

I. Background

On December 1, 2004, the TCEQ adopted revisions to the State Implementation Plan (SIP) for the eight-county Houston/Galveston/Brazoria ozone nonattainment area (HGB). HGB is comprised of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties. The subject SIP revisions include amendments to previously adopted rules requiring reductions in emissions of highly reactive volatile organic compounds (HRVOC) from four key industrial source types:

- fugitives
- flares
- process vents
- cooling towers

For purposes of this guidance, the HRVOC of concern are:

- ethylene
- propylene
- all isomers of butene
- 1,3-butadiene

The 2004 SIP revisions incorporate a dual approach to achieving the necessary HRVOC reductions by addressing:

- variable short-term emissions through a not-to-exceed hourly emission limit; and
- steady-state and routine emissions through an annual cap.

To provide flexibility in complying with the annual cap on HRVOC emissions, and to allow for continued economic growth, the TCEQ also adopted the HECT program for the affected area. This program, codified as Division 6 of 30 TAC Chapter 101, Subchapter H, will serve as the mechanism for compliance with the annual cap on HRVOC emissions from flares, process vents, and cooling towers.

II. Applicability

The HECT program applies to each site located in the HGB area that is subject to the HRVOC control requirements of Chapter 115, Subchapter H, Division 1 or 2 and has the potential to emit (PTE), as defined in 30 TAC §116.12(15), more than ten tons per year (tpy) of HRVOC from all covered facilities. For the purposes of the HECT program, covered facilities include flares, process vents, and cooling towers that emit HRVOC and that are located at a site subject to Chapter 115, Subchapter H. Sites that have a collective PTE of ten tpy or less of

HRVOC from all covered facilities at the site are exempt from the HECT program. Accordingly, sites should calculate the PTE for each identified covered facility at the site, then sum the PTE for all covered facilities for comparison to the ten tpy exemption level. In calculating HRVOC PTE, all routine emissions activities, including routine maintenance, should be included. Emission events covered under §101.201 should not be included in the calculation of HRVOC PTE. For determining applicability of the HECT program to a site, its HRVOC PTE from all covered facilities should be compared to the ten tpy exemption level for each year of operation beginning with calendar year 2000. If at any time the site's PTE exceeds ten tpy, the site shall be subject to the HECT program.

Based on modeling analysis, the commission has also determined that subject sites located in Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, and Waller counties are exempt from the otherwise applicable short-term and annual cap requirements. Sites in these seven counties are required to set enforceable limits on HRVOC emissions from covered facilities and are still required to certify their HRVOC level of activity. The exemption for these seven counties is subject to revocation pending the results of ongoing evaluations of the consistency of this exemption with the HGB attainment demonstration and the need for additional short-term and annual limitations on those sites.

- Vent gas streams, flares, and cooling tower heat exchange systems exempt from the control requirements of 30 TAC Chapter 115, Subchapter H, Division 1 or 2 will not be subject to this division; processes and equipment exempt from HECT certification requirements are not included in the HECT program and should not be considered in the LOA estimate.
- The newly adopted 30 TAC §101.392(b) provides an “opt-in” mechanism for sites exempted from Division 6 requirements (based on a PTE HRVOC of 10 tons per year or less). Sites otherwise subject to the program, but with PTE no greater than this threshold, may voluntarily participate in the certification process, with the understanding that the “once in, always in” rule applies (30 TAC § 101.391). Once established, however, whether by straightforward applicability or by the “opt-in” route, participation is mandatory and a facility may not modify itself out of it. Voluntary entry to the program may be established by notifying the executive director in writing, along with submitting certification of the HRVOC level of activity for the site, no later than April 30, 2005.

III. Level of Activity Certification and Submittal Requirements

As defined in 30 TAC§ 101.390(7), **level of activity** is “*the amount of highly-reactive volatile organic compounds, as defined in 30 TAC §115.10 of this title, in pounds produced as an intermediate, by-product, or final product or used by a process unit during a given period of time, but excluding any recycled highly-reactive volatile organic compounds internal to the process unit.*” In accordance with 30 TAC § 101.401, sites subject to the HECT program must certify their historical LOA by submitting Form ECT-3H (Level of Activity Certification), with its completed Attachment A (Producer, Consumer, Separations Units) or Attachment B (Storage and Loading Units) to the agency's Emissions Banking and Trading Program. All sites subject to the HECT program must submit their certifications no later than April 30, 2005. In addition, storage or loading sites must also notify the commission of their intent to receive an allocation from the 10% set-aside no later than January 30, 2005. This notification may be accomplished by the site’s submittal of a signed letter to the Emissions Banking and Trading Program, stating its intent to receive allowances from the 10% set-aside. For purposes of establishing enforceable limits on HRVOC emissions pursuant to the requirements of 30 TAC §101.401(e), applicants should also submit a completed Form APD-CERT (Certification of Emission Limits). Enforceability of HRVOC emissions may also be established by initiating or providing documentation of other appropriate permitting actions (e.g., demonstrate representation of HRVOC in most recent permit amendment, etc.).

