Activated Sludge Training

Day One

Basic Fundamentals - 4.5 hours

System Components - 1.5 hours

Identify equipment necessary to operate the activated sludge process and explain the function of each. List the environmental factors that affect the AS process.

References - Operation of Wastewater Treatment Plants - Sacramento Course Volume II (4th Ed.), 11.1 - 11.25

Operational Parameters - 1.5 hours

Identify the common parameters used to describe the AS process and explain the function of each.

References - Sacramento Course Volume I (4th Ed.), 8.301

Modes - 1.5 hours

List the common operating modes for AS plants and their associated operations parameters. Identify the advantages & disadvantages of each.

References - Sacramento Course Volume I, 8.201 (extended plants) and II, 11.840 - 11.846

Physical Observations - 1.5 hours

List the common physical observations made at an AS aeration tank and clarifier. Describe the process conditions that can be inferred from the observations listed.

References - "Activated Sludge, Evaluating and Controlling Your Process" Hobson Chapter 1, and field visit to an activated sludge plant

Day Two

Control Tests - 3 hours

List the operational tests needed to control the AS process. Identify the proper location & sample frequency for each test listed. Describe the procedure for each test listed. Explain the use of each test listed in controlling the AS process.

References - Hobson Chapters 3 & 9, Sacramento Course Volume II, 11.5, 11.7, 16.45, 16.461, 16.51, and hands on work at an activated sludge plant.

Calculations - 3 hours

Perform the calculations required to determine the operational parameters listed in Basic Fundamentals.

References - Hobson Chapter 3, Sacramento Course Volume II, 11.7

Day Three

Jeopardy Review - 1 hour

Review material from Days 1 and 2 using a Jeopardy format.

Microscope - 1 hour

List the indicator organisms commonly found in AS plants. Describe the process conditions that can be inferred from each indicator listed.

References - Hobson Chapter 7, Sacramento Course Volume II, 11.9, hands-on microscope work at an activated sludge plant.

Return Activated Sludge (RAS) Flow Control - 1 hour

List the common RAS flow control strategies; constant rate, percentage of influent, Sludge Blanket Control, Mass Balance & "Thick but Quick." Identify the parameters that must be observed with each strategy. List the advantages & disadvantages of each.

References - Hobson Chapter 11

Waste Activated Sludge (WAS) Flow Control - 2 hours

List the common WAS flow control strategies; Constant Mass - (MLSS, MLVSS, MCRT, GSA), Constant F/M, and Sludge Quality Control. Identify the parameters that must be observed with each strategy. List the advantages and disadvantages of each.

References - Hobson Chapter 10, Sacramento Course Volume II, 11.52

Record Keeping - 0.5 hour

Demonstrate the use of a data sheet to record and trend data.

References - Hobson Chapter 8 and Appendix, Sacramento Course Volume II, 11.0

Start-Up - 0.5 hour

Explain the need to inspect all process units. Describe the steps needed to start-up an AS plant.

References - Sacramento Course Volume I 8.22, Sacramento Course Volume II, 11.4

Day Four

Troubleshooting Problems - 3 hours

List and describe problems common to activated sludge plants. Describe the causes of slow settling sludge and what tests are useful to determine these causes. Describe sludge bulking, the process conditions associated with this and what remedial actions can be taken to control sludge bulking. List the chemical additives and settling aids used to control bulking.

References - Hobson Chapter 1, Sacramento Course Volume I 8.252 and 8.333, Sacramento Course Volume II, 11.6, plus use of data from previous on-site visits to troubleshoot plant operations

Case History Problem - 3 hours

Using the concepts covered, the students should be able to use the skills learned to identify and correct the problems found in a case history covering all the common problems associated with activated sludge.