



CARIBBEAN CURRENTS

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Welcome..

...to **CARIBBEAN CURRENTS**, Volume Seven, Number Three. This newsletter is edited by INFOTERRA/USA in its capacity as the Regional Service Centre (RSC) for INFOTERRA National Focal Points (NFPs) in the English and French-speaking Caribbean. Although the *CURRENTS* is assembled at INFOTERRA/USA, the content belongs to you, the readers. You are encouraged to send in any questions, comments, problems, or interesting issues relevant to the Region for inclusion in the *CURRENTS*. Please see the Guidelines for Contributions on page 7 for more information.

Each issue features a Directory of NFPs in the Region so that anyone with international environmental questions can contact their nearest resource. Please feel free to contact one another as well as your RSC for assistance or materials.

Please don't hesitate to share *CARIBBEAN CURRENTS* with your friends and colleagues, and to make copies as needed. The Currents should serve as an informational forum for anyone who lives, works, or is involved in environmental issues in the English and French-speaking Caribbean Region.

Transshipment of Nuclear Waste

This issue's topic is the first of two parts on the transshipment of nuclear waste. Companies in France and the United Kingdom are reprocessing nuclear fuel from power plants in Japan and shipping the substance, weapons-ready mixed-oxide, or MOX, from Europe to Japan by way of the Caribbean Sea. There is concern regarding the safety of this cargo and the environmental and economic consequences if an accident occurs releasing the nuclear waste into the sea. This issue highlights a question and answer paper on the transshipment of MOX fuel. The next issue will address radiation emergency plans.

If you have any comments on any topic, or would like to contribute a short article or have a resources guide to share, please submit your contribution following the guidelines on page 7. Thank you for your assistance.

Transshipment of Nuclear Waste: Is It Safe?

In March of this year, the Caribbean Community held a two-day summit in Surinam where leaders of Caribbean countries discussed the use of the Caribbean Sea for the transshipment of nuclear waste from France to Japan. Spent fuel from nuclear power plants in Japan is reprocessed at factories in France and the United Kingdom to create mixed-oxide or MOX fuel. MOX fuel combines plutonium and uranium and is used as an alternative fuel for nuclear reactors. Because MOX is not pure plutonium, the Japanese nuclear industry and European reprocessing plants regard it as an acceptable substitute for shipment. The transport of pure plutonium was the subject of controversy in 1984 and 1992 due to plutonium's "extreme radiotoxicity and its weapons utility" (Tanzer). Opponents to the passage of nuclear waste through the Caribbean maintain that the shipments jeopardize economic security and environmental integrity of the region. The tourism, fishing and shipping industries could be devastated by the long-term health threat to marine life and to people living in the area caused by an accident. Another concern is that "the plutonium in the fuel is considered weapon-usable by both the US government and the International Atomic Energy Agency (IAEA) as it can be easily extracted and used in nuclear weapons if the material were diverted or stolen" (BBC Monitoring). Shipments are therefore vulnerable to terrorist attacks "increasing the likelihood of a major accident and environmental disaster" (BBC Monitoring).

The Most Important Questions and Answers About the MOX Shipment

(updated July 13, 1999)

The following question and answer paper by Sharon Tanzer, vice president of the Nuclear Control Institute, provides useful information on the shipment of MOX fuel. It is reprinted with the permission of the Nuclear Control Institute.

1. What is MOX fuel?

MOX (mixed-oxide) fuel combines plutonium with uranium and is an alternative fuel for nuclear power reactors. Power reactors normally run on low-enriched uranium (LEU) fuel that is unsuitable for use in nuclear weapons. Japan's plutonium, which could be used in nuclear weapons, comes from uranium fuel originally supplied by the United States and irradiated in Japanese reactors. The "spent fuel" is shipped to Britain and France for "reprocessing," and the recovered plutonium is shipped to Japan as MOX fuel.

