

Decontamination and Degassing Process to Remove Mercury Vapour

Most of the electrical requirements for Vancouver Island, B.C. are supplied from the mainland via submarine cables installed and operated by British Columbia Hydro.

Between 1967 and 1979, a bi-polar high voltage direct-current (HVDC) link was installed to meet the ever growing demand for electrical power. The HVDC link is designed to transmit power as a rectifier which converts the AC power to DC power so that it can be transmitted to Vancouver's surrounding islands in the most efficient manner.

The HVDC station configuration consists of two converter valve groups. Pole I is designed to transmit up to 312 MW at 1200 Amps while Pole II is designed to transmit 476 MW at 1700 Amps. Before solid state thyristor valves were developed, mercury arc valves were the technology of choice to achieve the AC/DC conversion.

Mercury Vapour Decontamination System Designed to Protect Facility Operators

Each arc valve has four 300 Amp anodes mounted upon a tank which houses a common cathode. Mercury vapour is maintained in a high vacuum inside the cathode tank and anode cylinders. Mercuric compounds can be extremely toxic to humans. Present day reports on mercurialism center around industrial exposure for the most part to mercury vapours. The exposure limit



Vancouver Island HVDC link (B.C. Hydro Facility)

as set by the American Conference of Governmental Industrial Hygienists is 0.1 mg/m^3 of air. Therefore, the decontamination process had to achieve a significantly high absorption efficiency. The engineers at H.A. Simons Ltd. designed a ventilation and contaminant removal system to effectively handle the toxic potential of the mercuric compounds expected in this application. This design was confirmed and implemented by the chemists and engineers at Circul-Aire.

Gas Phase Filtration Designed to Meet Specific Requirements for Mercury Removal

In order to ensure adequate absorption of the mercury vapours, a special formulation of activated carbon impregnated with iodine was developed by the chemists and engineers at Circul-Aire. This media formulation had to guarantee effectiveness against such toxic compounds of mercury, as well as maximize the removal efficiency of the other gases present



when a valve was being degassed. Before a valve can be put into service, it must undergo extensive decontamination which can last from four to eight weeks. The special media formulation labelled MM-8000 had to be designed to absorb high concentrations of mercuric compounds for these periods and relatively low trace amounts during times when degassing was not occurring.

Air Purification Designed to Meet Space Limitations and Maximize Efficiency of the Source Capture Ventilation System

Any ventilation system that is designed to remove hazardous gases at their source must incorporate an effective source capture process that ensures minimal exposure of the facility operator to off-gassing within his or her breathing zone.

The Circul-Aire system was designed to be vertically installed, thus minimizing space within the mechanical room and providing the most effective means of gas removal by utilizing a upflow configuration.

The recirculation units, designed for 1000 CFM, installed at the site consisted of two A.P.S.-1000-VU-2 units complete with stainless steel media modules, a NEMA-4 motor starter assembly, high efficiency motors, and a differential pressure monitoring system comprising of 4 minihelic gauges. A third unit of similar specification was also installed to operate at 2000 CFM.

All of these systems incorporated a 30% efficiency pre-filter, 3 stages of MM-8000 chemical media, a 30% efficiency after-filter and a 90% rated efficiency final filter.

TECH-CHEK™ Service for Maintenance Monitoring

The maintenance of the A.P.S.-2000 Air Purification Systems has also been simplified with the TECH-CHEK™ Service supplied by Circul-Aire. With this exclusive service, media samples are tested in order to verify consumption rates.

This lifetime service is monitored by a computerized program from Circul-Aire that indicates the appropriate schedule for media replacement.

This customized service, supplied at no additional charge, not only provides a precise maintenance schedule, but also ensures the highest performance of the A.P.S.-2000 Air Purification Systems installed at the B.C. Hydro facility.



Circul-Aire APS-1000 complete with control system at B.C. Hydro Facility in Vancouver, B.C.

FOR MORE INFORMATION ON A SPECIFIC APPLICATION, PLEASE CONTACT YOUR LOCAL REPRESENTATIVE OR CIRCUL-AIRE.

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