Natural Gas Liquids (NGL) Contract Terms

What You Should Care About

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Overview

The focus of this article is on NGL production from the Appalachian Basin and, more specifically, the Marcellus and Utica Shale formations. It’s reasonable to ask, in view of the implied question in this article’s title – what you should care about when it comes to NGL contract terms, “Why should I care about NGL contract terms?” I assume, if you’re reading this, that you already have a pretty good idea about why you should care about NGL contract terms. But until fairly recently — starting around 2009, if you were practicing oil and gas law in the Eastern United States, it’s a fair bet that NGL contract terms were not something you were dealing with on a regular, or even occasional, basis. This article covers a few preliminaries before addressing the specifics of NGL contracts, such as what natural gas liquids are; why natural gas liquids contracts have become relevant; where natural gas liquids come from; how natural gas liquids get from the well to the pipeline, truck, tank car, barge or ship; what regulations impact the processing and transportation of NGLs; and what kinds of agreements are used to get natural gas liquids from the well to the various modes of transport and, ultimately, to market. These subjects are covered because they have a bearing on NGL contracts. If you already have a handle on those things, then skip ahead to Paragraph G for a discussion of specific contract terms.
Why talk about natural gas liquids?

The growth of NGL production in the Appalachian Basin has been geometric – and that follows in part, but not directly, from the geometric increase in natural gas production, which has grown from less than 2 billion cubic feet/day (Bcf/d) before 2010, to about 20 Bcf/d now, or a nearly 10-fold increase in six to seven years. Until recently, NGLs were a byproduct of gas production – often considered a nuisance and something to be gotten rid of. NGLs were first extracted from natural gas at Dominion’s Hastings plant, then operated by Dominion’s subsidiary, Hope Gas Company. Hope teamed up with the University of Pittsburgh in the early 1900s and figured out how to extract propane and butane from the natural gas stream – and more importantly, how to market the NGLs to the steel industry. The advantage of this was that extracting the NGLs from the gas stream made the gas less volatile and rendered its heat content more stable, while at the same time resulted in profitable NGL byproducts. And that’s the same advantage we have today; but in just the past few years, NGLs have gone from being a niche market in the basin, to driving a huge investment in infrastructure: pipelines, processing plants, fractionation plants, investments in refineries, and, most recently – with Shell’s announced construction of an ethane cracker in Beaver County, Pennsylvania – the likely renaissance of a petrochemical industry in the Appalachian Basin.

Until recently though, natural gas producers generally preferred finding and producing dry gas – that is, natural gas with little or no NGL content. Dry gas, after minimal field processing to knock out water, sand, gunk and grit, can be delivered directly into a pipeline for delivery to market. Dry gas has the desirable quality of having a consistent and predictable heat content – typically around a million British thermal units\(^1\) per 1,000 cubic feet of gas. Wet gas, on the other hand, is “hot” – it has a higher Btu content than dry gas. That might sound like a good thing – and it is, at the upstream and midstream end of the market. But it is not at all a good thing at the downstream end of the market; that is, close to the burner tip. For the residential and commercial markets, consistent, predictable heat content is important. Put simply, we want the pilot lights in our stoves and under our water heaters to remain little flames, and not the three-foot torches they would become if untreated wet gas were being delivered to our homes and businesses. So interstate pipelines that deliver the gas from the midstream to the downstream markets have heat standards, and will not accept gas into their systems unless that gas has a narrow band of heat variability from a little below a million Btus per thousand cubic feet to a little above.

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\(^{1}\) A British thermal unit, or Btu, is the amount of energy required to raise one pound of water by one degree Fahrenheit.
The natural gas boom in the Appalachian Basin, depending on how you measure the start, began in the 2006 – 2009 time frame. Since then, the natural gas production industry has been a victim of its own success. There has been a steep learning curve and the industry is now getting a lot more gas for every dollar invested in a well than it did when Marcellus production first began in earnest. So much so, in fact, that supply and demand are out of balance, with supply outstripping demand and a corresponding collapse in natural gas prices. Nowhere is this more true than in the Appalachian Basin, where the pipeline infrastructure was sized to handle the much lower volume legacy production, and was largely devoted to moving gas around the region or to moving gas from the Southwestern United States to and through the region to the Northeast, in large part to support heating season demand. Now, the midstream and interstate pipeline industry is devoting enormous capital, both financial and intellectual, to designing, engineering and building pipeline infrastructure to move gas out of the region in every direction, including the Southwest. Ultimately, this likely will yield good returns for the pipeline industry and its upstream and downstream customers. But there is a lag, and that lag has led to sustained and historically low prices for Appalachian Basin natural gas.