- Historical activity for each subject process unit may be certified on the basis of any consecutive twelve months within the 2000 through 2004 calendar year period. For purposes of the HECT program, LOA is to be expressed in terms of HRVOC throughput capacity (lbs., MM lbs., or tons per year for producer, consumer or separation units; bbl. or turnovers per year for storage and loading units) for the various designated process units which “see” these materials in their respective operations. Process unit category descriptions and LOA determination guidelines (see next two sections) should be consulted for additional guidance in process unit designation and development of the throughput capacity for each designated unit.
- After estimating this capacity for all designated process units at a site, a summation of the overall site capacity should be performed. It is essential that values represented in the Level of Activity Certification, Form ECT-3H are an accurate account of a site's HRVOC throughput during the time period for which it is being reported. These values will be the basis for determining the allocation of allowances within the HECT program.

- LOA submittals for each process unit must also include:
 - verifiable documentation (e.g., auditable financial, sales or production records, etc.) of process unit throughput;
 - an overall simplified block flow diagram and a brief text description to designate the site's individual process units and to illustrate their process relationships to each other;
 - a simplified block flow diagram for each designated HRVOC process unit that details the HRVOC process streams that either enter or exit the boundary of the designated process unit. This diagram should also illustrate how flowrates and material speciation for each of those HRVOC-containing streams will be verified (e.g., flow meter number, stream analytical data summaries, etc. - see Form ECT-3H for examples); and
 - HRVOC speciation and respective amounts for the process streams of interest.

IV. Process Unit Categories

The following categories of the various process units that produce, use, store or load HRVOC, and that are subject to the HECT program, should be considered together with the subsequent guidelines (see next section) in the development of the site's HRVOC throughput estimates:

Producer Units	Produce one or more HRVOC as an intended product, co-product or by- product.
Consumer Units	Consume or use one or more HRVOC as a feed or raw material which becomes chemically changed in the production of another product.
Separation Units	Provide purification, distillation or other separation unit operations with one or more HRVOC in the feed to the unit
Storage Units	Provide storage of materials containing one or more HRVOCs; materials may be either process feed raw materials OR products, co-products, or by-products associated with inventory management. For LOA determination purposes, this designation is reserved for storage units at sites that do not operate producer, consumer or separation units. Storage of HRVOC-containing materials that serve only as a QA/QC purpose (run-down, prover, verification, and/or day tanks) should be considered a part of the producer or consumer process unit with which it is associated, and not as a separate storage process unit.
Loading Units	Provide loading of materials containing one or more HRVOCs; materials may be in the products, co-products, or by-products for sale to customers at the same or a different site. For LOA determination purposes, this designation is reserved for loading units at sites that do not operate producer, consumer or separation units. Container types for which these units provide loading operations may include tank railcars, tank trucks, barges, ships, or other containers.

General Guidelines for LOA Determinations

- Any 12-consecutive month period in the 5-year (2000-2004) window may be used for each individually defined process unit.

- The “process unit” definition is as established in 30 TAC §115.10. In defining process units at a site, a single process unit should consist of the smallest collection of all process equipment and operations necessary to achieve the overall objective of the process. For example, an ethylene plant consisting of pyrolysis, compression, refrigeration, and separation processes should be defined as one process unit.
- “Producer” units may count only the HRVOC content of the product/co-product/by-product streams leaving the defined process unit (may not include feed/raw material streams).
- “Consumer” units may count only the HRVOC content of the feed/raw material streams entering the defined process unit (may not include product/co-product/by-product streams).
- Separation units that use one or more HRVOCs in their feedstreams may count EITHER (but not both) the HRVOC content of exiting (preferred) OR entering streams.
- Process units that use one or more HRVOC in their feedstreams but that generate (as product/co-product/by-product) one or more different HRVOC not initially contained in the feedstream may count EITHER (but not both) feed OR generated HRVOCs.
- Storage and loading units owned, operated, or located separately from producer, user, or separation unit sites with dedicated storage and loading units will receive their allocations from the 10% of total set-aside amount (345.14 tpy maximum).
- LOA submittals for each process unit should include verifiable documentation (e.g., auditable financial, sales or production records) of process unit throughput.
- Representative data collected during the selected 12-month window may be submitted to provide the speciation and quantification required for HRVOC LOA certification submittals. If this preferred data is not available, alternative information may include: representative process modeling results for the period, minimum contract or specification requirements for specific HRVOC (for product, by-product, or co-product streams ONLY), Material Safety Data Sheets for compounds which include specific HRVOC, material balances (required when the previously described alternatives are not available or do not otherwise provide adequate throughput estimates), and process engineering knowledge (acceptable only when none of the previously described alternatives is available; applicants must provide satisfactory justification for the use of this alternative).
- When determining the HRVOC mass of a feed or exit stream, the percent content of each HRVOC species should be applied to the tenth of a percent. Percent HRVOC content should be rounded up to the nearest tenth of a percent if 0.05% or greater. For example, to quantify the HRVOC mass of a stream containing 34.45% propylene, a value of 34.5% should be applied to the total mass of the stream in calculating the mass of the propylene fraction.