2. Why is Japan using MOX fuel?

Japan is turning to MOX fuel for its light-water, nuclear power reactors as a way to consume the plutonium it had intended to use in fast-breeder reactors. Japan's prototype breeder reactor, Monju, has been shut down since a serious accident in 1995. Plans to build a larger, commercial breeder have been deferred. To avoid the embarrassment and political repercussions of stockpiling plutonium, an essential ingredient of nuclear weapons, Japan's nuclear authorities are pressing Japan's utilities to use it in the form of MOX fuel in their commercial power reactors. Japan's commercial reactors do not need plutonium fuels and could continue to operate with cheaper, safer uranium fuel that is unsuitable for weapons. Japan's government perceives a need to reduce its supply of surplus plutonium by using plutonium in MOX fuel rather than disposing of the plutonium as waste.

3. Why is Japan fabricating MOX fuel in Europe?

Japan's nuclear industry hopes that shipments of mixed-oxide fuel from Europe to Japan will prove less controversial than previous transports of pure plutonium. The MOX shipments are being portrayed as posing no environmental or security risks. Two shipments of separated plutonium in 1984 and 1992 raised an outcry in countries along the potential shipping routes because of plutonium's extreme radiotoxicity and its weapons utility. (A speck the size of a pollen grain can cause cancer; less than 15 pounds can be fashioned into a bomb.) With shipments of pure plutonium oxide now virtually ruled out for political reasons, British and French reprocessing companies are counting on MOX as an acceptable way to send back to Japan the plutonium they have processed from Japan's spent nuclear fuel.

Plutonium is an essential ingredient of nuclear weapons. Less than 8 kilograms is enough to construct a bomb. The plutonium in fresh MOX fuel can be separated from the uranium by straightforward chemical means and can be MOX shipment, which is the first of many and will set a precedent for how future shipments are protected. Under the terms of the nuclear-cooperation agreement between the United States and Japan, a transportation plan for any shipment of plutonium extracted from U.S.-supplied nuclear fuel is subject to U.S. approval. In 1992, the United States required Japan to use a gunboat to escort a shipment of plutonium from France to Japan. Japan has insisted that the stringent physical-protection standards that apply to shipments of plutonium need not be applied to MOX. On several occasions, however, high-ranking State Department officials---Undersecretary of State John Whitehead in 1988 and then-Acting Secretary of State Strobe Talbott in 1996---have asserted the U.S. position that the same strict physical- protection requirements must apply to MOX fuel and plutonium. They also confirmed that any “alternative security measures” are unlikely to be acceptable for the entire voyage. Nonetheless, Japan continued to press the United States not to require an armed-escort vessel for MOX fuel shipments.

5. What security arrangements were made for this shipment of MOX fuel?

In May, 1999, the U.S. Government bowed to Japanese wishes and approved a security plan that does not require use of the armed Japanese plutonium escort vessel for an impending shipment of MOX fuel containing 450 kgs. of plutonium (enough for at least 60 nuclear weapons), which the United States had required for a 1992 sea shipment of 150 kgs. of plutonium. Instead, two commercial freighters owned by British Nuclear Fuels Ltd. have each been outfitted with light cannon and machine guns. On board the two ships will be 26 lightly-armed, civilian police from the U.K. Atomic Energy Authority Constabulary. The two ships will travel together without an armed military escort vessel and without radar-directed anti-missile armaments despite a 1988 assessment by the U.S. Joint Chiefs of Staff that maritime transports of plutonium would be vulnerable to “small, fast craft, especially if armed with anti-ship missiles.” A U.S. Government fact sheet concedes the armed transport vessels lack the speed and maneuverability of the Japanese coast guard vessel used in 1992. Nonetheless, the U.S. State Department informed Japan that this plan “fully satisfies” the requirements for “adequate physical protection of the nuclear material.” The new arrangement ignores a pledge made in 1996, in a letter from the State Department to the chairman of the House of Representatives International Relations committee, that security for the MOX shipment will be no less rigorous than the measures applied to Japan’s 1992 shipment of plutonium oxide.

6. Is the Panama Canal route under consideration?

According to a State Department briefing, the Panama Canal route has not been ruled out. In 1998, Greenpeace demonstrated the vulnerabilities of this narrow waterway by boarding a ship carrying nuclear waste from Europe to Japan as the ship entered the Canal. An investigation by Canal authorities found the list of security failures included the “dysfunctional communication, command and control between the National Maritime Service patrol boats and Panama Canal Commission security.” A MOX transport in the Canal would be vulnerable to attack by terrorists who might seek to steal the plutonium-bearing fuel or blow up the ship and disperse its toxic contents.

