

GLOSSARY

Accident risk—The possibility of loss or injury to people or property. The risk of a particular consequence during a period of time is measured by the estimated frequency of the event over that period of time and the magnitude of the consequences of that event.

ACRS—The Advisory Committee on Reactor Safeguards.

Availability *y*—The percent of time that a plant or an electric power system is actually capable of performing its mission. Periods during which a plant is not available include both forced outages (due to equipment malfunction, etc.) and planned shutdowns (notably for refueling and planned maintenance).

Ballasting—The taking on by tankers of water to replace off-loaded oil and thereby improve stability.

Barrel—A unit of volume for petroleum products. One barrel is the equivalent of 42 U.S. gallons, or 35 imperial gallons, or 159 liters. One cubic meter equals 6.2897 barrels.

Blowout preventer—Equipment installed at the wellhead for the purpose of controlling pressures in the space between the casing and drill pipe or in an open hole during drilling and completion operations. The blowout preventer is the first line of defense against blowouts.

Capacity factor—The ratio of the average load on a plant for the period of time considered,

to the load capacity for which the plant is rated by the manufacturer. For an electric generating unit, the capacity factor in a given 1 -year period may be calculated by dividing the total kilowatt-hours of electric output for the year by the number of hours in the year, and then dividing the average kilowatts thus calculated by the generating unit's electric-kilowatt-capacity rating.

Christmas tree—The collection of valves, pipes, and fittings, usually high pressure, used to control the flow of oil and gas from the well casing.

Class 9 accident —For analytical purposes, the Nuclear Regulatory Commission divides the spectrum of postulated nuclear powerplant accidents into nine categories. These categories are ordered according to the severity of consequence ranging from minor accidents (Class 1) to the potentially catastrophic but highly improbable core-melt accident (Class 9).

Containment—A gas-tight shell or other enclosure around a nuclear reactor to contain radioactive vapors that would otherwise be released to the atmosphere in the event of a major reactor accident.

Cooling system—A method of dissipating waste heat from nuclear (or other heat-engine-based) electric generating units.

Cooling tower—A structure through which water is circulated in order to reduce its temperature. In a dry cooling tower, the water

is recycled after passing through tubes over which cooling air flows, in a manner similar to that of an automobile radiator. In a wet cooling tower, water cascades through the tower, in which air is passed either by mechanical or natural draft to cause partial evaporation of the water. A wet-dry *cooling tower* contains both dry-cooling and evaporative systems; these can be used alternately or in combination.

Core-melt accident—Any accident in a nuclear reactor that leads to melting of the fuel elements in the core. This type of accident has the most serious potential consequences of any accident that can occur in a nuclear reactor.

Dead weight—The difference, expressed in tons, between a ship's displacement at load draft and at light draft. It is comprised of cargo, bunkers, stores, fresh water, etc.

Decommissioning—The activities of shutting down operations of a nuclear plant at the end of its operational life and either dismantling the plant or maintaining it in a safe condition.

Design-basis accident—NRC policy requires that nuclear power reactors be designed to include engineered safety features and protection systems to prevent or mitigate the effects of design-basis accidents, which include accidents in the first eight accident categories (see "Class 9 accident"). Class 9 accidents, involving melting of the core, are not included among design-basis accidents on the grounds that their probability of occurrence is so low that they can be safely ignored.

Development and production—Basically, development of an oil and gas field begins after discovery of accumulations in commercial quantities. It includes definition of the extent of potential reserves, production rate estimates, and construction and installation of facilities for production of the

field, including the means to deliver the product to a loading point. Production of the oil or gas begins only after a reasonable estimate has been made of the approximate amount and potential flow rates of the oil or gas found and completion of the installation of necessary facilities and the drilling of producing wells. (Oil and gas can occur together in a field or separately. There is usually some gas associated with all oil fields, but there can be significant occurrences of gas with little or no oil.)

Development well—A well drilled in a proven field for the purpose of completing the desired pattern of production. Sometimes called an exploitation well.

Downhole safety equipment—Valve or other devices installed below the Christmas tree in production wells to prevent blowouts. The blowout preventor is the first line of defense against blowouts. The downhole safety equipment is a second defense system.

Drill pipe—In rotary drilling, the heavy seamless tubing used to rotate the bit and circulate the drilling fluid. Individual pipe lengths are normally 30 feet and are coupled together with tool joints.

Drill string—A "string" or column of drill pipe.

Economic impact—The effects upon the production and consumption aspects of society which introduction of an installation or other innovation into the area is expected to produce. These would include effects on the labor force, industry, financial structure, infrastructure, tax rates, etc.

Environmental impact—The effects upon the physical and biological characteristics of an area which introduction of an installation or other innovation into the area is expected to produce. As used in this report, environmental impact does not include the effects upon human characteristics, except those

which are an indirect result of the physical and biological effects.

