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CONTRIBUTIONS AND FUTURE OF RADIOISOTOPES IN MEDICAL, INDUSTRIAL, AND SPACE APPLICATIONS

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INTRODUCTION

Of the over 2300 isotopes identified to date, more than 1700 are short-lived with half-lives less than one day, 291 are stable, and 333 have a half-life between 1 day and 100,000 years.[1] It is on this last group that we focus for the isotopes with useable radioactivity. In addition to the wide range of half-lives, this group of isotopes includes varying types of decay (i.e., alpha, beta, and gamma), various energies released per disintegration, and a wide variety of chemical and physical properties. Thus, there are almost unlimited potential applications for these materials.

Radioisotopes are used in a wide variety of applications including public health, medicine, industrial technology, food technology and packaging, agriculture, energy supply, and national security. In 1988, the Department of Energy reported transfers of 64 separate radioisotopes to 233 domestic and 69 foreign organizations.[2] These isotopes are reported to have a value of over $11,000,000. In addition several private organizations produce and market radioisotopes on a smaller scale.

Worldwide radioisotope use is increasing in many applications, particularly in medicine. Nordian International is continually increasing its production of cobalt-60 for irradiation services all over the world with an estimated capacity in excess of 100,000 Ci/year before the turn of the century. The purpose of this paper is to provide an overview of some of the most extensive applications of radioisotopes including some observations of future uses. In the future, those radioisotopes will contribute to a myriad

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