

Scott Rotruck

Interviewers: Michael Kline

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Michael Kline: **0:00:00.0** Pretty good at protective moves. Gosh, that was crazy.

Carrie Kline: Michael's a good faller. He used to be a wrestler and—

MK: Are you a good faller?

CK: He rolls like crazy.

Scott Rotruck: Oh, I hurt myself a lot, too. I've busted every bone in my body at one time or another. Some of them several times.

MK: You get reminded of them later in life.

SR: Yeah, you do. They come back to haunt you.

CK: Is it the 29th?

MK: Today's the 29th of December. We're looking at New Years coming at us like a speeding train. It's raining. It's a Sunday morning. And my name is Michael Kline. I'm here with Carrie Kline. And will you say, "My name is?"

SR: My name is Scott Rotruck.

MK: And your date of birth, please?

SR: August 7, 1955.

MK: Okay, maybe if you would, start out by telling us about your people and where you were raised.

SR: I was born in Huntington, West Virginia. I lived there until I was about 1 year old and my parents, who were both in Keyser, West Virginia moved back to their hometown, and I really grew up in Keyser, West Virginia.

MK: Talk about that a little bit—your family life, your school, whatever.

SR: Well growing up in Keyser was a wonderful experience. Everybody was employed. It was very low unemployment. People worked Westvaco, they worked at the BNL Railroad, they worked at a number of other industries in the area. It was a good life growing up. We had good schools.

MK: (background noise) Oh, sorry about that. Good schools—

SR: Good schools. It was a very integrated community early on. There was a lot of inclusiveness there. I learned that early on. So it was just a great place to grow up. My father was a funeral director, so he knew everybody in the whole area and was always, as I saw, very, very kind to people in the toughest times of their life usually. So I had good parental examples to go by. I have 1 brother, Craig Rotruck, who became a funeral director himself. He followed in my father's footsteps. He lives in Kingwood now with my father who's 89. My mother passed away in 2002. But my father still works every day.

MK: **0:02:22.7** Imagine that.

SR: I can't imagine that, and neither can you. (laughs)

MK: He loves his work.

SR: He loves work and he loves people, and that's something I really did just take in and absorb from my parents was being kind to folks, working hard, being honest, being inclusive, trying to make a difference in simple ways, and never trying to grab too much sunshine for it. That was my parents.

MK: And then your education.

SR: After Keyser High School I went to Potomac State College for a year. I had some opportunities to go play football at a few places, but I elected to stay home and go to Potomac State College. A number of my friends were also playing there. I played 1 year, then I set out and walked on at WVU in 1976, which was Coach Cignetti's first year at WVU. I actually made the team and I had an Achilles tendon injury and that ended my football career—rather abruptly. So I thought I wanted to go to law school, but they wanted tuition and that costs money, and I didn't have money. I was broke. But they were hiring people at the Baltimore and Ohio Railroad then. If you had a 4-year degree, they would hire you. You could go through an engineer training program, which was fabulous. And then you could go onto a management training program.

So I became an engineer on the Baltimore and Ohio Railroad from Cumberland, Maryland to Grafton, West Virginia—historic run up over the mountains. It was beautiful; it was exciting. If you had any bit of motor head in you at all, running a train was fabulous. And I actually did it for about 8 years. And then the railroads were reducing their workforce down doing a lot of technological advancements, and I actually got a buyout and finished my MBA and went to work for Norfolk Southern Railroad and was in management there for awhile.

And that got me acquainted pretty well between that railroad stent with CSX, Norfolk Southern with the coal industry. And some folks knew of my background, so I came back towards Keyser, West Virginia and became the president of the Maryland Coal Association. And I got to know some folks in the coal industry very well by virtue of that and went to work for Anchor Energy and we moved to Morgantown in 1996. That is my wife of now 32 years this coming June and 3 children.

The 30-year-old one has a little granddaughter Nora. The second child, Jill, is now an MD, and she's on the west coast—San Francisco—doing a residency in ophthalmology. And then our son, as I've been going to WVU, and he works for me part-time in a couple business endeavors I've had.

MK: **0:05:02.9** So it sounds like your major skill set is in the area of management. You've got your MBA—

SR: I have an MBA, and I have had an opportunity to be in a management setting. I've had an opportunity to do a lot of fun things, and fortunately a lot of things in West Virginia, though we made a couple of brief sojourns out of the state. We lived in Virginia Beach for awhile when I worked for Norfolk Southern. We lived in Fort Wayne when I worked for Norfolk Southern. And Carolyn and I lived—after the kids were gone—in Oklahoma City for a period of time while I worked for Chesapeake Energy.

So I really spent about 10 years in the railroad industry, about 13 years in the coal industry. I spent a few years working with the president of WVU and for WVU extension service. And then I taught 5 years at the College of Business, ran a chamber for 4 years and went to work for Chesapeake Energy and worked 7 ½ years until this past August, at which time we had a significant reduction and I was able to actually retire. And I now work for Spilman Thomas & Battle, the law firm. I'm the director of transportation and energy services for them.

MK: Transportation and energy services for a law firm.

SR: Yes, sir. In other words my job, since I have been a client—and this is a firm that I think the world of. I've been a client individually—or my family—and when we bought and sold the family business or otherwise for going on 25 years—and I hired them when I was at Chesapeake to do work for Chesapeake Energy. So I've bought that perspective of a client in house so we can better understand how to fully and holistically and comprehensively serve our clientele. Especially my focus is energy. Early stage companies, which I've had some involvement with helping to develop early-stage companies.

In West Virginia, I was chair of the West Virginia Jobs Investment Trust, which is the state's venture fund. It's a double bottom line investing fund. It tries to not only make a return so it can repeat its job which includes helping to create jobs for West Virginia. It's helping to create economic stimulus in the state. It's not just a pure financial-driven metric endeavor.

MK: Well, it might be interesting to hear some of the history of Chesapeake and how long it's been in the state, it's record as an energy-producing company.

SR: Well know that I am now retired from Chesapeake, so I will not speak for it, but I will speak very affectionately about it. Chesapeake Energy was a company that was started by a very, very well-known entrepreneur named Aubrey McClendon, whose from Oklahoma City. He started—he went to Duke; he graduated. He and a friend of his were involved in the leasing aspect of the business. They started Chesapeake really at \$50,000. The company went public in 1993 and rocketed up as an energy sector. It kind of came down. It rocketed back down—up and down and up and down. But it really did very well. Fortune 500 company.

0:08:24.9 Chesapeake came east first by acquiring Columbian natural resources in 2005. And then it was looking at drilling a lot of deep wells in West Virginia, because in the Appalachian Basin, which West Virginia's a part of, only a half a percent of all wells ever drilled have ever been below 7500 feet, giving rise to the observation from the Interstate Oil and Gas Compact Commission and others that this is the most drilled but least explored basin in the country. There was a lot of shallow gas which was amenable to older technology. And then of course the industry moved west.

The industry really started in the east. Now it came back to go deep. But then the shales proved themselves up, specifically the Barnett Shale in Texas. So were the granddaddies of the shales where George Mitchell, another great entrepreneur just died at I think age 94. He was persistent over years in combining a couple key technologies—horizontal drilling and hydraulic fracturing in order to go down into the actual kitchen where all the gas was cooked—all the natural gas was cooked—the shale itself—and go down and produce it out of the shale itself. That was a source rock for where the shallow gas as it was all forming had come from and had caught into traps over time. But now he went down into the mother lode. And that's why we really have an energy revolution right now in this country, because of the combination of those technologies by a persistent entrepreneur.

