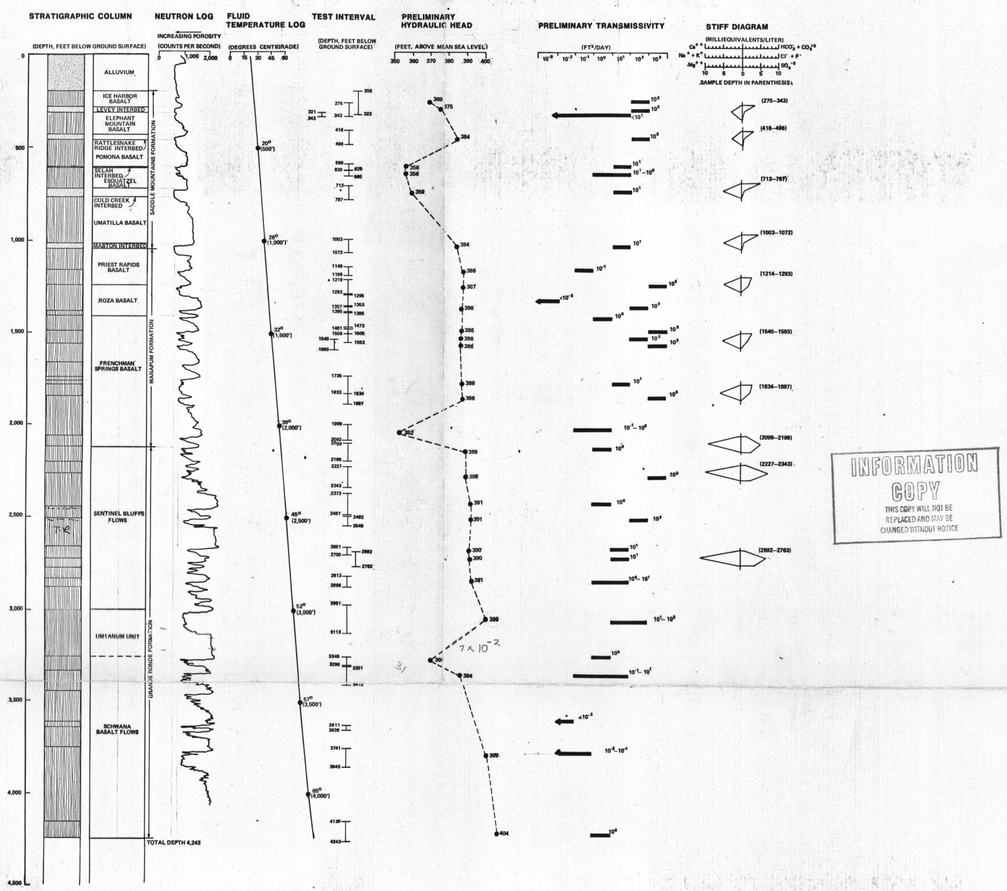
HYDROSTRATIGRAPHIC CHART FOR BOREHOLE DC-15

HANFORD SITE COORDINATES 699-S15-E15

GROUND SURFACE ELEVATION 402.1 FEET ABOVE MEAN SEA LEVEL



This plate is a hydrostratigraphic chart for Borehole DC-15 located in the southeast portion of the Hanford Site adjacent to the Columbia River. DC-15 is a 3.032 inch diameter borehole cored through the Saddle Mountains and Wanapum Formations and into the Grande Ronde in which selected zones were hydrologically tested during coring. The purpose of this chart is to identify the basic stratigraphy and preliminary hydrologic testing results for Borehole DC-15. Final charts will be issued when hydrologic testing and analyses are completed.

The Stratigraphic Column shows the major formations and members of the Columbia River Basalt Group. The Saddle Mountains Formation lies between the depths of 195 and 1045 feet. The principal sedimentary interbeds penetrated in the Saddle Mountains include the Levey, Rattlesnake Ridge, Selah, Cold Creek and Mabton. The Wanapum Formation is between the depths of 1045 and 2118 feet. No Vantage interbed occurs between the Wanapum and Grande Ronde Formations.In the stratigraphic column, sedimentary interbeds are identified by name and with a dotted symbol pattern. Individual basalt flows are shown as sets of vertical lines. The Grande Ronde lies below the Wanapum Formation.

A Neutron Log accompanies the stratigraphic chart to identify zones of lower (shift to right) and higher (shift to left) porosity. Within the Saddle Mountains, zones of high porosity correspond to interbeds and flow tops. Within the Wanapum and Grande Ronde Formations, zones of high porosity are essentially flow tops. Interbeds are scarce and thin in the lower two basalt formations. An attenuation of the neutron log response is seen opposite the Saddle Mountains and Wanapum Formations. This occurs because of steel casing present during logging in the upper 2198 feet of borehole compared to open hole conditions below this depth.

Temperatures given on the Fluid Temperature Log were measured during temperature logging of each test interval. Temperature callouts are given at 500 ft intervals. The fluid temperature gradient in DC-15 from 500 to 4000 feet below ground surface averages 13° centigrade per 1000 feet.

As DC-15 was cored, hydraulic heads and transmissivities were measured. In addition, groundwater samples were collected for hydrochemical analysis. The downhole intervals across which these activities were carried out are identified under the column entitled Test Intervals. A single packer system was used to isolate the rock zone tested. The packer arrangement consisted of water inflated or mechanical packers attached to steel tubing of sufficient diameter to conduct fluid withdrawal and/or displacement tests. The above system was used to test each major interbed and flow top as the borehole was cored. Most testing of low transmissivity entablature and colonnade zones and flow tops of lower transmissivity are being conducted since borehole completion using a straddle packer system.

When the desired zone was isolated and developed, hydraulic heads were measured. Heads were recorded using high sensitivity pressure transducers, steel tapes or electric tapes. These measurements will be corrected for viscosity and temperature variations. The heads shown under Hydraulic Head are uncorrected and therefore noted as preliminary. These data show a variable head pattern within the Saddle Mountains Formation with a hydraulic low of ~356-359 feet above mean sea level near the Selah and Cold Creek interbeds. A generally uniform head occurs, from the Mabton interbed to just above the Umtanum flow top of the Grande Ronde Formation, with most heads ranging between 386 and 391 feet. The exception is a zone of lower head within the Frenchman Springs member of the Wanapum Formation. A head increase with depth occurs below the Umtanum Unit.

Tranamissivity is one of the hydrologic properties determined routinely during in situ testing. The transmissivities given on this chart are preliminary. Therefore, order of magnitude estimates are provided. (Final values will vary over a much smaller range.) Those values represented by long bars are very preliminary estimates. Overall transmissivities range between 10^{-1} ft²/day and 10^{3} ft²/day with most values between 10^{0} and 10^{2} ft²/day.

Stiff Diagrams display the principal cation and anion constituents within the groundwater. These diagrams show changes in hydrochemistry with depth for the various basalt formations. A selection of representative stiff diagrams is given on this chart. Within the Saddle Mountains and Wanapum Formations, groundwater is of a sodium-bicarbonate chemical type, with increasing fluoride and chloride concentrations evident within the Wanapum. Grande Ronde groundwater is of a sodium-chloride chemical type with a considerably higher total dissolved solids content.

BOREHOLE LOCATION MAP

BASALT WASTE ISOLATION PROJECT
ROCKWELL HANFORD OPERATIONS
OCTOBER, 1981