Red Vector Approved Courses for IGWA, 2008

NDA Groundwater Knowledge (4 hours) – NDA Scored for 4 Idaho Credits
This 4-hour online course requires you to review the NDA"s Driller Handbook, which is included as a PDF file download. The handbook provides up-to-date information regarding drilling methods and well installation. It includes:

- ☐ Basic Geology & Hydrology
- ☐ Occurence & Movement of Groundwater
- ☐ Well Hydraulics
- ☐ Well Drilling Methods
- ☐ Drilling Fluids
- ☐ Well Screens & Sediment Size Analysis
- ☐ Water Well Design
- ☐ Installation & Removal of Well Screens
- ☐ Development of Wells
- ☐ Field Testing of Hydraulic Parameters
- ☐ Pumps and Pumping
- ☐ Groundwater Monitoring Techniques
- ☐ Sealing Abandoned Wells & Boreholes
- ☐ Subsurface Exploration Tools & Equip.
- ☐ Drilling, Sampling & Installation
- ☐ Drilling Safety Guide

After reviewing the handbook, you will be asked to answer 43 quiz questions testing your level of groundwater knowledge. **This course is designed for someone with a drilling background.** The quiz calls for you to refer to the handbook, as well as your own personal knowledge.

NDA Monitor Well Construction (6 hours) – NDA Scored for 6 Idaho Credits
Successful completion of this course & exam results in the National Drilling Association's Monitor Well Construction Certification.

This course requires you to review the NDA"s Driller Handbook, which is included as a PDF file download. The handbook provides up-to-date information regarding drilling methods and well installation. It includes:

- ☐ Basic Geology & Hydrology
- ☐ Occurence & Movement of Groundwater
- ☐ Well Hydraulics
- ☐ Well Drilling Methods
- ☐ Drilling Fluids
- ☐ Well Screens & Sediment Size Analysis
- ☐ Water Well Design
- ☐ Installation & Removal of Well Screens
- ☐ Development of Wells
- ☐ Field Testing of Hydraulic Parameters
- ☐ Pumps and Pumping
- ☐ Groundwater Monitoring Techniques
- ☐ Sealing Abandoned Wells & Boreholes
- ☐ Subsurface Exploration Tools & Equip.
- ☐ Drilling, Sampling & Installation
- ☐ Drilling Safety Guide

After reviewing the handbook, you will be asked to answer 75 quiz questions. This course is designed for someone with a drilling background. The quiz calls for you to refer to the handbook, as well as your own personal knowledge.

Basics of Water Resources - Groundwater Hydrology (1 hour) - Donna Rona Scored for 1 Idaho Credit
This **1-hour interactive online** course covers the fundamentals of water supply hydrology. From the hydrologic cycle to the nature and character of groundwater as it goes from recharge zones to discharge points, the basic concepts and terminology are introduced in a clear and easy to read form.

Water Well Design (2 hours) - William Hoffstetter Scored for 2 Idaho Credits
Extracting groundwater for use as public water supply, irrigation, or industrial supply presents a challenge to Engineers, Geologists, and Well Drilling Contractors. Water wells must be designed to fit existing natural conditions. Factors including aquifer parameters (location, depth, rock types, and water yield capacity), geology and water quality, are unique to every location. The professional engineer, geologist, and well driller need to be informed of these factors to complete a successful water well construction project.
This two hour interactive online course will introduce you to the necessary steps in a water well design project. Proceeding with researching of local groundwater conditions to obtaining information necessary to locate and plan a well, this course presents techniques for designing a water well. You will learn valuable skills in the phases necessary to implement a well construction project.

Biofilms - An Introduction (1 hour) - Mark Reinsel Scored for 1 Idaho Credit
This 1-hour online course is an introduction into the fascinating world of biofilms, which exist everywhere from natural hot springs to heat exchangers to pharmaceutical bioreactors to human teeth. Biofilms can be both beneficial and detrimental. Biofilms significantly affect many aspects of our everyday lives, including drinking water, human health and industrial processes. All of the information presented is available from public websites.

Introduction to Mineral Soils (1 hour) - Antonio Azevedo Scored for 1 Idaho Credit
Soil science is a growing field of knowledge. As in any other science discipline, there is an effort to build sharp definitions and precise concepts.This 1 interactive hour online introductory course focuses on general aspects of soil mineralogy and attempts to relate it to chemical and physical properties of soil related both to agronomical, environmental and engineering aspects.This course introduces some of the main characteristics of soils, and gives a rough idea of their origin and applications to professionals not related to soil science. This course includes a multiple-choice quiz at the end.

