Yale SCHOOL OF MANAGEMENT

Initiation coverage
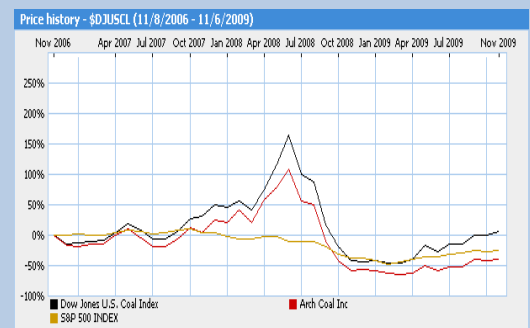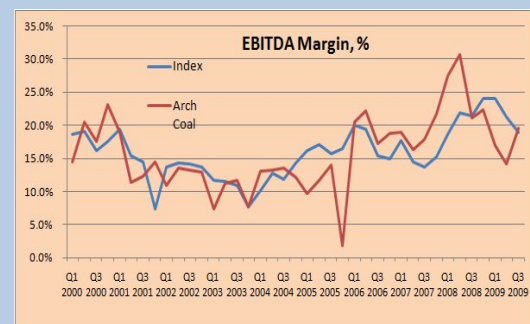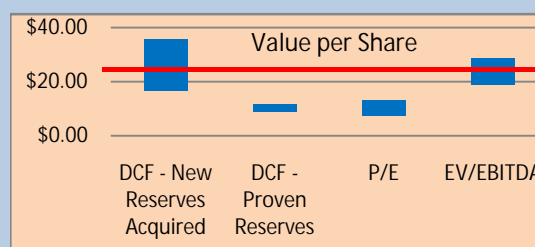## ARCH COAL, Inc (NYCE: ACI)
November 6, 2009

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Company Statistics

Current market cap:	$3.45B
2008 Sales:	$2.98B
2008 Income after tax:	$345M
Price per share:	$22.16
Analyst's recommended price:	
Near-term:	$23.14
Long-term:	$11.23
52 week price range:	$10.43 - $25.86
Gross margin:	20.4%
ROE:	5.2%
P/E:	30.82
Price/Sales:	1.16
Beta:	1.77
Shares outstanding:	163M

Value per Share — DCF - New Reserves Acquired, DCF - Proven Reserves, P/E, EV/EBITDA

EBITDA Margin, %

Price history - $DJUSCL (11/8/2006 - 11/6/2009)

Arch Coal, Inc. is 2nd largest U.S. coal manufacturer producing around 10% of U.S. annual coal production for domestic and international customers.

ANALYST'S RECOMMENDATION: SELL

We are initiating coverage of Arch with a SELL recommendation and a fair value per share of $11.23. The US coal industry is under downward pressures of decreasing domestic demand, increased customers' negotiation power, and accumulated coal stockpiles. In our analysis, we have examined Arch's coal reserves and have a negative outlook on its ability to economically add to the current proven supply. As such, our valuation (DCF – Proven Reserves) assumes Arch does not add significant new reserves. In an alternate scenario that reflects current optimistic market sentiment, we have assumed a perpetual supply of economically recoverable reserves. Under this assumption, Arch's value is estimated to be $23.14, but this is deemed to be improbable and overly optimistic. Arch has not nominated any new coal seams to be acquired in the LBA process and there are no further acquirable operations neighboring its current mines. As the market digests this view, we expect significant downward adjustment of Arch's price.

Report Summary:

✚ Increasing potential for exports in South-East Asia will allow the company to increase its export volumes that currently stand around 5% of annual production.

✚ Arch Coal has been able to successfully leverage its competence in acquiring assets and improving their efficiency. By acquiring Jacob's Ranch mine complex in the growing Powder River Basin Arch has enhanced its competitive position and extracted long-lasting operational synergies.

○ DCF Valuations assuming Arch is able to continually acquire sufficient reserves to replace past production indicate Arch is fairly valued at $23.14. This scenario is not deemed likely, but there are no current catalysts to drive the market away from this conclusion.

▬ DCF Valuations for Arch indicate its existing operations contribute $11.23 per share, but production begins to decline in 2014 and would cease by 2030 if no new reserves are acquired.

▬ Depletion of reserves in Western Bituminous and Central Appalachia basins and increasing costs of production in Central Appalachia further necessitate the switch to mining at the lower-cost - but also lower-margin Powder River Basin.

▬ Two of Arch Coal's primary customers are increasing their share of non-coal power generation in their generation portfolio.

▬ Unless inclement weather or other factors push domestic electricity production up, current power generators' 40 million ton overhang will further decrease near and medium term sales outlook and create more downward pricing pressure.

▬ Recent third quarter results indicate a drop in realized coal prices in the PRB and WBIT regions (thermal coal) and a rise in CAPP prices due to the recent demand increase in the metallurgical coal market. This trend is expected to continue as the power generation market remains weak, while the steel market begins to rebound from the recession of 2008-2009.

I. Company Overview

Arch Coal operates in three mining regions: the Powder River Basin (PRB), with main operations in Wyoming; the Western Bituminous (WBIT), with operations in Utah, Colorado and southern Wyoming; and the Central Appalachia (CAPP) area, with operations in southern West Virginia, eastern Kentucky and Virginia. The company ships its coal to customers in 35 U.S. states and 21 countries. Over 90% of coal is sold to power generators; the rest is supplied to steel manufacturers. Coal is mined via a combination of surface and underground mining.

Chart 1: Arch Coal, Inc's Mine Location
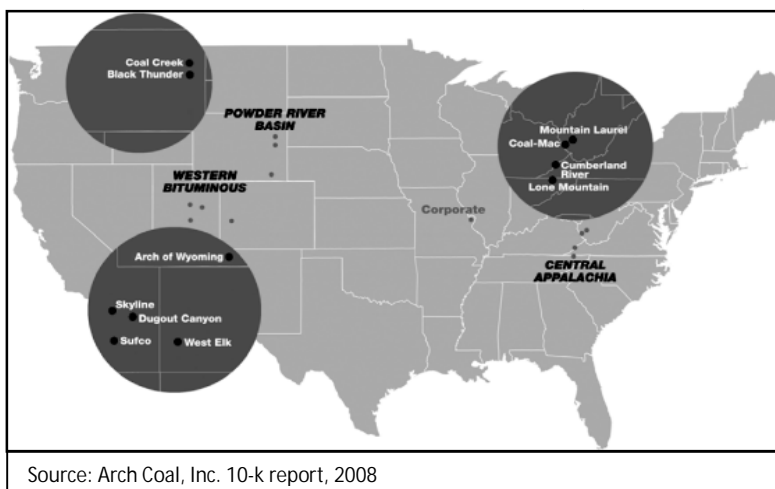
The three main coal regions differ in terms of coal quality and cost to mine. Table 1 (below) describes the size, location, and mining style employed in each state or region in which Arch operates. Note that in Table 1, Production refers to mined coal, which can differ from tons sold due to the sale of coal purchased rather than mined. Table 2 summarizes the differences in coal quality of each region. In general, Central Appalachian (CAPP

Source: Arch Coal, Inc. 10-k report, 2008

or APP BASIN) coal is higher in quality due to lower moisture content and higher heat content. Some of the coal is considered 'compliance coal' meaning it's combustion meets EPA standards for the emission of sulfur dioxide (SO_2) and nitrous oxide (NO_x), although much of the coal here is significantly higher in Sulfur content than that mined in the PRB and WBIT regions. Coal that does not meet these standards must be blended with lower sulfur coal from other regions or burned in facilities with special scrubbers designed to remove the SO_2 and NO_x before it is emitted into the atmosphere. In the CAPP, the least costly reserves have been largely depleted. This fact and the generally higher levels of sulfur and nitrogen in CAPP coal have caused production to steadily decline (see Chart 2) since the 1970s. Conversely, coal mined in the Powder

Chart 2: Historical Coal Production

Source: Production and Depletion of Appalachian and Illinois Basin Coal Resources, The National Coal Resource Assessment Overview-2009, U.S. Geological Survey

River Basin (PRB or MT/WY) is generally of lower heat content than that mined in CAPP, but the cost of producing it is significantly lower because it can be extracted using surface mining techniques. Additionally, PRB coal is also attractive to power generators due to its extremely low sulfur content. Therefore, production in the PRB has been steadily growing.
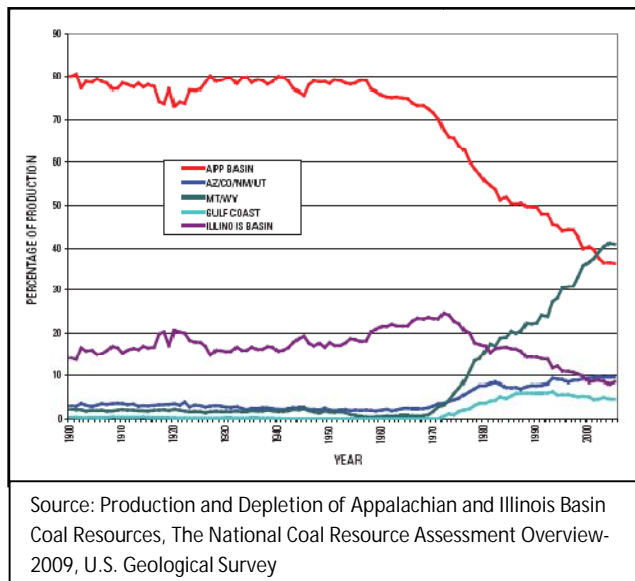
Table 1: Selected data for Arch Coal's coal reserves

State	Coal basin (region)*	Total Assigned Recoverable Reserves	Reserve Control		Mining Method		Production (million tons)		
			Leased	Owned	Surface	Underground	2006	2007	2008
Wyoming	PRB, WB	1,476	1,461	15	1,476	-	95.6	96.4	100.2
Utah	PRB, WB	89	88	1	-	89	13.1	13.1	15
Colorado	PRB, WB	71	71	-	-	71	5	6.2	5.3
West Virginia, Kentucky, Virginia	CAPP	176	169	7	77	99	8.8	9.7	13.1
Total		1,812	1,789	23	1,553	259	122.5	125.4	133.6
* - PRB - Powder River Basin, WB - Western Bituminous, CAPP - Central Appalachian									

Source: ACI 2008 10-K

Table 2: Coal Quality

	Central Appalachians	Western Bituminous	Powder River Basin
Moisture, %	2 - 5.5	3 - 15	24 - 31
Ash, %	3 – 15	4 – 13	3.1 – 10.5
Heating value (Btu/lb)	11,500 – 14,200	9,200 – 12,800	7,800 – 9,700
Sulfur (S) content, %	0.5 – 4 (significant compliance coal)	0.2 – 1.4 (significant compliance coal)	0.2 – 0.8 (significant compliance coal)
Future Mining	Mature mining area; most thick seams, low to med. S, high Btu coal has been mined. Medium to thin, high S, high Btu resources remain for UG mining; few large surface-minable resources remain.	Large amounts of low to med S, low Btu, and high ash, DL, and TS strip resources are available in the San Juan Basin. Long-wall (UG) operations will be used for most of the deep, thicker, low S, high Btu resources.	The largest operations will continue to use a combination of DL and TS operations. BWE operations failed in the past, but may prove to be the best way to continue stripping in the future.
Mining costs	moderate to high	low to high	low to moderate
Transportation costs	low to moderate	low to high	low to high
UG – underground,DL – dragline, TS – truck/shovel, BWE – Bucket Wheel Excavator			

Source: Coal Resource Availability, Recoverability, and Economic Evaluations in the United States 2009, U.S. Geological Survey

II. Powder River Basin Operations

Overview

Arch Coal operates three large surface mines in the Powder River Basin: Black Thunder, Coal Creek, and Jacob's Ranch (acquired on October 1, 2009). Chart 3 illustrates a Powder River Basin mining operation. The coal mined here is generally of low heat content and extremely low Sulfur content and is used exclusively for electrical power generation. It is very inexpensive to extract because it exists close to the surface in very thick seams. Once the thin layer of rock, or overburden, has been removed, the coal is extracted by a dragline or shovel and then loaded into large trucks for delivery to a rail-car loading station. The coal does not need to be processed and is delivered to customers

Chart 3: PRB Coal Operations

raw, also contributing to its low cost of production. The cost of coal mined in the PRB is then largely a function of three drivers: royalties paid to the federal government for each ton of

3

coal extracted (% of sale price + flat fee), labor, and diesel fuel required in the extraction process and local transportation from dig site to loading facility.

