Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Interested Parties **Date:** December 5, 2006

From: Dan Eden, Deputy Director
Office of Permitting, Remediation, and Registration

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Subject: Air Emissions During Tank Floating Roof Landings

This memo provides guidance related to tank floating roof landings and the resulting air emissions to all stakeholders in Texas. The Texas Commission on Environmental Quality (TCEQ) has identified that storage tank floating roof landing air emissions have probably been under reported and a number of companies in the Houston region have been contacted directly by the Chief Engineer in that regard. This issue is of particular importance in that area as it may play a role in demonstrating attainment. There is likely to be additional direct communication on this topic with sources in the Houston, Beaumont, and Corpus Christi regions. In the body of this memo, tank roof landings are described briefly; an accepted method for estimating the air emissions presented; typical classification, reporting and recordkeeping requirements for these emissions are discussed; and methods to authorize the emissions associated with this activity are identified.

What are storage tank floating roof landings and how are the resulting air emissions quantified?

Air emissions from most tanks storing moderate or high vapor pressure liquids are controlled with the use of floating roofs equipped with seals to prevent the direct contact of the stored liquid with ambient air. This simple system serves as an effective method of pollution prevention as long as the roof and associated seals are floating on top of the liquid. If the liquid level in the tank is lowered to below the level of the floating roof support legs, the roof will rest (land) on the legs, or supports, rather than on the liquid, severely limiting the control efficiency of the floating roof. Air emissions from tanks are greater while the tank roof is landed and remain so until the tank is either completely emptied and purged of organics or the tank is refilled and the roof is again floating. Air emissions that occur during this period are referred to as landing loss emissions.

Until recently, there had not been a generally accepted method available to estimate the air emissions during the period when a floating roof was landed. However, the American Petroleum Institute (API) published the first formal methodology for determining landing loss emissions in 2002, and subsequently revised this methodology in its 2005 publication API Technical Report 2567, Evaporative Loss from Storage Tank Floating Roof Landings. The U. S. Environmental Protection Agency updated AP-42, "Compilation of Air Pollutant Emission Factors," incorporating this methodology in November. This method of estimating air emissions and other related resources are discussed in more detail later in this memo.

Are these emissions authorized?

With few exceptions, floating roof landings and the associated air emissions were not considered in permit review, represented in permit applications, nor considered in the development of permits by rule (PBR) to authorize storage tanks. Short term (hourly) emissions from a tank with a landed roof are greater than the routine operating emissions identified for the tank in a permit maximum allowable emission rates table (MAERT). Operating a tank with a landed roof renders the floating roof emission control ineffective, contrary to the requirements identified in most permits authorizing floating roof tanks. Emissions that occur from a tank while the roof is landed are not authorized by the permit unless such operations were represented in the permit application, the tank landing emissions are compliant with the tank allowable emission rates on the MAERT, and there is an exception in the permit conditions allowing the floating roof to be landed.

If a floating roof is necessary to satisfy the requirements associated with the PBR used to construct or modify the tank, these requirements will not be met when the roof is landed because a landed roof does not effectively control emissions. Tank PBR language related to a change in tank service being authorized only encompasses emissions associated with normal operation of the tank, after the tank roof is floating following the tank roof landing necessary for the change in service. The emissions that occur when a tank roof is landed were never reviewed or evaluated in the development of these PBRs and therefore they do not authorize tank landing emissions.

A discussion of PBRs that might be used to authorize planned floating roof landings is provided in section 2.A under the heading, “What actions need to be taken now?,” later in this memo.

Can an owner or operator claim an affirmative defense for these emissions under 30 TAC Chapter 101 Subchapter F?

Section 101.222(h) states that unauthorized emissions from maintenance, startup, or shutdown (MSS) activities that are not unplanned and have been reported or recorded in compliance with § 101.211 are subject to an affirmative defense to all claims in enforcement actions brought for the activities for which the owner or operator proves all of the criteria listed in § 101.222(c)(1) - (9). Section 101.222(c)(1) - (9) lists the demonstrations that must be made to provide for an affirmative defense for planned tank landings. It should be understood that documenting the criteria necessary for an affirmative defense does not “authorize" or “exempt” the emissions.

The affirmative defense for planned MSS will become unavailable for facilities per the schedule specified in § 101.222(i). There are two other factors that should also be considered when choosing to demonstrate an affirmative defense for emissions.

- The period of time a roof is landed must be minimized in order to make an affirmative defense under § 101.222(h). Title 40 CFR Title 60 Subparts Ka and Kb also require that the “process of emptying and refilling when the roof is resting on the leg supports shall be continuous and shall be accomplished as rapidly as possible.”

- Landing a tank roof solely for the purpose of inventory control (in lieu of other methods of metering liquid volumes) is not operating in a manner consistent with good practices for minimizing emissions and would therefore not meet all the criteria for an affirmative defense. Landings for non-maintenance purposes should be limited to those supporting a change in service

to a liquid that is incompatible with that stored previously. Tank landings where the tank roof is landed and the tank subsequently filled with the same liquid with no maintenance occurring (referred to as convenience tank landings in this document) will not satisfy the criteria for an affirmative defense.

These factors are not likely to be concerns if the tank emissions are routed to an alternate control device while the tank roof is landed or if the liquid stored in the tank has a vapor pressure less than 0.50 psi. An alternate control method should be seriously considered when tank landings are planned.

What actions need to be taken now?