Then the Marcellus became focused on in the east. In Pennsylvania, range resources just north of where we are today—in Washington County, Pennsylvania drilled the first Marcellus well in 2004 and began producing in 2005—horizontal well. So West Virginia also became a focus for the Marcellus shale. And Chesapeake's been a leader in that. It's drilled more horizontal wells than anybody else in the country. It's a fabulous company with a great entrepreneurial beginning. I think it has a very bright future, and I think it really, really helped accelerate the development of the shale, which has done a number of things.

If you look at any set of metrics, Michael, you can see that this dependence on foreign energy sources is now much lessened. You will see CO2 emissions have actually gone down in recent years because of the increased use of natural gas.

MK: Over coal you mean?

SR: Yes, sir. Yes, there's been a lot more natural gas that has been used. So CO2 emissions have lessened. You can see that each year the EI—the Energy Information Administration or the Colorado School of Mines with their future energy committee have all increased their prediction on how much natural gas that we have. And all natural gas is not the same. We have wet gas and dry gas, and those are 2 general kinds of natural gas. And it West Virginia we have a large slice

of the wet gas in the Marcellus, meaning that besides methane, the number 1 constituent in the natural gas stream, we have a lot of ethane. And ethane is something that you have to manage. You can leave so much of it in the stream that you sell to the in-user, but it burns hotter so you have to find some way of managing it. And 1 way is to strip it out and to crack it into ethylene.

Now I know you've heard about crackers. There was an exciting announcement north of Pittsburg in Monaca that Shell has made about putting a cracker in where the Shale produced ethane, will be cracked into ethylene, which is the building block for the plastics industry. Most of this, now, is resident in the Gulf Coast area. Four of the largest petrochemical facilities in the entire world are there. But the good news is between the Utica Shale, the Marcellus Shale, and other shales, remember that this is one of the least explored basins in the entire country. We are going to have a lot of this ethane in order to be able, I believe, to reinvigorate the manufacturing sector, which is something whose demise over time since the early '80s, has really hurt West Virginia's economic fortunes. And I see that as on a trend of reversal.

MK: **0:13:06.4** So the presence of this ethane is a defining feature between wet and dry? I'm trying to understand.

SR: Yes, yes. Wet—if you think of it, again, with a full disclaimer that I'm not a geologist or a geoscientist, this is a layman's understanding for you and I to enjoy here.

MK: Thank you for the disclaimer.

SR: As you proceed from the eastern most extent of the fossil fuels in the United States and go west, the natural gas is thermogenically less mature. And therefore, when it's really thermogenically most mature, it becomes almost pure methane—CH₄. You burn it, and you get water vapor and CO₂. That's what you get. It has very little of anything else in it. But when it's thermogenically less mature, you have liquid gas.

So that's that natural gas stream, still predominated by methane, but also associated with other heavier hydrocarbons, 1 of them being ethane. You can have butane. You have pentanes, which are the natural gasolines, and all of the other products have markets—propane. They all have various ways of being used. Propane can be used to run an engine on. Or you can use propane as the beginning to be cracked for the building block of propylene.

This is a chemical industry, a very complex thing. But simplistically the wet gas, especially in West Virginia, offers us opportunity of taking that ethane out, cracking it, turning it into ethylene, and using in locally, trying to do every value-added thing we can with whatever we take out of the ground.

One, being that Secretary Ernie Moniz was just a talented national energy technology lab and made a strong reaffirmation of his preference for looking at efficiency, which is a good thing to pursue using less and less energy per unit of output. I believe we should do that as hard as we can every day. That doesn't mean we're going to use less energy overall. That just frees up energy for use in other ways. But efficiency is still very virtuous. So if we can use energy closer to where is originally produced, we have less of it lost in the continual change in its

transportation. And the beautiful thing about West Virginia, especially here with this wet gas, is we're right in the middle of a huge part of the population of the United States. We're within 8 hours of about half the population of the country. So we really are in a good position, I think, to fully leverage this natural gas—this place with this wet gas that we have in West Virginia.

There's one other option to be made. And while not solely unique, it is very, very rare indeed, that any place else in the world, can an individual own the minerals in the ground, whereas in the United States, you can own your own minerals. So you will find up in Ohio in Marshall County where a lot of the wet gas is being concentrated on by a lot of companies. Individuals who live there own the mineral, and they are participating most directly in the financial benefit of this early on. And the bonus money they receive that'll induce leasing and the royalties that will come thereafter.

0:16:54.3 So it's a much different story than what you have in most countries—say France, or Norway, or other places—where the sovereign or government owns the mineral. Here you can own your own. I think it harkens deeply back to the founding fathers and their intellectual godfathers who had a strong preference for protecting property and property rights. And here you can own your own minerals. It doesn't mean you always do. Sometimes they are divided off, which I find most unfortunate. But what's beautiful is when—

MK: Divided off?

SR: Divided estates where you can have—and again, I'm not an attorney. A laymen's understanding I'm offering you, but you can have different estates in a piece of property. So you may own a surface and someone may own the coal and somebody else may own the natural gas. And then as we think about things like carbon sequestration, who owns the poor space in which the CO₂ would be placed—there's all kinds of things that maybe years and years back weren't fully contemplated that lay before us to be answered.

But still I think it is so key—and many other commentators have made this observation—the fact that individuals can own their minerals, that they can be the beneficiaries of that stream of cash early on, the communities can think of inventive ways now to offer other alternatives to reinvest some of that new-found wealth back into their communities, to create new rounds of economic development.

MK: Is that actually happening, or is everybody running out buying a new fleet of pickup trucks?

SR: I think, fortunately, it is treating people so often so well that they're able to do both. It's not a zero sum. But I do think that we need to be mindful of trying to make certain that we continue to offer folks new ways to reinvest back in their communities. And not just charitable, which is a wonderful thing, but how can we use some of this new cash that's available to fund new, longer-term economically sustainable development. That's the beauty of it.

And if you're from the energy sector, which is where I spent a good bit of my career, you want to do that. You know that, yes, these are finite energy resources, but how do you extend their promise and their impact into the future? I've just described one way for you. Take that cash

stream, find ways to reinvest it back into those communities that are hosting the development of the energy to begin with. I think it's a very wholesome, sort of symbiotic relationship.

CK: As in—when you talk the investment, what do you picture?

SR: **0:19:40.3** Well a number of things. First, we've had a number of efforts. I mentioned the jobs investment trust earlier—States Venture Fund. I'm involved in another early-stage fund now, which is private investors. We've kicked money into a pool in order to have that available to fund new deals that we hope are West Virginia grown—new ideas, new inventions, new businesses for goods or services that we can invest in that people can find a place to work—a way to have a livelihood in West Virginia.

So that's one way, Carrie, is just to make certain that we're as creative and do it quickly, because money is very mobile. Money—it's not uncommon to find places where wealth has been created and if not finding enough opportunities to be reinvested, we'll go someplace else. So this is a great opportunity. It's a good opportunity for the financial-planning community. We have a wonderful group of banks in West Virginia, and they're being mindful of this. And they're trying to make certain as people come in, and they just come up upon some new wealth, that they're thoughtful about how they can help in that regard as well. People need financial planning.

It's a good story. I believe, also, one key thing when you think about development, West Virginia is many different cultures and places, as you know. But 1.8 million people, give or take a few, half of them at any given time living in the border county, sharing a culture and an economy with other people in other states with other rules with other laws—2 sides of the watershed, if you will—it's many places. And some places in West Virginia, when industries started to develop, you had an indigenous capital—local capital that helps support and build that industry. And therefore, you had a much more diverse, sustainable, evolving kind of economy. You find that in the northern part of West Virginia.

Some places in the southern part of the state, there was no indigenous capital very early on when resources were developed. But I think now where the Marcellus shale, at least right this minute has first taken place, it's a rather mature area. So I'm quite optimistic and confident with just a little bit of encouragement that we're going to find successive rounds of development, predicated for a softer energy source, but finding new ways of sustaining and repeating itself.

