



Art Berman: Crude Oil Special, Parts 1 & 2

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Erik: Joining me next on the program is petroleum geologist Art Berman. Art, you have a blog post that just came out. We have a link to that in our research roundup email for registered users. It's basically explaining how it is that OPEC came with its much awaited announcement, now a nine month extension of their 1.8 million barrel per day production cut, which was designed to bump prices up and of course prices has sold off rather dramatically, in fact, took out the 200 day moving average on that news to the downside. We did see a bounce back up to retest it, and as you and I were speaking on Wednesday morning, we've given up the 200 day again, and we're actually just barely trading on a 47 handle as we speak now, high 47's, just taking out 48 on the last few minutes of Wednesday morning. Art, how's this possible for people who didn't read the full blog post? How come it's doing the opposite of what they predicted it would do?

Art: Erik, I think the issue has to do with fundamental misunderstanding between what the market wants and what OPEC wants. In my view, OPEC is more focused at least for now and has been really since some time, well, early last year on maintaining a floor on prices, and what the market wants is for prices to go up, and so I think the issue is that perhaps you could phrase it as simply, or simplistically, as OPEC is taking the long view, and the market is taking the short view. The other issue that's important is that markets don't always pay attention to fundamentals, but fundamentals tell me, and have been telling me for quite some time that the right price for oil based on supply demand of inventory is \$45, and basically we've been dealing with the, what I call the OPEC expectation premium now for over a year. That sentiment or expectation of what OPEC's cuts or freezes or extensions or whatever are going to do to prices have been inflating them beyond what fundamentals suggest, so to me what's happened is the market expected deeper cuts because it wanted higher prices. OPEC was unwilling to give that gift to its competition, was more concerned about a floor, and after all, I mean prices were \$26 a barrel a little bit over a year ago, and now they're, you know, in the upper \$40's, and so from that perspective, if you're looking at revenues, that kind of looks like success to some people in OPEC looking at

revenue, and so I think it's just a mismatch of expectation, plus the market has been trying to adjust down to \$45 several times here in, just since the beginning of 2017, so we're just going to see more cycles, greater frequency, greater amplitude is my sense.

Erik: You also sent us a fantastic chart book of about 13 slides, and I added four more slides to the end of that just to facilitate some of the questions that I wanted to ask you about. Our registered users can find the link to that download in the research roundup email. For anyone who is not registered yet, we told you earlier in the program how to register and get the download. Let's go ahead and dive into this slide deck that you sent us, Art. What's going here on slide two, what's this telling us?

Art: Yea, slide two is just showing NYMEX futures prices since the beginning of 2016, well actually, you know, back into the last part of '16/early '17, and what it's showing there is that, you know, prices were down around \$45 a barrel. OPEC announced that it was cutting, and that's the inflation that I talk about, and so the prices rose up rather starkly, and you know, found themselves on a plateau, somewhere above \$50 a barrel for a while, and then in February/March, I think that markets began to lose a little bit of confidence that these production cuts were in fact really working, or working as quickly as the market expected, and we saw a big downward trend that I called the February/March deflation on that slide number two down towards \$45, which remember is the threshold that my comparative inventory work tells me is kind of where prices ought to be, not that markets care about that, but, you know, that's just a boundary that I look at. You know, then expectation went back up for a while based on a variety of subjects, and then by, in another month- April/early May, things tried to adjust downward again. We got hopes for this OPEC extension, maybe they're going to make some deeper cuts, prices tried to go up, cuts were not announced, extension was, and prices went down.

So, to me, you know, this is just kind of a rational and repeatable trend of markets first responding to sentiment and going up and then trying to adjust downward to where fundamentals suggest that maybe the prices ought to be.

Erik: And it looks like we're starting to see the formation of a down sloping price channel there just beginning in that February/Mark deflation. Through the current activity, we've got a series of lower lows and lower highs, looks like maybe we're even heading to a lower low. Let's move on to the next chart. You're showing that volatility is coming out of this market as things are stabilizing. You see a \$55 per barrel ceiling and a \$45 floor. Why don't you just give us the rationale on why you see those ceiling and floor levels and what you thing is coming next in terms of where the market trades from here?

Art: Yea Erik, my sense is that we're pretty much range-bound between \$45-\$55. I think, you know, more likely, the downward excursions toward \$45 are going to be short-lived. This market really wants to take every excuse it can find to raise prices, and it's bewildering and confusing because in some weeks there'll be an inventory report that looks real positive, and the market doesn't respond at all, maybe goes down. Other weeks, there's an inventory report that's somewhat positive, and the price goes way up. So, you know we're dealing with a market that has an awful lot of sentiment and expectation built into it, but realistically the \$45 is really floor under which I don't believe that anybody can make any kind of money or maybe even break even, and we can talk about the details of that later, because I know that there's a lot of headline discussion about how shale producers in the US are able to make profits at way below \$40. I don't believe any of that, but again, we'll get to that when we do.

