

### START-UP & SHUTDOWN SUPPORT

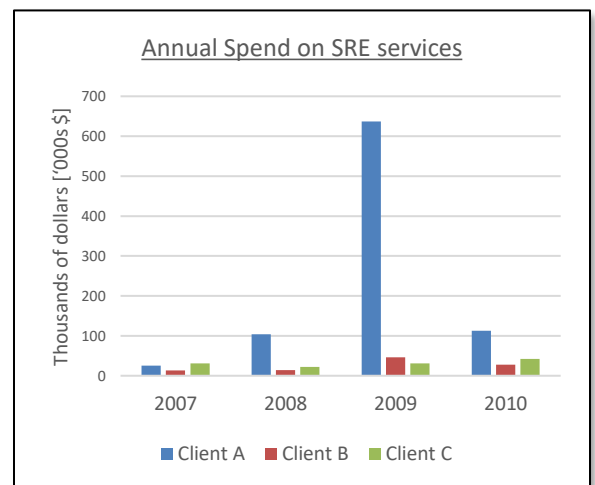
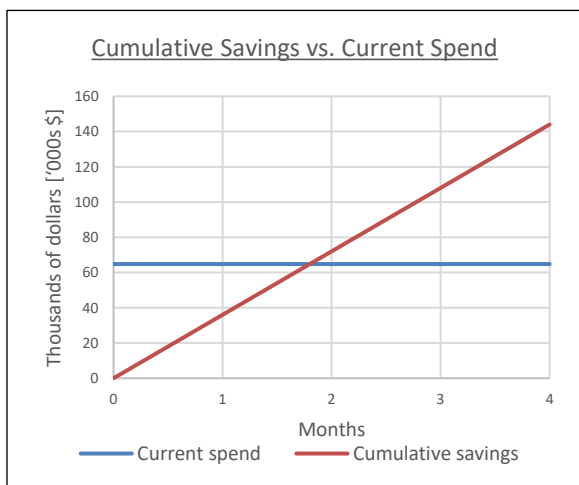
Shutdowns and start-ups are not everyday events, and much care must be taken to prevent damage to catalysts and equipment. Sooting of catalyst beds, refractory damage, and even destruction of equipment due to sulfur fires, are common problems that can be prevented by using SRE's on-site shutdown and start-up assistance services.

The level of SRE's start-up and shutdown support can take on various forms. We can fully take over the operation of the SRU to free up Operations personnel for other tasks during the turnaround. Otherwise, we can provide analytical data to support Operations in the start-up/shutdown program. With a range of flexible options, gaining the right level of support for our client's needs is simple.

SRE's analytical support includes ensuring a stoichiometric burn within the main burner and direct-fired reheaters via two different methodologies as well as ensuring the temperature change within the refractory is maintained within acceptable limits via a specialized handheld device. Conducting this analysis regularly throughout the support program helps our clients protect their SRU equipment, minimize their emissions, and reduce costs.

**Contact us regarding a quotation for your next start-up or shutdown at [info@sulfurrecovery.com](mailto:info@sulfurrecovery.com).**

Founded in 1998, Sulfur Recovery Engineering (SRE) is an international engineering company that specializes in on-site testing and analysis of components found in process gas streams in oil refineries and natural gas processing plants. Our extensive knowledge in all things SRU-related has allowed us to be leaders in managing the dynamic nature of starting up and shutting down these complex units and has allowed our clients to save money<sup>1</sup>.



<sup>1</sup> Graphs taken from SRE's *SRU Cost Savings Webinar* (recording available on SRE's website)  
[www.sulfurrecovery.com](http://www.sulfurrecovery.com)



## THE SULFUR RECOVERY ENGINEERING DIFFERENCE

1. SRE utilizes the latest GC technology.
  - a. Shutdown and start-up support requires a gas chromatograph (GC) with a short acquisition time.
  - b. A short runtime results in a faster response to dangerous conditions. Based on SRE's experience, if there is significant soot formation occurring in the reaction furnace, then **it can take as little as 20 minutes to plug up the first converter and stop the shutdown.**
  - c. SRE's GC has a runtime of 5 minutes. Larger, desktop GCs have a runtime of at least 30 minutes.
  - d. By choosing a vendor with a GC runtime longer than 5 minutes, our clients would be putting their unit and the shutdown at risk.
2. SRE not only provides analytical data, but provides operational guidance.
  - a. SRE sends crews of **Engineers only** to site. These individuals have years of SRU troubleshooting experience, making a highly trained and knowledgeable individual available to our clients.
  - b. **Having an SRU Engineer specialist onsite** is necessary to mitigate any risk of a catastrophic event occurring while the SRU is in a dynamic state. Thousands of dollars can be saved.
  - c. Further, SRE will observe and **will** provide guidance to Operations should they not be following best practices when it comes to conducting the shutdown or start-up. This extra support has been translated into a decreased shutdown timeline, thus saving our clients money.
3. SRE saves you money.
  - a. **Beyond the cost savings mentioned above, SRE saves our clients money by removing the need of a Nitrogen truck.**
  - b. The cost of a small Nitrogen truck to cool the SRU down can be upwards of \$70,000.
  - c. In most cases, SRE can cool an SRU using the main air blowers in a 24-hour period for a fraction of the cost of the Nitrogen truck.
4. SRE has no hidden fees.
  - a. The price quoted in SRE's proposals for start-up and shutdowns are lump sum with no other charges unless there is a change in the scope of work.
  - b. SRE does not add line items to our invoices for office setup or for administration charges or for cleaning our own equipment after the project is completed. The price we quote is the price our clients pay.



### **SRU SPECIALIZED SERVICES**

SRE's objectives are to provide professional services and expertise that will enable clients to optimize operations and properly manage sulfur recovery units (SRUs) on a day-to-day and long-term basis. SRE offers the following specialized services:

- Sulfur Plant Performance Evaluation
- Amine System Evaluation
- Tail Gas Treating Unit Evaluation
- Optimization using VMGSim™
- Start-up and Shutdown Assistance for Amine, Sulfur Recovery, and Tailgas Treating Units
- Sulfur Plant Capacity (Turndown) and De-Bottlenecking Studies
- Thermal Incinerator Optimization Program
- Sulfur Plant Simulation Using VMGSim™ (Steady-State and Dynamic Modeling)
- Bulk and Trace Ammonia Testing with onsite results (Destruction Efficiency Studies)
- Comprehensive Sulfur Product Analysis (Liquid and Solid)
- Source Testing and General Analytical Services
- SRU Post-Construction Management for Pre-Commissioning, Commissioning, Start-up Activities, and Performance Guarantee Verification
- Sulfur Plant Process Review - Ongoing Consulting/Support/Affiliation
- Tailored Sulfur Recovery Seminars for SRU Operators and Engineers delivered on site.