- HRVOC content of recycle streams internal to individual process units may not be counted. Some process units, however, may have recovery processes that are external to the central process; the HRVOC content of these external processes may be counted.
- Process information may be submitted under confidential cover as necessary.
- LOA determination strategies for unique situations not otherwise adequately addressed by these ground rules may be considered on a case-by-case basis.

Additional Guidance for Specific Industry Sectors

Refineries

Process Unit Designation

- Refinery operations include a complex network of many processing units, some of which produce materials containing HRVOC. Refinery process units that produce materials containing HRVOC include catalytic crackers and thermal cokers. Refinery process units that receive streams containing HRVOC and either use or produce HRVOC include alkylation units, MTBE units and propylene concentrators. A process flow diagram indicating typical refinery units and their process relationships is provided. Depicted streams may not all or always contain HRVOC. Applicants are responsible for final determinations and representations regarding HRVOC content in refinery process streams.

Basis of LOA

- Where HRVOCs are only concentrated or separated by a process, only the material used or the material produced should be used to establish level of activity. Where HRVOCs are consumed and/or altered in a process, the LOA can be based on either incoming or produced streams as long as the same HRVOC material is not counted on both ends. The LOA for each process unit that produces or handles HRVOC material should be established separately, and then aggregated for the overall site.

Units of Measure for Submitted Throughput Estimate

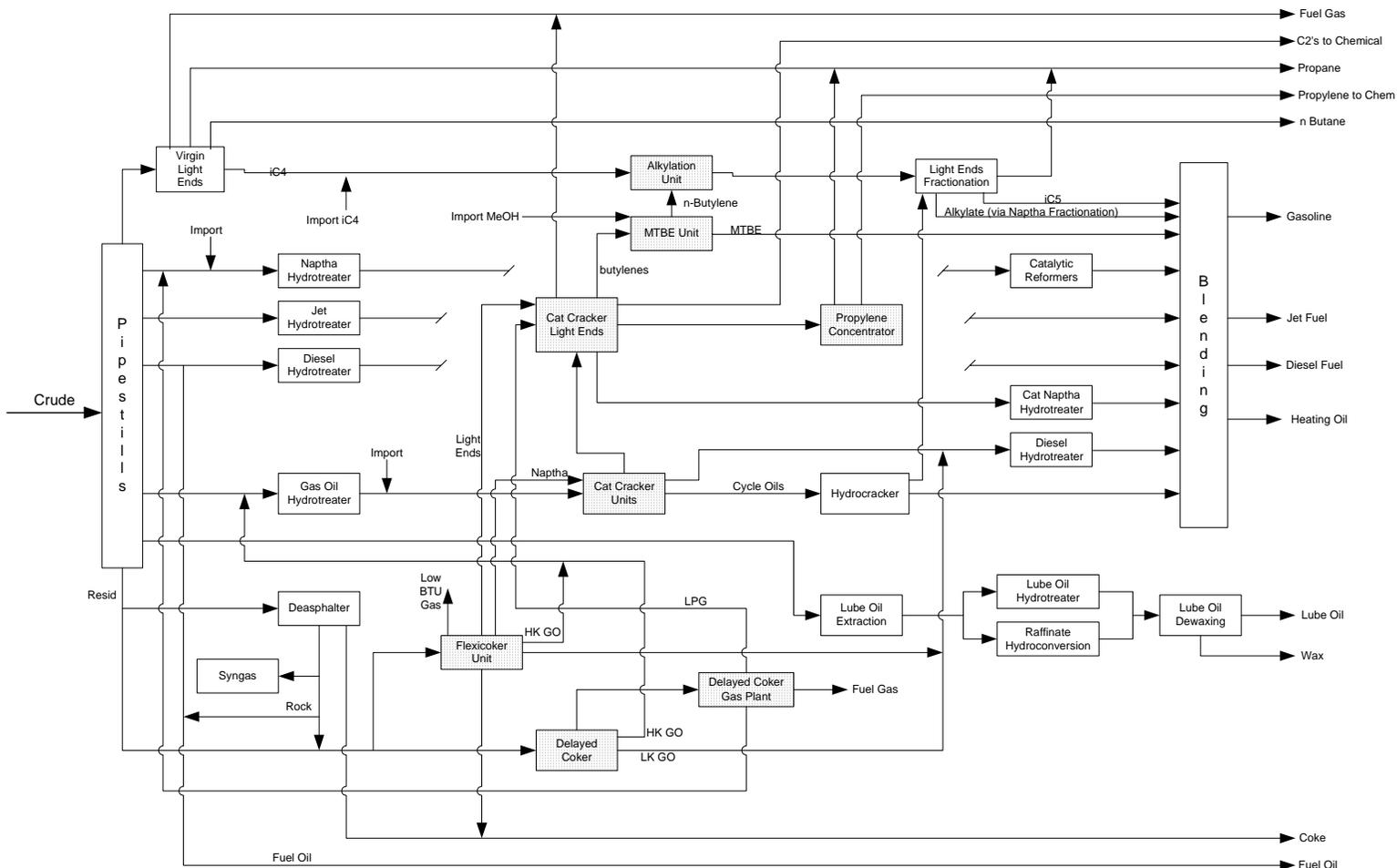
- as appropriate, pounds-, million pounds-, or tons per year