And then the upper ceiling, the \$55, or whatever the right price is, I think is the price at which demand destruction begins. I think it's important to understand that demand is hugely price sensitive these days, and we're dealing with a global economy that's tremendously weakened by debt and almost a decade now of currency devaluation, quantitative easing, all kinds of things, and so we can, what we see is, when prices are low enough, demand for things like gasoline go up impressively, and then we start approaching prices above \$50, and then we become a little bit more questionable, and so, to me, there's an economic limit to what the economy can manage. It looks like \$55, or you know, I don't know what the exact price is, but that's what the market is telling us it is. And then there's a lower limit at which nobody can make any money, and that's a problem for, well, for everybody, and so that's the reason that I see that range, but it's empirical. It's just the way that the fluctuations define themselves, really.

Erik: Moving on to page four, you're touching on a couple of subjects that are extremely interesting to me as an oil trader. I'm going to have more to say about the term structure in particular as we get to slide 14. But for now, why don't you tell us your looking here at the beginning, it looks like, of an unwind, and the net speculative long positions, which is mostly hedge funds betting on the upside of oil. They're starting to sell their positions and give up, but it looks like there's still plenty of room in the sense of how much open interest is there for that selling to continue. So, tell us a little more about both of these slides, and about what you see in both the term structure and the open interest.

Art: Right, so I've learned to be suspicious whenever the long positions start to look, you know, too bullish, I learned just through experience that it's time for prices to fall. That's not necessarily what you read in the Wall Street Journal, but that just seems to be the pattern, so back in February we saw all

time record long term positions. Actually, we saw a double peak that you can see on that left-hand graph in slide number four. And at the time, I wrote, I said, you know, look for prices to go down, because that's what they always do. They went down some, came back up a little, but it, to me, I think that the traders and hedge funds are way ahead of what's really happening in the market, relative to what the headlines say, and those guys seem to have lost patience with OPEC's ability to really manage this market. So, as you said, there's plenty of room farther below. I'm not making any predictions about where that's going to go, but, you know, this is a tendency that started well over a month ago, and I don't see any reason to, you know, we look at it every week, but I don't see any reason for these particular investors to get very bullish until something happens. And, of course, we'll talk about that, but they are an awful lot of reasons to be concerned about more supply than less supply and certainly in the coming months and year or so.

The slide on the right, and I'm no expert on this, and in fact you've taught me a lot about term structure just in our conversations, Erik, and I'm grateful for that, but, you know, what this shows to me is that you see the text that says "November 30th Contango" That was kind of the persistent term structure for quite a while after prices collapsed, that prices are always higher in the future, and then once the OPEC cuts were announced, there was just a whole reordering of those term structures, and we went in to various different forms of flatter futures to stronger backwardations saying that, you know, the near term prices are higher than prices out a year or two years, and this thing seems to go up and down, but what it looks like to me is that, well, there's been a substantial shift, and what it says is that, my perspective is largely or mostly focused on domestic production, and it's just become very hard for domestic producers to make very effective hedges out in the, whatever the one to two year range that they were effectively able to hedge as long as the curve was in Contango, so the good news about this shift is there's cash flow in the near term, and the bad news is that they're kind of stuck for hedging forward, so there's a plus and a minus there, but the minus is, is that you can't lock in better prices in the future.

Erik: Well, I'm going to have plenty more to say on the term structure when we get to slide 14, but for now, I want to continue on your deck here. Let's talk about the reasons for more lower prices on page five.

Art: Right, so the first graph on the left, this shows OPEC plus Russia and Mexico, NOPEC, if you will. This is incremental production that goes back to 2014 or so, and incremental production, all I've done here, I just take the lowest, the production minimum for each one of those countries and subtract it from all of their future production or past production and then add it back in in the base. So, the total production numbers here are the true production numbers, but it allows you to see the fluctuations, and so unknown to, you know, a lot of people, in the public at least is that the elephant in the room

here, is rock, I mean, we hear all the noise about Saudi Arabia and how Iran's production, when sanctions were lifted, came on, but I mean Iraq is the country that has really really ramped up its production, and so that's an important thing to look at. And so the countries that are in the upper part of that graph are the ones that are increasing, and the countries in the lower half are the ones that are decreasing. So, what I see in this is, I mean Iraq is a country that's got a gazillion problems, budgetary not the least of which, and they're fighting a war with ISIS, I mean a war of survival really. They need cash, and I just look at this and say, my goodness, I mean, they've already kind of cheated on their quotas and the quotas haven't been in place very long. What are the odds that Iraq is going to maintain its production cuts, I say low. Iran, I think Iran has probably expanded its production about as much as is capable, without substantial additional investment. Russia is a real wild card, I mean, you know, Russia has joined in this alliance and it wouldn't have happened without Russia, but looking at the graph on the right, what we see is that Russia's supposed cuts are really consistent with just seasonal fluctuations in production. They produce less in the summer months than they do in the winter months, and there's a reason for that, and that's got to do with frozen ground. They can't work on boggy, swampy ground, they wait until it freezes. And if you look at the red curve, which is 2016, you see that their production ramped up dramatically in the winter. So, a cynical take on this would be that Russia's production cuts aren't really cuts at all, they're just following seasonal norms, and once we get into the second half of the year, their production cuts are going to go away. So, you know, there are a lot of things to balance here, and then on the negative side, of course, there's Venezuela, and nobody knows what's going to happen there, but it's not good. On the plus side, Nigeria has fixed a lot of its infrastructure problems. They're paying off the rebels in the Niger delta again, I don't know why they stopped, and so I look for Nigeria production to continue to increase, and it looks like Libya production is increasing. So, on balance, I'd say there's more probability here that OPEC production will not be able to hold, for a variety of reasons. Of course Nigeria, Libya, and Iran are exempted from the production cuts.

