of the Internal Revenue Code (IRC). Although the Plan has been amended since receiving the determination letter, the plan administrator believes that the Plan is designed and is currently being operated in compliance with the applicable requirements of the Internal Revenue Code. Therefore, no provision for income taxes has been included in the Plan's financial statements.

U.S. GAAP requires the Plan to assess the recording of uncertain tax positions by evaluating the minimum recognition threshold and measurement requirements a tax position must meet before being recognized as a benefit in the financial statements. As of December 31, 2010, the Plan has not recognized any liabilities for uncertain tax positions or unrecognized benefits. The Plan does not expect any material change in uncertain tax benefits within the next twelve months. The Plan is subject to routine audits by taxing jurisdictions; however, there are currently no audits for any tax periods in progress. The plan administrator believes it is no longer subject to income tax examinations for years prior to 2007.

## 6. Excess Contributions

Contributions received from participants for the year ended December 31, 2010 and 2009 include \$74,456 and \$91,628, respectively, of excess contributions (net of corresponding gains and losses) that were remitted to certain active participants. The excess contributions are included in the Plan's statement of net assets available for benefits as

excess contributions payable. The excess deferral contributions, originally deducted in the year ended December 31, 2010 and 2009, were subsequently returned to comply with the participants' applicable maximum annual contributions permitted under the Code.

7. Notes Receivable from Participants

9

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The Plan permits participants to obtain loans against their account balance. The loans are administered by the trustee and are measured at the unpaid principal balance plus any accrued but unpaid interest thereon. Under certain circumstances, delinquent loans may be treated as distributions from the Plan. As of December 31, 2010 and 2009, total loans outstanding were \$206,930 and \$164,818 respectively. Interest earned on such loans for the year ended December 31, 2010 amounted to \$9,792.

8. Party-in-Interest Transactions

Capital Bank and Trust is the custodian of the Plan's assets and record keeper. Certain participant investments are in American Funds investment vehicles, which are managed by Capital Bank and Trust and these transactions are considered as party-in-interest.

Participant loans granted in accordance with the Plan are considered as party-in-interest transactions.

The Plan sponsor has paid audit fees for 2010 aggregating \$15,500.

9. Reconciliation of Financial Statements to Form 5500

The following is a reconciliation of the net assets available for benefits per the financial statements to the corresponding amounts shown in the Plan's Form 5500 as of December 31:

	2010	2009
Net assets available for benefits per the financial statements	\$ 8,409,827	\$ 7,217,018
(Less) contributions receivable	(39	) (1,168
Excess contributions payable	74,456	91,628
Net assets available for benefits per the Form 5500	\$ 8,484,244	\$ 7,307,478

The following is a reconciliation of the participant contributions per the financial statements to the corresponding amounts shown in the Plan's Form 5500 for the year ended December 31, 2010:

Participant contributions per the financial statements	\$ 663,075
(Less) prior year excess contributions payable	(91,628
Current year excess contributions payable	74,456
Prior year contributions receivable	856
Participant contributions per the Form 5500	\$ 646,759

The following is a reconciliation of the employer contributions per the financial statements to the corresponding amounts shown in the Plan's Form 5500 for the year ended December 31, 2010:

Employer matching contributions per the financial statements	\$ 214,944
(Less) current year contributions receivable	(39
Prior year contributions receivable	312
Employer matching contributions per the Form 5500	\$ 215,217

Spire Corporation 401(k) Profit Sharing Plan  
Notes to Financial Statements (Continued)  
For the Year Ended December 31, 2010

10. Untimely Remittances

As reported on Form 5500, Schedule H, Line 4a - Schedule of Delinquent Participant Contributions, certain participant contributions were not remitted to the Plan within the time frame specified by the Department of Labor's Regulation 29 CFR 2510.3-102, thus constituting nonexempt transactions between the Plan and the Company during the 2010 Plan year. Late remittances amounted to \$49,143. The Company is currently in process of making the appropriate filings in accordance with the Department of Labor's Voluntary Fiduciary Corrective Program and has recorded a receivable to the Plan in the amount of \$39 representing estimated lost earnings.

11. Subsequent Events

The Plan evaluated subsequent events through the date of this filing and had no subsequent events to report.

Spire Corporation 401(k) Profit Sharing Plan  
 EIN 04-2457335, Plan Number 002  
 Schedule H, Line 4a - Schedule of Delinquent Participant Contributions  
 Year Ended December 31, 2010

Participant Contributions Transferred Late to Plan	Total that Constitute Nonexempt Prohibited Transactions			Total Fully Corrected Under VFCP and PTE 2002-51
	Contributions Not Corrected	Contributions Corrected Outside VFCP	Contributions Pending Correction in VFCP	
Check here if late participant loan repayments are included: <input checked="" type="checkbox"/> x	\$—	\$—	\$49,143	\$—

Spire Corporation 401(k) Profit Sharing Plan  
 EIN 04-2457335, Plan Number 002  
 Schedule H, Line 4i - Schedule of Assets (Held at End of Year)  
 December 31, 2010

(a) Identity of Issue, Borrower, Lessor or Similar Party	(c) Description of Investment Including Maturity Date, Rate of Interest, Collateral, Par or Maturity Value	(e) Current Value
* American Funds	Investment Co of America R3	\$ 1,459,037
* American Funds	Money Market Fund R3	1,349,191
* American Funds	Growth Fund of America R3	1,250,833
* American Funds	Capital World Gr & Inc R3	915,015
* Spire Corporation	159,029 shares of common stock	828,541
Pimco	Real Return Fund R	401,598
* American Funds	Small Cap World Fund R3	313,652
Oppenheimer	Developing Markets R	300,195
* American Funds	Bond Fund of America R3	243,436
* American Funds	High Income Trust R3	222,535
Victory	Victory Small Company Opportunity	215,254
Victory	Fund for Income	156,196
* American Funds	2030 Target Date Fund R3	144,496
* American Funds	2025 Target Date Fund R3	138,442
Investco	Real Estate Fund	82,060
Victory	Established Value Fund	65,719
* American Funds	2020 Target Date Fund R3	57,605
* American Funds	2035 Target Date Fund R3	40,179
* American Funds	Capital World Bond R3	38,702
* American Funds	2040 Target Date Fund R3	27,468
* American Funds	2015 Target Date Fund R3	17,154
* American Funds	2045 Target Date Fund R3	8,974
* American Funds	2050 Target Date Fund R3	378
* American Funds	2010 Target Date Fund R3	364
* American Funds	2055 Target Date Fund R3	289
* Employer Stock Awaiting Purchase Fund	Employer Stock Awaiting Purchase Fund	1
Total investments, at fair value		\$ 8,277,314
* Participant loans	Interest Rates 4.25% - 9.25%	\$ 206,930

\* Represents party-in-interest

Column (d), cost, has been omitted, as all investments are participant directed.

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the Investment Committee of the Spire Corporation 401(k) Profit Sharing Plan have duly caused this annual report to be signed on their behalf by the undersigned hereunto duly authorized.

Spire Corporation 401(k) Profit Sharing Plan

Date: June 29, 2011

By: /s/ Robert S. Lieberman  
Robert S. Lieberman  
Chief Financial Officer and Treasurer

INDEX TO EXHIBITS

Exhibit Number	Description
23.1	Consent of Independent Registered Public Accounting Firm (Moody, Famiglietti and Andronico, LLP)
23.2	Consent of Independent Registered Public Accounting Firm (Siegrist and Cree, CPAs, PC)

15