Supporting Documentation for HRVOC Content and LOA

- If available, analytical process data should be used to specify and quantify HRVOC content and flowrates of the feed or exit streams. If this data is not available, process simulation information may be used and should be supported by stream sampling where possible. The LOA reported for each facility must be validated with supporting documentation such as monitoring, test, or process simulation data,

usage and/or production records, etc. All supporting data may be

Simplified Typical Refinery Process Diagram



Note: For simplicity, gas treating, sulfur recovery, hydrogen collection/distribution, sour water stripping, etc are not shown.

Refinery units and relationships may vary and all process units shown may not exist in all refinery operations.

submitted as Confidential Business Information.

Chemical Manufacturing

Process Unit Designation

Various examples of chemical manufacturing processes that use HRVOC (i.e., “consumer processes”) are provided in the following list*:

Ethylene + benzene (catalytic reaction) = ethylbenzene
Ethylene + oxygen (catalytic reaction) = ethylene oxide
Ethylene + oxygen + acetic acid (catalytic reaction) = vinyl acetate
Ethylene + chlorine (catalytic reaction) = ethylene dichloride
Ethylene (catalytic reaction) = ethanol
Propylene (catalytic reaction) = isopropyl alcohol
Propylene + other reactants = propylene oxide (three different processes)
Propylene + benzene = cumene
Propylene + ammonia (catalytic reaction) = acrylonitrile
Propylene + oxygen (catalytic reaction) = acrylic acid
Butadiene + styrene = SBR
Butadiene + styrene + acrylonitrile = ABS

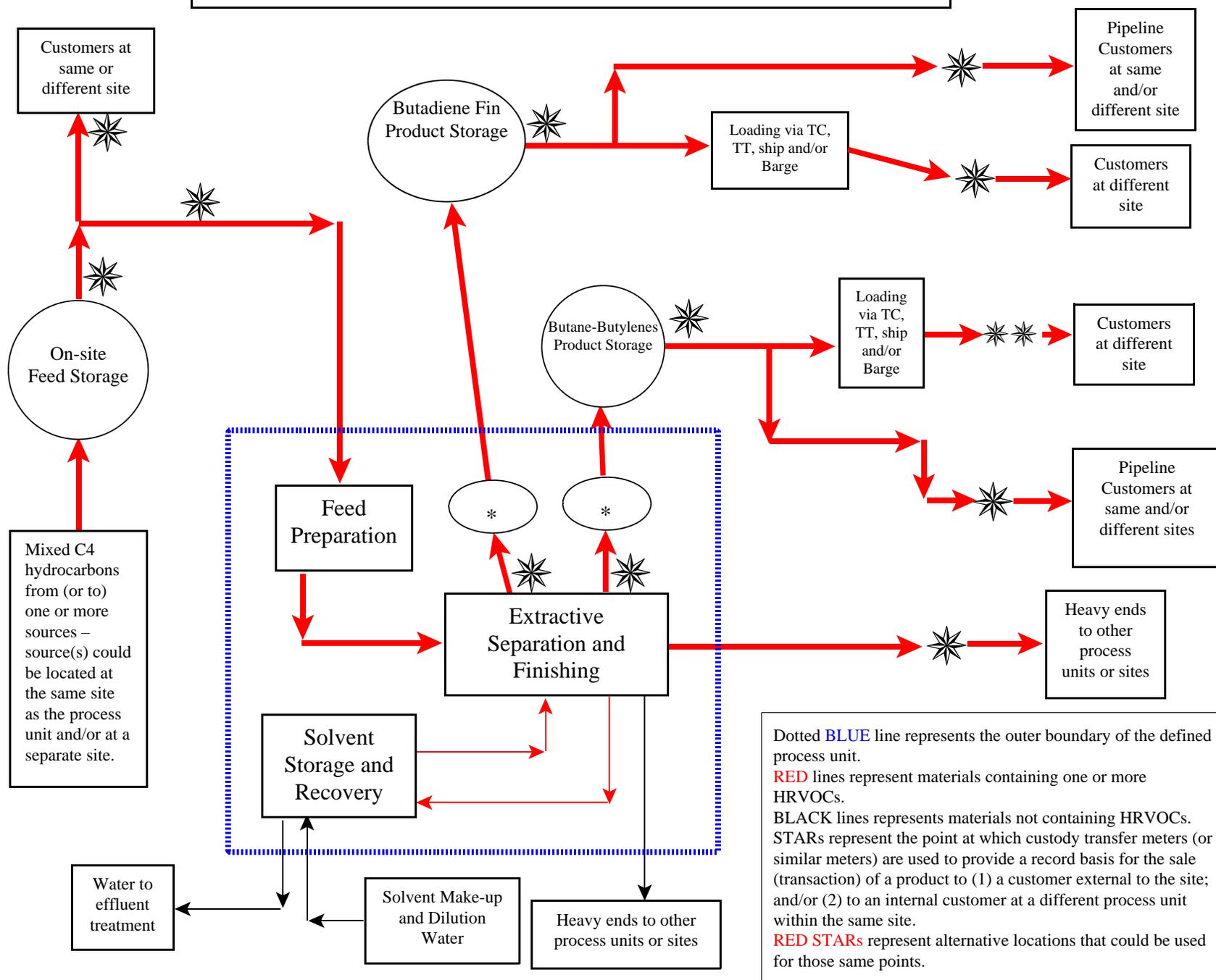
* list is representative but not all-inclusive