Erik: On slide six, you're showing graphs that indicate both US and Chinese imports of OPEC crude oil. Talk to us about that, but particularly I'm curious is you have any opinion on some rumors that I've heard that supposedly Saudi Arabia intends to curtail specifically its exports to the United States, because they're trying to manipulate US stock levels because they figured out that that's what market is watching closely. Do you think there's any truth to that, and how does it fit into the story you're telling on page six here?

Art: Yea, so this comes from an outfit called Clipperdata, and Matt Smith is one of their principals. He comments regularly on fuel fix for anybody that's interested. These guys, they monitor cargos, so they often have a very different view than what the rest of the sketches from sort of monthly EIA,

IEA inventory updates, and what their data is saying is that despite these production cuts, the United States and China, which are, you know, the two biggest oil consuming countries in the world. OPEC's exports to those countries are 10%-13% higher than they were a year ago, so what Matt Smith is saying is that, you can talk about cuts all you want, but until we see reduced cargos, they didn't have any effect. So, the world continues to be well supplied. The counter argument is, well it takes time, you know, it takes time before you get rid of all the floating storage and etc. and, you know, I'm neutral on that. This is something I follow and pay close attention to, but I'm hardly an expert on the timing of all that.

As far as the recently announced Saudi cuts to US, exports to the US, I've got no filter, Erik, to really tell me if that's anything more than purely for press consumption, but here's the problem- the problem is that US domestic production is super super light oil, ok, and US refineries are not engineered for it because remember US production peaked in 1970, and we started importing oil like crazy, and the predominant oil in the world is heavier, so we completely re-engineered all of our refineries for heavier oil, and so now that we're producing a whole bunch of oil, it's super light, and we can't put it directly into our refineries without blending it. So, Saudi oil, as it turns out, is like the perfect oil for US refineries. I mean it is refinery ready, you just dump right in, you know, and probably that was by design. So, when I hear that Saudi is going to cut its exports to the US, my reaction to that is, well, then we're just going to have to get that grade of oil from somewhere else, because we can't refine our own oil without mixing it with heavier oil. And again, this is a wrinkle on the story that most people just don't really even have a clue to. It's not that hard to understand when you think about it, but the whole reason that we repealed the crude oil export ban at the end of 2015 was precisely this issue. The reason that there's a differential spread, if you will, between WTI and Brent is that there's limited, more limited demand for WTI because it's too light to go into most of the refineries in the world, not just in the United States, so, if Saudi really does cut exports to US, we're just going to have to get that grade of oil somewhere else. So, I don't see that as necessarily having much of an effect on US inventories.

Erik: Moving on to slide seven, you're saying production concerns are real. I assume by concerns, you mean the concern that US production is on the rise and that that is contributing to extending the supply cut and offsetting the cuts that OPEC is making. Walk us through the three slides, or the three charts rather than you have here on slide number seven.

Art: So, the concern in question is certainly the amount of the rig counts in the US have gone up dramatically since really mid-September of 2016 when it became clear that OPEC was going to cut production, and so the question that a lot of us have asked is, ok that's great, we're going to drill a lot of wells, but is the service industry really prepared, and I'm talking mostly about the

crews that, you know, that complete the wells, that do the hydraulic fracturing? Are they up to speed, can they actually, you know, take these newly drilled wells and convert them into producing wells? And there's been a lot of concern that that pressure pumping business is really, you know, in great disarray, but what I'm showing here on the first slide on the left, in the first graph on the left in slide seven, these are just the number of well completions, and despite concerns about the personnel, and the state of the fleet of the frack crews, it looks to me like we've ramped up a lot in terms of new producing wells in the three main plays, the Permian Basin, the Eagle Ford shale, and the Bakken shale, so that tells me that, yea, that there's, you know, that the drilling is, in fact, being converted into supply. And so, the concern that US additions will cancel out or maybe even overwhelm OPEC cuts, I think are very real.

The slide on the right is EIA's tally of production up until I think the third red bar is the latest month's data, that's April. And then their forecast going forward, and what their forecast is, is that crude oil is going to increase, and again, that's crudes, not liquids, liquids is going to be a lot more. It's a million barrels a day between the end of '16 and the end of 2017. The other point here though is that the, you know, there's so much discussion about the breakeven price for Permian Basin in particular, but the tide oil plays in general, and the narrative is of course that, ah, you know, we're just so smart here in the United States, we've used efficiency and technology to the point that we've really driven the costs down, and the point is, and you know, I drill wells, that's what I do. I'm not an analyst, I'm not a pundit, and the cost of drilling wells has gone down 40% since the oil price collapsed, so I'm not trying to say that US companies aren't smart, because they are, and I'm not saying that they haven't made gains in both efficiency and technology because they have, but by the far the lion's share of the lowering of breakeven costs is just because the service companies are desperate for work and they deeply discount their costs, and so if the cost of your basic services goes down 40%, duh, your costs are way down.

