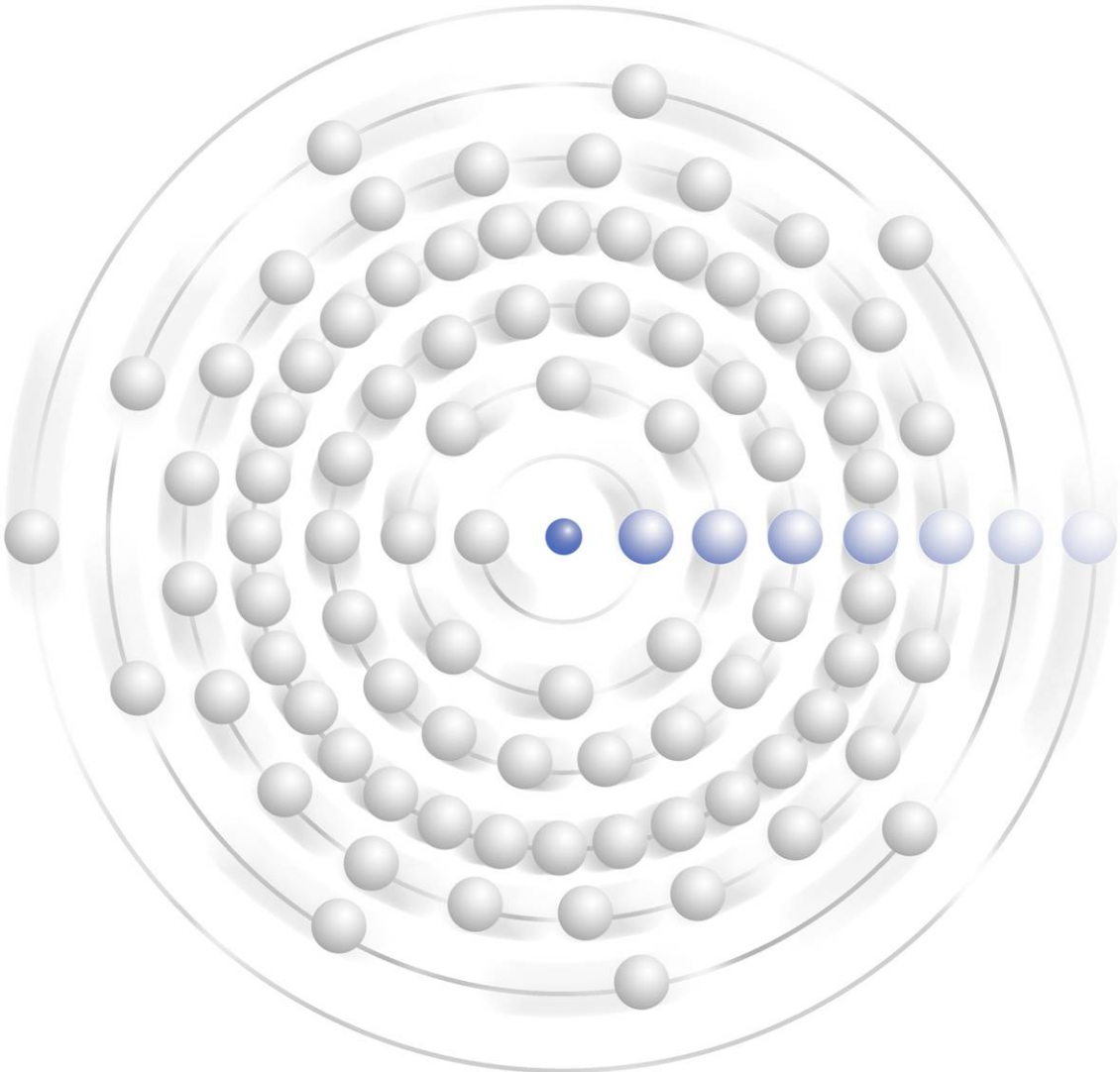
Special Ux Consulting Report **November 2008**

Nuclear Zirconium Alloy Market



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Ux Consulting
1401 Macy Drive
Roswell, GA 30076
(770) 642-7745
www.uxc.com

