What is claimed is:

1. A system for generating power in a subsea environment, comprising:

    a. a compressed air storage chamber in fluid communication with a compressed air source;

    b. an outer shell located on the ocean floor enclosing a portion of the compressed air storage chamber; and

    c. an engine having an inlet in fluid communication with the compressed air storage chamber and an exhaust port.

2. The system of claim 1, further comprising:

    d. an exhaust line for removing exhaust gas through the exhaust port of the engine.

3. The system of claim 1, further comprising:

    e. a power generator driven by the engine.

4. The system of claim 2, further comprising a boiler or heat exchanger in heat exchange relation with the exhaust line for transferring heat from the exhaust line to a heat exchange fluid.

5. The system of claim 1 wherein the compressed air storage chamber is partially enclosed by a flexible diaphragm capable of maintaining constant air pressure within the compressed air storage chamber.

6. The system of claim 2 wherein the exhaust line is tied into a produced fluids production line so that exhaust gas can be removed by the production line.

7. A system for generating heat in a subsea environment, comprising:

    a. a compressed air storage chamber in fluid communication with a compressed air source;

b. an outer shell located on the ocean floor enclosing a portion of the compressed air storage chamber;

c. a combustor for combusting an air-fuel mixture thereby generating heat, the combustor having a first inlet in fluid communication with the compressed air storage chamber, a second inlet for supplying a gaseous or liquid fuel, and an exhaust port; and

d. a boiler or heat exchanger in heat exchange relation with the combustor for transferring heat generated by the combustor to a heat exchange fluid.

8. A method for generating power or heat in a subsea environment, comprising providing air from a compressed air storage chamber within an outer shell located on the ocean floor to an engine coupled with a power generator or a combustor in heat exchange relation with a boiler or heat exchanger.

9. The method of claim 8 wherein the compressed air storage chamber is partially enclosed by a flexible diaphragm.

10. The method of claim 8, further comprising removing exhaust gas from the engine via an exhaust line.

11. The method of claim 10 where the exhaust line is connected to a production line.

12. The method of claim 10 wherein the compressed air storage chamber is periodically refilled by compressed air through the exhaust line.

13. The method of claim 10, further comprising utilizing heat from the exhaust line to heat a heat transfer fluid in a boiler or heat exchanger.

14. A method for generating heat or steam in a subsea environment, comprising:

a. providing air from a compressed air storage chamber within an outer shell located in a subsea environment to an engine, combustor or steam generator;

b. delivering a fuel to the engine, combustor or steam generator; and

c. combusting a mixture of the air and the fuel in the engine, combustor or steam generator thereby generating heat or steam.

15. The method of claim 14 wherein the heat or steam generated is utilized to heat heavy oil.

16. The method of claim 14 wherein the heat or steam generated is utilized for thermal hydrocarbon recovery.

**CLAIMS**

1. A system for generating power in a subsea environment, comprising:

a. a compressed air storage chamber located on the ocean floor in fluid communication with a compressed air source;

b. an outer shell located on the ocean floor enclosing a portion of the compressed air storage chamber;

c. an engine located on the ocean floor having an inlet in fluid communication with the compressed air storage chamber;

d. an exhaust line in fluid communication with the engine and having an exhaust port at the end thereof for removing exhaust gas from the engine, wherein the exhaust port is located below the water surface at a vertical position between the engine and the water surface; and

e. a produced fluids production line, wherein the exhaust line is tied into the produced fluids production line so that exhaust gas can be removed by the production line.

2. The system of claim 1, further comprising:

f. a power generator located on the ocean floor driven by the engine.

3. The system of claim 1 wherein the engine is an air engine or a combustion engine.

4. The system of claim 3 wherein the engine is a combustion engine fueled by a gaseous or liquid fuel.

5. The system of claim 4, further comprising a boiler or heat exchanger in heat exchange relation with the exhaust line for transferring heat from the exhaust line to a heat exchange fluid.

6. The system of claim 1 wherein the compressed air storage chamber is partially enclosed by a flexible diaphragm capable of maintaining constant air pressure within the compressed air storage chamber.

7. The system of claim 1, further comprising a boiler or heat exchanger in heat exchange relation with the engine for transferring heat generated by the engine to a heat exchange fluid.

8. A method for generating heat in a subsea environment, comprising:

a. providing air from a compressed air storage chamber within an outer shell located in a subsea environment to a combustor located on the ocean floor or at the bottom of an offshore oil well;

b. delivering a fuel to the combustor;

c. combusting a mixture of the air and the fuel in the combustor thereby generating heat;

d. removing exhaust gas from the combustor through an exhaust line having an exhaust port located below the water surface; and

e. refilling the compressed air storage chamber periodically over time through the exhaust line.

9. The method of claim 8 wherein the heat generated is utilized to heat heavy oil.

10. The method of claim 8 wherein the heat generated is utilized for thermal hydrocarbon recovery.

11. The method of claim 8 wherein the heat generated is utilized to generate steam.

12. The method of claim 8 wherein the combustor provides power to at least one of a gas turbine, a positive displacement engine, a thermoelectric generator or a Stirling engine.

13. A system for generating power in a subsea environment, comprising:

a. a compressed air storage chamber located on the ocean floor in fluid communication with a compressed air source;

b. an outer shell located on the ocean floor enclosing a portion of the compressed air storage chamber;

c. an engine located on the ocean floor having an inlet in fluid communication with the compressed air storage chamber; and

d. an exhaust line in fluid communication with the engine and having an exhaust port at the end thereof for removing exhaust gas from the engine, wherein the exhaust port is located below the water surface at a vertical position between the engine and the water surface;

wherein the engine is an air engine and a pressure differential between the ocean floor and the vertical position allows the engine to produce a maximum power output.

14. The system of claim 13, wherein the system is capable of generating at least about 4.3 kW of power continuously over a 100 day period resulting from a differential pressure between the ocean floor and the vertical position of the exhaust port.