

More TECHNICAL BRIEFS

The negative side of civilian nuclear power development holds (1) that coal is so abundant in this country we should let other nations where coal is scarce develop the technology for use of the new nuclear fuel, (2) that a strong civilian nuclear power program would seriously reduce the military effort in this field and, because of the declassification necessary, would compromise security. And last but not least, such a program would cost millions of dollars.

Summarizing the situation favoring nuclear power development now, there is the prestige value to be gained, the matter of foreign competition, the optimistic views on the current economics of nuclear power, by-product military benefits, assuring maximum return from our military investment in the atom, provisions of the Atomic Energy Act permitting civilian development and the present enthusiasm in industry to join with government in the search for commercial nuclear power. *APC Paper, no number.*

Economic Evaluation of the Industrial Use of Atomic Energy. By Walker L. Cislak, The Detroit Edison Co.

Although many industrial uses of atomic energy are contemplated, the practical uses, for the present, seem to be (1) production of radioactive isotopes for numerous purposes, and (2) use of the vast amount of heat energy released by the fission of atoms of uranium (U-233 and U-235) and plutonium (Pu-239). This heat will be used for production of steam which in turn can be used for generation of electric power or for other industrial purposes. For the sake of simplicity, this discussion will concern chiefly the generation of electric power.

The questions first asked about the use of atomic energy for the generation of electric power are (1) is it physically possible at this time? and (2) how much will it cost?

The first of these questions has been answered affirmatively many times. Dr. Walter H. Zinn, in a paper presented at this meeting has told us of the exceedingly difficult problems which are involved and indicated that ways of meeting these problems can be found. He has also told us of the experimental breeder reactor at Arco, Idaho where the generation of comparatively small amounts of electricity using the heat of nuclear fission has actually been accomplished.

The second question, how much will it cost, is much more perplexing. It involves many different problems and unfortunately cannot be answered spe-

cifically at this time. The best we can do is to make a rather broad economic evaluation of several aspects of the development to show why atomic energy is of such vital importance to our country and to the world, and to point out areas in which energy derived from nuclear fission will be of great economic value. The aspects to be considered include (1) the potential fuel resources of the world, and their importance to civilization, (2) the utilization of our naturally fissionable and fertile materials, and (3) the justifiable costs of heat power reactors.

In undertaking an economic evaluation of this kind we should bring into focus the goals which we are striving to achieve. The electric power industry has long balanced costs in the effort to provide power to the ultimate consumers in the most economical manner. It has weighed the cost of producing power in thermal plants located at mine mouths as compared with location near the load centers. It has made studies of the overall costs of supplying power from thermal plants as compared with hydroelectric plants. And from these studies

decisions have been made concerning the methods of supplying electricity to our power systems and to the ultimate customers at the lowest possible cost, consistent with good service standards.

Atomic energy provides us with a new source of fuel. It is attractive to us because we hope to be able to utilize it to produce electric power at a cost less than that incurred with the present conventional fuels or with the energy of falling water—hydro-electric generation. Unless we can accomplish this goal, electric power systems or those industries that provide self-generation cannot justify the large scale use of atomic fuels for power generation. Consumers cannot be expected to pay a higher cost for electricity simply because it is produced by using atomic fuels. It is understood, of course, that all proper credits and debits for by-products produced in the operation of nuclear reactors must be included in determining real costs of power produced with atomic fuels.

The goals, therefore, are to develop practical commercial installations which will produce electric power at as low a lower cost than present day power generating plants.

From the standpoint of reactor design, construction and operation, the economic possibilities look bright indeed, but we still are in the development stage. We believe that costs of reactors for the generation of electric power can be brought within reason and that an important new segment of industry may result. We believe, too, that there may be many auxiliary effects which will contribute greatly to an improved economy for our country. *APC Paper, no number.*

Packaged Drives

Construction, Components and Control of Packaged Adjustable-Voltage Drives. By Gerald Secor, Cutler Hammer, Inc., Milwaukee, Wis.

Advantages of packaged adjustable-voltage drives and the components which make up the control that uses a dc generator for the adjustable-voltage power supply are presented. Probably the greatest advantage of a packaged adjustable-voltage drive is that all the equipment required to supply the adjustable voltage is mounted in a single, ventilated enclosure. The drive motor, starter, start-stop pushbutton, dc generator and control panel are mounted in the enclosure complete with connections. Thus, the user need only

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Three Reasons Why ...Years of Trouble-Free Service

One Few moving parts!

Bayonet contacts (1) are the only moving parts of the Ruptor interrupting device.

Two Easy inspection!

Drop the tank, and the bayonet contacts are visible in open position. For access to the stationary contacts, one needs only to remove four bolts and cylindrical shell (2).

Three Self-aligning and Self-cleaning contacts!

Tulip and bayonet contacts (3) maintain high conductivity without readjustment or cleaning. Arc energy is minimized by efficient interruption within oil-filled Ruptor unit. This in turn contributes to long contact life and low oil deterioration.

In addition, a mechanically trip-free solenoid operating mechanism controls contacts of time-proved Ruptor interrupting devices. And pole unit mechanism is self-lubricated—completely enclosed—sealed from dust, dirt, corrosion.

In brief, Allis-Chalmers DZ breakers are built to assure years of dependable, trouble-free service.

Allis-Chalmers power circuit breakers are available in ratings from 2.5 to 230 kv, with interrupting capacities from 15,000 to 10,000,000 kva, to meet all industrial and power company requirements. For more information, call your nearby A-C representative, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

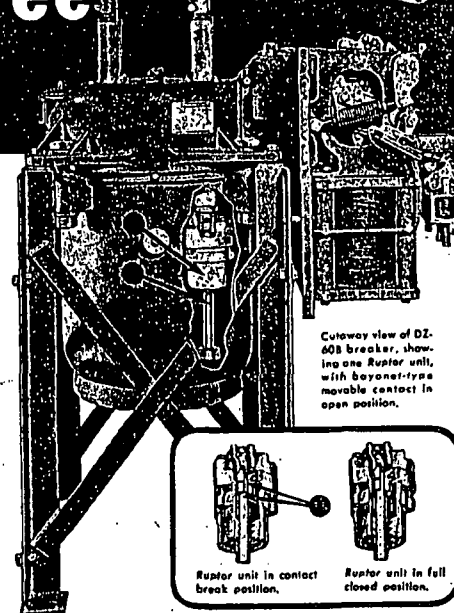
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Ruptor is an Allis-Chalmers trademark.

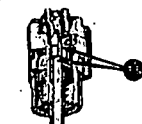
ALLIS-CHALMERS



ALLIS-CHALMERS
Indoor
OIL CIRCUIT BREAKERS



Cutaway view of DZ-608 breaker, showing one Ruptor unit, with bayonet-type movable contact in open position.



Ruptor unit in contact break position.



Ruptor unit in full closed position.

TYPE	RATED KV	MINIMUM KV AT RATED KVA	RATED AMPS	KVA INT. CAPACITY
DZ-408*	7.2	2.3	600	100,000
			1200	100,000
			2000	100,000
DZ-608†	13.8	4.0	600	150,000
			1200	150,000
DZ-1008†	13.8	4.0	1200	250,000
DZ-2008†	13.8	6.6	1200	500,000
			2000	500,000

*Ask for Bulletin 7186179. †Ask for Bulletin 7186179.