

Ex 9.2 (Hydroelectric power)

In one second, 150,000 gallons spill over Niagara falls. The height is 176 ft. How much power is produced? Work in 1 sec =

$$W = F \cdot d = (\text{mass}) \left(\begin{array}{c} \text{grav.} \\ \text{accel.} \end{array} \right) (\text{distance})$$

$$= (\text{density}) (\text{volume}) (g) (d)$$

$$= \left(\frac{1000 \text{ kg}}{\text{m}^3} \right) (568 \text{ m}^3) \left(9.8 \frac{\text{m}}{\text{s}^2} \right) (53.6 \text{ m})$$

$$= 2.98 \times 10^8 \text{ Joules}$$

So the power is 298 million watts

or 298 Megawatts