A sample process flow diagram is provided (“Flow Diagram for 1,3-Butadiene Process”) for a typical “consumer” process unit to illustrate its process boundaries and relationships to associated storage and loading unit operations.

- The following process unit designation guidelines apply specifically to "consumer" process units and the chemical manufacturing sector, but may also be generally applicable to other process unit categories and industry sectors:
 - Flow diagram lines that represent process streams should be formatted to indicate which streams contain HRVOC.
 - The diagram should also indicate primary (for designated process unit) and alternative (for storage and loading units) locations of custody transfer or similar meters used to record the transaction of a product to (1) a customer external to the site; and/or (2) to an internal customer at a different process unit within the same site.

The process unit boundary may be established as the point where the HRVOC enters the process and that is upstream of where a recycle stream is returned to the process.

Process Flow Diagram for 1,3-Butadiene Process Unit



Basis of LOA

- The LOA should be based on the amount of HRVOC in the total feed stream (i.e., fresh feed plus any recycled from recovery if the recovery is external to the central manufacturing process). Facilities that store or load 1,3-butadiene and/or butenes, and that are associated with the 1,3-butadiene process unit at the same site, are generally excluded from the defined process unit boundary. Throughput for these facilities should therefore not be counted in the LOA determination for this process unit, and neither are these facilities eligible for an allowance allocation from the amount reserved for certain storage and loading units (i.e., those owned, operated or located separately from the process unit and site). Only those storage vessels used for run-down* (see Process Diagram designations) in demonstrating product specifications may be included within the designated process unit. Some processes may include HRVOC recovery and recycle streams. Recycle streams internal to the defined process boundary are not included in the basis of the LOA for the defined process unit. Recycle streams from recovery operations external to the central process, however, may be included in the LOA determination.

Units of Measure for Submitted Throughput Estimate

- as appropriate, pounds-, million pounds-, or tons per year

Supporting Documentation for HRVOC Content and LOA

- If available, analytical process data should be used to speciate and quantify HRVOC content and flowrates of the total feed stream. If this data is not available, feed stream purity specifications in contracts, specification sheets or financial transfer records provided to customers may also be used. Process simulation data may also be used, but should be supported by stream sampling where possible. The LOA reported for each facility must be validated with supporting documentation such as monitoring, test, or process simulation data, usage and/or production records, etc. All supporting data may be submitted as Confidential Business Information.

