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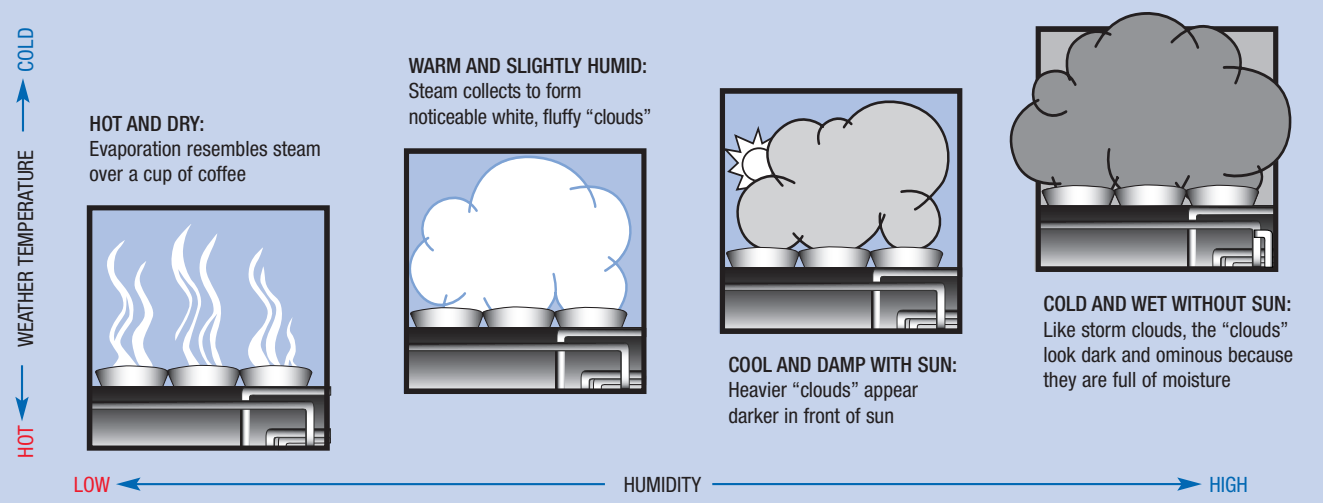
Are Those "Clouds" Over The Refinery Really Just Steam?

To many, the "clouds" that form over the refinery cooling towers can sometimes look ominous. This is not surprising, as "clouds" exist on some days, do not exist on others, and change shape and color from time to time. Like many, you may be wondering just what those "clouds" are made of and how they are formed. We'd like to "clear the air" about these mysterious "clouds."

Technically Speaking

Water is used throughout the refinery to heat fluids during the refining process and to cool various production units while they perform refining functions. In some units, water temperature reaches more than 140 degrees Fahrenheit. In order to continually reuse and conserve the water, it is sent to be cooled and stored in the cooling towers located alongside Crenshaw Boulevard. Once in the cooling towers, hot water is cooled by an airstream that is blown at it as it enters the tower. The cooling process causes some of the water to evaporate, while the major portion is cooled and stored to be reused in the refinery. The evaporated water mixes with the airstream on its way out of the cooling stacks at the top of the towers. This mixture forms the visible "cloud" over the cooling units. The only thing coming out of the cooling tower stacks is the water in the form of vapor or steam, and air that cannot be retained and reused in the refining process.



The illustration above depicts the look of the "clouds" based on the atmospheric conditions on a given day. Beyond the temperature and humidity of the surrounding air, the appearance of the "clouds" is also affected by the angle of the sun: if it is behind the "clouds" they appear darker. The wind also affects the appearance: on a windier day the steam mixes with the surrounding air more quickly.

Weather Determines Look of "Cloud"

The cooling towers are constantly running and producing exactly the same substance: steam. But the look of the "cloud" varies based on the temperature of the water entering the tower and the weather outside. When hotter water enters the cooling towers, more water needs to evaporate to bring the temperature down. Therefore, more evaporated water mixes with the air and a larger "cloud" is emitted from the stacks.

Most of the time the temperature of the water entering the tower is the same, but the look of the "cloud" is affected by the weather on a given day. The water exiting the stacks evaporates into the air at different speeds based on the temperature and humidity of the day. You may recall from science courses that you took in school that water evaporates into warm air more quickly than into cold air (that's why you see more natural clouds on a cold day, too). On a humid day, there is already so much water in the air that it cannot absorb the cooling tower "clouds" very quickly. Therefore, the clouds are darker and heavier looking on those days.

Cooling tower clouds are generally much more visible in the winter, when there are lots of cold, humid days like we typically have in the months of December and January. They are also usually darker, and more visible during the colder morning hours.

Mist Over Crenshaw

Occasionally, due to wind conditions, water vapor rising out of the refinery cooling towers is carried eastward by the wind and condenses as a mist that settles back to the ground, often affecting cars passing through on Crenshaw Boulevard. This can be likened to what happens when someone's lawn sprinklers dampen a car. Although it can be annoying, it is not damaging to vehicles. Naturally, if water spots are left to bake in the sun for a few days, the minerals that are present in our water can become concentrated, making them more difficult to remove. So the sooner the vehicle is washed, the better. As we are committed to our goal of zero impact on our neighbors, we encourage you to report any concerns immediately to our 24-Hour Neighborhood Hotline at (310) 505-3158 to ensure rapid corrective response by refinery personnel.

Emissions Monitored Closely

The Torrance Refinery's environmental performance is carefully monitored by several local agencies, including the South Coast Air Quality Management District (SCAQMD). We are held to absolute standards and work hard to meet and exceed these standards and to uphold our commitment to run the refinery in an efficient and environmentally friendly manner.

Need More Information?

Contact our Public Affairs Department at (310) 212-1852
Torrance Refinery 24-Hour Neighborhood Hotline: (310) 505-3158
www.exxonmobil.com