As prices for natural gas collapsed, natural gas liquids production became more attractive, because NGL prices were tied, albeit loosely in some cases, to oil. And oil was selling for more than $100 a barrel. So, the market went from NGLs being a byproduct of natural gas production, to natural gas being a byproduct of NGL production. But there are some unique challenges to producing NGLs in the Appalachian Basin – some of which can be and are being addressed; but some, such as the lack of NGL storage capacity, will continue to be difficulties to be worked around if they cannot be overcome.

Pipeline infrastructure, gas processing capacity and fractionation capacity in the Appalachian Basin was all woefully inadequate to handle the massive volumes of NGLs ready to come on line, but the industry has responded and much of that infrastructure is now in place, with more to come.
What are NGLs?

NGLs are natural gas liquids, and that’s where the confusion starts, because the substances that are actually in liquid form when they come out of the well are generally not natural gas liquids. They are field condensates — typically natural gasoline and very light oils. Natural gas liquids, on the other hand, are gasses when they are at atmospheric pressure. They include ethane, propane, butane, isobutane and pentane. References to specific NGLs are often abbreviated based on the number of carbon atoms in the molecule for that NGL, with ethane being referred to as C2, propane as C3, butane as C4, and pentane as C5. Methane is C1. Pentane and heavier liquids are also referred to as natural gasoline.

Natural gas, like oil, is not a uniform substance in its natural state. Oil, for example, can range from light crude, what most U.S. production is, to very heavy, almost tar-like crude. In fact, some of the field condensate being produced in the Appalachian Basin is being piped to Alberta to be used as a diluent to help the oil produced from tar sands in Alberta flow in pipelines.

Some natural gas production is dry, some is wet, and some is wetter still, and some is so wet that it is dissolved in oil. The consistency of natural gas depends on how old it is. Typically, oil is relatively young compared with natural gas, and wet gas is younger than dry gas.

References to wet gas are references to natural gas containing a blend of NGLs in an amount sufficient to require that the natural gas stream be processed to strip out the NGLs to make the gas “pipeline quality” gas; that is, gas with a heat content that is in a range acceptable to the pipeline. The blend of NGLs can vary from location to location. In the Appalachian Basin, as much as 70 percent of the blend is likely to be ethane.
Getting NGLs to Market

Gathering, Processing and Fractionating

In order to get NGLs to market, the natural gas production must first be gathered, meaning transported from the well to a natural gas processing plant. At the processing plant, the natural gas is processed, by cooling and pressurizing the gas to the point where the NGLs actually become liquid – a blend of NGLs called “raw make” or “y grade.” The processing separates the NGLs from the gas stream, and the processed gas, referred to as “residue gas,” is delivered into a pipeline at the tailgate of the processing plant. The raw make blend of NGLs is then sent to a fractionation plant, which may be co-located with the processing plant or at a separate location.

At the fractionation plant, the raw make is fractionated into “purity products”\(^2\) of ethane, propane, butane, and pentane, which are then marketed and transported from the fractionation plant.

Ethane – a special case

Typically, ethane makes up nearly half (or more) of the raw make. Purity ethane may be extracted from the raw make at the processing plant so that the raw make, without the ethane, can be transported by means other than a pipeline to another location for fractionation into its constituent parts. Ethane (like natural gas) cannot be transported overland economically except by pipeline, and the same is true for raw make with a high ethane content.