The other thing is, is that so many of those improvements in efficiency and technology, they're kind of one-off deals, I mean, you know, you can't continue to cut 15% every year, and so for instance the biggest breakthrough was TAD drilling, ok, so you don't have to rig down your drilling rig and move it to the next location, rig it up, and that all takes several days but, you know, they figured out how to drill multiple wells from one location, and that was a big breakthrough and a step forward that probably saved 15%, which is significant, but once everybody converted over to that, the forward gains are maybe 1% a year. So, I think it's important to keep some perspective. You know, we all want to believe that America is great again and that our ingenuity can do anything, but my perspective is this is an old extractive industry, and it cost a lot of money to do stuff out there, and when I read these headlines about how we're driving the price down to almost \$0, I, you

know, maybe the guys I work with are just the dumbest people in the oil and gas business, but we can't do that. So, it's really got to do more with price, and the reality is, is that those service companies can't survive at current prices. Prices have got to go up.

Erik: Well, I think it's very very important, this point that you're making, because the popular narrative that you read in the financial press is that there have been profound improvements in efficiency and they paint a picture that suggest that going forward, you know, the breakevens for US shale production are going to be in the, you know, \$35-\$40 range, and as long as we have oil at those prices, we can just keep on going. What you're really saying is that the breakevens came down to that only because people were forced to fire sale their services at prices that would eventually drive them out of business. They managed to get through that, and they can't stand to do it much longer and that those prices have to go back up. So, that suggests that the breakeven price that everybody in the industry, in the investment industry anyway, seems to think is in a secular downtrend, really it's been a down spike that was artificial that has to mean revert. Am I right about that?

Art: You're absolutely right, and of course, the other component is that for many of these producing companies have laid off tremendous numbers of staff, and so their costs are down. I spent a fair amount of time and I've got a post out there from a month or so ago on this for those that are interested. I went through the annual reports of a number of companies, both shale producers and major oil companies, and what I found was that an awful lot of the reduction in breakeven prices is because companies have written off huge amounts of reserves that are no longer commercial, and at present oil prices, ok, so when you right down reserves, two things happens- the first is, reserves you keep are, they're more productive wells, so the breakeven price on the reserves you keep is lower because your high-grading, ok, but the other thing is, is you're writing down all the equipment costs, you know, the depreciation, and the amortization, and all that stuff on all those wells that are off the books. And so, the headline looks good, but the reality is, is that the reserve base has fallen by 50% or 60% over the last two years, and that's not good for investors. So, as always, there's two sides to every story, and I think that story is clear, and by the way, what I found was, that the breakeven cost for the majors was just about exactly the same as for the supposedly super nimble, innovative, efficient, small independents, and that's not the narrative. The narrative says that, oh those guys are, you know, they're quick and smart and fast, and they can adjust, and the big majors, they're dinosaurs, no! They're all breaking even at \$40 a barrel, so you know, this a function of accounting, is what I'm trying to tell you, Erik.

Erik: The next slide moves on to comparative inventory. I just want to cover for the benefit of any listeners who have not heard your prior MacroVoices

interviews, comparative inventory simply means, as we look at the weekly inventory data, we don't care so much about the absolute number, whether it's a build or a draw on inventory, we care about how that compares to the moving average historically, seasonally adjusted effectively to how that same week of the year over the last four or five years, what we should be expecting and we compare it. So, what are the comparative inventory charts telling you now?

Art: Right, and as you know, I mean, comparative, if I had only one tool to use in trying to figure out price trends and where they're going, this is the one I would use. Obviously I'd like to use more tools and do, but I can't understate the value of this particular technique, which is, if other people use it beyond a couple of us outliers, they never publish it.