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1 – Introduction & Overview

The Ux Consulting Company (UxC), a leading nuclear fuel market consultancy, has prepared this special report to provide an overview of the zirconium alloy market for the nuclear industry. Nuclear-grade zirconium alloys and products are used in the fabrication of fuel assemblies used in the vast majority of nuclear reactor designs currently operating, under construction, and planned around the world. As the nuclear renaissance takes hold to varying degrees in countries all over the globe, many questions about the international nuclear supply chain have arisen. The supply of nuclear-grade zirconium – from zircon mineral sand through the cladding and components used in finished fuel assemblies – has also not escaped this scrutiny. Therefore, the primary objective of this report is to factually and analytically approach the current and expected future direction of the nuclear-grade zirconium market to help arrive at some clear conclusions about how producers of fuel assemblies for nuclear reactors will obtain the necessary zirconium for their finished products.

This report offers UxC's analysis and opinions of the various sectors that make up the nuclear-grade zirconium sponge, alloy, materials, and tubing markets. Additional details are also included on the interplay of the nuclear fuel fabrication and the zirconium alloy supply markets. We then identify major trends in this unique industry by analyzing the global, regional, and selected country supply and demand balances for nuclear-grade zirconium alloy and tubing. We conclude with some final observations on the global nuclear-grade zirconium market as well as expectations for future price developments for the related zirconium alloys and tubing.

Data Limitations

To accumulate the data required for this analysis, a questionnaire was sent to each of the various processors and fabricators of nuclear-grade zirconium sponge, zirconium alloys, and fuel assembly components. The questionnaire requested data on products produced, production capacities, current production levels, suppliers and customers, etc. Follow-up calls and emails were made to each of the targeted companies after the questionnaires were distributed.

The response to these efforts was disappointing. In the great majority of the cases the suppliers declined to provide the information claiming it was proprietary and that permission could not be obtained from management to release it. Thus, much of the data presented in this report was collected from other public and private sources available to UxC. Where possible, we confirmed data from one source with a second, independent source. We believe that the information obtained from these sources is accurate or at least representative of the production levels, etc. of the companies discussed in the succeeding chapters of the report. However, the possibility exists that there may be errors or that the information has changed since the sources used were published. In a few cases, there were no available data, and therefore, the missing data are listed as "not available" in the data tables.

Structure of Report

This report includes separate chapters for various aspects of the nuclear-grade zirconium alloy market, supply and demand, and other related areas. In addition to this **Chapter 1 – Introduction & Overview**, our report follows this basic format:

Chapter 2 – General Zirconium Overview provides a broad summary of the zirconium mineral occurrence, resource base, and industrial applications, including the role of zirconium alloy production for the nuclear fuel industry. This discussion helps to put the specific nuclear-grade zirconium alloy market analysis in better perspective, as there are numerous applications of the zirconium mineral beyond nuclear reactor fuel.

Chapter 3 – Manufacturing Processes for Nuclear Fuel Cladding discusses the manufacturing processes and the overall "zirconium cycle" for production of the materials and components used in nuclear fuel assemblies.

Chapter 4 – Nuclear Zirconium Alloy Materials & Product Suppliers offers a summary description of each of the companies involved in nuclear-grade zirconium alloy materials and product supply. This includes all the companies in the world involved in zirconium sponge and alloy production and processing through manufacture of tube-reduced extrusions (TREX), as well as separate tubing manufacture

Chapter 5 – Nuclear Fuel Fabricators and Zircaloy Tubing Supply provides a brief overview of the global nuclear fuel fabrication business and indicates where each fabricator receives its fuel assembly tubing.

Chapter 6 – Nuclear Zirconium Supply & Demand Analysis offers UxC's proprietary data and analysis of the global supply and demand balance for nuclear fuel-related zirconium alloy products. In addition, this chapter includes regional breakdowns as well as supply and demand discussions for some of the key countries in the nuclear zirconium market.

Chapter 7 – Overall Conclusions and Market Analysis completes our nuclear-grade zirconium market analysis with some final thoughts on the current situation and forecast of future trends in this market, as well as expectations for future price developments.