PRB Coal Prices
Chart 4 presents the historical spot price for coal from several coal producing regions in the U.S. Pricing of PRB coal has traditionally been weak for several factors. First and foremost, transportation from the mine to
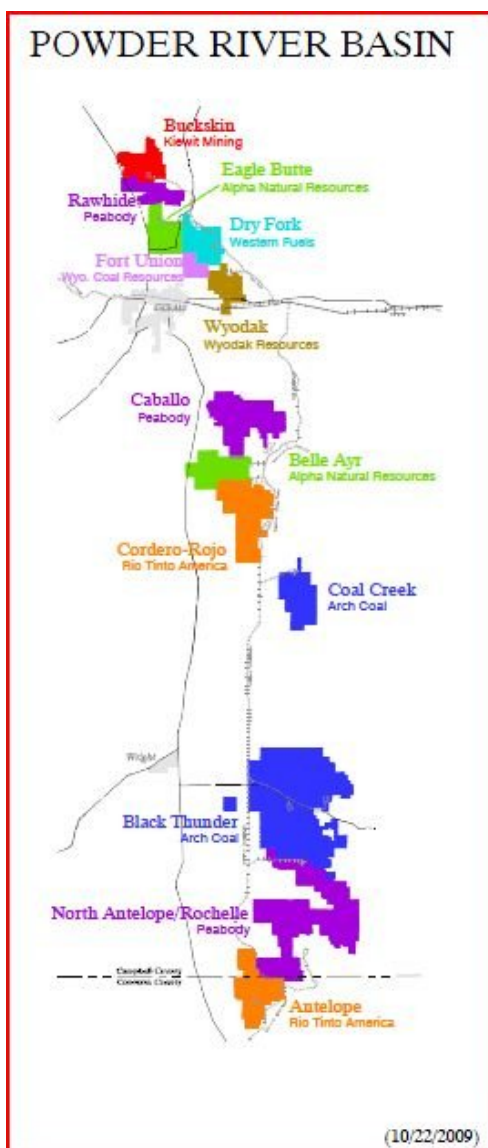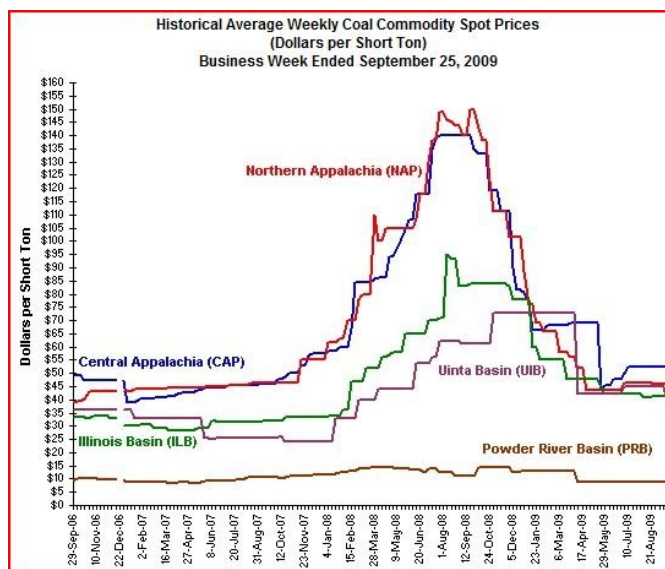
Chart 5: PRB Mining Operations

Chart 4: Coal Spot Price History

Source: DOE, Coal News and Markets.
http://www.eia.doe.gov/cneaf/coal/page/coalnews/coalmar.html

the customer limits the price for PRB coal. Customers typically pay transportation expenses. Delivery charges for distant customers can be up to two-thirds of the delivered cost of PRB coal[1]. To be cost competitive with coal mined closer to the customer, the price at the mine-head for PRB coal is naturally low. Next, the heat content of PRB coal, as described earlier in Table 2, is up to 50% lower than coal found in CAPP. Because many power-generating facilities in the Eastern United States were designed to operate with higher heat content coal found in the CAPP region, they require retro-fitting to burn coal from the PRB. For instance, according to a study by the city of Escanaba, MI, retrofitting a generating facility with two 12.5 MW generators to use PRB coal rather than CAPP coal was estimated at $20-30 million[2]. The additional capital cost forces a price differential between CAPP and PRB coal beyond a simple BTU/lb relationship. Finally, supply of PRB coal is high, it is relatively undifferentiated across the basin, and competition between mining firms is fierce. These factors, together with the transportation costs and low heat content of PRB coal contribute to weak pricing power for PRB miners.

We are projecting a decline in the realized coal sales price for PRB in 2010 of 13.3% followed by price appreciation of 1.2% through 2015, finally rising 2% from that point forward. This price forecast was developed in our coal industry report "US Coal Production: Outlook cooling amid warming climate" based on the availability of

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[1] US Energy Information Administration (EIA): http://www.eia.doe.gov/cneaf/coal/page/acr/table34.html
[2] http://www.escanaba.org/electric/PRBConversion.pdf

Natural Gas as a substitute fuel for power generation, the current low price of Natural Gas, the weakening demand for coal-fired power due to environmental considerations, and the 2008 run-up and subsequent collapse in spot prices for coal. On this last point, we have seen evidence that the expiration of delivery contracts signed under the bubble in coal prices has begun. According to Arch's third quarter earnings, released October 30, 2009, realized prices for PRB coal have declined by 7.5% since the first quarter of 2009. In its earnings announcement, Arch cited "roll-off of high-priced contracts" as one contributing factor for the recent decline in prices.

PRB Production Capabilities

Production expansion options for Arch in the PRB are limited. While Arch is a very large producer in the PRB, other large mining competitors exist. Chart 4 illustrates the PRB as of October 22, 2009. Note that the Jacob's Ranch mine (recently acquired) is not detailed in Chart 4 as it has been integrated into the Black Thunder mining complex. Jacob's Ranch now makes up the northeast corner of Black Thunder. Jacob's Ranch was acquired because it shared a border with Black Thunder and could be efficiently integrated into the operation there, allowing for scale efficiencies. By optimizing loading routes between the two operations as well as eliminating redundant back-office functions, Arch estimates the acquisition will result in $50 million in synergies (4-5% of PRB cost of sales). Further expansion is possible as land and coal adjacent to Black Thunder is available to be leased from the federal government, however, the process is complex. Arch must submit a proposal for economically mining the coal which is evaluated by the government. If accepted, Arch must then participate in a competitive bidding process for the new lease. This is a multi-year endeavor and as of now, Arch has not initiated this process. Therefore, future expansion options are limited as only a small segment of the North Antelope/Rochelle mine, operated by Peabody, borders any of Arch's current operations.

To value Arch, presented later, we have projected Arch's PRB operations separately from each of the other coal producing regions. This is because the mining operations here are separable from those in other regions (they are, in fact, presented as separate operating segments by Arch) and operate with unique economics. In addition, because expansion options are limited, we have first valued the current operations until the economically recovered reserves have been exhausted in each mine. Table 3 presents Arch's estimates of recoverable reserves as well as the projected production rate and the expected exhaustion date. We will also present a valuation assuming that expansion occurs and production levels can be maintained. Appendix 1 details our production forecasts for Arch's PRB mines.

Table 3: Arch PRB Mining Operations as of December 31, 2008

Mine	Recoverable Reserves (million tons)	Production Rate (million tons)	Projected Exhaustion of Recoverable Reserves
Black Thunder	751.2	92.5	2021
Coal Creek	148.2	11.5	2026
Jacob's Ranch	357.4	44.0	2017
Source: Arch Coal, 3Q 2009 data			

III. Western Bituminous

Overview

Arch coal operates four underground mines in the Western Bituminous region: Dugout Canyon, Skyline, Sufco, and West Elk. In addition, it is in the process of closing a fifth mine, Arch of Wyoming. The coal mined in the WBIT region is Bituminous with a relatively high heat content and low sulfur content and is used exclusively for electrical power generation. Arch uses underground mining here to extract coal. Underground mining tends to be much more capital intensive than surface mining as deep mine shafts must be dug and extensive and expensive ventilation systems are required to allow safe working

conditions for the miners. Coal mined in underground complexes in the WBIT has a high production cost, relative to the PRB, that is primarily a function of labor, royalties paid to the federal government, depreciation, and the geology of the coal seam. In the first half of 2009, Arch began extracting coal from a new seam in its West Elk mine. Temporary unexpected quality issues in the seam (it was thinner than expected in areas and had more chalk to be removed) caused the realized cost to rise dramatically for the first half of 2009. Net margin per ton fell from $4.23 in the fourth quarter of 2008 to -$2.23 in Q1 and -$1.56 in Q2 in 2009. In Q3, net margin had rebounded to $3.56 per ton despite a 2.8% drop in realized prices. Arch expects that the quality issues experienced have been resolved.

WBIT Coal Prices
Prices for Western Bituminous coal have been much stronger than that of PRB coal. This is partially due to its relatively high heat content and also its customer base. Chart 5 (below) illustrates the destination of coal produced in various coal basins. WBIT coal, also known as Rocky Mountain West coal, is generally delivered to customers in states near the mines leading to lower transportation costs. Furthermore, these states are not supplied by coal from other regions, giving the miners in the WBIT region less external competition. That said, the realized price relationship between WBIT and PRB coal, as indicated by Arch's financial statements, has been fairly stable.   The realized price for WBIT has varied only between 2.3 and 2.4 times that for PRB. For this reason and because WBIT and PRB coal are consumed by power generators, we apply a similar pricing forecast for WBIT coal as that of PRB. Its price is expected to fall 13.3% in 2009 and then rise 1.2% through 2015 and 2% annually subsequently.

