



# Indigo Water Group & Hydrolysis

HYDROLYSIS

## 2012 Water Exam Cram Topic Descriptions

**Water Treatment Sources** - This 60 minute course covers the Hydrologic cycle, a brief overview of water rights, surface water, groundwater, and reclaimed water. Physical impoundments, reservoirs, and intake structures will be discussed. Sourcewater selection and protection will include sanitary survey information, physical, biological, radiological, and chemical characteristics of potential source waters, and basic math including acre ft and demand, and residence time calculations

**Coagulation** – This 60 minute course covers coagulant alternatives, basic coagulant chemistry, and mixing (methods and types of mixers), coagulation basins. Attendants will learn about optimum pH and saturation conditions, floc density, and enhanced coagulation treatment techniques.

**Flocculation** – This 75 minute course will cover floc formation processes, baffling, paddle mixing, and basic math of flocculation, including detention times, basin volume calculations, and settling times. Course will also cover performing a Jar Test.

**Sedimentation** – This 60 minute course will cover sedimentation basin zones, basin types, and processes, and basic math of sedimentation, including detention times, basin volume calculations, settling times, and weir overflow rates. Floc characterization, effluent NTU's and filterability indicators and sludge handling techniques and removal systems will also be covered.

**Operations Math** – This 60 minute refresher will cover unit conversions and Coagulation, Flocculation, and Sedimentation calculations, including volume calculations, mixing energy, settling rates, and weir overflow rates.

**Drinking Water Regs** – This 60 minute course will cover the CDPHE Primary Drinking Water Regs, including the new Groundwater Rule, DBP Rule, and ESWTR.

**Instrumentation and Control** – This 60 minute course will cover basic remote monitoring and automation technologies, including SCADA, Remote IO, Radio, Telemetry, and operations control strategies. It will also cover basic instrumentation, including pressure switches, level monitoring equipment, flow measurement equipment, and basic online water quality instrumentation.

**Plant Operations** – This 60 minute course will cover tools and methodologies to optimize treatment performance. Topics include using data and trends to measure performance, predicting demand and water quality changes, optimizing chemical dosages, and documentation.

**Taste and Odors** – This 60 minute course will focus on controlling and preventing taste and odor indicators and causes in source water, and treatment of taste and odor in the treatment process. Blue green algae prevention and treatment strategies, and other treatment strategies will be discussed. Customer service, customer notification, and responding to taste and odor events will also be discussed.

**Lab Procedures** – This 75 minute course will cover basic water laboratory procedures, including basic metric system math, basic chemical names and formulas, and basic laboratory equipment. Titrations, dilutions, QA/QC will be discussed, and sampling techniques will also be covered. Several specific tests will be covered, including titrating for alkalinity, free and total chlorine, and using spectrophotometers.

**Operations Math** - This 60 minute refresher will cover unit conversions and basic dilution calculations, it will also cover dosage problems and QAV problems .

**Drinking Water Regs** - This 90 minute course will cover the CDPHE Primary Drinking Water Regs, including the TCR, Lead and Copper, and reg 100.

**Advanced Treatment** - This 90 minute course will cover advanced water treatment technologies, including ion exchange, membranes, UV, AOP, and Ozone.

**Pumps and Motors** – This 60 minute course will cover different types of pumps and motors and will include typical uses. Basic pump curves, horsepower calculations, basic hydraulics, and pressure conversions will be discussed.

**Maintenance** – This 60 minute course will cover predictive, preventative, and corrective maintenance strategies. It will address maintaining electrical equipment, mechanical equipment (general pump maintenance including lubrication and impellers,) compressors, valves, and basic engine maintenance.

**Filtration** – This 75 minute course will cover types of filters, types of medias, and filter operations, including backwashing and surface washing techniques. Filtration interactions with other treatment processes, including sludge lagoons, sedimentation effluent weirs, and polishing filters will also be discussed. Particle counters and Turbidity measurements for performance indication, data documentation, and other filter surveillance strategies will also be discussed.

**Record Keeping** – This 60 minute course will cover record keeping requirements for compliance with CDPHE PDWR's and will also discuss data storage and operator and maintenance logs theories and best practices.

**Chlorination** – This 90 minute course will discuss the purpose of disinfection, and effect of pH, Temperature, and organic matter on disinfection. Topics will include breakpoint chlorination curve, free and total chlorine, demand calculations, hypochlorite, and chlorine dioxide. Points of application, and operation and maintenance of chlorination equipment will also be covered.

**Operations Safety** – This 90 minute course will cover basic operations safety, and will include emergency response, fire safety, vehicle/traffic safety, PPE, slip trip and fall hazards, and spill prevention and response.