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1. This pneumatic kelly spinner spins both directions. 3
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19. The driller sits in an ergonomically designed chair inside a climate-controlled cabin, and controls drilling through a joystick, switches, and touch screens. 32
20. An integrated drilling system takes data from many sensors and routes it to readouts and computers. 33
21. A day tank and pump supply diesel fuel to the rig. 36
22. An air compressor supplies pneumatic power to tools and auxiliary equipment. 37
23. This simplified diagram is typical of how evaporators work. 39
24. A vapor compression evaporator compresses the water vapor before condensing it. 40

25. The compressor's impeller is made of titanium or a corrosion-resistant nickel-chromium alloy. 41

26. A waste heat evaporator uses low pressure and waste heat from the rig's engines to boil seawater. 42

27. a) Osmosis b) Reverse osmosis 43

28. A reverse osmosis watermaker uses a pump to draw salt water through a filtering membrane. 44

29. Flow of fluids in a reverse osmosis watermaker. 45

30. This portable pressure washer can use water, base oil, or solvents to clean equipment. 47

31. A steam cleaner may be portable or permanently installed at the rigsite, such as this one. 49

32. A low-temperature desorption system cleans cuttings before disposal. 50

33. Diagram of low-temperature desorption system 51

34. The vacuum cleaner cleans up spilled liquids. 52

35. Molecules of a hydrocarbon, such as methane, combine with oxygen when heated. 56

36. Radiation feedback is heat that travels back to the fuel from the flames. 57

37. The chain reaction of burning. 57

38. The fire triangle. Fuel, oxygen, and heat are necessary for combustion. 58

39. Class A fires involve common flammable materials. 60

40. Class B fires involve flammable liquids, gases, and petroleum products. 61

41. Class C fires involve live electrical equipment and wiring. 61

42. Class D fires can become airborne and explosive when in powdered form. 62

43. A hand-held fire extinguisher has a short range of 6 to 8 feet (1.8 to 2.4 metres). 63

44. A wheeled extinguisher has a hose for a longer range. 63

45. Fire extinguishers are labeled with a letter inside a geometric shape for their class (A, B, or C) as well as a picture symbol for the type of fires they put out. 64

46. A separate cartridge filled with pressurized nitrogen or carbon dioxide expels dry chemical extinguishing agent. 65

47. A monitor sits on the ground (a) or is permanently bolted to the floor or deck of a drilling unit (b). 68

48. Lined fire hose and hose couplings 69

49. The three components of a fire station hydrant are the control valve, hose connection, and hose rack. 70

50. An adjustable fog nozzle delivers a 30° or 90° fog pattern as well as a solid, narrow stream of water. 71

51. When the bail is pushed all the way forward, the nozzle is closed. 71

52. With a mechanical nozzle, the nozzleman's movements are restricted by the need to keep the pickup hose in the foam concentrate container. 73

53. An in-line proportioner allows the foam concentrate container to be farther back from the end of the hose. 74

54. Heat from a fire melts solder, which allows the links to separate. 76

55. Fire line automatic system. 77

56. A combustible-gas detector senses the presence of flammable vapors in the surrounding air. 78

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58. A bunker suit reflects as much as 90% of the radiant heat from a fire. 81