Chart 5: Consumption of Coal by Production Region

Source: Platts

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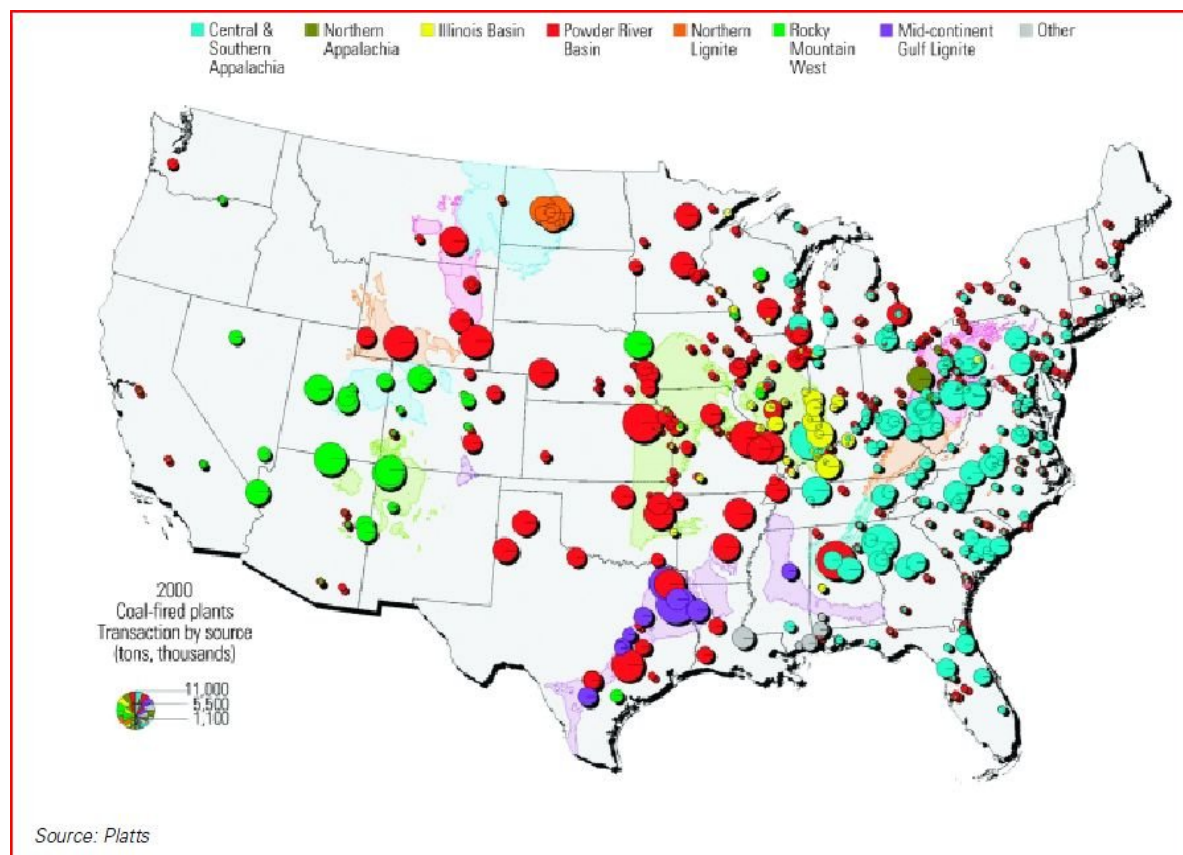
WBIT Production Capabilities

Table 4 describes Arch's coal assets in WBIT. As the table suggests, WBIT production is limited. Furthermore, Chart 2 illustrates that production growth in WBIT (AZ/CO/NM/UT) has leveled off as the most inexpensive seams to mine have largely been exhausted. In our valuation of Arch, as with the PRB, we first value the current mining operations under the assumption that future production growth opportunities will be limited. We believe this to, in fact, be the likely outcome, but we also present a valuation assuming production can be continued at current levels indefinitely. Appendix 3 details our production forecasts for Arch's WBIT mines.

Table 4: Arch WBIT Mining Operations as of December 31, 2008

| Mine	Recoverable Reserves (million tons)	Production Rate (million tons)	Projected Exhaustion of Recoverable Reserves
Dugout Canyon	21.2	4.3	2013
Skyline	17.2	3.3	2014
Sufco	38.8	7.4	2014
West Elk	66.6	6.2	2019
Source: Arch Coal, 3Q 2009 data			

IV. Central Appalachian

Overview

Appalachian coal production province is divided into the north, central and southern Appalachian regions. According to the EIA, volume of coal produced in the Appalachian region decreased from 445.4 million tons in 1994 to 389.6 million tons in 2008, primarily as a result of the depletion of economically attractive reserves, permitting issues and increased costs of production[3]. The Central Appalachia coal basin runs across eastern Kentucky, Tennessee, Virginia and southern West Virginia and accommodates four Arch Coal Inc's mines (Table 6). Coal mined from this region generally has a high heat value ranging from 11,400 to 13,200 Btu and a low to medium sulfur content ranging from 0.2% to 4.0%.

CAPP Production Capabilities

Arch Coal Inc's production in Central Appalachian has grown almost 50% during the period of 2006-2008. However, opportunities for quick ramping up of production are limited. First, around half of the volume of coal mined in the basin is produced via underground mining which limits changes in production schedule. Second, extending or acquiring new economically viable reserves in the area is limited (Table 2 above). At current production level, three mines out of four will run out of coal around 2016 and fourth, Mountain Laurel, may produce up to 2030.

Chart 6: Transportation cost per ton
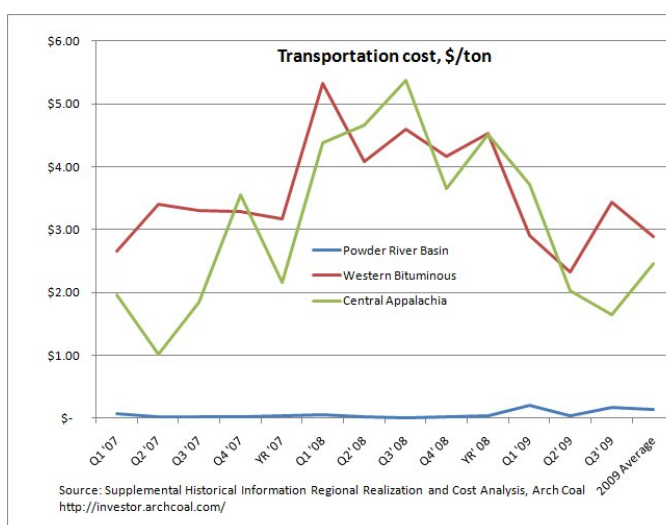
Miners producing at the Central Appalachian area have experienced increased costs of coal production. During the past 2 years, cash cost per ton has been increasing at 10% per year contributing to lower

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[3] Coal Resource Availability, Recoverability, and Economic Evaluations in the United States 2009, U.S. Geological Survey

7

producers' margins. Arch Coal has been able to partially offset the rising costs of production by selling higher-margin product mix in 2009 and shifting the bulk of production to the lower-cost Mountain Laurel mining complex like the company did in 2008[4].

Each of the four mining complexes operates a coal preparation plant to wash and blend coal to the customer's specification. Each of the production facilities has loadout stations to load coal trains. Arch Coal has used either Norfolk Southern or CSX railroad to ship its coal from the Central Appalachia operations. Arch Coal typically pays for coal transportation up to a loading facility or, in case of international shipments, ports. Customers pay for transporting the coal from loading stations or ports to a destination. After transportation costs increased sharply in 2008 they leveled down in 2009 to the previous level (Chart 6).

CAPP Coal Prices

Since metallurgical coal typically commands higher prices than steam coal, average realized price per ton of coal sold at Central Appalachia is higher than the one at the other Arch Coal's operating sites (Table 5). Most of the met-grade coal produced at Central Appalachia in 2008 was shipped to China.

Table 5: Arch Coal's average price per ton of coal	
Coal Basin	Realized Average Price, USD/Ton of coal
Powder River Basin	12.69
Western Bituminous	29.04
Central Appalachia	62.19
Average	20.14
Source: Supplemental Historical Information Regional Realization and Cost Analysis (on a per-ton basis), Arch Coal	

Table 6: Arch Central Appalachia Mining Operations as of December 31, 2008

Mine	Recoverable Reserves (million tons)	Production Rate (million tons)	Projected Exhaustion of Recoverable Reserves
Coal-Mac	27.8	3.6	2016
Cumberland River	23.3	2.3	2016
Lone Mountain	34.1	2.6	2017
Mountain Laurel	90.7	4.1	2016-2030
Source: Arch Coal, 3Q 2009 data			

V. Customers

During 2008 Arch Coal shipped its products to power plants, steel mills and industrial facilities in 35 U.S. states. By leveraging its presence in all 3 main coal mining provinces, Arch Coal is able to supply coal to major utilities throughout the U.S. Arch Coal supplies approximately 48% of its coal volumes to 10 largest customers in the U.S with 24% of coal shipped to 3 buyers, namely Tennessee Valley Authority, Ameren Corporation and TUCO, Inc. Therefore, large customers may exercise substantial buyer's power over Arch Coal.

Arch Coal also exported coal to 21 countries in North America, Europe, South America, Africa and Asia. At that, sales from exports have grown at approximately 80% year-on-year from 2006. Arch Coal's sales of metallurgical coal to China more than doubled in 2008 compared to 2007 and reached 4.4 million tons.

Among others, there are three driving factors that, to different extent, affect demand for Arch Coal product. These factors are: recent increase in customers' coal stockpiles, increased demand from Asia Pacific region and risk of domestic customers increasing share of renewable in their generation portfolio.

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[4] Arch Coal 2008 10K report

VI. Key Investment Drivers

➢ Limited Reserves

Arch's coal reserves, given current levels of production, will be exhausted in 20 years. In order for Arch to economically acquire additional reserves, it must be able to purchase the reserves for a greater price than its peers and then exploit the resource more efficiently. Since coal mining technology is uniform across large miners, there is not sufficient evidence to suggest Arch should be able to mine a given coal seam more efficiently than other large-scale miners. An exception to this logic exists where Arch can exploit economies of scale that others cannot, namely, when the coal seam can be integrated into Arch's exiting operations. This was the case in the Jacob's Ranch acquisition. However, further acquisitions of this nature (bordering current operations) are non-existent. Furthermore, Arch has not nominated any adjacent lands for mining through the Lease By Application (LBA) process with the Federal Bureau of Land Management (BLM). Therefore, we deem it unlikely that Arch will be able to add to its coal reserve base at a cost that would add value to the existing operations. Therefore, our target share price assumes a valuation which incorporates only Arch's current proven reserves.

➢ Increased Customer's Stockpiles

As the US power generation industry enters 2010, it has accumulated an additional 40 million tons of coal overhang stockpiled in excess of the usual stock of 160 million tons[5]. Although this amount is only 4% of the total volume of coal consumed annually and may be used up in case of particularly cold winter of 2009-2010, the accumulated stockpile may somewhat lower the usual annual demand of ~1 billion tons.

