Versatile Deuterated Compounds Production Plant (VDPP)

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Why in News?

Recently, The Department of Atomic Energy (DAE) inaugurated the VDPP and commissioned the 24 kA Prototype Sodium Cell at the Heavy Water Board Facilities (HWBF) at Vadodara.

VDPP

- It produces ***specialized high-purity deuterated solvents***, essential for advanced scientific research, frontier technologies, and strategic applications.
- **Deuterated compounds –** These are chemical compounds where *ordinary hydrogen atoms are replaced by deuterium* (a heavier isotope of hydrogen, often called heavy hydrogen).
- **Uses –** These compounds are elite, high-purity solvents absolutely essential for advanced scientific research, specialized electronics, pharmaceuticals, and strategic frontier technologies.

24 kA Prototype Sodium Cell

- **Sodium Cell –** It is an industrial electrochemical system used to produce high-purity, *nuclear-grade liquid sodium* with existing *HWBF.*
- **24 kA –** A 24 kA (kiloamperes) cell is a massive, high-capacity electrical system.
- **Uses –** Nuclear-grade *liquid sodium is the critical coolant* required for India's for India's Fast Breeder Reactor (FBRs) Programme (2^{nd} stage of nuclear power programme).
- FBRs represent the crucial second stage of India's 3-stage nuclear power programme.
- **HWBF –** It *produces heavy water (D_2O),* under DAE which is *used as moderator and coolant in nuclear reactors*.

- **Strategic Materials Hub –** Now it is used for producing deuterated compounds from heavy water and nuclear-grade sodium through specialized chemical separation and purification processes for India's nuclear programme.

References

PIB | VDPP