STUDY OF OUTDOOR STEAM SYSTEMS AND RELATED PROBLEMS

OBJECTIVES

IN THE REFINING AND PETROCHEMICAL INDUSTRIES, THE UTILIZATION OF STEAM OUTDOORS PRESENTS A PECULIAR SET OF PROBLEMS. OUR OBJECTIVE IN THIS DISCUSSION IS TO IDENTIFY THESE PROBLEMS AND DISCUSS SOLUTIONS,

STEAM CONSERVATION

THE EFFICIENCY OF A STEAM SYSTEM CAN SIMPLY BE STATED AS THE NUMBER OF BTUs USED VERSUS WORK DONE. THE WORK DONE IN THIS CASE IS GENERALLY THE BTU TRANSFER FROM THE HEAT EXCHANGER (TRACER LINES) TO THE PRODUCT FLUID, PIPE OR INSTRUMENTS. THE INEFFICIENCIES IN THE STEAM SYSTEM CAN BE CONTRIBUTED TO POOR TRACER LINE DESIGN, INADEQUATE OR NONEXISTENT RETURN SYSTEMS, IMPROPER STEAM TRAP DESIGN OR FAILING STEAM TRAPS.

ONE OF THE TESTS IN PROGRESS TO BE WITNESSED IS A HEAT BALANCE TEST ACROSS THE TRAP (BTU IN VERSUS BTU OUT). IT IS NOT "TOTAL EFFICIENCY" OF A STEAM TRAP. IT IS, HOWEVER, AN IMPORTANT AND COSTLY ASPECT AFFECTING THE TOTAL EFFICIENCY OF A STEAM SYSTEM.

LONGEVITY OF STEAM TRAPPING EQUIPMENT

THE FAILURE OF AN INDIVIDUAL STEAM TRAP NOT ONLY CAN BE A COSTLY MAINTENANCE PROBLEM, BUT ALSO CAN BE A SUBSTANTIAL ENERGY WASTER. IF A STEAM TRAP FAILS SHUT, FREEZE-UP OR PRODUCT SPOILAGE CAN RESULT. IF A STEAM TRAP FAILS OPEN, CONSIDERING THE COST AND SCARCITY OF ENERGY, THE RESULTS CAN BE EQUALLY COSTLY. I WONDER IF THERE IS SUCH A THING AS A "FAIL-SAFE" STEAM TRAP. THE DEPENDABLE, YEAR IN, YEAR OUT OPERATION OF A STEAM TRAP HAS TAKEN ON EVEN MORE IMPORTANCE.

ONE OF THE PROBLEMS TO BE LOOKED AT IS THAT OF STEAM TRAP TESTING IN THE FIELD. SUCH METHODS AS PRESSURE, TEMPERATURE AND SOUND (INCLUDING ULTRASONIC SOUND) WILL BE EVALUATED.

CONDENSATE SYSTEMS HANDLING

As THE COST OF A BTU INCREASES, JUSTIFICATION OF A WELL DESIGNED CONDENSATE RETURN IS INEVITABLE. SUCH FACTORS AS INITIAL COST, MAINTENANCE COST, AND FREEZING PROBLEMS MUST BE CONSIDERED. WE'LL HAVE THE OPPORTUNITY TO STUDY AND EXPERIMENT WITH TRACER LINE APPLICATIONS THROUGH A VARIETY OF TRAPS, LOADS, AIR CONDITIONS, AND RETURN SYSTEMS ALL UNDER GLASS. WE WILL ALSO HAVE THE OPPORTUNITY TO WORK

WITH A BI-PHASE (GAS-LIQUID) RETURN LINE IN OPERATION UNDER GLASS. THESE ARE ALL IMPORTANT SYSTEM CONSIDERATIONS FOR SUCCESSFULLY RETURNING CONDENSATE IN OUTDOOR APPLICATIONS.

FREEZING PROBLEMS OF OUTDOOR STEAM SYSTEMS

As WE ALL KNOW, THE FREEZE-UPS CAN BE DISASTROUS. THE CAUSES ARE NUMEROUS AND CAN BE AGGRAVATED BY A POORLY DESIGNED CONDENSATE HANDLING SYSTEM. WE'LL HAVE THE OPPORTUNITY TO EVALUATE A CONDENSATE HANDLING SYSTEM OR STEAM TRAP STATION UNDER FREEZING CONDITIONS.

To GENERALIZE, IF WE CAN ADDRESS OURSELVES TO THESE MAJOR OBJECTIVES - STEAM CONSERVATION, LONGEVITY, SYSTEM CONCEPTS AND FREEZING PROBLEMS - WE'LL BE MOVING IN THE RIGHT DIRECTION TOWARD A "TOTALLY EFFICIENT" STEAM SYSTEM.