Exploration—Simply defined, exploration involves two major steps: geophysical surveys and exploratory drilling. More broadly, exploration for oil and gas is the entire process of broad and specific surveys and collection of indicative data on an area followed by detailed Geophysical delineation of geologic features and by drilling of holes into potentially productive traps. Exploration is completed if oil or gas is found. Additional exploration work—the drilling of more holes—may be done after a discovery to further delineate a field. Exploration involves a high economic risk, since there is the high probability that no discoveries will be made, particularly in frontier areas. In the offshore oil industry, even after detailed surveys are conducted, only one drill hole in ten can be expected, on the average, to show a commercial discovery, and there are wide but unpredictable variations, in particular cases, from the average.

Exploratory drilling—Exploratory drilling is the second phase of an exploration program. In offshore areas it is accomplished by means of some type of mobile drilling rig, which can be moved from place to place to drill into traps located by geophysical methods. The primary purpose of exploratory drilling is to get a “yes” or “no” answer as to whether there is, in fact, oil or gas in a given trap. Coring and data logging techniques within the exploratory well may be necessary to make this determination and to provide certain additional geologic information. Data logging involves the lowering of a sensor (acoustic, gamma-ray, etc.) down a drill hole to obtain formation data.

Fission—The splitting of a heavy nucleus (such as uranium-235), accompanied by the release of energy and two or more neutrons. In a nuclear reactor, most of the

energy released in fission manifests itself as heat, which is used to generate steam to drive turbines.

Frontier areas—Frontier areas of the Outer Continental Shelf are those which have not yet been explored and are generally considered suitable for leasing. A number of specific regions in the Atlantic, the Gulf of Mexico, the Pacific, and around Alaska are identified as frontier areas. The principal ones are:

- Georges Bank (North Atlantic)
- Baltimore Canyon Trough (Mid-Atlantic)
- South Atlantic
- Gulf of Mexico (beyond all present discoveries)
- Southern California Offshore
- Washington and Oregon Offshore
- Gulf of Alaska and Outer Cook Inlet
- Bering Sea, Bristol Bay, and Norton Sound (Alaska)
- Chukchi Sea (Alaska)
- Beaufort Sea (Alaska)

Fuel cycle—The sequence of steps through which the nuclear fuel used in nuclear reactors passes, including mining, milling, conversion, enrichment, processing, fabrication, utilization, reprocessing, radioactive waste management, and the storage of radioactive waste products.

Fuel element—A rod, tube, plate, or other mechanical shape or form into which the fissionable material used to produce energy in a reactor is fabricated. In prevalent power-reactor practice, a fuel element is a mechanical array or assembly of rods; the rods contain the fissionable material.

Fuel reprocessing—Chemical treatment of spent fuel to separate the uranium and plutonium from the fission products created as byproducts of the fission process.

Gathering lines—Flow lines which run from several offshore oil wells to a single storage system.

Geophysical surveys—Geophysical exploration is an indirect method of mapping subbottom geological forms and features to show submerged structures and interfaces. The principal method used is the seismic (or acoustic) survey, a technique of producing precise sounds (of discrete frequencies and intensities) which are variously reflected and refracted from underground layers and then measured at the surface. The measurement of natural gravity and magnetic fields also helps define the geology of an area. Having become a major component in oil exploration, the seismic survey is typically employed extensively in any offshore area prior to drilling. Seismic techniques have become much more sophisticated in recent years and are used both to identify good potential traps and to locate the most promising site for drilling an exploratory hole.

Ice condenser system—A pressure suppression system included in the floating nuclear powerplant, as well as some onshore plants, that uses millions of pounds of ice as a heat sink to condense steam and thereby reduce containment pressure in case of an accident in the reactor.

Isotopes—Variant forms of a given chemical element, differing from each other only in the number of neutrons in their nuclei.

Jack-up rig—A mobile drilling platform with extendible legs for support on the ocean floor.

Lay barge—A barge used to lay underwater pipelines.

Light-water reactor—(See *PWR*) The two basic types of LWR are the pressurized-water reactor (PWR) and boiling-water reactor (BWR). Most U.S. power reactors in existence or being built at this time are LWRs.

Lightening—A method of offloading tankers at sea or outside of ports, usually from large

tankers to smaller ones which, in turn, continue into a discharge port. Lightening is a common practice at entrances to certain ports which cannot handle the deep drafts of large tankers.

LOCA—A Loss-of-Coolant Accident, involving a break in one of the lines carrying the water that transfers heat from the reactor core to the steam system. The LOCA is one of the two possible initiating events for a core-meltdown.