Generally, the producer of the wet gas retains title to both the residue gas and the raw make, and sells the residue gas at the tail gate of the processing plant (or further downstream), and exchanges the raw make for purity products, which may or may not be marketed by the gas processor for the producer’s account. If the wet gas has a high ethane component, the producer or the processor (depending on the contract terms) may elect to “reject” some or all of the ethane. “Rejecting” ethane means blending it with the residue gas stream. There is a limit to how much ethane can be rejected, and that limit is based on the downstream pipeline’s heat content standard. If too much ethane is blended with the residue gas, then the residue gas will be too hot (meaning, the Btu content of the residue gas is too high) to meet the downstream pipeline’s heat content standards. If the ethane is not “rejected,” then it will be “recovered,” which means it will be extracted from the raw make as a purity product where it may be sold, either as a purity product or blended with propane. The decision to reject or recover ethane is mostly driven by price, within the limitations of the downstream pipeline’s heat content

\(^2\) References to a “purity” product are references to specific natural gas liquid constituents – ethane, propane and butane – usually with a purity of 90 percent or more.
standards. If natural gas prices are high, relative to the price of ethane or ethane/propane blends, then it pays to reject as much ethane as possible, thus increasing the Btu content of the residue gas.\textsuperscript{3} If natural gas prices are low relative to the price that ethane will garner, then it pays to recover the ethane. In addition, it is less expensive to reject ethane than to recover it, so the cost of ethane recovery factors into the equation, as does the cost of transporting ethane – or whether the means to transport, i.e., an ethane pipeline, is available. To date, the incentive in the Appalachian Basin has been to reject as much ethane as possible; but there is so much ethane in the wet gas stream that substantial ethane recovery has been unavoidable.

One reason ethane presents more issues than other NGLs is because there is currently no market for ethane in the Eastern United States, and the only practical use for ethane is as a feedstock for steam cracker plants to make plastic\textsuperscript{4}. Recovered ethane in the Appalachian Basin must be transported by pipeline out of the region. There are currently three options in Pennsylvania for ethane transport: the Sunoco Mariner East pipeline to the Marcus Hook terminal in Philadelphia, through which ethane is being delivered for shipment to Europe; the Sunoco Mariner West pipeline, through which ethane is being delivered to Sarnia, Ontario, for use in the NOVA Chemicals and Imperial cracker plants; and the Enterprise ATEX\textsuperscript{5} pipeline, through which ethane is being delivered to Mont Belvieu, Texas, the epicenter of the North American NGL market.\textsuperscript{6}

Of course, the recently announced Shell cracker plant, being built in Beaver County, Pennsylvania, along with other likely chemical plants, will substantially change that picture, and there could well be a robust ethane market in the Eastern United States within the next several years.

\textsuperscript{3} Natural gas is usually sold based on its heat content measured in units called dekatherms (dth). One dth equals one million British thermal units (MMBtu).

\textsuperscript{4} A few projects are underway to use ethane, blended with natural gas, for electric power generation; but for all practical purposes, the markets for ethane are at a distance from the source.

\textsuperscript{5} Appalachia to Texas

\textsuperscript{6} Ethane cannot be economically stored in tanks – it is stored in underground salt caverns. Most ethane is stored in salt caverns in Mont Belvieu, Texas.
Regulatory Framework

Regulations on transporting gas and liquids can play a significant role in structuring contracts for gathering, processing, and fractionating wet gas and NGLs.

Gas gathering is, for the most part, not subject to federal regulation under the Natural Gas Act, but it is subject to varying levels of state regulation. Historically, in the Appalachian Basin, gas gathering systems were low pressure, small diameter systems – and sometimes poorly maintained and operated. The gathering systems being built and operated in the Basin now are high pressure, large diameter systems, and are owned and operated by large, well-capitalized and sophisticated companies. Except for some types of gathering in rural areas, gas gathering is subject to the federal pipeline safety regulations, which, for intrastate gathering systems, are usually administered by the applicable state agency.

Gas processing plants and fractionation plants are not subject to FERC regulation unless they are owned by an interstate pipeline, which is one reason, among others, why gas processing plants are usually not owned by interstate pipelines.

