No go at Indian Point, AEC staff tells Con Ed

The regulatory staff of the Atomic Energy Commission placed itself on the side of the environmentalists this week. In its final environmental statement on Consolidated Edison Co.'s new nuclear power plant now nearing completion at Indian Point on the Hudson River, the staff concluded that Con Ed should be issued a license to operate the plant only if it changes its cooling system to one less damaging to the environment. New York City, 25 miles south, desperately needs new power sources, but conservationists have been opposing the plant.

In the present system, river water would be sucked into the plant (pulling millions of fish to their deaths on the intake screens) circulated through the plant and returned, considerably warmer, to the river.

The AEC staff concluded that Con Ed should install a closed-cycle cooling system, using giant cooling chimneys. It gave the company until July 1, 1973, to submit an evaluation of the best system. The system would have to be designed, built and installed by Jan. 1, 1978. Meanwhile, the plant should be allowed to operate, said the staff, but under a plan that would minimize detrimental effects on the aquatic biology. □

Detecting gamma rays from the sun's surface

Gamma rays are very high-energy photons—thousands of times more energetic than X-rays. They can be produced by particle-antiparticle annihilation, radioactive decay of subnuclear particles, or nuclear reactions. Explorer 11 in 1961 was the first spacecraft devoted primarily to detecting gamma rays from celestial bodies. It didn't see any. "Their flux was just too low and they were difficult to see," says Alois Schardt of NASA headquaters. As a result, the flux theories had to be revamped. In 1967 oso 3 (orbiting solar observatory) saw gamma rays for the first time coming from the direction of the galactic center.

Now, Edward L. Chupp and David Forrest of the University of New Hampshire report the first measurement of definite gamma-ray lines coming from the sun—evidence for the predicted nuclear fusion reactions on the sun's surface during solar flares. (The usual solar theory holds that fusion takes place primarily deep in the solar interior.) The lines were detected by oso 7 during the solar storms Aug. 4 and Aug. 7 (SN: 9/16/72, p. 181). At 511 KeV, the gamma-ray detector recorded radiation from the mutual annihilation of electrons and positrons. (The positrons are the antiparticles of the electrons and must have been produced in the solar flares because they could not exist for long in the ordinary matter of solar gases, according to Chupp. Chupp thinks the nuclear reactions in the flares created unstable radioactive isotopes of carbon, nitrogen and oxygen, which promptly decayed to stable forms, releasing the positrons as a by-product.) At 2.2 MeV, the oso 7 instrument detected radiation from heavy hydrogen (deuterium) produced by nuclear reactions in the flares.

To map the sources of gamma rays inside and outside the galaxy is the objective of SAS B (small astronomy satellite), to be launched for NASA by the Italian Government late this month. SAS B has a gamma-ray telescope that will observe the energy spectrum from 25 to 200 MeV, according to Carl E. Fichtel of Goddard Space Flight Center, who is principal investigator for SAS B. The gamma-ray detector will not measure the rays directly: As they hit a layer of lead on the instrument, they interact to produce a positron and electron. It is these electrons that are then detected by the instrument. The spacecraft can be pointed at possible gamma-ray sources such as the Crab nebula. Majorie Townsend of Goddard is project manager of SAS B. □

Carbon monoxide in another galaxy

Radio astronomers have discovered upwards of two dozen chemical compounds in the clouds that pervade the interstellar space of our galaxy. Of these, carbon monoxide is ubiquitous and one of the most abundant. In International Astronomical Union Circular 2447 (Sept. 28) the first discovery of carbon monoxide in another galaxy is reported by W. J. Wilson and E. E. Epstein of the Aerospace Corp. in Los Angeles and P. R. Schwartz of the Naval Research Laboratory.

Wilson, Epstein and Schwartz detected radio emission from carbon monoxide at a wavelength of 2.6 millimeters (115.2712 gigahertz). The emanations came from a bright ionized hydrogen cloud called NGC 604 located in the spiral galaxy known as NGC 598 (Messier 33). The apparent velocity of the carbon monoxide figures out to minus 237 kilometers per second. This compares very well with the velocity determined from optical measurements of the galaxy, minus 235 kilometers per second, and indicates that the carbon monoxide is inside the galaxy. □