Olefins

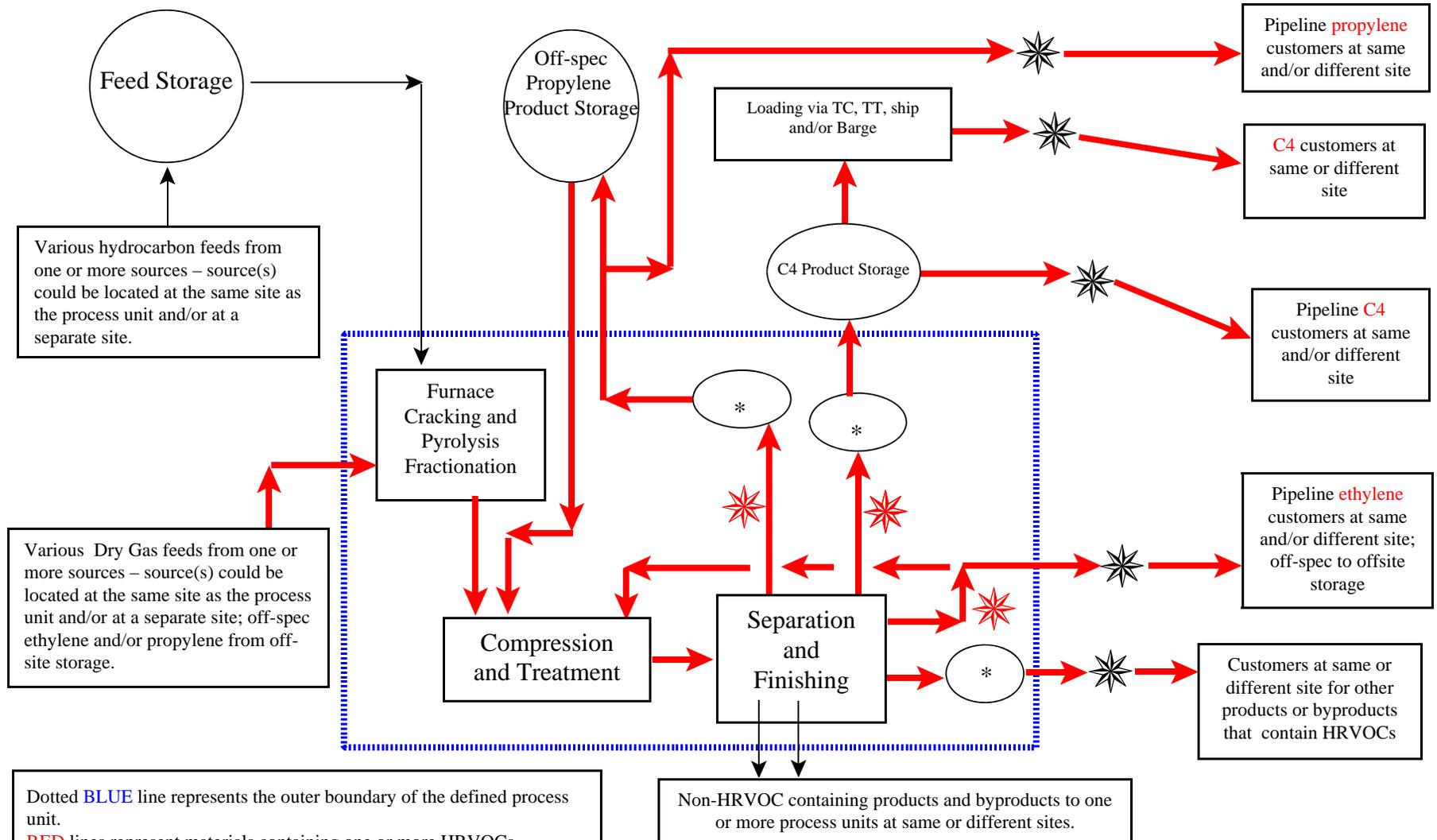
Process Unit Designation

A sample process flow diagram is provided (Flow Diagram for Olefins) showing a typical Olefins process unit to illustrate its process boundaries and relationships to storage and loading unit operations.

- The following process unit designation guidelines apply to this diagram and the olefins industry sector, but may be generally applicable to other process categories and industry sectors:

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Process Flow Diagram for Olefins Process Units



- Flow diagram lines that represent process streams should be formatted to indicate those which contain HRVOC.
- The diagram should also indicate primary (for designated process unit) and alternative (for storage and loading units) locations of custody transfer or similar meters used to record the transaction of a product to (1) a customer external to the site; and/or (2) to an internal customer at a different process unit within the same site.

Basis of LOA

- LOA for olefins units should be based on HRVOC in the product streams; maximum total production of total HRVOC in any 12-month period between 2000-2004 for each process unit should be considered. Facilities that store or load olefins, however, and that are associated with the olefins process unit at the same site, are generally excluded from the defined process unit boundary. Throughput for these facilities should therefore not be counted in the LOA determination for this process unit, and neither are these facilities eligible for an allowance allocation from the amount reserved for certain storage and loading sites (i.e., those owned, operated or located separately from the process unit and site). Only those storage vessels used for run-down* (see Process Diagram designations) in demonstrating product specifications may be included within the designated process unit. Recycled streams internal to the defined process boundary may or may not exist; these are not represented in the diagram and are not included in the basis for the LOA for the defined process unit.