Interstate gas pipelines and liquids pipelines (both intrastate and interstate) are regulated by FERC. The details of FERC regulation are beyond the scope of this article, but it is important to bear in mind that gas pipelines and liquids pipelines are subject to separate, and in some ways significantly different, regulatory frameworks.

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7 Unless the gathering system is interstate, in which case it would be subject to FERC regulation under the Natural Gas Act.

8 49 CFR 192, et seq.

9 Interstate gas pipelines are regulated by FERC under the Natural Gas Act of 1938, as amended. Both interstate and intrastate ethane and other NGL pipelines are regulated under the Interstate Commerce Act of 1887, as amended. One significant distinction, in addition to the varying regulatory reach under the two acts, is that natural gas pipelines, under FERC regulations, are subject to the shipper-must-have-title rule, which requires that the shipper (the person buying transportation capacity on the pipeline) must own the gas being transported by the pipeline. The rule has important implications for negotiating the agreements necessary to get wet gas from the well to the market. Failure to abide by the rule can result in significant penalties. The same rule does not apply to liquids pipelines.
Types of NGL Agreements

Although various types of processing agreements are described in this section, keep in mind that processing agreements can include a blend of the different kinds of agreements described in this section.

**Keep Whole Agreements**
Under a keep whole agreement, the processor retains the raw make in return for making the producer whole on a Btu basis by delivering additional natural gas to add to the residue gas at the tail gate of the processing plant (or elsewhere). Keep Whole Agreements offer upside potential and downside risk for the processor. The processor is exposed to the risk that NGL prices will go down and that natural gas prices will go up. In addition, the processor needs to lock in long term gas supply in order to be assured of having supplies available to keep the producer whole. On the other hand, the Keep Whole Agreements give the processor upside potential if liquids prices increase and gas prices decrease. Of course, the risk to the producer is just the opposite. Both parties would likely hedge their risks.

**Percent of Proceeds (POP)/Percent of Liquids (POL) Agreements**
Under a POP Agreement, the processor sells the raw make or purity products fractionated from the raw make and pays a percentage of the proceeds to the producer, keeping the balance as compensation (or partial compensation) for processing the producer’s gas.

Under a POL Agreement, the processor takes title to a percentage of the NGLs and markets them for its own account. A POL Agreement can complicate the producer’s calculation of royalties and both types of agreement expose the processor to commodities price risk and upside.

These agreements are frequently backed with an offtake agreement between the processor and a third party that needs NGLs as a feedstock, which can diminish the commodity price risk and upside.

**Volumetric Fee Agreements**
Under a volumetric fee agreement the processor is paid a fee, or an assortment of fees, on a volumetric basis, to process the producer’s gas. The processor has no direct commodity exposure in a volumetric fee agreement and no commodity upside. The upside for a processor under a volumetric fee agreement is to maximize volume throughput. In my

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10 While the processor has no direct commodity exposure, it is, of course exposed to the financial stability of its customers. Some recent bankruptcy cases have called into question whether dedications of acreage or gas are covenants running with the land or merely contracts that can be rejected in bankruptcy. That issue is beyond the scope of this article, but is an important consideration when negotiating dedication provisions.
experience, these are by far the most common form of processing agreements and will be the focus of the discussion on agreement terms, although that discussion is relevant as well to Keep Whole, POP and POL agreements.

It is often the case that the gas processing company is also in the business of providing gas gathering services, either on its own or through an affiliate, and it is not unusual for a gas gathering agreement and a processing agreement to be combined. Nor is it unusual for the agreement to be negotiated in anticipation of constructing a gathering system and processing plant, so parts of these agreements often have the flavor of an engineering, procurement and construction contract.
Legal Issues in Gas Processing and Related Agreements

In addition to legal issues common in other agreements, such as assignment rights, limitations on liability, warranties, indemnities and so forth, there are issues that are particularly relevant in natural gas gathering, processing and fractionation agreements. Here are some of them:

**Dedication**

These agreements frequently require that the producer “dedicate” acreage to the processor, meaning that the producer agrees that all of the producer’s production from a specified area will be delivered into the gathering system or to the processing plant, and most likely, both. A number of issues come up in negotiating the terms of the dedication. Important issues include term and termination of the dedication, release from the dedication, and assignment of the acreage subject to the dedication.