The following actions should be taken to properly document and report emissions from tank landings:

1. Ensure that tank roof landing emissions are and have been properly estimated and reported in emissions inventory. Since the API published the first formal methodology for determining landing loss emissions in 2002, landing loss emissions should have been reported in the point source emissions inventory from calendar year 2002 forward. The CEO does not plan to pursue annual emissions inventory revisions for years prior to 2002 because no published methodology to determine landing loss emissions existed before that time. These revisions should be submitted as soon as possible, due to the potential effect on the agency's air quality planning efforts. For specific procedural guidance on updating previously submitted Emissions Inventory Questionnaire (EIQ) emissions rates, please consult Chapter 5 of the 2005 Emissions Inventory Guidelines. This document is available on the TCEQ website at:

   http://www.tceq.state.tx.us/comm_exec/forms_pubs/pubs/rg/rg-360_05/index.html

   Per § 101.10(c), representative sample calculations are required to be submitted to the Executive Director with these revisions. Include enough information so that all landing loss determinations may be reasonably reproduced. There is an Excel template for reporting tank landings for emissions inventory that may be accessed from the following web page:

   http://www.tceq.state.tx.us/implementation/air/industei/psei/psei.html

   Please include any other data that you believe will be useful to characterize these emissions to the agency. Address completed EIQ revisions to:

   Emissions Inventory Data, MC-164
   Texas Commission on Environmental Quality
   P.O. Box 13087
   Austin, Texas 78711-3087

   Once revised EIQs have been received, the Industrial Emissions Assessment Section (IEAS) will enter the revised data into the State of Texas Air Reporting System (STARS). A copy of the revised site-wide emissions totals for each calendar year as entered into STARS will be mailed to your site for verification. The IEAS will then use the updated emissions totals in STARS to invoice your site for any additional emissions fees as appropriate. Please direct any questions regarding the update of emissions inventory to Danielle Nesvacil at (512) 239-2102 or by email at dnesvaci@tceq.state.tx.us, Russ Nettles at (512) 239-1493 or by email at rnettles@tceq.state.tx.us, or the Industrial Emissions Assessment Section Helpline (512) 239-1773.

2. Ensure your planned tank roof landings and associated air emissions are authorized. We expect most of these reviews will be performed as permit holders authorize start-up and shutdown emissions as they lose the affirmative defense per the schedule in § 101.222(h) but there may be advantages in terms of recordkeeping and reporting to doing so now. There will also be cases during permit reviews where you may need to do so earlier. Tank roof landing emissions must satisfy all applicable state and federal rules (including 40 CFR 60 Subpart Kb) in order to be authorized. Planned tank landings may be authorized through a permit by rule or a case by case permit review as described below:

   A. Permit by Rule

      Permit by Rule § 106.263, "Routine Maintenance, Start-up and Shutdown of Facilities, and Temporary Maintenance Facilities," may be used for tank landings that are due to planned maintenance, start-ups, or shutdowns. This includes landings for change of service as well as convenience tank landings. It requires that daily emissions from each tank with a landed roof be less than the Reportable Quantity for the contaminant emitted and that all site emissions claimed under the PBR be less than 25 tons per year (tpy). This restriction limits its utility for sites where a significant number of tank roof landings or maintenance activities take place.

   B. Permit

      Floating roof tank owners and operators are encouraged to permit all planned tank landings so that they may be reviewed for adequate emission controls and acceptable off-site impacts. In addition to those applications submitted specifically for this purpose, there are several situations where this review will be required on permit applications submitted and currently under review. These situations are identified below:

      i. Permit holders with pending renewal applications will be asked to identify whether they perform convenience landings for any tanks in the permit application being reviewed. A permit amendment application to authorize this mode of operation will be required if they intend to continue doing convenience landings unless the landings have been authorized through another mechanism such as PBR § 106.263. The same documentation will be required if there are convenience landings of any existing tank that is subject to review in a permit amendment application. This will require that the applicant demonstrate best available control technology (BACT) emission control when the roof is landed as well as showing that off-site impacts are acceptable when the tank roof is landed.

      ii. All tank operations, including landings, will be reviewed for any new tank being authorized via permit to ensure that the tank is designed such that landing emissions are minimized and may be controlled cost effectively. Tier I BACT will require new floating roof tanks be designed so that there will be no standing liquid when they are emptied (drain dry) and the tank must include a connection that would allow for the vapor space below the landed roof to be routed to a control device after the roof is landed and during the subsequent tank refilling.

iii. If one or more tanks in a permit are subject to review to authorize tank landings, the Air Permits Division will strongly encourage the permit holder to authorize landings for all tanks in that permit. An accurate BACT and impacts review will likely depend on the total number of tank landings to be authorized at a site so all tanks at the site need to be considered. This comprehensive review would also allow for landing emissions for all tanks at the site to be included in a site-wide emission cap.

The Air Permits Division is in the process of developing Tier 1 BACT for tank landings and will make it available when completed. Until that time, these reviews will likely require additional cost and technical documentation. Questions relating to the authorization of tank landings may be directed to Javier Garza at (512) 239-5543 or by email at jagarza@tceq.state.tx.us, or to Tony Ionescu at (512) 239-1277 or by email at cionescu@tceq.state.tx.us.

3. If the tank roof landing is not authorized in a permit or PBR, the event and associated emissions must be documented and reported as required under 30 TAC Chapter101 Subchapter F and 30 TAC Chapter 122, § 122.145(2) concerning deviation reports if the site has a Federal Operating Permit. If the tank landing is authorized, the landing and associated emissions must comply with the allowable emission rates and control requirements specified in the permit or PBR. Landing emissions should be estimated using the methodology identified in the API document identified above.