➢ Chinese Story: Positive Outlook for Arch Coal

Arch Coal's aspirations to increase exports to Asia Pacific, particularly China, are well understood. The company agreed to ship 24 vessels to the Asia-Pacific market through Vancouver in 2009 and, in January, completed test shipments to China. Arch Coal will ship over 2 million tons of coal to China from its lower-cost Powder River Basin operations.

The Company's high expectations are well-supported by the numbers. China, the largest coal producer in the world, has recently turned into net importer of coal with its imports almost tripling in 2009 compared to 2008 figures (Chart to the side). Several factors were cited to have contributed to such a spike in demand – among them are 2008 Olympics, harsh winter and massive shutdowns of small coal mines due to safety concerns. However, one cannot discount the basic reason for demand for coal – rising power generation

Chart 7: China – Coal Exports/Imports

Sources: 1999-2008 data- BUSINESS MONITOR INTERNATIONAL LTD China Power Report Q1 2009. 2009 data– China's General Administration of Customs (cited at http://www.commodityonline.com/news/China-coal-imports-hit-record-125-mln-tons-22372-3-1.html)

Source: BUSINESS MONITOR INTERNATIONAL LTD China Power Report Q1 2009 data

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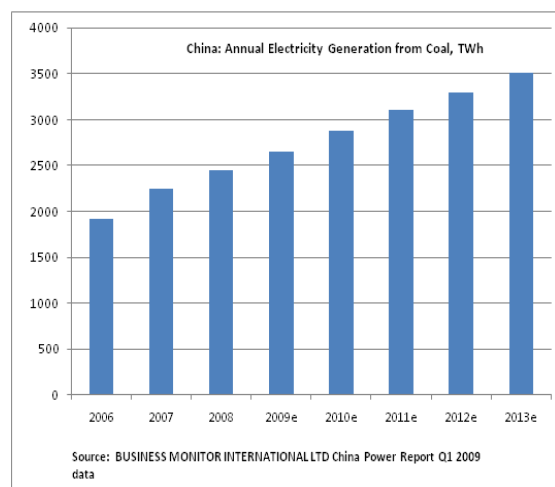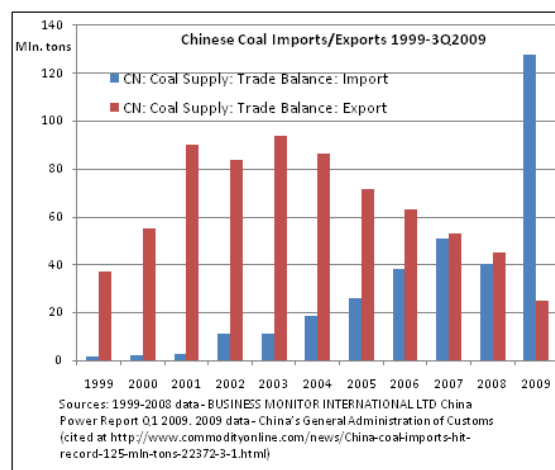
[5] 2008 Coal Producer Survey, National Mining Association, May 2009

across China, especially in northern and western provinces and ramp up of steel manufacturing (Chart to the side).

➢ "Green" Story: Potential Negative Outlook for Arch Coal

Two main Arch Coal's customers - Tennessee Valley Authority (TWA) and Ameren Corporation (AC) are increasingly looking towards switching to renewable power sources.

The Tennessee Valley Authority is the US's largest public utility supplying power to Tennessee, northern Alabama, northeast Mississippi, southwestern Kentucky, and parts of Virginia, Georgia and North Carolina. TVA generates electricity from variety of sources: 64% of generation comes from fossil, 30% - nuclear, and 6% - hydro sources. However, TVA is committed to increasing ratio of non-fossil sources in its generation portfolio: the company restarted its Browns Ferry nuclear power plant in 2007 and announced plans to build 2nd units at its Watts Bar nuclear plant[6]. TVA participates in the Green Power Switch Generation Partners project and, within this projects, has constructed new wind turbines and solar generation sites. Current total generation under the Green Power Switch program is 15.7 MW out of 310 MW total TVA's generation but TVA is projecting that the share of energy generated from renewable sources will exceed 50% by 2020[7].

Arch Coal's second largest customer – Ameren Corporation serves approximately 2.4 million customers and almost one million natural gas customers in Missouri and Illinois. There are signs of Ameren also switching to providing electricity from renewable sources: its reliance on coal-fired generation capacities decreased from 85% in 2007[8] to 70% in 2008[9], largely substituted by wind power Ameren purchases from Horizon Wind (up to a share of 18% of total power sold).

In addition, Ameren has made dramatic attempts to reduce its cash spending in 2008 and 2009. The company reduced dividends by 39%, slashed capital and operating expenditures by approximately $800 million and reduced management salaries and compensations[10]. Under such circumstances, Ameren, being one of the Arch Coal's largest customers may be successful in negotiating lower prices for its coal supplies when striking new contracts in 2009 and 2010.

VII. Valuation Using Multiples

EV/EBITDA multiples was used to value the Arch Coal equity. EV/EBITDA values as of the end of 3rd quarter 2009 for 9 largest US coal producers were weighted against their market caps to produce weighted average EV/EBITDA representing the industry. The value – 7.02 is lower than that of Arch Coal; at the end of the 3rd quarter 2009 the EV/EBITDA ratio for Arch is 9.71. Three EBITDA scenarios were used: conservative assuming that EBITDA remains, in average, at the same lows as observed throughout 2009, medium (Analyst's Estimate) that assumes that 4th quarter 2009 EBITDA will remain the same as in the 3rd quarter and slightly higher than that in the 1st and 2nd quarters, and 2008 case that assumes EV/EBITDA will be the same as in 2008. Medium case EBITDA produced Arch Coal price value per share $18.70. The valuation is rather sensitive to both industry EV/EBITDA multiple and Arch Coal's EBITDA and produces per-share price of $26 if our projected 2009 EBITDA and current Arch Coal's EV/EBITDA are combined or lower price of $18 if conservative case EV/EBITDA is combined with our EBITDA

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[6] http://www.tva.com/greenpowerswitch

[7] TVA Environmental Policy, http://www.tva.com

[8] Ameren 2007 Environmental Report, p. 4

[9] Ameren Corp report, Argus, Oct. 12, 2009.

[10] Ibid, p. 2

projection. However, it is unlikely that EBITDA will further fall during 2009 given the improving sales and cost outlook for the rest of the year, therefore, we project that value of Arch based on this metric is in the range of $18.7 – $28.5.

The average P/E ratio weighted against companies' market cap for 9 index companies was found to be equal to 19.58. Using our projection of 2009 per-share earnings – $0.4 - and the industry P/E ratio we valued Arch Coal at $7.9 per share. As sensitivity analysis shows, valuing the company using management earnings projections of $0.28-$0.43 per share assigned a value of up to $8.42 per share – still much lower than the actual current price around $22.7. We believe that the market ignores the lower sales and margins given raising demand for coal in the 3rd quarter, successful cost-cutting initiatives, demonstrated expansion of margins and future benefits realized through acquisition of Jacobs Ranch mine. This is also demonstrated by the fact that in the end of 3rd quarter of 2009 Arch Coal was traded at P/E ratio 30.8 – higher than most of the peers.

VIII. DCF Valuation

Summary

To value Arch Coal, we have developed production models for each of Arch's three operating segments: Powder River Basin, Western Bituminous, and Central Appalachian. Appendices 1-6 summarize the models. For each segment, we have modeled the existing mining production levels and used the company's estimates for recoverable reserves to estimate the lifetime of the mine. We have forecast production volume to be relatively flat given our outlook for modest to no growth in the electrical power sector. Holding prices and costs constant, increasing production based on unexpected growth in demand would slightly reduce the mine's projected lifetime but would increase its value as the last period cash flows would instead be collected earlier. The converse is also true. Lower demand would decrease projected value, but given the relatively stable nature of coal demand (growth in demand rarely exceeds two percent), these changes in value over the lifetime of the mine are insignificant. We have forecast the price of coal based on an analysis of forces acting in the primary market for coal, electrical power generation. Our price projections are included in Appendix 11 and more detail can be found in our industry report "US Coal Producers: Outlook cooling amid a warming climate." Costs are then projected using an analysis of historical data. Free cash flows can then be projected, WACC is calculated using readily available capital structure and interest rate information, and equity value is estimated.   This process is then repeated assuming coal production can be extended indefinitely by purchasing or leasing the rights to additional coal reserves. In this case, future cash flows are forecast to year 2015, one additional year is then forecast to allow a settling process as the terminal growth rate is achieved, and then equity is again valued by discounting the cash flows. Finally, sensitivity analyses are performed in each case to identify the effects of errors in assumptions.

Powder River Basin Model

The Powder River Basin model is included in Appendices 1 and 2. First, historical peak production of each mine is used to project future production. Since the recession of 2008-2009 produced a decline in coal demand, we project a two year return to pre-recession production levels. We track the recoverable reserves remaining in the mine and discontinue production when the reserves have been exhausted. We use the previously developed price forecast (Appendix 11) to forecast revenues.

Costs can be broken down into cash costs and depreciation costs. Cash costs for PRB mining operations consist of diesel fuel, labor, and sales-price linked royalties paid to the government. These costs can be

11

estimated using a regression analysis using past diesel fuel prices obtained from the Department of Energy, sales prices obtained from Arch's financial statements, and productions levels also obtained from Arch's financial statements. We performed a regression using these data and found a highly statistically significant result which explained 97.1% of the variation in cash costs per ton for the last eleven quarters. The regression analysis (PRB, Cash costs per Ton) is included in Appendix 2. Depreciation, depletion, and amortization costs can also be estimated in much the same manner. Depreciation and amortization are a function of production volume while depletion is a function of production volume multiplied by sales price. A regression using these inputs is also included in Appendix 2 (PRB, DD&A per Ton). This regression explained 92.6% of variation in costs for the last 11 quarters with most coefficients found to be highly statistically significant.

Finally, capital expenditures were projected to maintain net property plant and equipment at approximately 2008 levels and were discontinued six years prior to exhaustion of reserves in each mine. This allows the PP&E to depreciate to values near zero as the reserves are completely depleted.

Western Bituminous Basin Model

The Western Bituminous model is included in Appendices 3 and 4. First, historical peak production of each mine is used to project future production. Since the recession 2008-2009 produced a decline in coal demand, we project a two year return to pre-recession production levels. We track the recoverable reserves remaining in the mine and discontinue production when the reserves have been exhausted. We use the previously developed price forecast (Appendix 11) to forecast revenues.