OSHA Welding & Cutting (2 hours) – David Chitester Scored for 2 Idaho Credits
This two hour interactive online course is a brief review of Government Regulations regarding Welding and Cutting as posted under Subpart J, Part 1926, from OSHA's Safety and Health Regulations for Construction. The course reviews the following topics:

- Gas Welding and Cutting
- Arc Welding and Cutting
- Fire Prevention
- Ventilation and Protection in welding, cutting and heating
- Welding, Cutting and Heating in way of preservative coatings

After reading over the OSHA material, a brief multiple choice quiz follows. You must have Flash Player Version 7 or higher to view some parts of this course. We also recommend you view this course in Internet Explorer.

Worksite Safety 03: OSHA Fall Protection (1 hour) – David Chitester Scored for 1 Idaho Credit
Each year, on average, between 150 and 200 workers are killed and more than 100,000 injured because of falls at construction sites. OSHA's construction industry

safety standard for fall protection 29 CFR, Subpart M, outlines systems and procedures designed to prevent employees from falling off, onto, or through working levels and to protect employees from being struck by falling objects. This **1-hour interactive online course** outlines the basics and provides some "do's" and "don'ts" for novices and those who need a refresher course. While workers may need additional training based on OSHA standards and the specific hazards of their jobs, RedVector's Worksite Safety courses can help inject entry-level workers with critical knowledge on a variety of OSHA-regulated safety and health topics.

Worksite Safety 07: OSHA Power Tools & Excavation (1 hour) - David Chitester
Scored for 1 Idaho Credit
It might seem silly to think of non-powered hand tools as hazardous, but anyone who's ever hit a finger with the full force of a hammer blow or staple-gunned their hand might beg to differ. Power tools are relatively safe when used properly and well maintained, but an electric shock resulting from a defective or modified device can be deadly. This 1-hour interactive online course will teach you the basics for keeping yourself and your coworkers out of harms way when using tools. While workers may need additional training based on OSHA standards and the specific hazards of their jobs, RedVector's Worksite Safety courses can help inject entry-level workers with critical knowledge on a variety of OSHA-regulated safety and health topics. **Excavations** - The fatality rate from cave-ins and other excavation-related accidents is more than twice as high as the rate for general construction work, but the OSHA standards provide a guide to greatly reducing the risks associated with digging operations. This potentially life-saving interactive online course discusses the basics about OSHA's excavation and trenching regulations.

Basics of Water Resources: Groundwater Contamination (2 hours) – Donna Rona
Scored for 2 Idaho Credits
Since the 1970s there has been a disturbing discovery of hazardous wastes in ground water. Early discoveries of sites such as Love Canal in New York and the Denver Arsenal in Colorado initiated a new era in groundwater studies. Throughout the 1980s numerous studies of abandoned waste sites, spills and leaking underground storage tanks became headline news. Groundwater hydrology is now critical to understand the mechanisms and rates of transport of physical, chemical and biological contamination below the ground, and the impact of those contaminants on the ground water supply. This 2-hour interactive online course covers the fundamental sources and classifications of groundwater contamination. The course focuses on the discussion of natural and man-made sources of groundwater pollution and gives some perspective into various systems of categorization and classification.

Groundwater Remediation (2 hours) - Mark Reinsel **Scored for 2 Idaho Credits**
High-quality fresh water is an increasingly rare and valuable commodity. The Earth contains a finite supply of water, and the small fraction useable for drinking and other beneficial uses will continue to be heavily utilized. Groundwater is the largest source of fresh water in the world, and many engineers and scientists need to understand the basics of groundwater for integration into their remediation or development projects.

Groundwater contamination has been a common problem at many industrial and military sites during the past several decades, frequently requiring groundwater capture and/or remediation. This 2-hour interactive online course reviews some groundwater basics, then explores technologies for remediation, and finally discusses the knowledge required to select a treatment process and successfully remediate a site.

Data Validation (1 hour) - Mark Reinsel Scored for 0.25 Idaho Credits

This **1-hour interactive** online course reviews the basics of Data Validation, or the quality assurance review of technical data. Data validation is an important concept for any engineer, scientist or contractor dealing with a Superfund site. Data validation is required for most data emanating from a Superfund site, which is administered by the **U.S. Environmental Protection Agency (EPA).** Much of the information presented in this course is available on EPA web sites.

An EPA document which provides standard operating procedures for data validation will be presented as part of the course. This document is specific to EPA Region 4 (Southeast U.S.) but is also applicable to the other regions. A multiple-choice quiz covering the EPA document and the other information provided will then conclude the course.

