

**INTER-OFFICE COMMUNICATION**

**PS Memo 97-4**

TO: CP and OP Permit Engineers  
FROM: Jim King and Dennis Myers  
DATE: ~~May 28, 1997~~ **Revised October 20, 1997**  
RE: NSPS KKK Guidance

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This memo is intended to resolve two issues related to Subpart KKK: 1) distinguish between gas plant and compressor stations in terms of KKK applicability, 2) at gas plants, discuss the issue of modifications/reconstruction that triggers KKK applicability for a process unit or compressor. The information used to develop this memo is from the January 20, 1984 Proposed rule as well as the June 24, 1985 Final Rule (attached). In general, KKK covers all compressors and groups of valves, pumps, pressure relief devices, flanges and connectors, and open-ended lines in VOC service or in Wet Gas service.

**Definition of a Gas Plant**

The rule is being promulgated under the provisions of 40 CFR 60.17 (amended in the 1/8/82 FR) which provides a prioritized list of source categories to be regulated under section 111 of the Clean Air Act. The category of "Crude Oil & Natural Gas Production" ranked 29th out of 59 source categories. This category covers 1) exploring for crude oil and natural gas products, 2) drilling for the products, 3) removing the products from underground, and 4) processing the products for distribution to refineries and gas pipelines. After some additional discussion, the Preamble goes on to say:

Equipment used in crude oil and natural gas production (not to be confused with natural gas processing) are widely dispersed over large areas. The analysis presented in the Background Information Document for the principal control techniques (leak detection and repair work practices) for equipment leaks of VOC is not appropriate for widely dispersed equipment....Thus, the proposed standards do not apply to equipment associated with crude oil and natural gas production. The proposed standards apply only to equipment located at onshore natural gas processing plants."

A Natural Gas Processing Plant (gas plant) is defined as:

"any processing site engaged in the separation of natural gas liquids from field gas (feedstock gas entering the natural gas plant), fractionation of mixed natural gas liquids (the hydrocarbons, such as ethane, propane, butane, and pentane that are extracted from field gas) to natural gas products, or both"

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For KKK applicability determinations, the basic question is whether or not the facility is producing condensate or Natural Gas Liquids (NGL). Subpart KKK defines NGL as follows:

NGL

Hydrocarbon liquids such as ethane, propane, butane, and pentane that are extracted from field gas which are only in a liquid state when under pressure.

Subpart Ka defines Condensate as follows:

Condensate

Hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature or pressure, or both, and remains liquid at standard conditions.

From the Petroleum Industry perspective, what EPA defines as NGL is actually Liquefied Petroleum Gases (LPG). Frick's Petroleum Production Handbook, Vol II shows that NGL can be subdivided into three categories:

Condensate

Consists primarily of low vapor pressure products recoverable by ordinary field separator equipment in the same manner a crude oil.

Natural Gasoline

Consists primarily of intermediate vapor pressure products which are recoverable by special separator equipment or gasoline plants.

Liquefied Petroleum Gases (LPG)

Consists primarily of high vapor pressure products such as butane, propane, and ethane which are recoverable in specially equipped gasoline plants and which can be maintained in the liquid phase only under substantial pressure.

For KKK applicability determinations, only if products meeting Frick's definition of LPG are produced at a gas processing facility should the facility be considered a "gas plant" subject to KKK. Note that if a facility/site contains a discrete set of equipment that makes up a gas plant as well as other gas processing equipment that the entire facility/site is considered to be a gas plant.

**Modification/Reconstruction Issues**

In order to trigger KKK via a modification or reconstruction, there must be a modification or reconstruction of an *affected facility* (as opposed to a Process Unit)

Affected facilities for KKK purposes can be either 1) each gas plant compressor in VOC or Wet Gas service, or 2) all equipment (other than compressors) in VOC or Wet Gas service within a "process unit".

#### Process Unit

Equipment assembled for the separation of natural gas liquids from field gas, the fractionation of the liquids into natural gas products, or other operations associated with the processing of natural gas products. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.

The 1984 preamble states that a Process Unit has discrete boundaries that consist of the point where process fluid enters from the preceding natural gas processing activity and where the treated process fluid is discharged to storage or for further processing. For example, if a separation train takes in field gas, discharges a product gas stream and a natural gas liquids stream, and the liquids stream is sent to a fractionation train, the separation train and the fractionation train are two separate process units.

#### In VOC Service

The piece of equipment contains or contacts process fluid for which the percent VOC content can reasonably be expected to be greater than 10% by weight (see exact definition in 60.632(f)).

#### In Wet Gas Service

The piece of equipment contains or contacts the field gas before the extraction step in the process (60.632(f)). The VOC content is not taken into account (6/24/85 FR, page 26123).

To determine whether or not a compressor or process unit as defined above is modified or reconstructed, the methodology set forth in 40 CFR 60.14 and 40 CFR 60.15 should be followed to determine whether or not KKK applicability is triggered.

The determination of whether or not a modification has taken place would be based on the emissions of the individual compressor or process unit and not the entire facility.

The determination of whether or not reconstruction has taken place would be based on whether or not the cost of replacement exceeded 50% of the cost of a new compressor or process unit and not the cost of an entire new facility. Note that in the preamble to the Final Rule EPA stated that they had provided an alternative procedure for determining "capital expenditures" used in the analysis of whether a modification has occurred under the provisions of 40 CFR 60.14. Since the alternative approach is not contained in the Preamble or the Rule, it is assumed to be in Part b of the Background Information Document (BID). The Division does not possess a copy of this document. Should this calculation be needed, a copy of the BID can be obtained from the Region 8 library. Also note that if an existing compressor cannot be technologically or

economically retrofitted, then the compressor would not be required to comply with the standards (1/20/84 FR, page 2642).

The reality of the above discussion is that if any compressor in VOC or Wet Gas service located at a pre-1984 gas plant is replaced, it will become an affected facility subject to KKK because of the reconstruction rules. Note that "reciprocating compressors" as defined in KKK that are in VOC/wet gas service are exempt from the compressor control requirements of 60.482-3 (Subpart VV), but are still subject to sections 60.482-1(a, b, and d), 60.482-2, 60.482 - (4-10); 60.485; 60.486; and 60.487 of Subpart VV.

For a Process Unit located at a pre-1984 gas plant, the modification/reconstruction analyses will have to be performed. If KKK is triggered for the affected facility which makes up the process unit, KKK applies only to that particular process unit, not the entire facility and not any compressors in VOC/wet gas service located within that process unit.

For example, if the gas plant has two compressor engines in wet gas/VOC service and one process unit that is fed gas by the engines, there are three affected facilities at that gas plant. Modification or reconstruction of any of the affected facilities triggers KKK for that affected facility only, not the entire process unit.

Alternately, if the gas plant has two compressor engines in wet gas/VOC service and one process unit that is fed gas by the engines but contains two refrigeration compressors that are not in wet gas/VOC service, there are still only three affected facilities at that gas plant. Since the (refrigeration) compressors are not considered to be part of the process unit and are not affected units, modification or reconstruction of one of them would not trigger KKK for either the compressors or the process unit.

Note that modification/reconstruction of compressors or Process Units in VOC or Wet Gas service that are not located at a Gas Plant as defined above do not trigger KKK. The only possible scenario that could trigger KKK at an existing natural gas processing facility that does not meet the definition of a Gas Plant is if equipment was added to the site which would produce NGL, thereby changing the facility into a Gas Plant.