Costs can be broken down into cash costs and depreciation costs. Cash costs for WBIT mining operations consist of labor, and sales-price linked royalties paid to the government. For WBIT, unlike PRB, diesel prices are not important because the underground mining operations used here are highly mechanized. This assumption was confirmed using regression analysis. The cash costs can be estimated using a regression analysis with sales prices obtained from Arch's financial statements, and productions levels also obtained from Arch's financial statements. We performed a regression using these data and found a highly statistically significant result which explained 76.9% of the variation in cash costs per ton for the last eleven quarters. The regression analysis (Cash costs per Ton) is included in Appendix 4. Depreciation, depletion, and amortization costs can also be estimated in much the same manner. Depreciation and amortization are a function of production volume while depletion is a function of production volume multiplied by sales price. A regression using these inputs is also included in Appendix 4 (DD&A per Ton). This regression explained 85.0% of variation in costs for the last 11 quarters with coefficients found to be statistically significant at the 10% level.

Finally, capital expenditures were projected to be zero for these mines due to their relatively short projected lifetime. As underground mining is highly capital intensive and mechanized, the useful equipment life was estimated to be twelve years. Since none of the mines exhibited useful lives extending twelve years into the future, the equipment was allowed to depreciate without reinvestment. This resulted in several of the mines retaining some PP&E which is assumed to be abandoned or used in other mining operations.

Central Appalachian Model

The Central Appalachian model is included in Appendices 5 and 6. First, historical peak production of each mine is used to project future production. In addition, production volumes are projected to expand slightly as the CAPP mines produce both thermal and metallurgical coal. Since metallurgical coal

demand fell significantly in the recession of 2008-2009, it is projected to recover somewhat, leading to overall volume growth of 1-2%. We track the recoverable reserves remaining in the mine and discontinue production when the reserves have been exhausted. We forecast price based on projections of senior management given the exposure to metallurgical coal. Consistent with management and analyst forecasts, we have assumed a price stabilization in 2010 with moderate price appreciation of 1.2-2% going forward.

Much like the Western Bituminous regions, costs can be broken down into cash costs and depreciation costs. Cash costs were estimated using historical data because royalties paid for coal in the Eastern U.S. are typically not paid to the government and thus deemed less predictable. In the projection, we have used the most recent cost data and projected a 3% future growth in costs. This exceeds the growth in price reflecting decreasing margins due to the depletion of inexpensively recoverable reserves described above and illustrated in Chart 2. Depreciation, depletion, and amortization costs can be estimated with a regression analysis of historical data. Depreciation and amortization are a function of production volume while depletion is a function of production volume multiplied by sales price. A regression using these inputs is included in Appendix 6 (DD&A per Ton). This regression explained 66.0% of variation in DD&A costs for the last 11 quarters with most coefficients found to be statistically significant.

Finally, capital expenditures were projected to maintain net property plant and equipment at approximately 2008 levels and were discontinued twelve years prior to exhaustion of reserves in each mine, based on the historical ratio of deprecation to PP&E. This allows the PP&E to depreciate to values near zero as the reserves are completely depleted.

DCF Valuation – Existing Operations (only)

Using the models developed for each segment and adding information regarding SG&A, Capital Expenditures, and Depreciation not tied to any one segment, free cash flows were forecast for Arch Coal assuming it is unable to invest in additional reserves. This analysis is presented in Appendix 7 with supplementary information provided in Appendix 8. This valuation indicates that Arch's existing operations have a value of $11.23 per share as compared to the most recent market price of $22.16. The sensitivity analysis in Appendix 8 indicates clearly that with more optimistic assumptions for the discount rate and coal pricing, the value is unlikely to exceed $15 per share. Clearly, for the market to not be overvalued, we must assume that Arch is able to expand its reserves in an economically attractive manner. As discussed above, expansion is not impossible, but there is no strong reason to believe Arch will be able to grow in any of its existing mining regions. For this reason, we place a long-term sell on this stock realizing that it may take several years for the market to come to this conclusion as well. Since none of Arch's mines are expected to cease operations prior to 2014, there are no short-term catalysts to prove this conclusion.

DCF Valuation – Perpetual Mining

In addition to the approach described above, we have forecast the equity value for Arch Coal in a scenario in which it is able to continue economically acquiring coal reserves in its existing mining operations. This valuation is presented in Appendix 9. In this approach, we have used a terminal growth rate of 2% and forecast Arch's value assuming it reaches this growth rate in 2015. Under these assumptions, our equity valuation for Arch is $23.13. In comparison with the current market price of

$22.16, this allows us to conclude that Arch is fairly valued in the short term with potential appreciation should our forecast for coal prices turn out to be overly pessimistic. Clearly, a forecasted terminal growth rate above 2% would also allow for a higher equity valuation, however 2% is in-line with the historical growth in the coal market and there are no short-term catalysts to lead to a market belief in a higher rate. Given the additional lack of short-term catalysts for proof of our theory about the exhaustion of Arch's coal reserves, we recommend a Hold weighting on Arch for the short term.

Appendix 1. Projections of ACI - Existing Powder River Basin Operations to Reserve Exhaustion

All values in 000s unless otherwise noted.

Combined PRB Operations	2007	2008	2009E	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E
Diesel price[1]			$ 2.50	$ 2.75	$ 2.86	$ 2.97	$ 3.09	$ 3.22	$ 3.35	$ 3.48	$ 3.62	$ 3.76	$ 3.91	$ 4.07	$ 4.23	$ 4.40	$ 4.58	$ 4.76	$ 4.95	$ 5.15	$ 5.36
Thermal (Steam) Coal price change[2]		6.7%	10.8%	-13.3%	1.2%	1.2%	1.2%	1.2%	1.2%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Arch Realized Price per ton	$ 10.59	$ 11.30	$ 12.52	$ 10.86	$ 10.99	$ 11.12	$ 11.25	$ 11.39	$ 11.53	$ 11.76	$ 11.99	$ 12.23	$ 12.48	$ 12.73	$ 12.98	$ 13.24	$ 13.50	$ 13.77	$ 14.05	$ 14.33	$ 14.62
Tons Sold	96,403	100,003	89,938	96,969	104,000	104,000	104,000	104,000	104,000	104,000	104,000	104,000	104,000	104,000	104,000	79,282	11,500	11,500	11,500	11,500	611
Coal Sales	$ 1,053,516	$ 1,162,056	$ 1,126,295	$ 1,052,836	$ 1,142,598	$ 1,156,254	$ 1,170,147	$ 1,184,278	$ 1,198,653	$ 1,222,626	$ 1,247,079	$ 1,272,020	$ 1,297,461	$ 1,323,410	$ 1,349,878	$ 1,049,627	$ 155,296	$ 158,402	$ 161,570	$ 164,801	$ 8,933
Cost of Sales[3]	$ 811,936	$ 935,271	$ 920,389	$ 824,717	$ 884,711	$ 903,075	$ 921,826	$ 940,974	$ 960,526	$ 990,967	$ 1,022,089	$ 1,053,909	$ 1,086,442	$ 1,119,706	$ 1,153,720	$ 895,404	$ 126,091	$ 126,535	$ 126,990	$ 127,455	$ 6,648
Depreciation, Depletion, and Amortization[4]	$ 115,136	$ 117,753	$ 131,268	$ 185,399	$ 190,359	$ 190,771	$ 191,191	$ 191,618	$ 192,052	$ 192,777	$ 193,516	$ 194,269	$ 123,568	$ 124,352	$ 125,152	$ 105,963	$ 12,250	$ 12,250	$ 12,250	$ 12,250	$ 12,367
Income (loss) from Operations	$ 126,444	$ 109,032	$ 74,637	$ 42,719	$ 67,529	$ 62,408	$ 57,129	$ 51,686	$ 46,075	$ 38,882	$ 31,474	$ 23,842	$ 87,451	$ 79,352	$ 71,006	$ 48,260	$ 16,955	$ 19,616	$ 22,329	$ 25,096	$ (10,082)
CapEx for PRB[5]	$ 48,141	$ 123,909	$ 149,136	$ 256,869	$ 261,829	$ 262,241	$ 262,661	$ 191,618	$ 192,052	$ 23,133	$ 23,222	$ 23,312	$ 14,828	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Black Thunder																					
Tons Sold[6]	86,200	88,500	79,445	85,973	92,500	92,500	92,500	92,500	92,500	92,500	92,500	92,500	92,500	92,500	92,500	67,782					
PP&E		$ 751,200	$ 766,923	$ 829,817	$ 892,711	$ 955,604	$ 1,018,498	$ 1,018,498	$ 1,018,498	$ 848,855	$ 678,561	$ 507,604	$ 398,864	$ 289,434	$ 179,301	$ 78,527					
Assigned Reserves		1,250,700	1,171,255	1,085,282	992,782	900,282	807,782	715,282	622,782	530,282	437,782	345,282	252,782	160,282	67,782	-					
Coal Creek																					
Tons Sold[6]	10,200	11,500	10,493	10,996	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	11,500	611
PP&E ($ thousands)		$ 148,200	$ 150,344	$ 158,921	$ 167,497	$ 176,073	$ 184,650	$ 184,650	$ 184,650	$ 164,293	$ 143,857	$ 123,342	$ 110,294	$ 95,371	$ 80,353	$ 75,164	$ 62,914	$ 50,664	$ 38,414	$ 26,164	$ 13,797
Assigned Reserves (thousand tons)		206,100	195,607	184,611	173,111	161,611	150,111	138,611	127,111	115,611	104,111	92,611	81,111	69,611	58,111	46,611	35,111	23,611	12,111	611	-
Jacobs Ranch																					
Tons Sold[6]		42,100	9,448	40,898	44,003	44,003	44,003	44,003	44,003	44,003	44,003	22,634									
PP&E ($ thousands)		$ 357,351	$ 357,351	$ 357,351	$ 357,351	$ 357,351	$ 357,351	$ 285,880	$ 214,410	$ 142,940	$ 71,470	$ -									
Assigned Reserves (thousand tons)		381,000	371,552	330,654	286,651	242,648	198,646	154,643	110,640	66,637	22,634										

[3] Coal Cash Cost per ton Regression Relationship (Appendix 2)	Intercept	10.86425371
	Quarterly Tons	-0.00059234
	Diesel * Q Tons	9.91893E-06
	Price * Q Tons	4.30802E-05

[4] DD&A per ton Regression Relationship (Appendix 2)	Intercept	1.33842347
	Price	0.030216114
	Quarterly Tons	-2.02782E-05

[1] Historical data from Quarterly Rocky Mountain Diesel Price from DOE, http://www.fwccinc.com/doefuel.html, future price appreciation forecast at 4%

[2] Source: Lukashov & Kohler: Coal Industry Report, "US Coal Production: Cooling outlook amid a warming climate." September 2009

[3] CapEx forecast to maintain PPE at each mine up to 6 years prior to exhaustion or reserves.

[6] Production forecast to return to historical peak levels (may use 2006 production figures, not shown) over two years.