Usually, the dedication is for the term of the processing agreement.\(^{11}\) Processing agreements tend to be long term agreements, with a term from 15 or more years to a term that runs for the life of the wells.\(^{12}\) There are some commonly negotiated dedication releases that provide for releasing free gas owed to the lessor and gas used by the producer for field operations from the dedication. Dedications that run with the land – and nearly all dedication provisions have language to that effect\(^{13}\) – by their nature follow an assignment to a third party of the producer’s working interest to a third party. Usually the producer wants the right to assign its working interest in the acreage without the processor’s consent, while the processor worries about the working interest assignee’s creditworthiness.

**Pressure**

Maintaining pressures in pipeline systems using compressor engines is expensive. The pressure in the gathering system or at the processing plant must be low enough to permit the producer’s gas to flow from the

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\(^{11}\) For ease of drafting and reading, I am going to refer to processing agreements for the rest of this article, but the same concepts apply to gathering and fractionation agreements, which are often linked with the processing agreement and may all be part of the same agreement.

\(^{12}\) Life of the well agreements generally provide that the agreement will remain in effect until the last producing well in the dedicated area is no longer producing in commercially paying quantities.

\(^{13}\) But, as noted in FN 10, whether the dedication is a real property interest or a contract right can be an issue if the producer is in bankruptcy.
well line into the gathering system or from gathering system into the processing plant and high enough for the gas to flow from the gathering system or at the tail gate of the processing plant to flow into a high pressure natural gas transmission line. Usually the burden is on the gatherer/processor to maintain pressures that allows the producer’s gas to be received at the receipt points and delivered at the delivery points. An issue that is often heavily negotiated in gathering agreements is the remedy for the producer if the gatherer fails to maintain the agreed upon pressures. These can range from the producer’s right to terminate the agreement to a reduced gathering fee or relief from a minimum fee to be paid regardless of volumes delivered while the pressures are out of range.

**Volume Commitment**

Under a volumetric agreement, the producer is usually required to pay for a minimum monthly volume of gas to be delivered to the receipt points, regardless of whether that volume is actually delivered. This provides some certainty regarding the processor’s revenue stream, which is often necessary for the gatherer to obtain the financing to build the processing plant. Aside from the obvious interest in both parties in negotiating the most favorable volume amount and fee, there is often significant negotiation about the consequences of events of force majeure on the processor’s ability to provide service under the contract. The processor will push for the minimum volume fee to be paid regardless of whether an event of force majeure is preventing the processor from processing the producer’s gas while the producer may argue for a release from the dedication if the suspension of service lasts for more than a specified period. It is common for the parties to agree on a “banking” mechanism whereby the producer will be obligated to pay the minimum volume fee (or perhaps a reduced fee) when the processor is not performing due to an event of force majeure, while the producer has a right to “bank” credits during that time to be used during some specified future time if, for example, the producer is unable to deliver the minimum volume due to an event of force majeure or planned system outage that prevents the producer from delivering the minimum volume to the receipt points.

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14 “Receipt Point” and “Delivery Point” are often defined terms in these agreements with the Receipt Point being those locations where gas enters the gathering system or processing plant and the Delivery Point usually being the location or locations where gas is delivered into an interstate transmission line. In a processing agreement, there is usually only one Delivery Point for the residue gas and that point is at the tail gate of the processing plant into an interstate transmission line.

15 Termination of the agreement is often not a practical remedy for the producer because there may be no other gathering system or processing plant available to economically take the producer’s gas.
LAUF & Fuel
The gatherer’s and processor’s16 obligation is to deliver to the delivery point the volume of gas, measured in increments of a thousand cubic feet17 or the equivalent heat content measured in dekatherms, net of lost and unaccounted for (“LAUF”) gas or gas consumed as fuel, that the producer delivered at the receipt points. Producer’s usually want to impose an upper limit on the amount of LAUF and fuel gas that can be netted out of what the gatherer or processor is obligated to the receipt points, while the gatherer and processor wants the opposite, because usually they are being compensated based on volumes accepted at the receipt point and not on volumes delivered at the delivery point18.