Drinking Water Treatment: Arsenic Removal (1 hour) - Mark Reinsel Scored for 0.5 Idaho Credits

From a chemistry standpoint, arsenic is the most recognized threat to drinking water quality in the world. In this 1-hour interactive online course, the engineer will learn the latest information about the regulatory status of arsenic in drinking water, methodologies for evaluating arsenic treatment needs, and both established and innovative technologies for removing arsenic.

All of the information presented is available from public reports and websites, and vendor websites. A multiple-choice quiz will be presented at the end of the course.

Hazardous Waste: The Basics (3 hours) - Mark Reinsel Scored for 0.75 Idaho Credits

Are you confused by all of the jargon and acronyms used regarding hazardous waste and remediation? What do you know about the latest (real or perceived) threats to groundwater or air quality? Do you want to learn whether your neighbor's stash of trash and rusted drums is merely annoying or legally hazardous? Learn the background to answer these and other questions in this course "Basics of Hazardous Waste." This 3-Hour interactive online course is presented in two sections, with a multiple-choice quiz at the end of each section.

Drinking Water – Disinfection (2 hours) - Mark Peterson Scored for 1 Idaho Credit

Disinfection is an important step in ensuring that water is safe to drink. Water systems add disinfectants to destroy microorganisms that can cause disease in humans. The Surface Water Treatment Rule requires public water systems to disinfect water obtained from surface water supplies or groundwater sources under the influence of surface water. Primary methods of disinfection are chlorination, chloramines, ozone, and ultraviolet light.

This 2-hour interactive online course presents the basics of each type of disinfection system and the advantages and disadvantages of each system. The material is taken from Technical Briefs published by the National Drinking Water Clearinghouse.

Drinking Water – Filtration (2 hours) - Mark Peterson Scored for 1 Idaho Credit

There are numerous contaminants in water that is to be used for drinking water. Filtration is the process of removing suspended solids from water by passing the water through a permeable fabric or porous bed of materials. Groundwater is naturally filtered as it flows through porous layers of soil. However, surface water and groundwater under the influence of surface water is subject to contamination from many sources. Some contaminants pose a threat to human health, and filtration is one of the oldest and simplest methods of removing them.

This 2-hour interactive online course presents the basics of filtration methods including slow and rapid sand filtration, diatomaceous earth filtration, direct filtration, packaged filtration, membrane filtration, and cartridge filtration. The material is taken from Technical Briefs published by the National Drinking Water Clearinghouse. The course is not intended to be a detailed design course, but rather provides an overview for each of these treatment methods.

Membrane Filtration - Part 2: System Components & Pumps (1 hour) - Mark Peterson Scored for 0.5 Idaho Credits

It has taken 35 years to develop sufficiently good and inexpensive membranes to treat a variety of liquids, including waste water. However, there is still a long way to go before it is generally known how to engineer and operate membrane plants. Membrane filters are used in the dairy industry, the pulp and paper industry and for high purity water.

This 1-hour interactive online course is the second of several courses on the subject of membrane filtration. The course covers system components, including heat exchangers, valves, pressure gauges, flowmeters, tanks and pipes. It also covers pump types and pump selection because without a pump, there is no membrane filtration system. This course is based on a handbook prepared by one of the leading suppliers of membrane filtration equipment.

Membrane Filtration - Part 4: Cleaning, Measuring, Controls and Pumps (1 hour) - Mark Peterson Scored for 0.5 Idaho Credits

It has taken 35 years to develop sufficiently good and inexpensive membranes to treat a variety of liquids, including waste water. However, there is still a long way to go before it is generally known how to engineer and operate membrane plants. Membrane filters are used in the dairy industry, the pulp and paper industry and for high purity water.

This course is the fourth in a series of several courses on the subject of membrane filtration. The 1-hour online course covers water supply and drains, chemicals for cleaning, sterilization, measuring devices, common control loops and control of pumps. The course is based on a handbook prepared by one of the leading suppliers of membrane filtration equipment.

Basic Civil Engineering - Water Supply (1 hour) - John Herrick Scored for 1 Idaho Credit

Water: It exists in many states, but for our purposes, the water that exists in ponds, rivers, oceans, and in the pores of the earth is what we need. We need to get the water from these locations into our homes at a pressure we can use and in a state of cleanliness we can live with - practically and 'for real'. This 1 hour interactive online course gives you the basic building blocks, the formulas needed and the general assumptions made to get that water from there to here. It explains and de-mystifies the process one needs to go through, both for a small home and for a city, to insure that the water supply we create will be both safe and will work! This course includes a multiple-choice quiz at the end.