Appendix 2 - Regression Analysis for PRB Mines: DD&A cost per Ton & Cash Cost per Ton

Period	Cash Cost per ton	Price	Tons	Diesel[1]	Diesel Ton	Price Tons	DD&A Cost per Ton
Q107	8.02	10.47	23,178	2.63	60997.56	242670.7	1.17
Q207	8.24	10.51	24,932	2.96	73818.35	262034.2	1.17
Q307	8.25	10.66	25,924	2.97	77116.54	276345.1	1.16
Q407	8.25	10.71	25,112	3.34	83922.76	268948.6	1.15
Q108	8.79	11.15	25,764	3.47	89415.93	287270.8	1.14
Q208	9.29	11.38	24,810	4.37	108491.5	282339.5	1.15
Q308	9.27	11.21	26,152	4.38	114578.6	293162.2	1.14
Q408	9.2	11.44	25,832	2.97	76669.76	295512.9	1.17
Q109	10.65	13.25	23,132	2.16	50015.16	306505.6	1.27
Q209	10.54	12.56	21,304	2.35	49984.45	267577.9	1.30
Q309	10.04	12.26	21,527	2.63	56601.89	263923.8	1.27

[1] Historical Diesel price data from Quarterly Rocky Mountain Diesel Price from DOE
http://www.fwccinc.com/doefuel.html

SUMMARY OUTPUT - PRB, DD&A per Ton

Regression Statistics

Multiple R	0.962292
R Square	0.926006
Adjusted R	0.907507
Standard E	0.018044
Observatio	11

ANOVA

	df	SS	MS	F	ignificance F
Regression	2	0.032595	0.016298	50.05812	3E-05
Residual	8	0.002605	0.000326		
Total	10	0.0352			

	Coefficients	standard Err	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	lpper 95.0%
Intercept	1.338423	0.172666	7.75151	5.48E-05	0.940255	1.736592	0.940255	1.736592
Price	0.030216	0.007996	3.778753	0.005398	0.011777	0.048656	0.011777	0.048656
Tons	-2E-05	4.12E-06	-4.91702	0.001168	-3E-05	-1.1E-05	-3E-05	-1.1E-05

SUMMARY OUTPUT - PRB, Cash Cost per Ton Regression

Regression Statistics

Multiple R	0.98565
R Square	0.971507
Adjusted R	0.959295
Standard E	0.189951
Observatio	11

ANOVA

	df	SS	MS	F	ignificance F
Regression	3	8.611631	2.870544	79.5576	8.99E-06
Residual	7	0.252569	0.036081		
Total	10	8.8642			

	Coefficients	standard Err	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	lpper 95.0%
Intercept	10.86425	1.228658	8.842377	4.78E-05	7.95894	13.76957	7.95894	13.76957
Tons	-0.00059	5.51E-05	-10.751	1.32E-05	-0.00072	-0.00046	-0.00072	-0.00046
Diesel Ton	9.92E-06	4.29E-06	2.313582	0.053902	-2.2E-07	2.01E-05	-2.2E-07	2.01E-05
Price Tons	4.31E-05	3.58E-06	12.02776	6.26E-06	3.46E-05	5.15E-05	3.46E-05	5.15E-05

16

Appendix 3. Projections of ACI - Existing Western Bituminous Operations to Reserve Exhaustion

All values in 000s unless otherwise noted.

Combined WBIT Operations	2007	2008	2009E	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E
Diesel price[1]			$ 2.50	$ 2.75	$ 2.86	$ 2.97	$ 3.09	$ 3.22	$ 3.35	$ 3.48	$ 3.62	$ 3.76	$ 3.91	$ 4.07
Thermal (Steam) Coal price change[2]		11.0%	2.9%	-13.3%	1.2%	1.2%	1.2%	1.2%	1.2%	2.0%	2.0%	2.0%	2.0%	2.0%
Arch Realized Price per ton	$ 24.73	$ 27.46	$ 28.25	$ 24.50	$ 24.79	$ 25.08	$ 25.39	$ 25.69	$ 26.00	$ 26.52	$ 27.05	$ 27.60	$ 28.15	$ 28.71
Tons Sold	19,362	20,606	16,626	18,913	21,200	21,200	21,200	21,200	9,705	6,200	6,200	6,200	6,200	5,489
Coal Sales	$ 540,061	$ 659,389	$ 469,753	$ 463,299	$ 525,496	$ 531,777	$ 538,166	$ 544,665	$ 252,363	$ 164,447	$ 167,736	$ 171,090	$ 174,512	157,585
Cost of Sales[3]	$ 371,004	$ 456,954	$ 372,420	$ 312,303	$ 304,444	$ 311,688	$ 319,058	$ 326,554	$ 163,923	$ 106,817	$ 108,953	$ 111,132	$ 113,355	102,359
Depreciation, Depletion, and Amortization[4]	$ 66,299	$ 81,174	$ 79,862	$ 69,185	$ 68,278	$ 69,377	$ 70,494	$ 71,630	$ 57,139	$ 41,707	$ 42,282	$ 42,869	$ 43,467	39,855
Income (loss) from Operations	$ 102,758	$ 121,261	$ 17,471	$ 81,811	$ 152,774	$ 150,712	$ 148,614	$ 146,480	$ 31,301	$ 15,923	$ 16,501	$ 17,090	$ 17,691	15,371
CapEx for WBIT	$ 99,282	$ 162,698	$ 79,862	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Arch of Wyoming														
Tons Sold[6]	-	200	-											
PP&E		$ 24,000	$ -											
Assigned Reserves		19,400	19,400											
Dugout Canyon														
Tons Sold[6]	4,000	4,300	3,522	3,911	4,300	4,300	4,300	4,300						
PP&E		$ 131,400	$ 114,483	$ 99,828	$ 85,710	$ 71,638	$ 57,340	$ 42,811						
Assigned Reserves		24,700	21,178	17,267	12,967	8,667	4,367	67						
Skyline														
Tons Sold[6]	2,400	3,300	2703	3001.4	3300.0	3300.0	3300.0	3300.0	996.0					
PP&E		$ 189,300	$ 176,317	$ 165,071	$ 154,235	$ 143,436	$ 132,463	$ 121,313	$ 112,419					
Assigned Reserves		19,900	17,197	14,196	10,896	7,596	4,296	996	(0)					
Sufco														
Tons Sold[6]	6,700	7,400	6061	6730.4	7400.0	7400.0	7400.0	7400.0	2508.9					
PP&E		$ 213,200	$ 184,088	$ 158,868	$ 134,570	$ 110,354	$ 85,747	$ 60,744	$ 40,799					
Assigned Reserves		44,900	38,839	32,109	24,709	17,309	9,909	2,509	-					
West Elk														
Tons Sold[6]	6,200	5,300	4341	5270.4	6200.0	6200.0	6200.0	6200.0	6200.0	6200.0	6200.0	6200.0	6200.0	5488.8
PP&E		$ 390,500	$ 369,649	$ 351,586	$ 332,559	$ 312,270	$ 291,654	$ 270,705	$ 253,995	$ 227,350	$ 185,068	$ 142,200	$ 98,733	58,878
Assigned Reserves		70,900	66,559	61,289	55,089	48,889	42,689	36,489	30,289	24,089	17,889	11,689	5,489	-

[3] Coal Cash Cost per ton Regression Relationship (Appendix 4)		
	Intercept	37.08760227
	Tons	-0.009682653
	Diesel Tons	0
	Price Tons	0.000217631

[4] DD&A per ton Regression Relationship (Appendix 4)		
	Intercept	3.412681529
	Price	0.174862596
	Tons	-0.00085404

[1] Historical data from Quarterly Rocky Mountain Diesel Price from DOE, http://www.fwccinc.com/doefuel.html, future price appreciation forecast at 4%

[2] Source: Lukashov & Kohler: Coal Industry Report, "US Coal Production: Cooling outlook amid a warming climate." September 2009

[5] CapEx forecast to maintain PPE at each mine up to 6 years prior to exhaustion or reserves.

[6] Production forecast to return to historical peak levels (may use 2006 production figures, not shown) over two years.

Appendix 4 - Regression Analysis for WBIT Mines: DD&A cost per Ton & Cash Cost per Ton

Period	Cash Cost	Price[2]	Tons	Diesel[1]	Price Tons	Diesel Ton	Dep Cost per Ton
Q107	16.07	24.77	4,764	2.63	117994.5	12536.54	3.49
Q207	17.28	24.13	4,956	2.96	119587.3	14673.6	3.07
Q307	17.38	25.16	5,057	2.97	127223.8	15042.17	3.35
Q407	13.89	24.84	4,586	3.34	113906.5	15324.87	3.82
Q108	15.92	26.76	5,051	3.47	135168.8	17530.27	4.25
Q208	18.90	29.91	5,722	4.37	171144.9	25021.53	3.47
Q308	19.01	26.76	5,135	4.38	137425.9	22500.07	3.68
Q408	17.29	25.99	4,697	2.97	122075	13941.01	4.47
Q109	25.40	28.11	3,951	2.16	111075.6	8543.523	4.93
Q209	26.06	29.93	3,475	2.35	104006.5	8153.198	5.43
Q309	20.70	29.08	4,560	2.63	132612.4	11990.37	4.87

[1] Historical Diesel price data from Quarterly Rocky Mountain Diesel Price from DOE
http://www.fwccinc.com/doefuel.html

[2] Price is Realized Sale Price for Coal from this region.

SUMMARY OUTPUT - DD&A Cost per ton

Regression Statistics

Multiple R	0.921963
R Square	0.850016
Adjusted R	0.81252
Standard E	0.331193
Observatio	11

ANOVA

	df	SS	MS	F	ignificance F
Regression	2	4.973164	2.486582	22.66948	0.000506
Residual	8	0.877508	0.109689		
Total	10	5.850673			

	Coefficients	standard Err	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	Ipper 95.0%
Intercept	3.412682	1.784844	1.912034	0.092242	-0.70318	7.528538	-0.70318	7.528538
Price	0.174863	0.05109	3.422662	0.009052	0.05705	0.292676	0.05705	0.292676
Tons	-0.00085	0.000179	-4.76687	0.001414	-0.00127	-0.00044	-0.00127	-0.00044

SUMMARY OUTPUT - Cash cost per ton

Regression Statistics

Multiple R	0.876699
R Square	0.768601
Adjusted R	0.710751
Standard E	2.056999

ANOVA

	df	SS	MS	F	ignificance F
Regression	2	112.434	56.21702	13.28617	0.002867
Residual	8	33.84996	4.231244		
Total	10	146.284			

	Coefficients	standard Err	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	Ipper 95.0%
Intercept	37.0876	5.158379	7.189779	9.34E-05	25.19236	48.98285	25.19236	48.98285
Tons	-0.00968	0.001957	-4.94656	0.001126	-0.0142	-0.00517	-0.0142	-0.00517
Price Tons	0.000218	6.53E-05	3.330344	0.010379	6.69E-05	0.000368	6.69E-05	0.000368

Appendix 5. Projections of ACI - Existing Central Appalachian Operations to Reserve Exhaustion