Capital recovery
The gatherer typically wants an “out” from obligations to build the gathering system out to the producer’s well pad if doing so would be uneconomic.19 Likewise, the producer wants release from the dedication20 or right to build out to the gathering system coupled with a reduced gathering fee for gas flowing through the producer’s build out to the gathering system for some period of time to give producer a return on its capital.

Capacity
Closely related to capital recovery issues are capacity issues. Will the capacity provided to the producer be firm or interruptible? All gathering systems and processing plants have limited capacity - they cannot transport or process an infinite volume of gas. Producers with firm capacity are guaranteed a specified volume on the system or in the plant, with priority over producers with interruptible service when capacity is curtailed due to outages for maintenance and force majeure events. Usually the producer and processor agree to a specified capacity that will be firm and volumes in excess of the agreed upon firm capacity are handled on an interruptible basis. Capacity needs change over time and that can pose significant complications. The producer almost always

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16 Of course, in the case of a processor, the liquids processed out of the gas will also be netted out of the residue gas to be delivered at the tailgate of the processing plant.

17 Abbreviated as “MCF”.

18 Although, in processing and fractionation agreements there are usually a number of other fees based on whether ethane is rejected or recovered and other services performed by the processor.

19 A gatherer wants the flexibility to decide whether or not to commit capital to build outs based on whether the anticipated volume from the well pad will generate a gathering fee sufficient over some reasonable time to give the gatherer a reasonable return on its capital.

20 Bear in mind that a release from the dedication may not be an adequate remedy for the producer if there is not other gathering system or processing plant available to take the producer’s gas economically.
needs increasing capacity during the first years of the contract term, as it drills more wells and production volume increases, and decreasing capacity in the later years of the contract term, when all the wells in a dedication area have been drilled and production starts to decline. The gatherer and producer, on the other hand, want throughput to be at maximum capacity. The issue is usually resolved with fee arrangements that may result in discounted fees to the producer as capacity grows. This issue can more easily be successfully navigated if there are other producers in the area that can add their production to the system or plant and that give the gatherer and processor the ability to scale up over time and then achieve something approaching full capacity.

**Other important, but less heavily negotiated issues**
In my experience, the following issues, while important, are less heavily negotiated.

**Gas Quality**
Gas quality specifications are always included in gathering and processing agreements. Generally, these are not controversial, but one important point is determining who will pay for field processing to dehydrate the gas and ensure that it is free of grit and other foreign substances that could damage the gathering system or processing plant. Usually the burden is on the producer to deliver “spec gas”.21

**Metering and Measurement**
The gatherer or processor is most likely to be the party in control of meters and other measuring devices (including devices that measure heat content, when that is relevant). However, the producer will have rights to be present when verification and testing procedures are done on the meters and may want to negotiate rights to install check meters to verify the accuracy of the other party’s meters. The metering and measurement section of the agreement will also include provisions for “truing up” measurements when there is a period of time when the metering was inaccurate. For the last several years, most metering and measurement sections provide for real time web-based access for both parties to the measurements being taken by the meters. Meters and other measurement devices are installed at the receipt points and delivery points.

**Allocations**
If more than one producer is delivering gas into a gathering system or processing plant, than the gas will be commingled and the agreements need to provide for an appropriate method for allocating the gas, including LAUF and fuel, so that each producer is allocated its proportionate share of LAUF and fuel and so that each producer is allocated appropriate credit for product delivered at the delivery points. These provisions

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21 Gas meeting the quality specifications of the agreement.
can be complicated, particularly when heat content is a factor, but they generally are not controversial.
Conclusion

NGL-related infrastructure will continue to expand in the Appalachian Basin, and the need by oil and gas producers and midstream companies alike for legal counsel, and guidance on reaching agreements for developing and using that infrastructure, will only grow. It is usually the case that the midstream company has more leverage than the producer in NGL agreement negotiations, but a solid understanding of the needs and motivations of both sides will help in negotiating creative solutions and sound incentives for fair agreements that meet both parties’ needs.
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