



PETROLEUM TECHNOLOGY

June 2015 Newsletter

Regulating the aspects of Petroleum production requires some way to control the processes of production. From the pump head to the tank battery to the pipeline in the production and in the drilling and well completion stages, flow of liquids must be controlled. This flow is controlled with valves. They control the flow of natural gas or other gases (carbon dioxide, gas products, etc). Valves control the flow of produced water and the flow of crude oil. Wide open, product or waste flows. Partially closed, product or waste flow is less. Closed, no product or waste flow is exhibited.

In the Western Texas College “Project Based Learning” – focused programs of Petroleum Technology or Process Technology, each program has a series of lab activities to educate the students about the elements of the regulation of flow. The labs are part of a multipart teaching program also known as the “Pipe, Pump, Tank, and Valve” concept.

To truly know how a valve does its job of controlling flow, one must look inside. In medicine, a physician will use an x-ray or MRI machine to look at the inside of the human body. However, neither of these are a practical way to look at a metal valve used in the industry. Visually, it is hard to look inside a valve, even when it is not set into a pipe line or pipe structure. So to see the inside operations, we cut the valve open. Then, with visual information and working with the concept of the fluid that is being controlled along with the data on what the valve is intended to do, a full understanding of valve operation will be achieved.

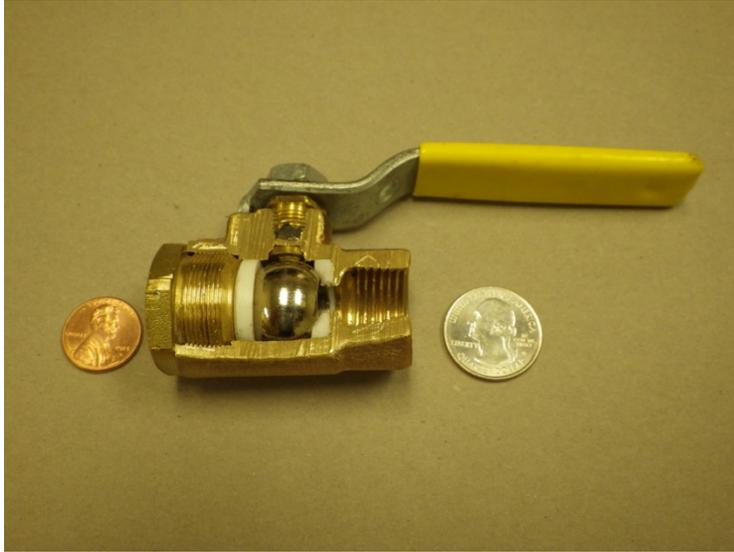
“Project Based Learning” exercises were devised to teach skill sets which led to the making of cut away valves. These exercises used valves made of either Brass (a relatively stable softer than iron alloy made of copper and zinc), or Bronze (a harder alloy, still softer than iron made of copper and 12% tin, some other metals and a few non-metals such as arsenic, phosphorous, or silicon).

ILLUSTRATIONS OF OPERATIONS



(Above) Valve being cut open to produce a cut away valve. The operation is being carried out on a JET band saw. This valve is a 1.5" ball valve. Notice that the working parts are removed for the cutting operation.

During the operations of the “Project Based Learning”, 3 special valves were chosen and turned into cut away demonstration units. These 3 valves are special, since they are going to students who stopped by to visit with the Petroleum Technology program this past April during the Texas Workforce hosted event at the Scurry County Coliseum. The event, the Jump Start Your Future Expo (JSYFE) enabled students to visit with employers, colleges, and universities. 45 students stopped by to see Petroleum Technology program at the JSYFE and filled out a contact form for a drawing which we held this month to coincide with another very exciting “Valve Event”. The Petroleum Technology exhibit at the JSYFE included some large red valves, a Programmable Logic Controller (PLC) Trainer that showed how a button or action can make a light flash, or a buzzer buzz.



(Left) Cut Away view of a 1/2" ball valve with handle (yellow), and the plastic washers (either side of the silver ball in the center). To turn flow on or off only requires a 90 degree turn of the handle. U.S. 1 cent and 25 cent pieces are present for size comparisons.



(Right) Cut Away view of a 1/2" water faucet valve with handle (green). To turn this on fully requires multiple turns of the handle. U.S. 1 cent and 25 cent pieces are present for size comparisons.



(Left) Cut Away view of a 1/2" water valve for a brazed or solder connection to copper pipe with handle (black). To turn this on fully requires multiple turns of the handle. U.S. 1 cent and 25 cent pieces are present for size comparisons.

Not all valves are this small; many are much larger, made of much harder materials than brass or bronze, and sometime much more complex.

The winning students of these valves drawn from the 45 students who visited with us were Issac DeLaPaz who won valve #1, S. J. who won valve #2, and M. C. who won valve #3.

The other exciting event occurred on June 24, 2015. Chris Mencor, of Kimray, Inc., Oklahoma City, OK., presented Western Texas College with six commercially produced cutaway valves which are commonly used in both the Petroleum and Process industries.

The addition of these large steel cutaway teaching units will greatly enhance the teaching programs of Petroleum Technology and Process Technology. The materials used, and degree of production are beyond the capabilities of what our students can produce with the tools we have available.

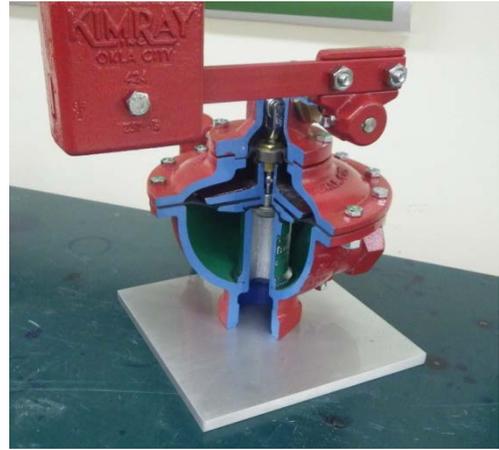
When these Kimray, Inc produced cutaway units are not being used in the class room as teaching aids, they will reside in the Scurry County Museum along with the permanent elements of the museum's Petroleum exhibit.

These valves are commonly used in Petroleum Technology locations for controlling tank levels, pipeline pressures, fluid pumping, tank waste water and product separation among others. See the six examples below.



(Left) Gas Back Pressure Valve (AAA). This valve is typically used to regulate flow using the gas in the line – it regulates the “upstream pressure” in a system.

(Right) Treater Valve (DAA). This unit works on emulsion treaters, water knockouts (separators for water), and gunbarrels (tall tanks used for separation purposes). Ideal for discharging salt water to disposal systems.



(Left) GLYCOL Pump (GAB). This item works as a pump, and is our first pump cut away unit. It pumps Glycol as the name states, which is a viscous fluid used to dehydrate (remove water) from oil, ethanol, methanol, or other petroleum products.

(Right) Base Low Temperature Thermostat (HAA). Used to set the temperature in Emulsion Treaters, reboilers, steam generators, and heat exchangers.



(Left) Low pressure valve Control Valve Motor Valve (EJA). Designed for liquid systems up to 500 psig.

(Right) Diaphragm Balanced. A mechanically operated, via a float connection, tank level control valve.

