

CHEMIST (7833) TASK LIST

Sample collection

1. Collects samples such as water and soil at designated locations and, if necessary, in the field, according to guidelines specifying types of container, frequency of sampling, and proper procedures, in order to obtain a representative sample for specified organic and inorganic analyses such as testing for nitrates, volatile organic compounds and heavy metals.

Sample Preparation

2. Reads safety labels on reagent bottles, safety data sheets (SDS), procedures manuals, and safety manuals in order to understand the necessary precautions, appropriate personal protective equipment needed, and to promote a safe working environment.
3. Prepares samples, such as water or soil for instrumentation analysis using proper apparatus such as separatory funnels, solid phase extraction, soxhlet extraction, drying ovens, hoods and hot plates, by concentrating solvent, for example pentane, hexane, methylene chloride in order to concentrate organics to proper volume in order to test more than one substance from the same sample.
4. Converts samples into an analyzable form or isolates components from samples, using techniques such as head space, purge and trap, solvent extraction, distillation, filtration and digestion, in order to prepare samples for testing according to standard operating procedures (SOP).
5. Measures the pH level of collected samples such as soil and water by using a pH meter and/or pH test strip to ensure that a sample is within a specified pH range to prepare the sample for subsequent uses such as preservation, sample preparation or analysis.
6. Sets up instruments for testing manually, or through a data station for use in sample preparation and analysis by selecting and calibrating appropriate equipment such as the appropriate lamp, setting proper wavelength, setting proper burner head, selecting proper column, detector, temperatures, and carrier gas in order to have equipment ready for testing according to associated methodologies, SOP(s) on various samples such as water, soil, or asphalt.
7. Establishes a standard calibration curve by creating a standard solution by mixing specific amounts of substances at different concentrations within the linear range of detection in order to have a basis for determination of sample concentration when performing further analyses on various samples.

Analysis/Testing

8. Manually enters data into computers and data stations by reading and typing relevant information from analyses preparation and output in order to perform work related data analysis and interpretation.
9. Determines the level of ions in a sample using a conductivity meter by inserting probes into aqueous sample and reading measurements on the meter, to conclude analysis, or in preparation of further testing.
10. Assesses various situations such as investigating suspected sewer lines or pipe breaks, or water percolation into private areas, in order to determine appropriate analyses such as testing water to see if it did come from City run sources, or determining whether the water can travel a specific distance to disputed area in order to determine whether or not the City is liable for damages due to grieving party.
11. Validates the results of analyses by testing quality control samples such as method blanks, matrix spikes, and duplicates alongside regular samples to interpret comparative results and ensure accuracy of analyses.
12. Tests samples such as water for total organic carbon/halide levels using a total organic carbon analyzer or total organic halide analyzer by putting samples into the analyzer via the appropriate containers and tubes and interpreting the computer output in order to determine if a sample has appropriate levels such as safe levels for drinking water.
13. Prepares Homogenous solutions by mixing reagents such as chemicals, water, acids, organic solvents, and bases in proper proportions according to SOP(s), using volumetric glassware, balance and stirring motors in order to perform specified testing dependent on the sample type.
14. Performs a wet chemistry colorimetric analysis on samples of water, fire debris, sediment, and sludge, using flasks, pipettes and indicators by adding the proper reagent and then agitating solution by stirring or shaking, in order to isolate one substance for testing in a colorimetric process.
15. Tests concentrations of organic and inorganic substances such as heavy metals, nitrogen, phosphorus, fluoride, silica, cyanide, phenols and detergents in samples such as water, and soil. using various spectroscopic equipment such as atomic absorption, atomic emission, ultra violet/visible, or infra-red, in order to determine appropriate concentrations of substances based on SOP's.
16. Tests samples for organic substances such as phenols, pesticides, herbicides, volatile organics, base neutral/acid extractables, and traces of accelerants, using various instruments such as a gas chromatograph or gas chromatograph/mass spectrometer in order to measure the level of known or unknown chemicals in samples or to determine the accidental or incendiary cause of fire.

17. Performs tests and analyses on substances such as water, air, fire debris, asphalt binder, sediment, tissue, and sludge to meet Environmental Protection Agency (EPA), other Federal, State, local, law enforcement, Superpave Mix Design, and public safety requirements.
18. Tests the level of chemicals in water samples using volumetric titration by placing a reagent in a buret, and releasing it to drip in the sample determining when the appropriate amount has been added, by observing the sample as it changes to a specific color in order to test samples for alkalinity, hardness, nitrogen, chlorine, chloride, chemical oxygen demand, and biological oxygen demand.
19. Tests for total suspended solids and oils/greases using gravimetric analysis by weighing the proper amount of substances using an analytical balance to determine the amount of substance in sample such as water and sediments in order to determine if samples meet SOP specifications.
20. Tests organic solid materials using a heating apparatus such as a furnace, oven, or burner to determine the samples flammability, or to dry, distill or digest substances.
21. Analyzes various materials such as liquids or asphalt binders using a flash point tester in order to determine a sample's ignitability.
22. Neutralizes solutions with extremely high or low pH by adding substances such as water, acids, bases to reach a neutral pH level resulting in water and salt to create a safe mixture for proper disposal such as pouring the neutralized sample into an appropriate container or receptacle.
23. Conducts bench-top studies consisting of determining new and more efficient methodologies for testing various samples such as asphalt leaching or water, by evaluating new technology in order to improve processes or procedures.