So, what I'm showing here, the graph on the left is OECD's, that's the rich countries of the world, including the US, inventories, and the graph on the right is US, basically WTI, and so by cross plotting these, you know, basically the current inventory minus the five year average, and cross plotting that with price on a weekly basis for WTI, and a monthly basis for OECD, you get this yield curve, and it's certainly clarifies and demystifies where these price trends are going, and it also gives you an indicator by where that yield curve crosses the Y axis, that's what we call the mid-cycle price, ok, so that's where the price is going, and so all you need to do is say, well, if everybody thinks we're going to get to \$70 oil or \$65 oil or whatever the analysts say by the end of the year, then it becomes a fairly simple issue to say, ok, great, so how much does comparative inventory have to drop before I get the \$65 on that yield curve? And what I find for both of those, OECD and US, is it has to go down a lot, it has to go down like 130 million barrels, and that's comparative inventory, I mean, just to drop 130 million barrels in absolute inventory is quite a stretch. So, at current withdrawal levels, how long is that going to take? Well, assuming that they just keep on rolling on at the rate they do, they are now, and they won't, that's a year. And to me that's not bad news, I mean, given the absolutely oversized kind of inventories we've gotten around the world, the fact that it might take a year after Saudi or OPEC cuts, that's kind of standard, but somehow the market doesn't see it that way. The market thinks that, ok, now they cut, it's smooth sailing, we're going to be there real soon. Frankly, I mean, I hope we do get there, because it benefits me as someone who drills wells and makes money from producing oil, but I don't see it, Erik, I mean, I think it's going to take at least, and again, you know, then you start looking at what smart people, with sophisticated modeling software, what they forecast the inventories to be over the next 6 months, 12 months, 18 months, and what they're telling us is no, we don't expect to see inventories reducing at the rate that they have been. So the good news, the best news is it's probably going to take at least 9 or 12 or 15 months to get to where we might be able to support \$65 oil. That assumes

the global economy can stand it. The bad news is that we might not get there that quickly either.

Erik: Now, the popular, mainstream media narrative is that boy, this glut of oil, it's been a tough roll here for quite a while, but it's finally over, it's clearly ending, it's got to be the end., but if I look at slide nine, Art, it looks like you're actually projecting glut chapter two comes in 2018. What's going on here?

Art: Yea, that, well, again now we're dealing in the realm of forecasts, and forecasts are always wrong, but you know, again, I think that the forecasts are undoubtedly notionally correct, and so what the slide on the left shows, the graph on the left, this is IEA's forecast of the production minus consumption balance in the world, and what it's showing is that, I mean, as early as next month, you know, you look at where that first downward arrow points and you see a big spike, well, that's May, and so IEO is saying, you know, that the negative market balance that we've been seeing for the last couple of month is going to reverse next month, and we're going to have maybe a million barrels to the positive, and moving forward into 2018, we're going back to like you say, not as much of a glut as we saw in '15, peaking in '15 and declining in '16, but another mini oversupply, that's what IEA forecast based on all the factors that I discussed, you know, Iraq, Iran, Libya, Nigeria, Venezuela, Brazil, etc.

And then the graph on the right is simply again taking IEA's inventory levels for OECD, which is in red, and US, which is in blue, and I can't explain exactly why they think US stocks are going to continue falling, but they have been, so maybe that's reasonable. OECD stocks, which include US, are going to be flat for the rest of the year, and then both are going to increase dramatically in the coming years. So, if we place any credence in these kinds of forecasts, and as I say, I don't believe them, but I think that they're notionally correct at least, 2018 doesn't look too good, and as far as, we're done, we're finally in the clear, and I don't depend solely on this source of data, you know, we'll get to the next slide with quarry research, but those guys do a really good job. I've known the principal down there for quite some time, years, and they're completely independent of IEA, EIA, and they're coming up with pretty much the same view. Again, it doesn't make it right, but that's the way that I have to imagine the future, of course supported by a lot of other trends that I see in the present.

Erik: Well I have some theories of my own as to how the shape of the term structure is being engineered by the people that are setting these expectations. I'll save that for slide 14. Why don't we come back to Macquarie on slide ten. Tell us why you see this financial data basically suggesting, at least in the short term for the next year or two, that we're going to have continued, you know, production strong and prices low.

Art:

Well, I mean I think it has all got to do with two issues- it has got to do with everybody has got to survive in an indebted world, and that means cash flow, and that's companies, national oil companies, little oil companies, and countries. Ok, so there's only so long that we can, I mean, even if we're losing money on each barrel we sell, we've got to have cash flow to service debt and to keep shareholders happy, and to keep our countrymen if we're dealing with developing countries from dying of starvation. So, and then there's capital markets, and you know, the capital markets of the world, the credit markets, and the central bank policies that we've been living with now since the financial crash, they're all geared toward maintaining more production, that's just the trend that we've seen. When interest rates are low, people are willing to put their investments into riskier places, like oil and gas, because they got to have the yield, and again, we see the forward curves that I think are kind of reflecting that.

So, you know, we've looked at all of this, query looks at potential problem countries, I've already mentioned Russia, but Brazil is another country that is in, that's got a ton of new offshore reserves and discoveries that the country is in a terrible problem with corruption, you know, there's riots and demonstrations every day. They've got to put some money out there. The query sees Russia, Brazil, and the US with all our capital markets and our "ra-ra make American great again", etc. These three countries, they see as being the real engines of production growth, no matter what OPEC does, and then OPEC, they say, man, you know, it's good enough that you guys have apparently adhered to the guidelines of the production cuts for six months, but do we believe you can hold this thing together for another nine months? No, we don't.

And then you got, you know, our US President talking about selling off of half of the United States strategic petroleum reserves, which I think is an absolutely awful idea, but regardless of what I think, that puts another 300 million physical barrels out there on the market on top of all this kind of stuff, and I repeat the term structure here only to emphasize that, pick any one of these curves you want, the most optimistic to the most pessimistic, and none of them see prices over \$50 a barrel until sometime out two and a half to three years from now, which doesn't mean it's going to happen that way, obviously, but what we're seeing I think is a coming together of an awful lot of lines of evidence and opinion that all bias you very much toward the low side of price and the high side of production.