Megawatt (MW)—1000 kilowatts. The symbol “MWe” is sometimes used to denote electrical power or capacity, in order to distinguish it from the thermal power of the reactor (MWt), which is typically about three times as high.

Mud—A water or oil based slurry used to counteract pressure in oil or gas wells and remove cuttings during drilling operations. It is circulated by pumps.

MW, MWe—See *Megawatt*.

NRC—The Nuclear Regulatory Commission.

OCS (Outer Continental Shelf)—The submerged lands extending from the seaward limit of the territorial sea to some undefined outer limit. In the United States, this is the portion of the shelf under Federal jurisdiction.

Oil and gas reserves—Reserves of oil and gas in any field are those quantities which have been identified through drilling, sampling, and calculating specific quantities. “Proved” reserves are those quantities in a field which can be recovered with reasonable certainty under existing economic and operating conditions. Only a portion (usually from 20 percent to 40 percent) of the total reserves in place can be recovered.

PWR—Pressurized water reactor. A type of power reactor that employs ordinary water as coolant and moderator and is

pressurized to keep the exit coolant stream from boiling.

Radionuclides—Radioactive nuclei of isotopes of various elements.

Rasmussen Report—See *WASH- 1400*.

Reliability—The probability that a power generating system will function without failure over a specified time period or amount of usage.

Segregated ballast—A term describing the provision of separate tanks for ballast water only, thus eliminating the need to carry ballast in cargo oil tanks. Tankers must carry about one-third or more of their total capacity in ballast when on an empty leg of a voyage to improve stability and control the draft of the ship. Usually sea water is used for ballast.

Seismic-line mile—Seismic surveys are normally conducted from a ship equipped with geophysical data-gathering instrumentation. The ship proceeds along predetermined lines following a grid on the surface above a given area. Many miles of closely spaced crossing lines are necessary to survey a major area. A seismic-line mile is a typical unit of measure of these survey lines.

Seismic survey—A geophysical exploration technique in which generated sound waves are reflected or refracted from underlying geologic strata and recorded for later analysis.

Subsea completion—A production well in which the Christmas tree assembly is located at or near the ocean bottom rather than on a platform. The produced liquids or gases are then transferred from the wellhead either to a nearby fixed platform or to a shore facility for processing. Some subsea completions are presently in use in offshore U.S. water.

Subsea production system—A production

system in which the wellhead assembly and all equipment for processing are located on the sea floor. There are presently no complete subsea production systems in use in U.S. offshore waters.

Supertanker—Tankers of great size and carrying capacity; generally considered to be any tanker of over 100,000 deadweight tons. Such tankers are typically more than 1,000 feet in length and 50 feet in draft. The largest supertanker afloat (480,000 dwt) is 1,250 feet long, 203 feet wide, and 90 feet in draft. Supertankers of 533,000 dwt are now under construction.

Surry Plant—The pressurized water reactor nuclear powerplant at Surry, Va., which was the basis for calculations made in the *WASH- 1400* study. (See *WASH- 2400*).

Territorial sea—The sea area immediately adjacent to a coastal nation within which it claims comprehensive jurisdiction.

Tract—An at-sea area of up to 5,760 acres (3 miles square), defined in the OCS Lands Act of 1953 as the maximum unit offered in each lease sale issued pursuant to the Act.

Trap and field—oil and gas are found in commercial quantities because these hydrocarbons tend, by geologic processes, to concentrate in particular rock formations over long periods of time. Certain kinds of subterranean geologic features are known to have acted as “traps” for oil and/or gas, and such traps are commonly described by geologists as having the potential of containing hydrocarbons. The process of exploring for oil and gas is thus focused on finding traps where petroleum may have been collected. When a trap has been identified and subsequently, through exploratory drilling, found to contain commercially producible quantities of oil or gas, it is then designated a “field.” A field is thus a single trap or many traps in which commercial amounts of oil or gas have been discovered.

WASH 1400—The formal NRC designation of the *Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants*, published in final form in October, 1975. This study, which considered a range of possible accidents including core-melt accidents, was performed under the direction of Professor Norman Rasmussen of Massachusetts Institute of Technology, and is commonly known as the Rasmussen Report. Only land-based, light water reactor plants were considered.

Waste disposal—The placement of radioactive waste in a locale where it can remain indefinitely isolated, and from which retrievability may or may not be considered necessary.

Waste management—A program which involves all aspects of the transfer, and ultimate storage or disposal, of high-level radioactive nuclear materials which are no longer useful from the nuclear facilities in which they are produced,

Waste storage—The holding of radioactive waste in a locale from which it can be removed or retrieved at some future time.

Wellhead—The equipment used to maintain surface control of a well. It is formed of the casing head, tubing head, and Christmas tree. Also refer to various parameters as they exist at the wellhead: Wellhead pressure, wellhead price of oil, etc.