



# CH2MHILL

## Applied Sciences Laboratory

### Case Study

## VOC Removal System (VRS)



*ASL provided the facilities and staff to research, evaluate, and develop VRS technology.*

CH2M HILL engineers from the Salt Lake City office developed and patented an untested process to remove volatile organic compounds (VOCs) from air using a proprietary scrubbing solution. The process is called the VOC Removal System, or VRS. For the most part, however, VRS was still only an idea. ASL chemists were called upon to develop methods to test and evaluate the effectiveness of this patent. Initially, the proprietary scrubbing fluid was tested to determine its absorption capabilities, its stability, and the capability of regenerating the fluid by heating. One of the unique qualities of VRS is that absorbed VOCs can be recovered by heating up the VRS fluid to release the captured VOCs, which are then condensed back into their liquid form. ASL designed a small-scale pilot distillation system to evaluate the practicality of regeneration of the VRS fluid. ASL also designed an automated heat cycling system to evaluate whether repeated regeneration of the VRS fluid affected its ability to absorb VOCs.

Once the basic physical and chemical properties of the VRS fluid had been evaluated, engineers began to think about applying the technology to practical applications. To this end, ASL staff designed and constructed a miniature paint booth to generate the type of VOC-laden exhaust which can be found in many industries. A stripping column, with VRS fluid running through it, was attached to the exhaust of the miniature paint booth. The test was a success, with a more than 80% reduction in VOCs observed.

The crude stripping column and miniature paint booth data led to a trial pilot study at an automotive manufacturing facility in Ulsan, South Korea. ASL staff conducted preliminary emissions testing at the facility 6 months prior to the pilot scale study. During the study, ASL staff operated the pilot system, collected samples for analysis, and collected pilot plant data. Through these efforts, and the countless laboratory studies conducted previously, CH2M HILL engineers were able to fully characterize and understand the capabilities of VRS technology.



*VRS Pilot Study in Ulsan, South Korea*

## Contacts

For more information on this and other services  
CH2M HILL's ASL can provide, please contact:

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