MK: That's why we wanted to come and talk to you, because your overview of this whole thing is incredible.

SR: I would say one other thing, Michael, is don't write off any given fuel source too early. To hearken back to Twain's response to the newspaper accounts of his death—they said they were quite exaggerated or whatever—same thing for—if you think about World War II, the British Navy, The First Lord of the Admiralty, Winston Churchill. Sir Winston took the British Navy off coal and put it on oil, in order that it could be faster. And that was an important, important decision. There were times that it looked like the coal industry's fate was going to plummet and go down.

Think about 1973 when we had OPEC. In '79 we had more trouble with the fall of The Shah. And in office in the United States was a nuclear engineer who was President, named Jimmy Carter. He was a nuclear engineer—probably one of the brightest guys ever in the office. And he looked at what we had, and he determined we didn't have very much natural gas. What we had was coal. And they really made the charge to build a lot of coal-fired, base-load power in this country. And the coal industry and the utility industry did what they were asked to do, and coal became king again.

And you think about the railroads. It used to be said that coal hauls itself. You would mine coal and then coal would fuel the diesel engine that hauled the coal to the other markets. Well they dieselized in the late 1950s. So again, what would the role be? Well think about now. Well we may be able to take natural gas, compress it down 600 fold into LNG, so you can get a lot of energy in a small container. Railroads are now looking at converting their locomotives to LNG.

MK: **0:24:17.2** LNG?

SR: LNG—liquefied natural gas. And therefore, you may find a situation where natural gas is now helping coal get more cost effectively to the market to go overseas, which is where the markets are really still burgeoning. The worldwide coal market is continuing to grow. You can't write off fuel sources too early because of innovation. Nobody though—in fact, the first recorded natural-gas well was drilled in—and you're a native New Yorker. This was in Fredonia, New York. And it was a shale well. It was 21-feet deep. And it produced a very little bit of gas, but it was into a shale. The shales come up as you go towards the Great Lake, they can come up. So it's very near the surface.

CK: What are we talking about?

SR: It was 1821—and it was either 21 or 27-feet deep in Fredonia, New York. And the point being, who would have ever thought we'd be able now to go down a mile or 2 miles and then angle the wellbore in so it can go out horizontally. And now instead of—and you get up in your mind's eye in a helicopter with me and look down at a square mile, which is 640 acres. And if you were drilling vertical wells to drain that acreage, theoretically, you may take 30 wells, pads, roads, pipes to get it out.

Now you can go up on a pad in the middle of that square mile and go down vertically at an angle and go out horizontally and have a wellbore that's a mile long or more. The innovation is incredible. And the good news is, it's not over. We're still only getting a small fraction, even with all these advancements of a natural gas or oil that's in place. Every day they're getting better. And how to get more molecules out of that wellbore for no more expense and no more environmental impact. That's the Holy Grail. And they're truly getting better at it every day. So there's a lot of innovation left to come.

There's a lot of natural gas now; it's driven down the prices. So in this low-price environment, people are being even more creative about lowering their cost. It's really a good time to see not only continuous improvement, but continued almost daily breakthroughs in how much you can produce off of one given location without any more impact. It's a good story.

MK: You mentioned, was it Shell Oil that's building a—what did you call it, a cracker?

SR: Yeah, Shell has announced that they have auctioned property in Monaca. That is north of Pittsburg, and they announced the potential building. Now they're in the early stages of evaluation and so on, but there is a sufficient amount of activity taken place all around it that people are optimistic. They would build a cracker there. And that would take the ethane and crack in into ethylene. Now this may be a more complex facility than just doing that one thing.

You also had an announcement about an interest by Braskem, which is a subsidiary of another company based in Brazil of an interest in Parkersburg. And remember Parkersburg has always been important to the oil and gas industry and to the founding of this state. You know that history of the Burning Springs, the gas—the oil fields that were there in Burning Springs. And that oil was so good as a lubricant back then and this was right near the founding in the state of West Virginia at that time—late 1850s. We were founded in 1863, but the BNL Railroad used that oil for lubrication. So those oil fields had a lot to do with a lot of the decisions that were made in terms of the development in the state of West Virginia.

CK: **0:28:39.4** Could you say that last line again? We had a siren.

MK: Yeah, could you say just last segment again? It had a lot to do with—

CK: —the founding and the state.

SR: Let me think back to a whole sentence. What I was observing, Michael, was at Burning Springs, which was a place where—in the book, *Where It All Began*. And this was a book that was sort of taking issues with those who claimed it all began in a state north of West Virginia. Talk about how the oil that was developed at Burning Springs—not very far from Parkersburg—was very, very coveted by the Baltimore and Ohio Railroad. It was a great lubricant.

So the railroad wanted Burning Springs protected and as the Civil War ensued, oil did play a role in the development of the state because the railroad wanted that protected. There was a strong feeling, maybe on the part of some, not to succeed from West Virginia, but there was not a strong urge to develop a new state. But I believe that the railroad's interest and interest of the people who invested in the oil industry there thought that a new state would be the best way of protecting those assets. So I think it did have an impact.

MK: So I'm interested in this cracker in the process. What other elements—what do they do with the waste in cracker? What do happens with the methane, for example, that comes off of that?

SR: Well now if you think of the natural gas stream—and again, we said methane is typically almost exclusively always the number 1 constituent in the natural gas stream. It's the simplest of the compounds—CH₄. CH₄—4 hydrogen, 1 carbon atom. You combust it—CO₂ and water vapor. The other things in it are more complex, but you can take them apart and reassemble them. That's what's really taking place in a cracker. You're using pressure and temperature in order to separate these out, and then use them as building blocks. So you really don't have a lot of waste. That's the idea. You could burn the ethane. And sometimes you do burn the ethane

along with the methane you send to the end-user, but there is a specification—a limit on the BTU. And the ethane burns hotter, so you can only burn so much of it in the product to send to the end-user.

So taking it to a cracker, you're really ending up with very, very little waste. You can use almost everything that's there completely. And remember it's not just ethane. It may be butane. It may be propane. It may be the pentanes, the natural gasolines. You have condensate. So these were more complex than natural gas. If you go to the far northeastern part of Pennsylvania—up in Bradford County. In that area you will find natural gas that's almost pipeline quality when it's produced. Very little foundation water coming back.

It's almost ready to go to market, and it's sitting right there on that huge market in New York. New York only produces 5% of the natural gas that it uses every year for itself. Pennsylvania used to be an importer; it's now an exporter of gas. It's phenomenal. In a very short period of time, PA has become one of the—it's the second largest producing natural gas state in the country after Texas. West Virginia's number 10 right now.

CK: **0:32:31.9** Is there a cracker plant in West Virginia yet?

SR: Oh there have been a lot of cracker plants in West Virginia in the past. And that's one of the interesting things. If you look back through the history books, you will find the story of the Kanawha Valley being one of the cradles of the modern chemical industry. You had this great research institutions in Germany, and you had that cradle of development there. But in the Kanawha Valley, you had all the ingredients. As they were drilling for salt, it was natural gas. And the chemical industry over time has shrunken rather dramatically, but the vestige is still there.

The other thing that you have besides just infrastructure and some companies remaining there, is an intellectual trust. When Union Carbide—which got sold to Dow—when they had their tech center there—their research center—it was reputed, and I think by very credible sources, that Kanawha County had the highest incidence of PhD per capital of any capita in the United States because—

CK: PhD?

SR: PhDs because of that tech center. There were so many things created, invented in West Virginia. Now they may have gotten patented in Michigan at a home office or someplace else, but this state has been part of creating a lot of the things that the chemical industry has given us, happened in the Kanawha Valley.

CK: Are there none, then, in Central West Virginia now?

