A great deal of work has been done with batteries and fuel cells. However, because of the short duration operating time and limited power levels, they are not practicable for long duration mission application. For the new generation of space activity, secondary power systems must be available that can produce from 10 to 100 kilowatts and that will operate for as long as 5 years. Obviously, a reactor system will provide the highest power level and survive for the longest period of time. However, the prohibitive weight of the reactor system shielding will deny access to the reactor's advantages during the foreseeable future. Unless radical changes occur in this technology, isotope dynamic and thermionic systems will most likely be employed. These systems weigh less and are approximately twice as efficient as the solar-cell battery or isotope thermoelectric power system. For these reasons, Douglas is concentrating on the development of these systems. For some applications, the system can be derated to supply low level power needs; for other applications, it can be used in multiple to supply the highest demand for secondary power.

Since we (Douglas) believe in the necessity for a nuclear stage, and because we are committed to the proposition that long-term future secondary power requirements cannot be met without employing reactor or isotope systems, Douglas has committed extensive resources to the task of developing a strong nuclear capability. We believe so strongly that nuclear power is going to be required during the next 15 years, that, in conjunction with operating the plutonium production reactor facilities at Hanford, Wash., we have constructed a nuclear laboratory nearby in Richland (fig. 61). We have just occupied that facility. The laboratory represents a $2 million investment; the laboratory equipment cost another $1.5 million; and currently, the staff of nearly 100 now has a payroll of about $2 million a year.

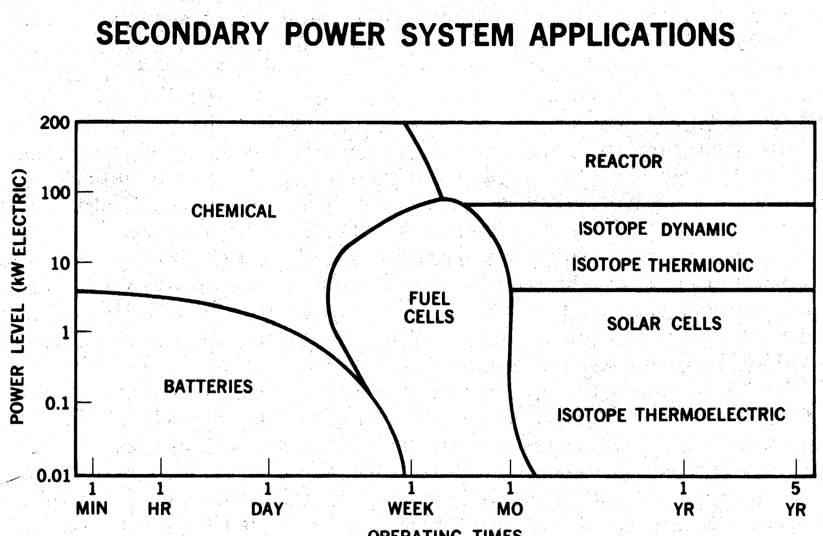

FIGURE 60