fuel and reprocessing facilities will be available as required for the life of the plant.

"Many countries are not in this fortunate position, and any national programme of nuclear-power development must look beyond the initial cost of a nuclear plant and its initial fuel. Thirty years, or the life of a plant, is a long time to be dependent upon the decisions or perhaps the whims of a foreign government, and the situation tends to worsen if a significant portion of a nation's power resources becomes nuclear and is dependent primarily on one foreign source of fuel. As time goes on, of course, if the consumption of enriched uranium in civil power reactors is sufficient to economically justify the construction and operation of more isotope-separation facilities, countries such as Canada could become an alternate source of supply. Such an economic climate is not yet in view and may be some time developing.

"With these conditions, the high burn-up natural-uranium reactor seems to meet a specific requirement if it is competitive or even near-competitive with other nuclear systems. It has the advantage of the simplest fuel cycle, using a fuel that is generally available throughout the world. Sufficient energy may be extracted in a 'once-through' operation so that it is economically feasible to treat the spent fuel as waste material, eliminating the need for reprocessing facilities, storage of highly radioactive liquids, and the problems of economic utilization of the plutonium.

"Storage of this irradiated fuel, particularly the present CANDU fuel, poses little or no problem and, although it is treated as waste in costing power, it may have a long-term value. When there is a sufficient quantity of irradiated fuel from a nuclear-power complex to allow a reasonable throughput to a separation plant, and if there is an economic civil use for plutonium and perhaps depleted uranium, and if we have safe and economical means of disposing of fission products, then perhaps this waste may have some value and, if so, can be processed to return a dividend to the owners.

"Because a well-designed heavy-water moderated and cooled nuclear plant can be fuelled with natural uranium taken to a relatively high burn-up, and because it has very low unit fuel costs compared to other systems, and because unit capital costs are falling as experience is gained, sizes increase and heavy water costs lower, it is becoming a very serious contender for many applications in various areas of the world. We do not predict a swing from enriched systems to natural systems in the U.S. for a number of reasons, but we do predict an increasing world demand for a good high burn-up, natural-uranium system and that is what we are keeping our eyes on in Canada."

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LOOKING FOR TROUBLE PAYS

If "a stitch in time saves nine", then a nail (or a board, or a coat of paint) may save even more. This is the theory behind the programme of Preventive Maintenance (PM) instituted three years ago by Royal Canadian Air Force construction engineers as the most efficient way of dealing with minor repair work to buildings and installations. So successful has the programme been that today, with PM's yellow-painted service vans a familiar sight on every base, construction officials estimate a reduction of 80 per cent in the number of trouble calls received.

LONGSTANDING PRACTICE

The principles behind PM are not new to the RCAF, since they are inherent in longstanding systems for the care of aircraft and other mechanical equipment. Even in construction, the method has long been used to service such installations as heating and electrical plants. What is new, however, is its application to buildings and other fixed facilities.

Operating on a continuous basis, PM is designed to reduce deterioration and to detect and correct minor faults, thus preventing them from developing into major problems. Since most such work is being carried out by the "PM Flight" and operators of power and heating plants are practising PM as a routine part of plant operation, a high percentage of construction-engineering resources is freed to concentrate on larger and more complex requirements.

CREW TYPES

On large RCAF stations, the PM flight is made up of two types of crews – the structural crew for repairs to building structure and fittings only and the mechanical crew for heating, plumbing, electrical and similar equipment. On smaller stations where the employment of specialist crews is not warranted, a third type of PM unit, the combined crew, is the rule.

The centre of PM activity is the van, or trailer, always located with its crew of tradesmen in the area where work is being carried out. And since the van is stocked with all tools and materials likely to be needed in minor maintenance work, time lost in return trips to the main workshop is almost entirely eliminated.

VISIT FREQUENCY

Most important in the PM plan is the "cycle", or frequency of visits the van makes to each area. While too long a cycle would result in poor maintenance and overwork, too many visits would be wasteful of time and manpower. After experiment with different time cycles, the period of four months has been standardized throughout the service.

The savings effected by the RCAF's PM programme take on added importance in a country called on to practice economy. The total annual saving so far achieved is $3 million, which reduces the previous cost of minor repairs by more than half. In the next ten years, it is estimated, savings will total $50 million.