SR: There are no cracker plants like we're talking about now in West Virginia. You have 1 refinery. It's Ergon's Refinery that's up in Newell, which is the absolute summit of our state. But no, you don't have crackers here. And the other thing that you need to think about—and we do need to think regionally about all these aspects of the energy sector—money is mobile;

workforce is mobile. It will take the region to really deliver on the promise of not just 1 cracker, but more than 1 for this region. You'll take the Utica, which is an area of extent even larger than the Marcellus. The Marcellus is about 95,000 square miles—New York, Pennsylvania, West Virginia, a little bit in Ohio. The Utica's even bigger than that. It's deeper. Right now it's being developed first and foremost in Ohio, but they're beginning to do it in West Virginia and PA as well.

It'll take both of those formations' wet gas to give the confidence to an industrial sector that has to invest billions up front to build a cracker because they want to know that they long term have a supply of the ethane. But you're seeing it now with Shell, you're seeing it now with Braskem. They believe the supply is here. Now they're vetting every other aspect of whether that's a good business decision. And I think it's going to be yes and yes.

CK: **0:35:51.9** There's something on route 50 around Doddridge, though, is there not? Some kind of a—

SR: Now what you're seeing, before you get to—we'll be talking about here again with the disclaimer that I'm not a chemical engineer—cracking. You also have to, before that, you've probably heard about people doing fractionating. So when the natural gas stream comes out, you have to fractionate it into these components, such as ethane, which you then crack. So you have to fractionate it before it goes through the process that is most commonly called cracking.

MK: And what are the emissions involved in doing that?

SR: The emissions? At what point in the chain?

MK: Well at that point where it's being—

CK: Fractionating.

MK: Fractionating.

SR: Okay, well where it's being fractionated—when the product's taken to a plant for fractionation, really what you want is a system that accomplishes all of this as tight with as limited getting out of the pipe because that's your product. You don't want anything getting out of the pipe. You want to have everything as tight, with as much integrity as possible. Because again, that's your product you're running through there, and it's very valuable. It's more valuable when it comes out the other end as a finished product at any place along the stage—not if it's a fugitive emission. I believe that's what you're talking about. There's been a lot of conversation—

MK: Fugitive emission.

SR: Fugitive emission. There has been a lot of conversation and a number of studies done saying we always will have this sort of thing, around this important of an issue. But the fact is, you don't want any excursion out of that pipe. When you drill a well, you want to keep everything

inside that wellbore and nothing from the outside getting into that wellbore other than what you want there. You want that system to have complete integrity.

And the good news is that has been and can continue to be accomplished. I've seen it and I've watched it—the level of sophistication, the level of advancement in materials. And materials, we were talking about your recorder that's 10 years old. It's still working pretty damn well, right? Material signs are so incredibly valuable. We were talking about that's made of titanium. And what you're able to do now with materials is phenomenal. They're getting down and examining aspects of this energy sector down to the nano level. That's a billionth of an inch. That's where they're looking at how can we improve the movement of these molecules that constitute the energy in the product out of these small apertures? How can we better connect the porosity in the permeability that moves the product through that tiny, tiny labyrinth down there inside the rock.

0:38:59.4 The level which they're doing this is phenomenal because the value of it is so high. If we mine coal with a long wall, we can get 100% of the coal saved. You might take a little off the top and the bottom, but you're getting 100% of that energy source out that you then have to process. With natural gas sometimes it may be 30-50% of the molecules that are in there are we getting out. They're getting better every day. But think if we can't, for no more impact, get another 10% out. It's a phenomenal opportunity. And that's what lay before us.

So we want the entire system. We want integrity maintained with that entire system from the beginning of developing the resource until it becomes a product on someone's table or in someone's room. Almost everything you and I are looking at in this room right now has petroleum products in it. We're looking at it all around us.

That's another great thing about natural gas is its versatility. It's not only used as home heating to make electricity, but it's the feeds thought for the chemical sector. We can use it for transportation. It's the number one source of hydrogen in this country, comes from natural gas. So its versatility lends it to so many different markets. And that's why I think you'll continue to see it called upon to do more and more and more because of that versatility and its molecular simplicity—CH₄.

MK: Is all this exciting development occurring within the current structure of laws that were passed in the 1970s to protect our air and water? Or have these laws been rolled back and—

SR: Let me speak to the production side first before we go to the Clean Water Act or Clean Air Act or those other federal acts. In West Virginia there was a special session that was completed in 2011. I think the legislator and the governor did a fantastic job. And it was a hard job they had because there were so many different people. As you may expect, with so many different ideas about how this particular aspect of the work ought to be done or this ought to be done. But they have done a number of things. They have conferred certainty on the system, and I think they've produced a very good product. We have enhanced the transparency now. Transparency is important—to have people to have confidence in a system. They need to be able see it to understand it. Where it's a financial system, which is really hard sometimes to understand with all the complexity of derivatives and so on, or if it's in a regulatory system.

I think West Virginia has done a very good job at getting the rules of it applying to the development of the shale, updated, understood from the law into regulations and put in place. They've done a very good job at that. For instance, with chemical disclosure and hydraulic fracturing fluids, if you go to FracFocus.org—have you been there? When you get a chance, go to FracFocus.org. The groundwater protection council and another entity came together to host and sponsor that site. But after you hydraulically fracture a well, some states require you to go there and to post the chemicals that have been used in the hydraulic fracturing.

It's a good thing to be transparent. Now there is some reserve for those fine and very small situations where there is something that just like we're looking at one of the finest pharmaceutical plants in the world right here, they're built around having to have patents, having to protect trade secrets, but making sure if a trade secret is protected as to what chemical is in that hydraulic fracturing fluid, that those who need to know can know it as soon as they need to know and if there's a medical situation. But that's rare. Most everything now is really out on the table to see is what's in the hydraulic fracturing fluids.

CK: Why's that?

SR: **0:43:34.8** Because of FracFocus.org. You can go see what people use.

CK: You said most states, like—

SR: Oh, yes. We post West Virginia. Folks here do post FracFocus.org.

MK: So on FracFocus.org, you can go and find out all of the—

SR: By well.

MK: By well—all the chemicals that are being used?

SR: Yes, yes. And basically, I think transparency, again, is a wonderfully good—people are much more confident if they understand what's going on. There was some legitimate assertion that some had a value proposition. They had a hydraulic fracturing constituent. It's better than theirs. Therefore, you ought to use my company to hydraulically fracture this well because mine can do a better job. So trade secrets are common in this country—Coca Cola being one that's often compared to—the secret formula. You know what the ingredients are; you don't the secret formula, right? But you know what the ingredients are. That's been one of the comparisons. But as much transparency as we can have, the better.

The companies are taking people on rig tours. I think when people go out and see the sophistication with which this work is done, they're comforted by that. They want to know. They want to understand. And this industry is wide spread and in semi-urban areas. So they're operating and having to do their work in the midst of populated areas. And they're doing it pretty well. But again, you really need—and it takes time—but I compliment a lot of the companies that I've worked with in the past were doing just that—taking the time, taking people out,

showing them what is taking place after. Because once they know, I think they're quite supportive—once they see.

CK: So anybody can go on a company tour?

SR: Well companies do—different companies take a different amount of tours. Number 1—number 1, Carrie, is safety. That has to be first and foremost of everything you do every day. And that means protecting that site from any unapproved entrance to it. You don't want people out there on a site unless somebody is with them.

0:45:56.8 Number 2, these can be done now pretty much without too much impact to the operation. But it does have some impact. People are having to stand down somewhat from their work and put things a bit on idle, if you will, if people want to get too close to the equipment. But with headsets now where you can stand off remotely and still get a good line of sight on the equipment, it can be explained to folks. Most companies when they do take people out do a one-on-one beforehand. There are some fabulous animations that have been created to get you magically underground before this has taken place, so that you can see how it's being done. So then when you go out and see actual equipment, it makes a lot more sense to you.