Erik:

Well, I think that everything we've discussed so far makes an extremely compelling case, which I agree with very much myself, which is, this thing is not over yet. We're going to continue to see an excess of supply and a depression in prices in oil, but boy, you know, something that it's amazing to me just how market participants are unable, sometimes, to see the forest

through the trees, because I know a view that you and I both agree is that, hey, this thing is not over yet, but it will be over, and boy, if you look at all the capital expenditure, we haven't made, and all of the investment we haven't made, once this glut is clear, once this massive oversupply of stocks has run its course, and we've drawn down those stocks back to historically normal levels, and once we get to the point where we no longer have this, and once, particularly, we get to the point that shale has played out, because shale is not forever, oh boy are we in trouble! So, what is slide 11 telling us about what's eventually coming in terms of a secular reversal in this soft oil market?

Art:

Yea, slide 11, 12 rather, is just summarizing exactly what you just described, and so the first slide, and all three of these come from Bloomberg, by the way. The first one, the dark one on the left shows that our reserve replacement, our oil discoveries, as a world, have been declining markedly since really the 1960's or '70s, and the discoveries that were made in 2016, the slowest level of reserve replacement we've seen since 1947, that's 70 years ago. That's really really serious, and so why is this happening? Well, part of it is we're, as you said, we're just not spending the money, we're not investing in exploration. Of course the shale plays are, you know, they exemplify this. I mean, this is not exploration, I mean, this is field development, ok, it's a known resource, and you look at reserve addition in the tide oil plays, and there aren't any, ok, I mean, there are slight addition, there are field extensions and such like that, and you look at the numbers, you look at the EIA numbers, and tide oil is something like 18 billion barrels. Now, 18 billion barrels kinds of sounds like a lot, but I mean, the US uses more than 5 billion barrels a year, so for people who think that the tide oil is going to keep the US and the world going for decades, we need a whole lot more reserves if that's going to be true. So, we're not finding more reserves. That's a big big problem.

The second slide on the right on the top, the green one, that's oil and gas company return on capital employed, and that's of course part of the reason, a big part of the reason, why the shale plays are so popular, because you go out and you spend money on something out in the deep water gulf of Mexico, and you spend and you spend and you spend and maybe in five years, six years, seven years, you start to see your first revenue come back, well that's terrible return on capital employed. Now, the positive is, is that once you get there, it lasts for a long time, you don't have to spend more money, but the shale plays conversely, you want to spend a few millions dollars and drill one well, you're not committing to a platform, you're not committing to long term costs, and you get the thing drilled in 60 days or 90 days and it's on production, and you've got cash flow coming back the other way- that's the appeal, ok, so, but the lack of the longer term is what keeps driving that down, and then of course, the lower slide on the graph on the right simply shows oil and gas companies stock performance compared to the S&P 500,

and it stinks. And there are reasons for that. So, again, the narrative is, is that we're just tearing them up, particularly here in the United States with all these shale plays, and yet the preponderance of evidence says that well, ok, but we're not finding new reserves, the return on capital employed is at historic lows, and overall the performance of the companies that are engaged in these activities is just not too high. So, tell me again what exactly looks good about this.

So, you boil it all down, and what it says is that when we finally do work through this oversupply, we absolutely will, and by the way, I guess I'm more pessimistic about this than many, I think it's coming in a couple of years, not a decade, and when we do, we're just going to be real tight on supply, and that's going to, we're going to draw down inventories like crazy, and the price is going to spike, and I don't know what it's going to be, but it's going to be big, and it's going to be bad, because the global economy can't take it, it can never take it, when oil prices get up above \$100. This time around, I hate to say it, but we've never been this poorly prepared, as we will be when supply gets tight again, so that's not a very happy thought, but that's where we're going. Of course, there is an opportunity there for investors, if you can call it, right?

Erik: Let's move on to slide 12 and 13. What are they telling us as we get to the rest of your presentation here, Art?

Art: Yea, real quickly, I mean, the graph on the left simply show oil prices in constant, 2017 dollars, and what we see is that we're recovering from second big oil bubble, the first one was 1974-1980, in which supply got tight for a variety of reasons, massive overinvestments in oil and gas, discovered more that we could use, price cratered, we had the depression in the oil and gas business for two decades. Then, the second one beginning in really 1999-2014 interrupted briefly by the financial crisis, second big bubble, so massive overinvestments, massive overproduction, that's why the price collapsed this time.

And the right hand graph simply shows oil price, this is annual, same data as on the left, with GDP, US GDP, and what it shows me is that whenever oil prices get high, GDP goes flat, and when oil prices are low, GDP increases. So, this is why we're having such a hard time recovering from the recession that we experienced, or are probably still experiencing to some extent, because oil prices got too high. And so that's why it's critical that oil prices remain low, because without that, there's no possibility of economic growth.

