

**Western States Petroleum Association**  
**Proposed rule language to address SRU SO2 emission issue**  
**October 2018 (Modified January 2019)**

**WAC 173-400-030 Definitions**

~~((87))~~ (93) Sulfur recovery unit or "SRU" means a process unit that recovers elemental sulfur from gases that contain reduced sulfur compounds and other pollutants by a vapor phase catalytic reaction of sulfur dioxide and hydrogen sulfide. A typical SRU is comprised of three components: a Claus unit, a tail gas unit, and an incinerator. This definition does not include a unit where the modified reaction is carried out in a water solution which contains a metal ion capable of oxidizing the sulfide ion to sulfur; e.g., the LO-CAT II process.

**WAC 173-400-040(7) General standards for maximum emissions.**

(7) Sulfur dioxide no person shall cause or allow the emission of a gas containing sulfur dioxide from any emissions unit in excess of one thousand ppm of sulfur dioxide on a dry basis, corrected to seven percent oxygen for combustion sources, and based on the average of any period of sixty consecutive minutes.

(a) Petroleum refinery sulfur recovery units (SRU) - For sulfur recovery units that utilize a Claus process followed by a tail gas unit with an incinerator, the following work practices (WAC 173-400-040(7)(a)), and/or numeric mass emission limit (WAC 173-400-040(7)(b)), may be followed in lieu of the ~~numerical limits~~ emission standard in WAC 173-400-040(7) during unit shutdowns and startups:

- (i) For a startup of a sulfur recovery unit the owner or operator shall complete these work practices:
  - (A) A startup begins when refinery gas or natural gas is introduced in the sulfur recovery unit ~~and ends when the unit has stable operation producing on-specification product.~~
  - (B) A startup ends when the ~~Upon~~ sulfur recovery unit is startup the unit shall be coupled with the tail gas treatment unit prior to the introduction of sulfur-rich feed and the unit has stable operation producing on-specification product.
- (ii) For a shutdown of a sulfur recovery unit the owner or operator shall complete these work practices:

- (A) A shutdown begins when acid gas process feed is stopped and ends at the completion of the shutdown steps listed in this subsection.
- (B) Notify the permitting authority of a shutdown of the sulfur recovery unit ~~three (3) hours~~ 24-hours prior to initiating the shutdown. If unanticipated factors arise which necessitate a sulfur recovery unit shutdown within the 24-hour pre-notice period, notify the permitting authority as soon as definitive plans for a shutdown are known.
- (C) During a shutdown of the sulfur recovery unit and after feed to the unit has been stopped, a hot sweep step to remove residual sulfur will be executed. A hot sweep consists of burning natural gas or hydrogen gas in the Claus unit to affect removal of residual sulfur in the sulfur recovery unit. Hot sweep gases from the Claus process equipment must be routed through the tail gas treatment unit and then to the incinerator until sulfur production has ceased as determined by one of the following methods. At that time, the tail gas treatment unit can be bypassed according to section (7)(a)(ii)(E) of this regulation.
1. The level in the sulfur tank or pit has stopped showing any appreciable increase indicating there is no longer a significant amount of sulfur left in the system, and/or
  2. The process ratio monitor analyzer for H<sub>2</sub>S and SO<sub>2</sub> ratio concentrations show adequate low sulfur levels, and/or
  3. Visible observations indicate that sulfur rundown has ceased (e.g., no liquid sulfur is dripping from the condensers, sulfur traps stop drooling during the heat soaking/hot sweep phase, liquid sulfur does not appear dark, etc.), and/or
  4. Observe the oxygen concentration entering the tail gas unit catalyst bed and, on oxygen breakthrough, bypass the tail gas unit.
- (D) The hot sweep process is determined to be complete when residual sulfur generation from the catalyst is at a minimal rate consistent with section (7)(a)(ii)(C) of this regulation, with worker safety and equipment protection considerations.
- (E) Following verified completion of the hot sweep according to (7)(a)(ii)(C) of this section, the tail gas unit may be bypassed to the Incinerator or other combustion device in order to safely complete the oxidation step of the SRU shutdown. Sulfur recovery unit oxidation means the step of an SRU shutdown following completion of the hot sweep where entrained sulfur is removed from the Claus unit and catalyst beds via oxidation by maintaining or adding heat and incrementally adding air or oxygen in a controlled manner

- (F) Shutdown ends when the tail gas unit incinerator is no longer burning fuel gas, except in the situation where only the Claus unit will be shutdown. In this case, shutdown ends when fuel is no longer combusted in the Claus unit.
- (iii) The owner or operator shall maintain records of shutdown and startup events that are suitable to demonstrate compliance with this work practice standard. These records must include:
- (A) The date and time of sulfur recovery unit shutdown notification.
  - (B) The date and time duration whenever the tail gas treatment unit is bypassed.
  - (C) Information describing how the emissions could not have been prevented through careful planning and design and if a bypass of control equipment occurs that such bypass is necessary to prevent loss of life, personal injury or severe equipment damage, and that the emission did not result in a violation of an ambient air quality standard.
  - (D) Thermal oxidizer hourly average firebox temperature and outlet exhaust oxygen content (if Claus unit tail gas is directed to an incinerator).
  - (E) If a flare is used to manage Claus unit tail gas pursuant to subsection (b)(v) above, all records necessary to demonstrate compliance with 40 CFR Part 63, Subpart CC.
  - (F) Records shall be maintained on-site for a minimum of five (5) years.
- (b) Petroleum refinery sulfur recovery unit alternative emission limit - As an alternative option to the WAC 173-400-040(7) sulfur dioxide emission limit or the WAC 173-400-040(7)(a) work practice standard, the owner or operator of a sulfur recovery unit may choose to comply with a mass emission limit of 20 pounds/hour of SO<sub>2</sub> during unit shutdowns and startups.
- (i) Compliance with the mass emission limit will be demonstrated through an engineering calculation using best available information. The owner or operator of a SRU source shall have the burden of demonstrating the adequacy of the emission estimate methodology to the permitting authority.
  - (ii) Requirements for providing notice of SRU startups and shutdowns to the permitting authority, and all recordkeeping requirements in WAC 173-400-040(7)(a), will apply if this alternative emission limit option is selected.
- (c) Alternative sulfur dioxide emission limitation for SRUs in operation before September 25, 2019. This provision takes effect on the effective date of EPA's approval in the SIP