The companies have been very, very good about doing this. Just like factories take people on tours. But again, they have to do it first and foremost, safety's number 1. And they have to have some respect for the operating process, that they're not too burdening to it. But by and large, they take people out a good bet. And it's really good, especially for policy makers. Then they know what they're trying to make policy about.

MK: Do these average visitors that go on these tours, does it explain to them that there are 5 million gallons of water in the average drilling operation?

SR: Sure.

MK: And that 5 million gallons of water is severely affected by how it's used underground and that much of it remains underground? Is all this about water explained to people?

SR: Most people ask all those questions and much, much more. Let me start off with this and then back into answering your question with some specifics. Water has gotten a lot of attention in terms of the natural gas in the shale industry. It also is one of its best stories. Per million BTU, shale gas only uses a couple gallons of water—per million BTU produced. A lot of other fuel sources, especially things like ethanol, use incredible multiples of that amount of water per BTU. Natural gas is very water conserving. Now what you've heard about is hydraulic fracturing in 5 million gallons. And it could be 3, it could be 5; it varies.

MK: I say it's average.

SR: But 5 is something that you hear commonly reported. Number 1, water is precious and water is expensive. You want to use as little of it as possible when you hydraulically fracture a well. Only within the last 4 or 5 years—maybe a little longer—did the industry finally really conclude,

we can recycle that water and use it again. Now as you said, when water is introduced into the formation, you will get water that comes back out. Some of it will be the water that you put in from hydraulically fracturing the well. And some of it will be naturally occurring formation water that was already there, which will have a very, very high salinity. It's in essence, an ancient ocean.

0:49:22.1 The most important thing is close-looping this. So when that produced water comes back out, you capture it. You can then filter out the solids and sequester those off, take that water you have, blend it with some new fresh water, and hydraulically fracture the next well. So when you have a rhythm down of a large, contiguous lease hold, and you have permits in place—that's why the responsiveness of the permitting system is critical. You have permits in place, and you can drill the well, hydraulically fracture and complete it, capture the produced water, blend it with new, fresh water, and do the next well. When you get that kind of rhythm down, it's incredibly efficient and an effective use of water for producing natural gas.

But again, I've seen quotes of 30, 40 gallons of water per million BTU of energy from coal. Shale gas is about 2 gallons. For ethanol I've seen upwards of thousands of gallons in order to produce a BTU, because you're having to water the plant, so on and so forth—irrigation in order to have the crop. So it's a really good story. One, water and natural gas. And we're blessed in this region of the country with a tremendous amount of water resources. And I learned that I was chair of the interstate commission on the Potomac River Basin in the year 2000, which is 5 states and the District of Columbia and the federal government. And we had responsibility under some cooperative agreements to help manage the Washington area water some supply.

But I learned back then that you really can't do much with 1 side of the watershed. It really has to think about the water resources holistically. So in some places you will have the Susquehanna River Basin Commission. And they've have responsibility for withdrawals and consumptive use. West Virginia, even early on before it was required, the DP had a great program where people were looking at these smaller stream if you took any water out of them.

You need to try and take the water out when they were in higher flow. And then you can build temporary impoundments where you can store the water for hydraulic fracturing and not impair any of the stream flows. The rules are very strict now to avoid any situation where you could draw down water sufficiently to threaten the benthos and the beginning of the life in the stream. We need to be very protective. But we have abundant water resources in the Eastern U.S. — Pennsylvania, West Virginia, Ohio. But again, it's expensive.

Now you can do fracs without water. But water thus far—again, this is a non-engineer here talking—water thus far has been found to be the best medium to carry the proppant in. When you hydraulically fracture the well, you're putting water in under pressure to microscopically fracture open up the shale to liberate the gas molecules. And when the water retreats, you have a proppant—most often sand—that is left in to hold those little apertures open. And to carry that sand in, sometimes you have to amend the quality of the water. That's why they put some material—

MK: Amend?

SR: Amend the quality of water—in other words, to make it a little more viscous so it can carry the sand better. And you might put some biocide in it because you don't want anything growing in the wellbore that's foreign. So there's a number of things like chemicals—the chemicals that are used are really pretty typically really simple, and you want to use as few chemicals as you can because they are expensive. It's not only a good thing to reduce a number. And by focusing on it, companies have really been able to do that. They've greened up the chemicals that they are using, and they found out they can use less of them. They found out we can recycle this water very aggressively. But even with that being said, over a period of time a well will have to be tended. Wells will produce water over the history of its production along with oil or natural gas.

MK: **0:54:05.4** Because the drills have gone down through water tables? Is that what you mean?

SR: Well it's the foundation water, not water tables. The drinking water tables say they're at 800 feet and above—most are above that. The Marcellus is a mile to a mile-and-a-half deep. There's a labyrinth of rocks a mile or more thick before you get down to the shale. We're talking about the water that's down in the shale formation itself that's the water that's really in essence an ancient ocean. That's why it has such high salinity. That's some of the water that's coming back.

MK: It's not just salt, though, that's coming out is it?

SR: Well it's not just salt. I'm just saying the water that does get produced has a high salinity because it is—it could be concentrations even greater than that you might find in an ocean—25,000-30,000 parts per million. So the important thing is should get out of its designated pathway—both while drilling, while hydraulic fracturing, while capturing this produced water, while moving this stuff around. You want everything contained.

You want to think of drilling in the same way that modern surgery was invented. There was a guy at John Hopkins University whose name I can't recall, but a surgeon who was a father of modern surgery. And instead of doing antisepsis—having an infection and then trying to kill it after he did surgery, he did asepsis—prevent. And that's what you want to do when you drill. You want to cordon off the area that you're going to use. You want to make sure you've got it **0:55:40.4** (???) (inaudible). If there's any fluids that get loose—water fluids that get loose, they stay within the pad on the pad. It can be vacuumed up, just like you were doing surgery or like you're at the dentist with a rubber dam. You really have to think about that kind of precision, again, because it's important to do anyway, but we're operating in very tight areas in many ways. It's impressive what these folks are able to accomplish. It really is. Have you been out on site?

MK: No.

SR: You've got to go out on site. I mean it's really—to see the size of this equipment in the small area they have to operate in and how they just so strategically array it is impressive. And the logistical complexity of a supply chain in this industry is phenomenal. That's another thing about economic development. There are so many jobs related to this industry besides just a handful of folks who are really doing the drilling. That's the enabler. There's hundreds of other jobs related to that well.

MK: Truck driving and—

SR: Truck driving and all sorts of different jobs—a whole continuum for people with 4-year and advanced degrees from geophysicists who are taking the most advanced technology to try to designate the geology of where it would be most probably to find a productive well, to folks that want to literally work outside and drive a truck for a living. There's something along that continuum for everybody. But it is a complex, logistical process. And it's one that moves. It's not like you put in the Wal-Mart or a factory. Once it's there, people will accommodate themselves to that infrastructure and traffic patterns.

0:57:30.4 What you're seeing with the energy sector now, especially in the shale, is an operation that moves around continuously in occupied areas. So the willingness of the industry to go the extra step—and that's what I'm seeing them do—go the extra step to be good neighbors, to explain who you are. And if you ask people for their help in understanding, it's just amazing to me how willing they are to give it to you. But you need to talk with them. And I'm seeing the industry do that. I'm glad they are.

CK: In terms of driving in congested, rural areas you're talking about?

SR: I'm talking about not just rural, I'm talking about in areas like where they're operating in near Wheeling. And you're sharing the road and there's a lot of new traffic. So companies have to be very vigilant about making sure that this whole array of contractors that they have are absolutely obedient to the rules, and going beyond courteous, thoughtful about how you treat your neighbors who you're asking them to operate in their backyards. And I'm seeing them do it very well. I'm very impressed with that.

