CLAIMS

1. A system, comprising:

   a wellhead monitoring system, comprising:

   a processor configured to:

   receive from a sensor pack a detection of one or more operating parameters associated with a wellhead disposed within a subsea environment, wherein the sensor ~~is~~ pack includes sensors disposed around and coupled to a casing of the wellhead, and ~~is~~ configured to detect the one or more operating parameters within the subsea environment;

   store the detection of the one or more operating parameters; and

   generate an output based at least in part on the detection of the one or more operating parameters, wherein the output comprises an indication of an operational fatigue or an operational health of the wellhead.

2. The system of claim 1, wherein the processor is configured to receive the detection of the one or more operating parameters within the subsea environment.
3. The system of claim 1, wherein the processor is configured to receive a detection of a cement level parameter, a cement quality parameter, a fluid level parameter, a pressure parameter, temperature parameter, a vibration parameter, a clearance parameter, a flow parameter, a load parameter, or any combination thereof, as the detection of the one or more operating parameters.
4. The system of claim 1, wherein the processor is configured to receive a detection of an annulus pressure of the wellhead and an annular temperature of the wellhead as the detection of the one or more operating parameters.
5. The system of claim 1, wherein the ~~sensor comprises~~sensors comprise a giant magneto-resistive (GMR) sensor.
6. The system of claim 1, wherein the ~~sensor comprises~~sensors comprise a tunnel magneto-resistive (TMR) sensor.
7. The system of claim 1, wherein the processor is configured to generate the output during a drilling operation of the wellhead.
8. The system of claim 1, wherein the processor is configured to generate the output during a production operation of the wellhead.

9. The system of claim 1, wherein the processor is configured to store the detection of the one or more operating parameters at the wellhead within the subsea environment.
10. The system of claim 1, wherein the processor is configured to transmit the stored detection of the one or more operating parameters to a central control system at an above-sea location.
11. A non-transitory computer-readable medium having computer executable code stored thereon, the code comprising instructions to:

cause a processor of a wellhead monitoring system to receive from a sensor pack a detection of one or more operating parameters associated with a wellhead disposed within a subsea environment, wherein the sensor ~~is~~ pack includes sensors disposed around and coupled to a casing of the wellhead and ~~is~~ configured to detect the one or more operating parameters within the subsea environment;

cause the processor to store the detection of the one or more operating parameters; and

cause the processor to generate an output based at least in part on the detection of the one or more operating parameters, wherein the output comprises an indication of an operational fatigue or an operational health of the wellhead.
12. The non-transitory computer-readable medium of claim 11, wherein the code comprises instructions to cause the processor to generate the output during a drilling operation of the wellhead.
13. The non-transitory computer-readable medium of claim 11, wherein the code comprises instructions to cause the processor to generate the output during a production operation of the wellhead.
14. The non-transitory computer-readable medium of claim 11, wherein the code comprises instructions to cause the processor to store the detection of the one or more operating parameters at the wellhead within the subsea environment.
15. The non-transitory computer-readable medium of claim 11, wherein the code comprises instructions to cause the processor to transmit the stored detection of the one or more operating parameters to a central control system at an above-sea location.

16. The non-transitory computer-readable medium of claim 15, wherein the code comprises instructions to cause the central control system to generate an output comprising an indication of the operational fatigue or the operational health of the wellhead.

17. A wellhead sensor and monitoring system, comprising:

~~a plurality~~a pack of subsea sensors each coupled to a casing of a subsea wellhead and configured to detect one or more operating parameters associated with the subsea wellhead while disposed within a subsea environment; and

~~a~~a subsea wellhead monitoring system coupled to each sensor of the ~~plurality~~pack of subsea sensors, wherein the subsea wellhead monitoring system is configured to:

receive the detection of the one or more operating parameters;

store the detection of the one or more operating parameters; and

generate an output based at least in part on the detection of the one or more operating parameters, wherein the output comprises an indication of an operational fatigue or an operational health of the subsea wellhead.

18. The wellhead sensor and monitoring system of claim 17, wherein the ~~plurality~~pack of subsea sensors comprises a plurality of giant magneto-resistive (GMR) sensors.

19. The wellhead sensor and monitoring system of claim 17, wherein the ~~plurality~~pack of subsea sensors comprises a plurality of tunnel magneto-resistive (TMR) sensors.

20. The wellhead sensor and monitoring system of claim 17, wherein the ~~plurality~~pack of subsea sensors are configured to be disposed along a high pressure housing, a low pressure housing, a ~~casing, a~~ connector, or a combination thereof, of the subsea wellhead.