Units of Measure for Submitted Throughput Estimate

- as appropriate, pounds-, million pounds-, or tons per year

Supporting Documentation for HRVOC Content and LOA

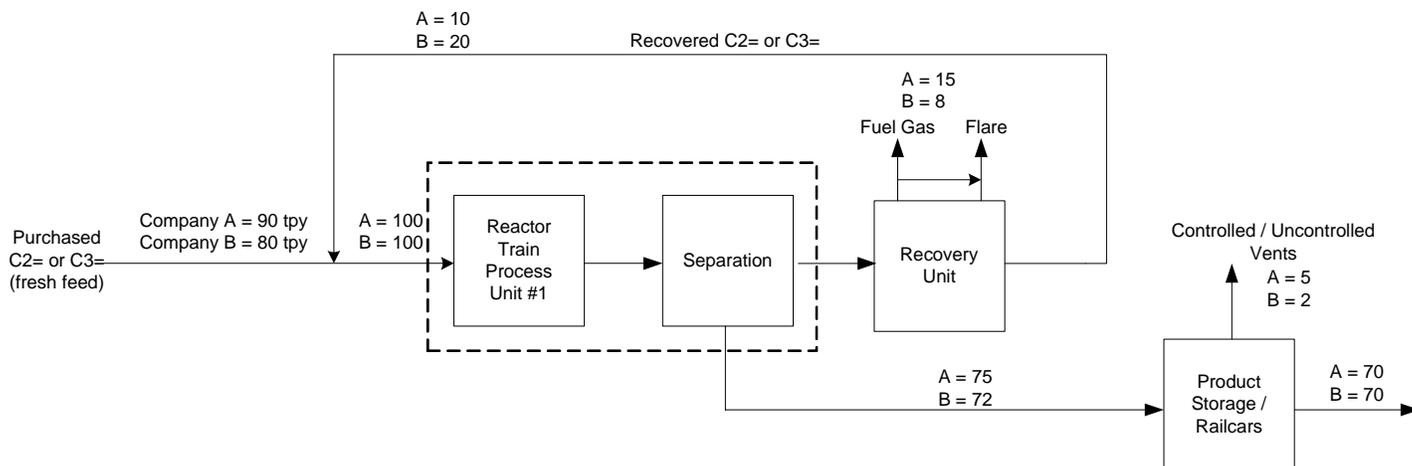
- If available, analytical process data should be used to speciate and quantify HRVOC content and flowrates of the total feed stream. If this data is not available, product stream purity specifications in contracts, specification sheets or financial transfer records provided to customers may also be used. Process simulation data may also be used, but should be supported by stream sampling where possible. The LOA reported for each facility must be validated with supporting documentation such as monitoring, test, or process simulation data, usage and/or production records, etc. All supporting data may be submitted as Confidential Business Information.

Polymer Manufacturing

Process Unit Designation

A sample process flow diagram is provided (Flow Diagram for Polyethylene) for a typical polymer manufacturing process unit to illustrate its process boundaries and relationships to storage and loading unit operations.

Polyethylene or Polypropylene Plant



Basis of LOA

- The LOA should be based on the total feed (i.e., fresh feed plus any recycled from recovery operations external to the central manufacturing process) to each reactor train. This approach considers that other basis strategies (i.e., fresh feed basis, total polymer production basis) would either penalize investments in separations and recovery capability, or constitute an unnecessarily burdensome exercise in the determination of various amounts of ethylene and propylene in different polymer grades and shipments (using the existing meters and corresponding analyses to measure total feed is substantially simpler and more accurate).

Units of Measure for Submitted Throughput Estimate

- as appropriate, pounds-, million pounds-, or tons per year

Supporting Documentation for HRVOC Content and LOA

- If available, analytical process data should be used to speciate and quantify HRVOC content and flowrates of the total feed stream. If this data is not available, product stream purity specifications in contracts, specification sheets or financial transfer records provided to customers may also be used. Process simulation data may also be used, but should be supported by stream sampling where possible. The LOA reported for each facility must be validated with supporting documentation such as monitoring, test, or process simulation data, usage and/or production records, etc. All supporting data may be submitted as Confidential Business Information.

Storage and Loading

HRVOC loading and storage operations may or may not be co-located at the same site as other HRVOC process units described for the foregoing industry groups. Each storage and loading operation should be assessed in terms of its relationship to producer, consumer or separations units, and its own LOA for HRVOC Cap allocation purposes. The allocations for storage and loading facilities are from an allowance amount reserved for those owned, operated or located separately from process units and sites otherwise eligible for allowance allocations on the basis of HRVOC production or use. Units of measure for annual throughput representations shall be in terms of bbl., MMbbl., or turnovers per year.