MK: Are you following the events in places like Doddridge County, which is supposed to be very, very rich in wet gas?

SR: Yeah, I'm aware of it. In my previous work—different companies operate in different areas, have different areas of focus, and the previous companies I was with, we didn't have—we weren't drilling in that area. But yes, I do know about the area generally, yeah.

MK: We interviewed the president, I believe, of the county commission there. And he was very vague about where the water was coming from. He says they take it out of the streams and rivers. But we don't have any idea where they take it from or how much they take. I said, "You mean these companies don't pay for the water?" "No," he said, "they just take out." I said, "Doddridge County Commission is going to stand by and let people take millions and millions and millions of gallons of water away from farming and other family uses without any compensation?"

SR: That is an interesting issue that—water rights are very least in the West. There's a much different set of laws developed to govern water rights and use. In some areas—like let's begin up in the northeastern part of the country and work our way down. The Susquehanna River Basin Commission, they govern withdrawals and what's called consumptive use. Now there is a theory to be made. By consumptive use, you use water, and then you're not going to be able to ever use it again. It's lost to the hydrologic cycle. The reality is probably. But natural gas is a net, a

contributor to the hydrologic cycle because when you burn methane, you get CO₂ and water vapor. So theoretically, it may even be a contributor. But they still remain calling it consumptive use. And they govern when a company, where a company can withdraw water. Different states do it in different ways.

In the West, down in the southern most part of Texas—in 5 counties or so down there, and there's even a few more counties now that constitute the Eagle Ford Shale. There are these farmers, these huge ranches down there. Typically the deal they make you is if you lease, you have to drill a water well. You have to drill a water well to get water to do hydraulic fracturing. But then you drill that well completed and leave it behind for the farmer.

MK: Because they need every drop of water.

SR: **1:01:42.2** He needs every drop. So there's been a number of places there where there really has been mutuality. Pennsylvania, I think, has 89,000 stream miles is the way they determine it. There's a number of different calculations how much water we have available. And there's all kinds of concerns now about won't 1 water shed become dryer if we are experiencing climate change? There's a theory that you and I looking here at this drawing here of the Potomac River watershed. If you come over to the high-river water shed, I think most of the consensus is in climate change, it may become wetter. It just depends where you are, but water's precious. You don't want to use anymore of it than you have to.

You want to recycle every bit you possibly can. There's a strong effort to see if there are ways to do effectively with less water and perhaps in some instances no water. There are nitrogen fracs and other constituents that are used to frac a well. But as we talk so far, water has been found to be the most facilitative in moving the proppant into the formation to hold open the fractures.

MK: But this legislative step that was taken in 2011 in West Virginia.

SR: Uh-hunh (affirmative).

MK: And with such effective leadership from the governor's office right on through the legislature, I think you gave it high marks.

SR: I gave it high marks because they had to, as you have to do in the legislative process, they had to really listen. And they went on—the legislature went on a listening tour. There were a number of leaders from the committees that took incredible interest in it. They listened to people. They heard them. Yes, in West Virginia, they want to know where you're talking water from, making sure that you try to take it during times of high flow, that you're not taking it from small streams.

MK: Do you really think that's being monitored?

SR: Yeah, it is being—you can go on—

MK: With as few regulators as we have in West Virginia? That they're paying attention to water?

SR: Well for one—

MK: I didn't get any sense of that from the president of the county commission over there.

SR: **1:04:14.9** Well, that's a view from one person looking at one, distinct set of facts there. But generally, that was a big focus. I'd have to go back and read to quote you in detail precisely how it is working, but I do know even prior to it being a requirement, they had a voluntary system in place where you went out and looked at the stream-flow stats. They have monitors of the route here. They're monitoring stream flow. And you were not to take any water out if the stream was in a certain reading. I believe that is being monitored very closely. And the next thing I would say to you is there is there's a lot of people watching. Remember a lot of this—the development here is not happening in really remote areas. The shale's being developed right now, especially with the focus on the wet gas, in very populated areas.

CK: Like where?

SR: Ohio County, Marshall County, Mon County is getting a good bit of look now. These counties are fairly-well populated. It's the wet-gas region. Because really, you go west of the Mon and up the northern panhandle, and as you mentioned earlier, a few other counties have some wet gas down south of there. But if you look at the DP website, you will see where most of the rigs—I think there's about 30 rigs running in West Virginia right now. Most of them are in the northern part of the state in the panhandle, because that's the wet gas.

I'm just saying, where it's at taking place now is taking place in very populated areas where there's a lot of people watching what's going on. Landowners that are interested in this—I think that the DP has also staffed up—there were provisions for them to add more people onto the DP. You want the rules rigorously enforced. And the companies that are doing the shale are very large, highly capitalized companies. Even the smallest ones, they do not want to jeopardize chancing here or there on something when they have so much at stake. It makes no sense for them to do so. You also, in the industry, don't want anybody else compromising, taking a shortcut, cutting their costs. You want everybody to be obeying the rules.

CK: Is that happening? So there aren't accidents? It's really—

SR: Oh, no. Accidents are one thing, Carrie. Sure, you can always have exceptions. You can certainly have—you can have rules that are violated. I'm just talking about not only the letter of the law, but the spirit of the law. And I think—and I know the great majority of players that are active in this industry in West Virginia. I trust that they are really trying to do this right because it has such a long future to it. This is not a short-term opportunity. And I would submit to you that if things aren't done well and done right, things can be shut down, or they can be shut down without ever getting a chance.

Look at New York—your home state, right? Look at Bradford County, Pennsylvania and those counties that border—New York Broome County. If you take Broome County and Bradford

County that meet, the geology on that boundary is identical. In Bradford County, they are producing massive amounts of wealth. In Broome County, they're not allowed to drill. And it has nothing to do with technical risk—the geology. It has to do with the fact that the decision makers have not been satisfied yet to allow it to occur. So I'm just saying, companies really want to do this well because they want to continue to develop this shale.

I heard a quote—I hope I quote him correctly because I respect him tremendously. Brad Harvey, who's the chairman of the board of CONSOL was on WV's campus here recently. And he said that they would be spending, I think, \$14 billion over the next 10 years on shale play in West Virginia. Now that is an incredible investment to risk. And there's other companies looking at equally sizeable investments. They don't want to take a chance on compromise. This is from a practical, hardcore look. They don't want to take a chance in jeopardizing that by chancing on something here or there. And the water resources we have in this state are plentiful enough that people can do this right. They can do it right individually. They can do it right collectively.

CK: New track.

1:09:16.3 (end of audio A)

MK: **0:00:02.1** Okay.

SR: I'm back. And the plumbing works great.

MK: Well you're on the low, Scott. It's pure gravity from here. (laughter) Yeah, we're all down the stream from somewhere, aren't we?

SR: That used to be a pond over there, by the way.

MK: Uh-hunh (affirmative). I was so shocked and amazed when the BP well blew in the gulf. I had always thought of BP as being a real blue-ribbon company, British company and British capability and all that kind of images of what I had of the company. And I used to enjoy stopping and buying my gas there. I don't buy from BP anymore. But I don't know why I should single BP out.

SR: Where do you buy?

MK: Well, I don't know.

SR: You have to tell me.

CK: The list of no's is longer.

MK: I don't know. We have a Citgo station our town. I don't buy Shell either.

SR: You need to convert to natural gas. It will solve this problem.

MK: Yeah, that's the next step. Thank you. But you're exuding—and I hope with a good basis—you're exuding all this confidence in companies like Chesapeake to do the right thing. And I say a prayer every night for that, that the right prayer will be done somehow. But accidents do happen as we said a minute ago.