Erik: And slide 13?

Art: Yea, so 13 is sort of the compliment to that, which is debt and interest rates in the graph on the left, interest rates in blue, and what I'm showing there is

two curves, public debt in red, and all debt, which includes public, corporate, and household, and what that shows me is that so much of what we'd like to think of as the golden years of mostly Reagan and Clinton of economic growth were really an adrenaline rush that was produced by lower oil prices and mostly just tremendous debt, ok, so you can keep growth going if you borrow enough money. At some point, you reach a threshold, where suddenly the debt is no longer productive, and that's when your economy stagnates, and I think that's where we are, and the reason, the compound reason is that we ran out of cheap oil sometime around 2000, and so we think, the world thinks that we solved that problem with unconventional oil and gas, and the problem is, is that unconventional oil and gas is more expensive regardless of your breakeven price that the conventional was, and the graph on the right shows US conventional oil in blue declining, unconventional in orange increasing, and so, something like 60% or more of US production is now unconventional oil of one sort or another, either deep water or tide oil, and tide oil alone is more than half. So, we're deeply committed, and there's no going back to more expensive oil going forwards, so again, that's the way it is, and that's the way it needs to be, but it's problematic, it's problematic for price and for the economy.

Erik:

Well, slide 13 concludes the slide deck that you sent us, Art, but in this case, I had to add a few more, just to facilitate the questions I want to ask you about this, because unlike most of our guests, who are here to entertain our listeners, I actually trade crude oil very actively, so when we get you on the program, it directly affects both my own personal investments and the fund that I manage. So, I'd like to talk more about term structure and get your feedback on a couple of points here. What I'm showing on slide 14 is that if we go back to 2014, the WTI term structure was in a steep backwardation, meaning that each successive delivery contract was priced lower than the one before it, and that was a good deal for Saudi Arabia, because what it meant is that they got paid top dollar for their oil, at the time it was over \$100 a barrel, but the US shale producers that were forced by their banks to hedge their forward production a couple of years out, they had to sell their oil for a 15% or 20% discount below the current spot or front month future's price, in order to lock in those hedges two years out on that curve that you're seeing. Now, by the time we got to February 11th of 2016, which was the low in the oil market, the day that we showed that \$26 low on front month future's contracts. We had reversed that term structure into a steep contango, where each delivery contract was priced considerably higher than the one before it, and what that meant was now Saudi Arabia was taking \$26 for its oil exports, but those shale producers that were hedging their production two years out, they were still able to sell that two year forward contract for above \$40, and that for, in the Permian Basin, at least, that still was above their breakeven prices. So, that was not a great deal for Saudi Arabia.

What's happened now, as we move on to slide 16, is we've gotten to the point where the term structure has completely changed its shape, and my contention is that this is no coincidence or accident. I think it is being engineered by Saudi Arabia. What they're doing with this nine month production cut, is they're forcing the beginning part of that curve up high. They want us to think that the market is tightening later this year, and that's a reason to pay Saudi Arabia higher oil prices. But what they're doing, I believe is, I believe they're intentionally adjusting their messaging to set expectations of a return to higher production next summer in 2018. Why would they do that? Because what it's doing is it's forcing structural backwardation into the curve through 2018 and 2019 on page 16 of the download. That means that even though OPEC is getting top dollar for their oil, the US shale producers that have to hedge their production two years out by selling those futures contracts, they're having to hedge at a much lower price. That makes it harder for US shale producers to get the funding they need to drill their oil wells and that's exactly what OPEC wants, and I contend that OPEC is adjusting their messaging.

Goldman Sachs and also another article I saw on Zero Hedge a couple of weeks ago agreed with my view on this, that it literally, term structure or forward curve engineering on the part of Saudi Arabia through their rhetoric and their messaging, which is creating this term structure. I think this is a gift, Art, to speculative investors who share my view in peak cheap oil, specifically that we're headed toward much much higher oil prices, once this glut clears, and as we've just discussed, the glut is not over yet, it may have another year or two to go.

But if we move on to slide 17, take a look at the 2020 delivery contract, or actually, let me go back for just a minute to slide 15. Everybody thinks, oh boy, look at that \$26 price- that was the buying opportunity of a lifetime. Well, it really wasn't an opportunity to buy crude oil with a long time horizon view at \$26, because if you had bought the front month, you would've had to roll it forward every month, and you would've paid a huge premium to that contango every single month that you rolled the contract forward. If you had instead said, ok, look, I've got a long time horizon, I'm going to buy the 2020 contract so that I can buy it and hold it and cash it in as we get closer to its expiry date in 2020, well you would've had to buy it between \$45-\$50, not nearly at the \$26 level that the front month was trading at.

So, moving back to slide 17, let's look at that December 2020 delivery contract. This chart shows the price action just for the single month, December of 2020 contract. Now, when we hit that low on February 11th of 2016, where the front month traded at \$26, we never saw less than \$46 on the 2020 December contract.

