

drag. However, in a long transition zone, the increase may occur so gradually that the significance of the increase may be masked. Also, increases in torque and drag may be due to factors other than increasing pressure.

#### General Procedure For Abnormal Pressure Detection

1. a. Upon an indication of abnormal pressure, check the well for flow. An indication can be a drilling break, slight increase in flow line temperature, decrease in shale density, increase in connection gas or trip gas, sloughing shale, severe and continued mud gas readings, or an increase in torque and drag, and doubts in general regarding magnitude of the overbalance.  
  
b. If the well flows, begin kick-kill procedures.  
  
c. If the well does not flow, drill ahead with constant monitoring of all parameters.
2. a. If one of the primary parameters for abnormal pressure detection shows a warning and/or if two or more of the secondary parameters indicate a possibility of abnormal pressure, check for flow and circulate bottoms-up to check shale density and stabilized flow line temperature.  
  
b. If the shale density or flow line temperature indicates that the transition zone has been reached, log for confirmation.  
  
c. If the shale density and flow line temperature indicate that the transition zone has not been reached, drill ahead with constant monitoring of all parameters.
3. When one of the primary parameters yields a definite indication of abnormal pressure, check shale density and flow line temperature, and log for confirmation.
4. Prior to tripping for logs, increase the mud weight by the amount needed for trip margin.

#### Confirmation of Abnormal Pressure

After logging, shale resistivity, interval transit time, log density, and/or wireline formation test pressure plots will be prepared. If logging and/or wireline formation test confirm the presence of abnormal pressure casing will be set before drilling ahead. If logging and/or wireline formation test fail to confirm the presence of abnormal pressure, drilling will be continued until drilling data indicate advisability of logging.

#### Limitations of Abnormal Pressure Detection Methods

The accuracy of all the abnormal pressure detection methods is affected by changes in lithology. In addition, penetration rate, "d" exponent, and surface shale densities are based upon the "pure" shale theory. When the composition of the shales being drilled is different from