Storage

Site Designation:

- Storage of materials containing HRVOCs involves the use of fixed-volume containment options such as tanks and underground caverns. Some storage units and/or sites may have simultaneous in/out transfer. A battery of similar storage units should be treated as a single unit for LOA determination purposes provided that the same material is handled over the preferred 12-month period.

Basis of LOA

- LOA should be based on the total amount of material containing HRVOC that is transferred into OR out of the storage facility during the preferred 12 month period. Adjustment for changes in inventory between the beginning and end of the 12 month period is not necessary as long as the volume and/or mass of the material for which LOA is to be certified is based only on transfer into OR out of any particular storage unit. The same or different preferred 12-month periods may be selected for each storage unit or battery at a site.

Units of Measure for Submitted Throughput Estimate

- as appropriate, bbl., -, million bbl.,- or total site turnovers per year

Supporting Documentation for HRVOC Content and LOA

- Purity specifications in contracts, specification sheets or financial transfer records provided to customers may be used to demonstrate HRVOC content. MSDS for compounds which include specific HRVOC may also be used. These types of information should be supportable by stream sampling as necessary. The LOA reported for each storage site must be validated with supporting documentation such as sampling, metering or transfer record data. All supporting data may be submitted as Confidential Business Information.

Loading

Site Designation

- Facilities used to load or unload materials that contain HRVOC onto or off of transport vessels, and that are owned, operated, or located *separately from* producer, user, or separation unit sites with dedicated storage and loading operations, are eligible for consideration as a loading site. A loading facility comprised of multiple stations should be treated as a single unit for LOA determination purposes provided that the same material is handled over the preferred 12-month period.

Basis of LOA

- The LOA for loading operations should be based on the volume or mass of material loaded during any 12-month period and the HRVOC content of this material. Loading facilities that handle separate materials through separate loading stations may use a separate 12-month period for each loading station. However, a common or shared loading station that handles multiple HRVOC materials may not use different 12-month period for each HRVOC material loaded. A loading facility comprised of multiple stations may use a single level of activity to characterize the entire operation.

Units of Measure for Submitted Throughput Estimate

- as appropriate, bbl.,-, million bbl.,-, or total site turnovers per year

Supporting Documentation for HRVOC Content and LOA

- Purity specifications in contracts, specification sheets or financial transfer records provided to customers may be used to demonstrate HRVOC content. MSDS for compounds which include specific HRVOC may also be used. These types of information should be supportable by stream sampling as necessary. The LOA reported for each loading site must be validated with supporting documentation such as metering or transfer record data. All supporting data may be submitted as Confidential Business Information.

V. **Allocation of Allowances**

Once the overall site LOA has been established for all sites eligible to receive an allowance allocation, these will be distributed according to the following considerations:

- The total amount of HRVOC emissions available for distribution among all HGB process unit category types in Harris County is 3451.44 tpy. The amount set aside from this total for certain sites specifically engaged in storage and loading operations (see next bullet) leaves at least 3106.3 tpy available for initial allocations to all other sites.

- The amount set aside for allocation to certain storage and loading sites may be up to 345.14 tpy (up to 10% of the initial total amount). This amount is reserved for distribution only to those storage and loading sites owned, operated, or located separately from producer, user, or separation unit sites with dedicated storage and loading operations. Any portion of this amount not required for distribution to eligible storage and loading sites will be re-aggregated to the amount available for the initial allocation to all other eligible sites.
- The respective amounts of HRVOC allowances available for initial distribution to the two site types (i.e., storage and loading sites vs. producers, consumers, separation sites) shall be distributed among eligible sites of each type. As described by the equation,

$$A,i = \{ LOA,i / [\sum_{i=1}^n LOA,i] \} \times A,r \quad (\text{Eqn. 1})$$

where:

A,i	=	initial allocation to any site of interest
LOA, i	=	LOA for the site of interest
n	=	number of sites to which allocations are to be distributed
A,r	=	(for storage and loading sites): 345.14 tpy maximum (up to 10% of initial total)
	=	(for all other eligible sites): 3106.3 tpy minimum (3106.3 + any not required for distribution to eligible storage and loading sites),

the initial allocation to any site of interest will be determined as the product of (1) the fraction of that site's LOA relative to the total LOA for all remaining eligible sites of that class (i.e., either storage and loading sites or all others eligible), and (2) the total amount of allocation emissions available for distribution to that site type.

- All sites whose thusly calculated A, i values are 5 tpy or less will be allocated a 5 tpy allocation. The sum of these allocations will be deducted from the initial value of A,r; the remainder will be distributed proportionately as specified by Eqn. 1, using the adjusted value of A,r, to all other sites that did not receive the initial 5 tpy minimum allocation.