CLAIMS

What is claimed is:

1. A drilling assembly, comprising:

a pressure control module positioned proximate to a drill bit, the pressure control module comprising :

a pressure sensor that detects pressure conditions associated with a drilling fluid hydrostatic pressure and a formation hydrostatic pressure at the drill bit; and

a valve that automatically shuts-off fluid flow within a drillpipe based on the pressure sensor detecting threshold pressure condition when the formation hydrostatic pressure exceeds the drilling fluid hydrostatic pressure.

2. The drill assembly of claim 1, further comprising:

the drillpipe having the drill bit provided at a downhole end, the drillpipe including one of a drill string and coil tubing.

3. The drill assembly of claim 2, wherein the valve switches-on fluid flow within the drillpipe when the pressure sensor detects an activation condition.

4. The drill assembly of claim 3, wherein the activation condition includes at least one of a preselected pressure for a preselected amount of time and lapsing of a preselected amount of time.

5. The drill assembly of claim 2, further comprising a second pressure control module positioned along the drillpipe, the second pressure control module comprising:

a second pressure sensor that detects pressure conditions along the drillpipe; and

a second valve that automatically shuts-off fluid flow within the drillpipe when the second pressure sensor detects a second threshold pressure condition.

6. A method of performing open-hole drilling operations, the method comprising:

detecting pressure conditions at a drill bit associated with a drilling fluid hydrostatic pressure and a formation hydrostatic pressure provided at a downhole end of a drillpipe;

automatically shutting-off fluid flow within the drillpipe upon detecting a threshold pressure condition when the formation hydrostatic pressure exceeds the drilling fluid hydrostatic pressure; and

switching-on fluid flow within the drillpipe upon detecting an activation condition.

7. The method of claim 6, wherein detecting the pressure conditions includes detecting a drilling fluid hydrostatic pressure and detecting a formation hydrostatic pressure.

8. The method of claim 9, wherein automatically shutting-off fluid flow within the drillpipe is performed when the formation hydrostatic pressure exceeds the drilling fluid hydrostatic pressure.

9. The method of claim 6, wherein the activation condition includes at least one of a preselected pressure for a preselected amount of time and lapsing of a preselected amount of time.

10. The method of claim 9, wherein the preselected pressure for the preselected amount of time is actuated from a remote location.

11. The method of claim 6, wherein the activation condition includes detecting a drilling fluid hydrostatic pressure.

12. A drilling assembly, comprising:

a drillpipe;

a drill bit provided at a downhole end of the drillpipe;

a pressure control module positioned proximate to the drill bit; and a processor provided at the pressure control module, the processor communicating with a computer-readable storage medium having instructions stored thereon that, when executed by the processor, cause the processor to:

detect pressure conditions associated with a drilling fluid hydrostatic pressure and a formation hydrostatic pressure at the drill bit;

automatically shut-off fluid flow within the drillpipe upon detecting a threshold pressure condition when the formation hydrostatic pressure exceeds the drilling fluid hydrostatic pressure; and

switch-on fluid flow within the drillpipe upon detecting an activation condition.

13. The drilling assembly of claim 12, wherein the drillpipe includes one of a drill string or coil tubing.

14. The drilling assembly of claim 12, wherein the processor is further configured to obtain a signal from a pressure sensor that detects the pressure conditions including a drilling fluid hydrostatic pressure and a formation hydrostatic pressure.

15. The drilling assembly of claim 12, further comprising an alternator that provides electrical energy to the processor.

16. The drilling assembly of claim 12, wherein the activation condition includes at least one of a preselected pressure for a preselected amount of time and lapse of a preselected amount of time.

17. The drilling assembly of claim 16, wherein the preselected pressure for the preselected amount of time is actuated from a remote location.

18. The drilling assembly of claim 12, further comprising:

a second pressure control module positioned along the drillpipe; and a second processor provided at the second pressure control module, the second processor communicating with a computer-readable storage medium having instructions stored thereon that, when executed by the second processor, cause the second processor to:

detect pressure conditions along the drillpipe;

automatically shut-off fluid flow within the drillpipe upon detecting a second threshold pressure condition; and

switch-on fluid flow within the drillpipe upon detecting a second activation condition.