Reporting/ Validation

24. Reviews the results of all laboratory analyses and investigations, checking to see if any of the results obtained appear to be out of standard parameters in order to control the quality of work within unit.
25. Reports violations of limits established by regulatory agencies to supervisor, either verbally and/or in memo form so that appropriate actions may be taken such as further investigation or manual corrections for the problem.
26. Confers with other employees, supervisors, engineers and the public, in person and over the phone, in order to answer questions, concerning test results, hazardous materials, and chemicals to obtain or provide information.

27. Communicates orally in order to testify in court regarding chemical test results and interpretation.
28. Communicates orally to provide information to management and subordinate personnel.
29. Communicates orally to a group in order to provide information to the public and to give group tours.
30. Conducts training meetings for subordinates on issues such as safety, chemical analysis, and instrumentation in order to disseminate information.
31. Fills out periodic result sheets on a daily, weekly, and monthly basis including the conditions of analysis, raw data, type of sample, time, method used, and results in order to document information required by management and/or regulatory agencies.
32. Calculates concentration of sample such as water, gas, and sediments, from data generated through analysis, using basic math skills, manually or through data station in order to determine the level of concentration for a chemical determined by the specific analysis.
33. Writes reports to management in order to convey analysis of current and pending legislation, regulation and directives on quality control standards, treatment processes, and testing.

Inventory and Maintenance

34. Inspects inventory of supplies, consumable items and ordered items, such as compressed gasses, and various chemicals and compounds in order to maintain sufficient inventory for operation.
35. Monitors amounts of disposable hazardous waste in order to arrange for hazardous waste disposal pickup.
36. Cleans and/or changes basic parts of instruments in order to perform routine maintenance as described in maintenance guides.
37. Writes performance specifications for desired equipment after assessing needs of the laboratory and specifying what capabilities the equipment should have, and compares it to the manufacturer's specification to determine whether or not equipment is suitable for needs of department.

Operations

38. Discusses the preparation for and performance of assigned work with employees including methodology in order to clearly define requirements and expectations.

39. Consults on the fabrication of a pilot project, including setting up systems and methodology, in order to simulate the design engineer's recommendations for processes of sewage disposal, including treatment and sedimentation with the recycling of activated sludge, to determine whether the recommendation is appropriate to produce the required results.
40. Trains and orients new employees in technical processes according to standard guidelines.
41. Reviews completed work of co-workers or subordinate personnel, in order to check for accuracy.

Development

42. Confers with outside consultants and plant engineers to determine the sampling procedures used for projects such as industrial wastes, process control and special projects such as Ground Water Monitoring and Cleanup in order to obtain the type of information necessary to achieve desired results of project.
43. Explains how the results of analyses relate to specific problems and/or suggests further actions to be taken in order to interpret the results of data collected for public or in-house employees and to put information gathered from tests to practical use by Department and public.
44. Attends industry organization meetings and conferences such as California Water Pollution Control Federation, American Chemical Society, Southern California Environmental Chemists Society, American Water Works Association, and American Society of Testing Materials in order to participate in current research, new testing, method development, literature, while staying up to date with technology and methodology.

Lab Operations

45. Confers with operations personnel, outside maintenance personnel, consultants, and representatives from regulatory agencies and other organizations in order to provide or receive information and to gain approval on desired projects.
46. Writes reports to management concerning investigations of plant operations, conditions within the water system, and maintenance conditions in order to alert management to problems or to give requested information.
47. Writes memos and reports concerning matters such as safety and laboratory operation in order to alert management of problems or to make recommendations.
48. Provides technical advice, as needed, regarding biological, chemical or physical processes to engineers, and operating employees performing studies or investigations.

49. Inspects laboratory and field conditions and operations through personal observation to ensure conformance with safety regulations according to CAL/OSHA.
50. Testifies in court as an expert witness as to the results of chemical analyses in order to give testimony regarding the City's liability when a case is brought to court.

Conducts tours and explains laboratory functions and processes, such as water and wastewater quality control facilities, materials testing laboratory, to governmental, technical, and educational groups.