Well, look at where we're at now on the right side of the chart, we're almost back to that same level, front month prices are about twice as high as they were then, but you're still getting almost the same buying opportunity, and I think we're going to head to a new lower low below \$46 as a result of Saudi Arabia's efforts to force the market into backwardation in order to cause the effect that they want. If that's true, I think it's a godsend for long-term speculative investors who want to buy on the long side of crude oil futures, but we don't want to buy the front month, because we've got a view that it's going to go up in the next two weeks, we want to buy long dated futures, because we believe the price is going to go dramatically up over the next five years. If you want to do that, either by buying the futures outright, you have to be careful because there's fairly thin liquidity in these long dated contracts, or perhaps a better strategy is buying call options on those long dated futures contracts. If you want to do that, it looks to me like Saudi Arabia is about to give us a gift horse here, by forcing the curve into backwardation. Now, the thing is, Art, if that's your view, and it's very much my view, and I'm very very much looking forward to accumulating a large position in long dated futures and call options on long dated futures, if that's your view, you've got to get the timing at least approximately right. So, is 2020 far enough out, or maybe the glut won't have cleared by then, it seems to me we've got to first draw down inventory, then as shale wraps up in reaction to price, that's going to keep the price down for a while, until eventually the shale operators have kind of blown their wad, the US is drilled up like Swiss cheese, and we've run out of production capacity to grow our production in the US. Does that point really come before 2020, or are we out to 2025? Where do you think the right place to be playing the long term speculative investment in the peak cheap oil upside, long play is going to come, what year do you think we should be targeting?

Art: That's a great and very difficult question to answer, but let me approach it at least qualitatively. My sense is that we've got three important shale plays, tidal oil play in the US, the Bakken, the Eagle Ford, and the Permian, and it seems pretty clear to me that the Bakken and the Eagle Ford are really pretty much done in terms of growth, ok, they've both declined quite a bit. The narrative is well, that's because of price, and as soon as the price comes back, they'll go back to drilling. Now, I've got a post out there on the Bakken that has a lot of very compelling information that says, no, we've reached optimum infill spacing based on gas/oil ratios, water production, etc, and yea, you can drill a lot more wells, but you're not accessing more reserves, ok, you're just accelerating rates, and so what that means, is yea, you might be able to move daily production higher, but probably never going to reach max levels again, and it's going to decline like crazy after that.

So, basically my view is that over the next year and a half, the realization that the Bakken and the Eagle Ford are really done in terms of growth, now don't misunderstand me, they're going to continue producing long tail for a long

time, they're not done, but they're done for growth, ok, so that puts the entire burden of US production growth on the Permian basin, and I think that by 2020, it's going to be pretty darn clear, ok the Bakken is gone, the Eagle Ford is gone, and we're going to start seeing the hair on the Permian basin, and the hair on the Permian basin is water production, that already, the water cut, the percentage of water divided by the sum of water plus oil is upwards to 85%, ok. Now for people that don't pay attention to oil and gas on a regular basis, you might say, well so what, and the so what is a big, because first of all, disposing of the water is expensive, but more importantly, the issue there is that, you know, you drive around in your car on interstates, and you see pump jacks, ok, and those pump jacks, that's what you do when you start to lose reservoir energy, when the gas goes away, you put a conventional reservoir on a pump, and you can suck more oil out of it. We're talking about shales here, ok, that if you can do that, nobody has successfully done it yet because the rock isn't good enough, and you put a pump on it, and all you do is you produce the fractures that you've already swept, and so, when you run out of reservoir energy, all you got left is water, which costs a ton of money to dispose of, so what I'm saying is, is that I think that by 2020, it's going to be obvious that the Permian cannot cover for the failure, the decline in the other tide oil plays, and then what? And then what? And the answer is, I don't know, but I don't see any other tide oil plays on the horizon that are going to come and fill the void.

So, we're not going to be out of oil, we may not be in the serious problem yet by 2020, but I think the writing will be so plainly on the wall that there's an impending problem, that the price is going to go up. I think that's what you're looking for, Erik.

Erik: Well, I can't thank you enough for another fantastic interview, Art. We went considerably over our usual time budget, but I didn't want to shut you down, because it was really worth it.

Very quickly, in closing, Artberman.com is where people can find your blog. Folks, you're crazy not to subscribe to Art Berman's blog. It is free, the content is excellent, and if you have any interest at all in the oil market, go to Artberman.com, sign up and register your email for the free blog there. Very briefly, Art, before we have to go, for our institutional listeners, tell them what else you do at Labyrinth Consulting.

Art: I'm just a consultant, and I'm available and have a lot clients who want me to tell them about value, value of leases, value of companies in their portfolio. I can give you a bottoms up look of what their reserves are really worth and what their real breakeven price is based on objective information as opposed to headlines.

Erik:

Art, I can't thank you enough for another fantastic interview. We are going to have to leave it there. Patrick Ceresna and I will be back, and we'll be joined by Kevin Muir, the author of the very popular Macro tourist blog as we discuss what we discussed with Art, as well as some of Kevin's analysis on China's role in the crude oil market. That's all coming up as MacroVoices continues right here at Macrovoices.com