SR: You want to take them to an irreducible minimum should be the goal. Here in Morgantown there was a guy named Markham, a doctor—a PhD who started the Safety Management Program here. That's now found under the college of engineering. But he created a worldwide safety institute. And I'd had 3 or 4 classes I took, just 1 at a time while I was working on the railroad. But it always impressed me what he said about safety. And this was really comprehensive. And he said it was safety of humanity, property, and efficacy. And he meant first and foremost keeping people safe. Those who work for you—contractors and the host community in which you operate. I'm just extending this a bit from when I had the class 25 years ago. But then on a property—was talking about not just property on the site, but on the environment.

And his conclusion was if you did both of those 2 things, you would have efficacy. You would have, not just efficiency, but effectiveness. And I'd had 3 or 4 classes I took, just 1 at a time while I was working on the railroad. But it always impressed me what he said about safety. And this was really comprehensive. And he said it was safety of humanity, property, and efficacy. And he meant first and foremost keeping people safe. Those who work for you—contractors and the host community in which you operate. I'm just extending this a bit from when I had the class 25 years ago. But then on a property—was talking about not just property on the site, but on the environment. And his conclusion was if you did both of those 2 things, you would have efficacy. You would have, not just efficiency, but effectiveness. You would have a company that was long-term viable.

0:03:06.7 How people respond to problems when they've had an accident or an incident or an excursion or a violation of a rule, I think is very, very important. And it appears to me now that you mentioned the incident in the Gulf that they're going out and about as hard as they can right now trying to do the right thing. One, to make certain that they determine what caused that situation. What caused it? Just like the people in Japan of Fukushima saying, what caused this? How do we avoid this ever happening here or anyplace else? And that's the kind of information sharing that's critical that the industry have and the regulatory agencies have. And it's important that there are places where regulatory agencies, policy makers, the inventive class, and the industrial class get together and are able to talk and are able to share information. Sure they're going to have valuable trade secrets or patents. But by and large they need to learn from each other so somebody doesn't repeat what happens.

But my confidence is in holistically, overall, as a percentage, I do see the energy sector as being incredibly inventive and resilient as very, very well capitalized. And generally as being in their own light and self-interest directed not just to comply with the letter of the law, but the spirit of the law. We are going to have another 2 billion people on this planet in the not-too-distant future—unless the sun supernovas early. And we are going to have smaller and smaller quarters to operate it. We have billions of people without any electricity. Our job to create enough energy for people and to yet keep using less and less of it per unit of output is critical for the success of this planet. And the energy sector is a huge part of that.

I look back on the work that they they've done today and see the advancement. It's really pretty impressive to see what 1 small well on 1 acre used to do, and what they can do now on 4 acres or 5 acres and drain a square mile or 2 square miles. Phenomenal technology. That's where—my confidence is the technology, the continued pace of innovation, the fact that this country, I believe, is still the best in the world at nurturing, incubating, facilitating, supporting, and letting innovation happen. That's what's critical, is to allow us to keep innovating ways that we can continue to develop energy with less and less impact. So that's where my confidence comes. There will be incidents. There will be problems. How we respond to those, I think is the question.

MK: **0:06:25.3** West Virginia in its 150-year history—151 year? No, it's not quite 1 yet—150-year history has had its reason for being as been to keep the lights burning in this country.

SR: You know, you hear that—yes.

MK: And what has been the reward of people in this state for 150 years of that kind of service and sacrifice? We're at the bottom of the heap. What was the study that you quoted that you found?

CK: The Health and Wellness Index.

MK: The Health and Wellness Index. West Virginia is scraping, bumping along the bottom in all the categories of that.

SR: We have heard so many folks, elected officials—

MK: A third of our children in this state are hungry.

SR: I understand what you're saying.

MK: And it goes on and on and on and on. And we have the symptoms collectively. Now it's not so true around here, maybe, but certainly in the southern part of the state, middle part of the state. We have the symptoms of a population that is suffering from post traumatic stress that is strung out on pain medicine that is—and every day we pick up the paper where we live and another meth lab has been busted. What has been the tradeoff for West Virginia people of these companies who come in here, swaggering into the state with all of the confidence and all of the capital that's needed to further explore and exploit another source of energy?

To me, I've been looking at this as long as you have, maybe through a different lens. But what has been the tradeoff? How have people in this state—native to this state, how have they faired other than maybe a career as a coal miner in a boom and bust economy where they're sometimes working? Historically I'm speaking and sometimes not. But how do you align all of this optimism that—it excites me to hear you say it. I wish I could adopt it as full-scale as you have. How do you rationalize?

SR: Well let me say this—when we first began talking, of my own volition I began to talk about the need in the northern part of the state where we had all this newfound wealth to make certain we did what? Found ways of offering opportunity for that local wealth to be reinvested in our community to build new successive rounds of community and economic development. So I think from that you should probably take that I do share your concern. And I'm seeing an opportunity this time around.

A lot of people—there have been books written called the *Resource Curse*. Hong Kong, Singapore, Japan, Iraq's in the middle of oceans without any natural resources much conventionally, yet to think about, right? Japan's looking now at methane hydrates, and you saw they have 54 nuclear reactors, but they get their uranium from somewhere else. But states that have had all these natural resources, how do they sometimes remain poor? West Virginia should not be over generalized as just 1 thing. We talked about sharing the culture with states on either side of it. Half of our people live in the borders, and there's a much greater different history in the north and the south, southern part of our state. At different times, different parts of the state had to pull a heavier load.

0:10:43.5 Weirton Steel north of here, I think had 14,000 plus people here at one time. Now virtually none. My little hometown of Keyser on the other side of the river, although was West Virginia Pulp and Paper Company, was Luke Mill—the first mill that the Luke brothers had. We had 2400 plus people working there. Now maybe there's 800 and some. Things do change. But the state's not just 1 statistic in that subject you talked about. For instance, although CONSOL, which has been I think a wonderful energy company and a strong corporate citizen and a good corporate citizen, they were chartered first to Maryland. They really grew up in West Virginia, and they grew up just south of Morgantown in this area. It was Harrison County and Marion County in that area, there was the Watson family and the Fleming family was indigenous capital. Capital that was already there that helped develop that company and to the worldwide player they are today.

But it's much different when you have local capital and you already have a diverse economy. You had WVU that was already born her in 1867. You had an agrarian economy that was successful. You had a glass industry in this area. So the coal industry right now mines about as coal in Mon County, West Virginia as they did at the turn of the century and the last turn of the century—a lot fewer mines. But what I'm saying to you was it was not a mono economy. But some places in our state that had great natural resources, be it coal, be it timber, you live in Elkins. I know you know the stories about Henry Gassaway Davis. There was a fabulous book called *Changing the West Virginia Countryside*. It was about the clear cutting in West Virginia. That almost was its correct name.

But the point being, the state was not just a place that was exploited. In some place, people got to participate much more fully in it because they had local capital that was involved. And the northern part of the state looks a lot more like that. And the reason for my optimism is I saw a better situation that I just described in the northern part of the state than what happened in some of our other counties that have any indigenous capital. And this time, especially the wet gas is getting developed in a part of our state that's mature, that has population, has industrial history, that has a lot of other things, plus people are receiving the bonus and royalty as individuals in a

great number of cases. And they, therefore, are now empowered to help address some of these concerns that you've expressed, which are real—which are really, truly real. But I think the money—the lowering of utility bills by the energy abundance that we're now experiencing—and make note of that. Since the 3 of us have been alive, especially you and I, we have always thought of energy as scarcity.