All values in millions

Combined Operations of CAP	2007	2008	2009E	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Coal-Mac	3.9	3.7	3.5	3.6	3.6	3.7	3.7	3.8	3.8	2.1	-	-	-	-	-	-								
Reserves, mln. Tons			27.8																					
Cumberland River	2.4	2.4	2.2	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.5	1.6	-	-	-	-								
Reserves, mln. Tons			23.3																					
Lone Mountain	2.4	2.7	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.8	2.8	2.9	2.9	2.9	1.1	-	-					-		
Reserves, mln. Tons			34.1																					
Mountain Laurel	1.0	4.3	4.0	4.1	4.2	4.3	4.3	4.4	4.4	4.5	4.5	4.5	4.6	4.6	4.6	4.6	4.7	4.7	4.7	4.7	4.7	4.8	0.7	-
Reserves, mln. Tons			90.7																					
Production growth, %	10%	35%	-7%	3%	2%	2%	1%	1%	1%	1%	1%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Total coal sales, mill. tons	9.7	13.1	12.2	12.6	12.8	13.1	13.2	13.4	13.5	11.9	9.9	9.0	7.4	7.5	5.7	4.6	4.7	4.7	4.7	4.7	4.7	4.8	0.7	-
Average realised price per ton, $		64.7	62.19	62.2	62.9	63.7	64.4	65.2	66.0	67.3	68.7	70.1	71.5	72.9	74.3	75.8	77.3	78.9	80.5	82.1	83.7	85.4	87.1	88.8
Price growth, %			-3.8%	0.0%	1.2%	1.2%	1.2%	1.2%	1.2%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Coal sales, mill. $	$ 681	$ 1,020	$ 760	$ 783	$ 808	$ 834	$ 853	$ 872	$ 891	$ 803	$ 678	$ 633	$ 531	$ 544	$ 427	$ 351	$ 360	$ 369	$ 378	$ 388	$ 398	$ 408	$ 58	$ -
PP&E, mln $	$ 830	$ 901	$ 894	$ 894	$ 894	$ 891	$ 888	$ 883	$ 876	$ 872	$ 873	$ 876	$ 803	$ 730	$ 657	$ 584	$ 511	$ 438	$ 365	$ 292	$ 219	$ 146	$ 73	$ -
PP&E as % of sales	8.6%	6.9%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%	8.1%
DD&A mln. $[1]	$ 58	$ 92	$ 89	$ 81	$ 83	$ 84	$ 85	$ 87	$ 88	$ 87	$ 81	$ 78	$ 73	$ 73	$ 73	$ 73	$ 73	$ 73	$ 73	$ 73	$ 73	$ 73	$ 73	$ 73
CapEx	$ 163	$ 82	$ 82	$ 82	$ 82	$ 82	$ 82	$ 82	$ 82	$ 82	$ 82	$ 82	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cash cost per ton	$ 40.2	$ 43.8	$ 47.9	$ 45.9	$ 47.2	$ 48.6	$ 50.1	$ 51.6	$ 53.2	$ 54.7	$ 56.4	$ 58.1	$ 59.8	$ 61.6	$ 63.5	$ 65.4	$ 67.3	$ 69.4	$ 71.4	$ 73.6	$ 75.8	$ 78.1	$ 80.4	$ 82.8
Cash cost per ton growth, %		9.0%	9.5%	-4.3%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

[1] DD&A Regression Results		
	Intercept	4.07825
	Price	0.11289
	Tons	-0.0015

Appendix 6 - Regression Analysis for WBIT Mines: DD&A cost per Ton

Period	Cash Cost	Price[1]	Tons	Price Tons	Dep Cost per Ton
Q107	41.64	48.87	3,446	168428.11	3.80
Q207	41.04	48.36	3,420	165368.22	3.81
Q307	39.87	46.41	3,044	141249.69	3.68
Q407	38.37	51.48	4,009	206365.44	5.21
Q108	40.45	60.73	3,482	211463.68	6.26
Q208	43.43	69.54	3,892	270655.73	5.95
Q308	47.56	78.95	3,534	279040.36	6.55
Q408	43.64	69.80	3,711	259042.03	6.49
Q109	45.22	63.47	3,516	223132.03	6.72
Q209	49.26	60.66	2,662	161496.61	8.04
Q309	49.32	62.44	2,989	186654.11	7.18

[1] Price is Realized Sale Price for Coal from this region.

SUMMARY OUTPUT - DD&A Cost per ton

Regression Statistics

Multiple R	0.81531
R Square	0.66473
Adjusted R	0.580912
Standard E	0.956764
Observatio	11

ANOVA

	df	SS	MS	F	ignificance F
Regression	2	14.51943	7.259714	7.930678	0.012635
Residual	8	7.323172	0.915396		
Total	10	21.8426			

	Coefficients	andard Err	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0%
Intercept	4.078249	2.90953	1.401687	0.198593	-2.63114	10.78764	-2.63114	10.78764
Price	0.112886	0.029673	3.804325	0.005205	0.04446	0.181313	0.04446	0.181313
Tons	-0.00148	0.000776	-1.90552	0.093172	-0.00327	0.000311	-0.00327	0.000311

Appendix 7. Arch Coal Inc. (ACI) DCF Valuation - Current Mining Operations

	Historical			Projected																			

(Columns: 2007, 2008, 2009E, 2010E, 2011E, 2012E, 2013E, 2014E, 2015E, 2016E, 2017E, 2018E, 2019E, 2020E, 2021E, 2022E, 2023E, 2024E, 2025E, 2026E, 2027E, 2028E, 2029E)

Central Appalachian
- Price ($ / ton)
- Coal Sales
- Cost of Sales (CA)
- Deprec., Deplet., & Amort (CA)
- Op Earnings (CA)

Western Bituminous
- Price ($ / ton)
- Coal Sales
- Cost of Sales (WBIT)
- Deprec., Deplet., & Amort (WBIT)
- Op Earnings (WBIT)

Powder River Basin
- Price ($ / ton)
- Coal Sales
- Cost of Sales (PRB)
- Deprec., Deplet., & Amort (PRB)
- Op Earnings (PRB)

Total
- Coal Sales
- Cost of coal sales
- Deprec., Deplet., & Amort.
- DD&A - Corp/Other/Elim
- SG&A
- EBIT
- Net Operating Loss Carryforward
- Taxes
- EBIAT
- - Capital Expenditures (Mines)
- - Capital Expenditures (Corp/Other/Elim)
- + Depreciation
- - d(Working Capital)
- FCF
- Discount Factor [1/(1+WACC) ^(Yr-2009)]
- WACC   10.8%
- PV(FCF) $ 3,210,620
- - net Debt (Debt - Cash & Investments) $ 1,386,000
- Equity Value (000s) $ 1,824,620
- # of Shares (million)   162.5
- Equity Value per share $ 11.23

Appendix 8. Arch Coal Inc. (ACI) DCF Valuation - Current Mining Operations - Supplementary Information

Arch Coal Inc. (ACI) Weighted-Average Cost of Capital

Rd[1]	5.7%
Equity Beta[2]	1.77
Rf - 10yr Tbond[3]	0.035
Rmp[4]	0.072
RE[5]	16.2%
D / V[6]	0.432
WACC[7]	10.83%
Tax Rate	35.00%

[1] Rd based on weighted average cost of outstanding debt - CapitalIQ

[2] Yahoo Finance

[3] Bloomberg 10-yr Treasury Yield (11/5/2009)

[4] Average [S&P Return - Risk Free Rate] over 1929 - 1996, Ibbotson Associates & Datastream

[5] Re = Rf + Beta * Rmp

[6] D / V reported by CapitalIQ

[7] WACC = Re * (1 - D/V) + Rd * (1 - Tax Rate) * (D/V)

DCF Sensitivity Analysis - Equity Value per Share

		2010 Thermal Coal Price Change			
		-13%	-7%	0%	7%
WACC	8.33%	$ 13.79	$ 14.20	$ 14.60	$ 15.00
	10.83%	$ 11.23	$ 11.60	$ 11.96	$ 12.32
	13.33%	$ 9.12	$ 9.46	$ 9.78	$ 10.11
	15.83%	$ 7.36	$ 7.67	$ 7.97	$ 8.27

