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Recursos educativos

Nuclear E.: Fission

Oklo's Natural Fission Reactors

Origen:

ans.org

Tipo:

Curiosities

Edad:

All audiences,

Elementary School (6-12),

Middle School (12-16),

High School (16-18),

Professional Training Institutions,

University

oklo

natural fission

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More than 1.5 billion years ago (that's more than 1,500 million years) a nuclear fission reaction took place in an underground uranium deposit in Oklo, Gabon, Africa. The fission reaction continued - off and on - for hundreds of thousands of years. Eventually, the reactor shut down.

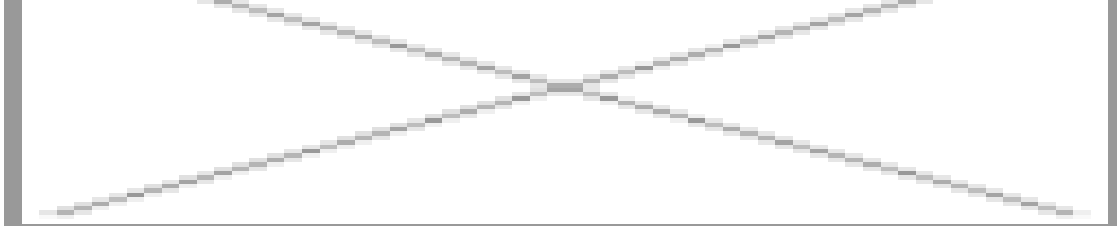
While it was active, the natural reactor generated fission products (wastes) very similar to those produced when fission occurs in modern nuclear reactors at power plants.

When evidence of the Oklo reactor was discovered in 1972, the fission products had been lying in Mother Nature's repository for about a billion years (that's 1,000 million years). In fact, it was studies of the fission products found in the uranium mine which showed that a natural reactor had operated there.

The Oklo reactor provided an interesting natural analog for waste management. Studying what happened to the fission products in the reactor has provided valuable insight into the requirements for a long-term waste repository.

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What led to the discovery of the Oklo natural fission reactors?

A scientist making a routine test noted a tiny "discrepancy" in the amount of uranium-235 present in some uranium which was undergoing enrichment. Seeking to explain the discrepancy, scientists began some detective work.

Where can I learn more about Oklo?

Visit your local library and ask the reference librarian or periodicals desk for the article:

"A Natural Fission Reactor" by George A. Cowan in Scientific American, July 1976. (Pages 36 - 47).

It contains photos, diagrams, and a description of the research into the Oklo reactors. This is probably the best-known article about Oklo; it contains readable scientific information for non-specialists.

Visit <http://www.oklo.curtin.edu.au/> [1], Australian web sites about the Natural Fossil Fission Reactors at Oklo, Gabon. The pages provide information about the "where, when, what, why, who, and how" of the Oklo reactors.

Read Phillip Morrison's commentary, "Where Fiction Became Ancient Fact," from Scientific American, June 1998. The author uses a vivid scene from a novel (written before basic discoveries about the atomic nucleus) to catch the reader's attention. Then, he deals with facts about Oklo. (Somewhat difficult reading.)

What does nature tell us about nuclear waste disposal?

A Canadian web site, http://www.nuclearfaq.ca/cnf_sectionE.htm#v2 [2], provides information about several analogs for waste storage/disposal, including the natural fission reactors at Oklo.

Does the information gathered from Oklo impact planning for disposal of radioactive waste?

Visit <http://www.ocrwm.doe.gov/factsheets/doeymp0010.shtml> [3] for information.

Where can I learn more about the management of radioactive waste?

Visit a library for a copy of:

Understanding Radioactive Waste (Fourth Edition)

by Raymond L. Murray

© 1994 Battelle Memorial Institute

ISBN 0-035470-79-4

Where can I learn more about nuclear science and technology?

Brochures from ANS provide more information. One discusses ways that nuclear science and technology contribute to sustainable development. Another discusses how nuclear is a sustainable source of energy. Brochures are available at <http://www.ans.org/pi/brochures/> [4].

The American Nuclear Society offers a useful web site at www.aboutnuclear.org [5].

The "ABC's of Nuclear Science" is another good starting point for basic technical information. It is provided by Lawrence Berkeley National Laboratory and found at <http://www.lbl.gov/abc/index.html> [6].

Where can I find definitions for the special terms used here?

The ANS web site offers an online glossary. It can be found at <http://www.ans.org/pi/glossary/> [7]

How does waste from nuclear power compare to the waste from fossil fuel plants?

"Rather than disperse massive quantities of waste products over wide areas, as is the case with emissions from fossil fuel plants (sulfur oxides, nitrogen oxides, carbon dioxide, and toxic metals such as arsenic and mercury contained in the fly ash), nuclear power plant operators are able to consolidate the waste and sequester it safely while its radiation level drops. By comparison, some of the waste dispersed into the air from fossil fuel plants is toxic and will remain so forever."

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