I went on spring break in 1974 and we took gas cans with us. We didn't think we could get gasoline. We've always thought about scarcity. We're now at a time of energy abundance. It's a whole different opportunity to think about addressing what you're talking about. How do we make sure that people get to participate in this? If not as a land owner, a lease holder, or a royalty owner. As somebody that works in the industry, how are we going to make—

0:14:31.6 (end of audio B)

CK: **0:00:00.2** Sorry about that. You were talking about how can people participate—

SR: We were talking about in essence, how do we deal with what people have here to fore, whether it was a number of authors where people generally talk about is a resource curse. How these natural resources and how come people have had all these natural resources seemingly remain impoverished? But that's not the case everywhere. That was my main point. It's not always been the case in West Virginia. It's been much different in some parts of the state than others.

But my optimism in great part stems from the fact that where the shale now is getting the most attention is in a part of our state that is best able, I think, to leverage it because people who live there in great percentage own the mineral themselves and have a lot of control over it. And we have an area that's near Pittsburg. It's in a metropolitan area that means you have the workforce, the sophistication.

You had this whole I-79 quarter to support it from West Virginia where we have a national research center for coal and energy, the National Energy Technology Lab. We have this regional university alliance now, which is Pitt, Penn state, Carnegie Mellon, Virginia Tech, and WVU. We have so many things in our favor this time to take this natural resource and really derive every value-added benefit we can from it, first and foremost for the people who are hosting it. This is the best set of circumstances I think that we've had.

MK: But isn't it ultimately—doesn't that wealth ultimately end up in the pockets of the shareholders of Chesapeake?

SR: Well one, I would prefer that you generalize it to companies. I don't represent Chesapeake now. But generally, publically traded companies—they do make profits and their shareholders enjoy and participate in that. But what I'm talking, before you get to where they share in it, whether it is a dividend or price appreciation of the stock and all of the sale on their part, the first people that get the benefit—or some of the first are those who are lessors.

If I have 100 acres and somebody wants to lease it—and the amount varies over time, but I get a bonus payment per acre that I get to keep if you never drill a well on it. And then if you drill a well, depending on how much of that mineral I own, I get a royalty. I'm just saying we're way in line before the shareholder gets to benefit. And that's only really if they make profit or if they have appreciation of the stock or they pay a dividend.

0:03:01.5 So West Virginia is in good shape this time, including individuals to be first in line to leverage this asset. And then if we can get the value-added things like crackers built in the region—it would be wonderful to have 1 in the state or 2 in the state. Of that I'm hopeful. But even in the region, it'll help us. This is a much different, better set of circumstances this time.

MK: For the people of West Virginia.

SR: For the people of West Virginia. Now I believe that natural gas will be developed in a number of stratas over time across a much wider area of the state. But where it's happening right now is in a pretty good situation. Of all these factors we've enumerated, to not have this area suffer the resource curves, because you've already seen the evidence of them. We've had significant coal mining going on here in this region. But it's within a diverse economy. That's what's healthy—diversification. Our state has begun to diversify.

CK: So like Doddridge you're talking about as a diverse economy?

MK: Well it has the opportunity. You typically need capital. Capitals—you have to have capital. And that's first and foremost the hope for opportunity that there's going to be capital development in Doddridge County. I was just talking first and foremost about the northern panhandle where the largest number of rigs right now are being focused on. But Doddridge is getting a lot of attention—so is Ritchie and so are other counties.

And as the development—typically what happens in natural resources is the first and easiest and best where the technology at that time gets done first. And then they begin to push out the boundaries. So you'll see a lot of development that'll happen that right now may not happen because it's far away from the epicenter, or the technology is not such. But someday it'll be doable. I think this has a long tail to it.

But first and foremost I think where it's happening now has the best of not suffering the resource curse that you described. That is real. It does happen in a number of places. I also think that worldwide, while you have had great successes by countries like Japan and Singapore and Hong Kong—countries that have not had natural resources, that have had to rely on someplace else to get them from—I think we have a much better hand now.

Whether it is an idea that is good or not, the fact that we are able to export natural gas is a complete paradigm shift from where we were 4 years ago. We were building multi-billion dollar capacity to bring natural gas in the form of LNG into the U.S. We're now, by Cove Point, dominion has in Baltimore Harbor to export natural gas. That's a whole paradigm shift.

CK: We're going to release you here soon because you have just been great, making really good cases. You're incredibly articulate. And we probably should have asked at the very beginning what your job is and what the law firm does, just to make sure we catch that really quickly.

SK: Oh, okay. Sure. The Spilman Thomas & Battle is the oldest law firm in the state of West Virginia. And personally it's been law firm since the early '90s. It helped my family sell its family business and buy it back and sell it again. And then when I bought personal property, they've been my attorneys. When I was at one company, Anchor Energy, they were attorneys. At Chesapeake Energy when I was there, from which I retired on August 14th of this year, I hired Spilman Thomas to represent Chesapeake in West Virginia. So I have great in the firm. They're a full-service law firm.

0:07:07.5 One thing that that I am doing is I'm working with some early-stage companies—companies that are just getting started, and helping them think about how to best take care of their comprehensive needs when they first began marketing their product. You should always seek good, legal advice, good accounting advice, good business advice. So we're trying to be supportive and hoping that by doing that, new businesses get successfully started in West Virginia. Spilman's a regional law firm. There's an office in Pittsburg, Harrisburg, Morgantown, Wheeling, one in Roanoke, one in Charlotte.

CK: We could spend the day listening to you. This is very complicated and you really have done a beautiful job.

SR: That's not very—you guys are nice interviewers, but I wasn't very afraid to say whatever I thought. So if I still work for a company—in fact, a couple of times I did interviews and got called in and told, "Next time you're going to read the script."

CK: No, no. You don't need a script.

SR: I said, "No, no. You've got to be honest with people."

MK: You've got to be transparent.

SR: Yeah. Are we still on?

CK: Yeah.

SR: It's interesting. That is a transparency—if you think about selling—we've got these buddies of ours that own a car dealership. And my wife, when she goes down to buy a car, knows as much about that car as he does as a salesman because the information's there. The field is pretty level. And that's what people really want. I do respect the need for some things to be kept private or you eliminate people's incentive to innovate. It's a balance. That's why patents have limits. You can't keep that private. You need to get that for society's benefit out there. But you need to make sure you keep people incented to keep risk in capital and inventing.

Most of the technology transfer in this industry happens pretty quickly. People move around and people learn—they learn what’s working best and then they try—there’s a lot of communication that happens to that. There’s always room for improvement, but the biggest thing that really amazes me is watching them do it in the middle of—not urban areas or rural, but sort of semi-urban areas. They’re densely rural—so one house every couple of miles. And people that—it does change the landscape some. Now hopefully you can minimize it. And that’s the good thing about this. You understand the pad drilling, right?

MK: **0:09:58.2** You explained it very, very well.

SR: This is a square mile, and we put this pad here. And then we go down, we can go out here horizontally. You can go out a mile or 2 miles and drain this. It’s almost like surgery. Now I had a lamina, back surgery in 1978. And they went in, chiseled out the lamina and pulled it over and got the disc and shaved off spurs and all that. Now they go in from the side, microscopically. The wound is so small. Now the difference, I think, with what people are experiencing here, where there is a pad or a well, it’s big. The rig’s big, the pad’s big. But overall, it’s reduced the footprint of getting those BTUs out of the ground by 90%. I took Cindy on a rig. Do you know Cindy?

MK: Uh-hunh (affirmative).

SR: I took Cindy on rig, and that was her observation. She said, “Okay, I understand what you’re telling me. And it’s true. But where you do have, they’re big.” And it used to be that the industry was 2 or 3 days to drill a well, small equipment. It was smaller, more of them, but smaller. And that’s one of the things that—and I’ve heard it said about industrializing. But really the more you can drain from 1 pad, the less that happens. That is the hoped-for scenario. Keep doing more off of 1 place. The same thing with surgery—don’t open up any other wounds if you don’t have to.

MK: Brilliant. Brilliant.

SR: I don’t know about that. You guys were generous coming—

0:11:38.8 (end of audio C)

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