

Course Outline

DAY 1	<p>Introduction and Overview The attendees will learn gas specifications and process selection criteria; both common and unusual impurities in raw gas such as H₂S, CO₂, Hg, COS, S, etc; overview of economic application ranges for treating processes; trace sulfur compounds and odorants. Example treating situations from an international perspective applying basic principles and important conversions will also be taught. An emphasis on safety will be maintained throughout.</p> <ul style="list-style-type: none"> • Specifications and Process Selection Criteria • Basic Principles and Important Conversions <p>Amines In this section the attendees will learn about the amines in commercial use such as MEA, DEA, DGA, DIPA, MDEA with solution properties, concentrations, and operating parameters; amine/acid gas chemistry; amine selection; trayed and packed tower comparison; filtration and foaming issues; operating upsets leading to off-specification and environmentally unacceptable gas; solution degradation; reclaiming techniques. Computer simulation of an amine plant is presented along with hand calculation examples.</p> <ul style="list-style-type: none"> • Amine Types, Process Overview and Applications • Operating Parameters • Operating Problems <ul style="list-style-type: none"> – Foaming – Corrosion – Degradation 	<p>Physical Absorption Processes (continued)</p> <ul style="list-style-type: none"> • Water • Selexol • Other Physical Solvents Overview <ul style="list-style-type: none"> – Fluor Solvent – Propylene Solvent – Rectisol / Purisol – Other <p>Selective Treating The attendees will learn selective H₂S removal using MDEA and Selexol with worked examples on two gas fields. They will see the selectivity of the various amines and Selexol.</p> <ul style="list-style-type: none"> • MDEA • Selexol <p>Metallurgical Issues Instruction materials address sour service, NACE/ISO MR0175 sulfide stress cracking (SSC), hydrogen induced cracking (HIC); corrosion, steels and alloys in use.</p> <ul style="list-style-type: none"> • Material Selection for Sour Gas Processing 	<p>Sulfur Recovery The attendees will learn about sulfur recovery processes such as Claus, Selectox; EUROClas LOCAT, SulFerox, SuperClaus, CBA, MCRC, Sulfreen, operational problems, computer simulation of Claus process; required recovery levels; affect of acid gas H₂S/CO₂ ratio; H₂S/SO₂ ratio control; hydrocarbons in acid gas H₂S content; split-flow; sulfur recycle; reaction equilibrium; catalysts; individual and combination reheat schemes; sulfur dewpoint; oxygen enrichment. Also taught will be Redox processes such as LOCAT, SulFerox, etc.; economic comparison of Redox processes on full sour gas and acid gas-only streams.</p> <ul style="list-style-type: none"> • Claus Process <ul style="list-style-type: none"> – Process Overview – Operating Parameters – Simulation – Operating Problems – Effect of CO₂ • Liquid Oxidation Processes <ul style="list-style-type: none"> – LOCAT / SulFerox – Stretford – Other
DAY 2	<p>Amines (continued)</p> <ul style="list-style-type: none"> • Computer Simulation Including MDEA <p>Sulfinol Processes Both Sulfinol-D and -M are discussed in routine gas treating applications as well as trace sulfur removal and cascade Sulfinol.</p> <p>Flexsorb The attendees will receive an overview of Flexsorb SE, PS and HP presented with reference to both gas treating and tail-gas clean up applications.</p> <p>Carbonate Processes The attendees will learn the various hot carbonate plant configurations; loading/conversion calculations and operating issues, salting out; corrosion; activators and applications of this process.</p> <ul style="list-style-type: none"> • Type and Process Overview • Operating Parameters • Operating Problems • Calculations <p>Physical Absorption Processes The attendees will learn applications of physical solvents and their advantages and disadvantages; flash and heated regeneration, example on hydrocarbon co-absorption, differences between physical and chemical solvents, underlying theory of absorption and key principles; detailed discussion of Selexol; overview of other physical solvents such as propylene carbonate, Rectisol/Purisol, etc.</p> <ul style="list-style-type: none"> • Applications • Absorption Theory Principles 	<p>Other Technologies / New Developments The attendees will learn about important technologies such as membranes for treating and dehydration, condensation in membranes, different membrane materials, single stage and recycle membranes, gas fractionation, extractive distillation, e.g. Ryan-Holmes, IFPEXOL, combination processes (membrane/amine), etc.</p> <ul style="list-style-type: none"> • Membranes • Ryan-Holmes / Fractionation Processes • Other Emerging Technologies • Others Including Combination Processes <p>Solid Bed and Non-Regenerable Processes The attendees will learn the range of commercially-proven solid bed processes such as Sulfatreat, iron oxide, zinc oxide, metal oxides, Sulfa-Check, doped charcoal, doped alumina, molecular sieve, etc.; advantages and disadvantages, economic ranges; waste disposal issues.</p> <ul style="list-style-type: none"> • Iron Sponge • Mol Sieve • Zinc Oxide • Other Processes <p>Liquid Treating The attendees will learn the range of processes for various contaminant levels in hydrocarbon liquids; how sweet gas can produce sour NGL; removal of the H₂S, CO₂, COS, RSH, (mercaptan) including extraction processes, etc.; distribution of contaminants between NGL components.</p>	<p>Tail Gas The attendees will learn the issues in process selection; characteristics of the available processes including SCOT, CBA, MCRC, Sulfreen, FlexSorb SE, ATS, BSRP advantages/disadvantages; typical operating conditions; recovery levels.</p> <ul style="list-style-type: none"> • SCOT • CBA / Sulfreen / MCRC • Others <p>General Workshop The attendees will participate in a class workshop to evaluate operating problems and gas analyses provided by attendees and the instructor. This consolidates the participant's knowledge acquired in earlier sections of the course with actual example gas compositions and problems. Attendees are encouraged to bring operating problems and actual gas composition information to this seminar/discussion session.</p> <ul style="list-style-type: none"> • Open discussion on gas analyses / problems brought to seminar by attendees. <p>Course Review and Summary The attendees will participate in a broad overview of the key learning points presented during the seminar.</p> <hr/> <p>Note: Course schedule is approximate and may be adjusted for location and participant interest.</p> <p>This G6 course and the RF61 have much material in common. RF61 gives more emphasis to oil refinery aspects of gas sweetening, SRU, sour water and tail gas.</p>
DAY 3			
DAY 4			
DAY 5			