Appendix 9. Arch Coal Inc. (ACI) DCF Valuation - Perpetual Mining Operations

	Historical			Projected							TV
	2007	2008	2009E	2010E	2011E	2012E	2013E	2014E	2015E	2016E	2016E
Central Applachian											
Price ($ / ton)	0	64.68	62.19	62.19	62.93	63.68	64.45	65.22	66.02	67.34	
Coal Sales	$ 681,433	$ 847,277	$ 760,145	$ 782,950	$ 808,102	$ 834,116	$ 852,579	$ 871,504	$ 890,903	$ 908,721	
Cost of Sales (CA)	$ 389,552	$ 573,387	$ 585,887	$ 577,256	$ 606,465	$ 637,152	$ 662,829	$ 689,541	$ 717,330	$ 731,676	
Deprec., Deplet., & Amort (CA)	$ 58,178	$ 92,250	$ 89,390	$ 81,133	$ 82,632	$ 84,154	$ 85,497	$ 86,873	$ 88,281	$ 90,046	
Op Earnings (CA)	$ 233,703	$ 181,639	$ 84,868	$ 124,560	$ 119,005	$ 112,810	$ 104,252	$ 95,090	$ 85,292	$ 86,998	
Western Bituminous											
Price ($ / ton)	$ 24.73	$ 27.46	$ 28.25	$ 24.50	$ 24.79	$ 25.08	$ 25.39	$ 25.69	$ 26.00	$ 26.52	
Coal Sales	$ 477,289	$ 557,438	$ 469,753	$ 463,299	$ 525,496	$ 531,777	$ 538,166	$ 544,665	$ 252,363	$ 257,411	
Cost of Sales (WBIT)	$ 371,004	$ 456,954	$ 372,420	$ 312,303	$ 304,444	$ 311,688	$ 319,058	$ 326,554	$ 163,923	$ 167,201	
Deprec., Deplet., & Amort (WBIT)	$ 66,299	$ 81,174	$ 79,862	$ 69,185	$ 68,278	$ 69,377	$ 70,494	$ 71,630	$ 57,139	$ 58,282	
Op Earnings (WBIT)	$ 39,986	$ 19,310	$ 17,471	$ 81,811	$ 152,774	$ 150,712	$ 148,614	$ 146,480	$ 31,301	$ 31,927	
Powder River Basin											
Price ($ / ton)	$ 10.59	$ 11.30	$ 12.52	$ 10.86	$ 10.99	$ 11.12	$ 11.25	$ 11.39	$ 11.53	$ 11.76	
Coal Sales	$ 1,020,876	$ 1,130,000	$ 1,244,614	$ 1,496,882	$ 1,626,036	$ 1,645,470	$ 1,665,241	$ 1,685,351	$ 1,705,808	$ 1,739,924	
Cost of Sales (PRB)	$ 811,936	$ 935,271	$ 920,389	$ 824,717	$ 834,711	$ 853,075	$ 871,826	$ 890,974	$ 910,526	$ 928,737	
Deprec., Deplet., & Amort (PRB)	$ 115,136	$ 117,753	$ 131,268	$ 185,399	$ 190,359	$ 190,771	$ 191,191	$ 191,618	$ 192,052	$ 195,894	
Op Earnings (PRB)	$ 93,804	$ 76,976	$ 192,957	$ 486,765	$ 600,967	$ 601,624	$ 602,223	$ 602,760	$ 603,230	$ 615,294	
Total											
Coal Sales	$ 2,179,598	$ 2,534,715	$ 2,474,513	$ 2,743,130	$ 2,959,635	$ 3,011,363	$ 3,055,985	$ 3,101,521	$ 2,849,074	$ 2,906,056	
Cost of coal sales	$ 1,572,492	$ 1,965,612	$ 1,878,696	$ 1,714,277	$ 1,745,619	$ 1,801,915	$ 1,853,713	$ 1,907,070	$ 1,791,779	$ 1,827,614	
Deprec., Deplet., & Amort.	$ 239,613	$ 291,177	$ 300,521	$ 335,718	$ 341,270	$ 344,302	$ 347,182	$ 350,121	$ 337,472	$ 344,222	
DD&A. - Corp/Other/Elim	$ 2,408	$ 1,732	$ 1,942	$ 1,942	$ 1,942	$ 1,942	$ 1,942	$ 1,942	$ 1,942	$ 1,942	
SG&A	$ 84,446	$ 107,121	$ 91,685	$ 101,638	$ 109,660	$ 111,576	$ 113,230	$ 114,917	$ 105,563	$ 107,675	
EBIT	$ 280,639	$ 169,072	$ 201,669	$ 589,556	$ 761,144	$ 751,628	$ 739,918	$ 727,471	$ 612,318	$ 624,604	
Net Operating Loss Carryforward	$ 154,222	$ 120,291	$ 86,291	$ 52,291	$ 18,291	$ -	$ -	$ -	$ -	$ -	
Taxes	$ 3,687	$ 25,093	$ 36,584	$ 172,345	$ 232,400	$ 244,779	$ 258,971	$ 254,615	$ 214,311	$ 218,611	
EBIAT	$ 276,952	$ 143,979	$ 165,085	$ 417,212	$ 528,744	$ 506,849	$ 480,947	$ 472,856	$ 398,007	$ 405,992	
										$ -	
- Capital Expenditures	$ 310,548	$ 368,467	$ 310,858	$ 338,729	$ 343,689	$ 344,101	$ 344,521	$ 273,478	$ 273,912	$ 279,391	
- Capital Expenditures (Corp/Other/Elim)	$ 177,815	$ 128,880	$ 64,440	$ 42,530	$ 21,394	$ -	$ -	$ -	$ -	$ -	
+ Depreciation	$ 242,021	$ 292,909	$ 302,462	$ 337,659	$ 343,211	$ 346,243	$ 349,124	$ 352,063	$ 339,414	$ 346,164	
- d(Working Capital)	$ (81,841)	$ 82,001	$ 28,905	$ (24,788)	$ 4,005	$ 957	$ 826	$ 842	$ (4,670)	$ (4,764)	
FCF	$ 290,266	$ (13,579)	$ 127,785	$ 440,930	$ 524,261	$ 508,034	$ 484,724	$ 550,599	$ 468,179	$ 477,529	$5,516,188
Discount Factor [1/(1+WACC)^(Yr-2009)]			1.000	0.902	0.814	0.735	0.663	0.598	0.540	0.487	0.487
WACC			10.8%								
PV(FCF)			$ 2,461,259								
PV(Terminal Value)			$ 2,685,578								
- net Debt			$ 1,386,000								
Equity Value (000s)			$ 3,760,836								
# of Shares (million)			162.5								
Equity Value per share			$ 23.14								
Terminal Growth Rate			2.00%								

Appendix 10. Arch Coal Inc. (ACI) DCF Valuation - Current Mining Operations - Supplementary Information

Arch Coal Inc. (ACI) Weighted-Average Cost of Capital	
Rd[1]	5.7%
Equity Beta[2]	1.77
Rf - 10yr Tbond[3]	0.035
Rmp[4]	0.072
RE[5]	16.2%
D / V[6]	0.432
WACC[7]	10.83%
Tax Rate	35.00%

[1] Rd based on weighted average cost of outstanding debt - CapitalIQ

[2] Yahoo Finance

[3] Bloomberg 10-yr Treasury Yield (11/5/2009)

[4] Average [S&P Return - Risk Free Rate] over 1929 - 1996

[5] Re = Rf + Beta * Rmp

[6] D / V reported by CapitalIQ

[7] WACC = Re * (1 - D/V) + Rd * (1 - Tax Rate) * (D/V)

DCF Sensitivity Analysis - Equity Value per Share								
		2010 Thermal Coal Price Change						
		-13%		-7%		0%		7%
WACC	8.33%	$	34.90	$	43.71	$	52.13	$ 60.56
	10.83%	$	23.13	$	29.53	$	35.64	$ 41.76
	13.33%	$	16.53	$	21.56	$	26.38	$ 31.19
	15.83%	$	12.29	$	16.45	$	20.43	$ 24.41

Appendix 11. Coal Pricing Forecast

	Historical Data						Forecast Data				
`	Coal Util	NG/Coal Price	Total Elec Demand	Total Coal Cap	Generation / Consumption (Loss)			Coal Price ($/Mbtu)	NG Price ($/Mbtu)	NG/C Ratio	Expected Electricity Demand	Predicted Coal Utilization
2009	0.573673	1.636534	3940000	342373			2009	2.2	4.9	1.67	3,940,574	61.97%
2008	0.677002	3.384335	4110259	336290.8	1.119238981		2010	1.95	5	1.92	3,904,179	62.81%
2007	0.68655	3.133645	4156745	335283.8	1.119155314		2011	1.97	5.10	1.94	3,907,720	62.86%
2006	0.680789	3.20335	4064702	333770.3	1.123656643		2012	2.00	5.20	1.95	3,967,139	62.89%
2005	0.68967	4.158124	4055423	333173.7	1.124401798		2013	2.02	5.31	1.97	4,035,371	62.92%
2004	0.678741	3.461582	3970555	332724.2			2014	2.05	5.41	1.98	4,104,584	62.94%
2003	0.678466	3.596678	3883185	332091.2			2015	2.07	5.52	2.00	4,175,083	62.97%
2002	0.664683	2.492017	3858452	332003.2			2016	2.11	5.63	2.00	4,246,893	62.95%
2001	0.654673	3.345058	3736644	331992.7			2017	2.15	5.74	2.00	4,320,854	62.92%
2000	0.677158	3.379851	3802105	331473			2018	2.20	5.86	2.00	4,396,178	62.90%
1999	0.648079	2.00009	3694810	331342.5			2019	2.24	5.98	2.00	4,472,890	62.87%
1998	0.646116	1.798297	3620295	331011.1			2020	2.29	6.09	2.00	4,551,018	62.84%
1997	0.636288	2.031704	3492172	331011.1								
1996	0.61929	1.90163	3444188	330912.7								

			Coal GWh / Billion Btu	0.094939986
SUMMARY OUTPUT			NG GWh / Billion Btu	0.126596922

Regression Statistics

Multiple R	0.824731
R Square	0.680181
Adjusted R	0.622032
Standard E	0.019658
Observatio	14

ANOVA

	df	SS	MS	F	Significance F
Regression	2	0.00904	0.00452008	11.69721	0.001892236
Residual	11	0.004251	0.00038642		
Total	13	0.013291			

	Coefficients	Standard Err	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.578149	0.107239	5.3912357	0.00022	0.342118519	0.8141804	0.342119	0.81418
NG/Coal P	0.032929	0.008691	3.78885523	0.003001	0.013800092	0.0520574	0.0138	0.052057
Total Elec	-3.4E-09	3.15E-08	-0.10872571	0.915378	-7.2754E-08	6.59E-08	-7.3E-08	6.59E-08

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Appendix 12: Valuation Using Multiples

Estimation of Arch Coal, Inc. equity value based on industry EV/EBITDA multiple and sensitivity analysis

Coal Producer	Q3 2009 EV/LTM EBITDA	Q3 2009 Market Cap,
Peabody	7.13	10,369
Arch Coal	9.71	3,659
Consol	7.04	8,435
Alpha NR	7.11	2,709
Massey	5.45	2,685
Alliance	5.15	1,270
Patriot	3.10	1,134
Walter	6.91	3,126
Foundation Coal	7.06	1,606
Average weighted EV/EBITDA	7.02	
Projected 2009 Arch Coal EBITDA, mln. USD	434.5	
EV, mln. USD	3051	
Shares outstanding, mln.	163	
Price per share, USD	18.72	

Sensitivity analysis: EBITDA vs. EV/EBITDA

EV/EBITDA**		EBITDA*					
		Conservative -10%	Coservative case	Analyst's estimate	+10%	+10%	2008 case
			378.0	420.0	434.5	478.0	525.7	590.0
-10%	5.1	11.9	13.2	13.6	15.0	16.5	18.5
-10%	5.7	13.2	14.7	15.2	16.7	18.3	20.6
-10%	6.3	14.7	16.3	16.8	18.5	20.4	22.9
Analyst's estimate	7.0	16.3	18.1	18.7	20.6	22.6	25.4
+10%	7.7	17.9	19.9	20.6	22.6	24.9	28.0
+10%	8.5	19.7	21.9	22.6	24.9	27.4	30.7
Current ACI figure	9.7	22.5	25.0	25.9	28.5	31.3	35.1
Current + 10%	10.7	24.8	27.5	28.5	31.3	34.5	38.7

* - Underlined figure is the analyst's estimate based on the 3Q 2009 figures from 3Q company press release. ** - Underlined is the average weighted EV/EBITDA for the index of selected largest US coal companies

Estimation of Arch Coal, Inc. equity value based on industry P/E ratio multiple and sensitivity analysis

Coal Producer	Q3 2009 P/E	Q3 2009 Market Cap, mil.USD
Peabody	14.91	10,369
Arch Coal	30.82	3,659
Consol	14.97	8,435
Alpha NR	33.73	2,709
Massey	18.87	2,685
Alliance	11.78	1,270
Patriot	7.56	1,134
Walter	12.92	3,126
Foundation Coal	53.23	1,606
Average weighted P/E	19.58	
Projected 2009 earnings, mln. USD	65.82	
Shares outstanding, mln.	163	
Projected 2009 earnings per share, mln. USD	0.40	
Price per share, USD	7.91	

Sensitivity analysis: Earnings per share vs. P/E multiple

P/E		Earnings per share					
		Lowest management estimate*	+10%	+10%	+10%	Analyst's projections	Highest management estimate*
		0.28	0.31	0.34	0.37	0.40	0.43
Average weighted P/E	19.6	5.48	6.03	6.63	7.30	7.83	8.42
Arithmetic average P/E	22.0	6.16	6.78	7.45	8.20	8.80	9.46
+10%	24.2	6.78	7.45	8.20	9.02	9.68	10.41
+10%	26.6	7.45	8.20	9.02	9.92	10.65	11.45
+10%	29.3	8.20	9.02	9.92	10.91	11.71	12.59
Current ACI figure	30.8	8.63	9.49	10.44	11.49	12.33	13.25
+10%	32.2	9.02	9.92	10.91	12.00	12.88	13.85

* - Source: 3Q 2009 earnings conference call