7. How much plutonium will be on board the two ships ?

The U.K. is shipping 8 MOX fuel assemblies to the Kansai Electric Power Company’s Takahama 4 reactor. Approximately 32 fuel assemblies have been fabricated in Belgium for the Tokyo Electric Power Company’s Fukushima 3 reactor. The two ships, the Pacific Pintail and the Pacific Teal, will leave from the French port of Cherbourg and the U.K. port, Barrow-in-Furness. The combined MOX orders these ships will carry contain an estimated 450 kgs. of weapons-usable plutonium, enough for nearly 60 nuclear weapons. MOX is classified by the International Atomic Energy Agency as a Class 1 nuclear material requiring the highest level of security. Plutonium in fresh MOX fuel can be extracted by a straightforward chemical process.

8. Is it safer to ship MOX fuel than plutonium?

MOX fuel pellets are less likely to be dispersed in the event of an accident than is plutonium oxide---a powder. Plutonium is highly toxic---a speck the size of a pollen grain can cause cancer if inhaled. However, certain severe accident conditions can result in rapid disintegration of MOX fuel pellets into dispersible and respirable fragments. MOX package designs tend to omit one of the multiple containment barriers that would be present in a plutonium oxide transport cask. For example, U.S. domestic regulations require that plutonium in dispersible forms be shipped (by land)

in packages with two independent barriers, but shipping packages for so-called “nondispersible” forms, including MOX, need only have one.

9. How sturdy is a MOX shipping cask? Is it likely to be damaged in an accident?

MOX shipping casks must meet an international standard for containers used in sea shipments of radioactive material, the IAEA’s “Type B” criteria. Independent observers agree that the conditions a package may encounter in the course of an accident at sea can be far more severe than those simulated in testing of the Type B cask. However, the IAEA claims that these packages are designed and constructed with such a high degree of conservatism that they will be able to withstand accident conditions more severe than those under which they are tested. Unfortunately, there is hardly any experimental evidence for this claim. Reviews of the type of cask that will be used for MOX sea shipments---a modified spent fuel shipping cask---do not provide confidence that they can withstand mechanical and thermal loads far in excess of those for which they were designed.

10. How credible are assurances that the shipping casks are safe?

It has been reported that a Japanese manufacturer falsified data about the shipping cask and its neutron shielding materials. *Atoms In Japan*, published by the Japan Atomic Industrial Forum, an industry group, acknowledged that the Science and Technology Agency (STA) had found that “data had been altered” with respect to the boron content of a number of transport containers, including a container for MOX fuel. Boron is used in canisters to provide shielding from radiation. According to press reports, a number of transport casks contained less boron than called for in specifications. Based on its finding, the STA ministry’s Advisory Committee on Technology for the Transport of Radioactive Material by Sea will reexamine the safety of the MOX container.

11. What are the obligations under international law of the shippers---Britain, France and Japan?

The 1982 Law of the Sea Convention imposes an obligation on all states to protect and preserve the marine environment. The “precautionary principle” adopted in the 1992 Rio Declaration on Environment and Development reinforces this obligation by recognizing the limits of knowledge on the marine environment and by assigning a high priority to exercising caution and avoiding uncertain risks to ensure its protection. The precautionary principle lays down a set of specific responsibilities that must be met before shipments of unusually hazardous materials may be undertaken. These include the duty to notify and consult other countries and the duty to prepare an environmental impact assessment. “Freedom of navigation is not an absolute freedom and is subject to qualifications in the 1982 Law of the Sea Convention and other international agreements,” writes Prof. Jon Van Dyke of the University of Hawaii Law School, an expert on maritime and international law, in a paper prepared for NCI. “All parts of the Convention must be viewed as equally important and the duty to protect and preserve the marine environment is just as much an international norm as the rights to innocent and transit passage.”

12. Are there negotiations underway to resolve this Law of the Sea dispute?

“Shipping and nuclear nations are now engaged in a process of consultation and notification with regard to many of the affected coastal states,” Professor Van Dyke reports. Some larger states have been notified in advance of shipments, but the smaller Pacific and Caribbean nations have been left in the dark regarding these shipments, and treated as second-class citizens and denied the right to learn what is going on. “Obviously, such a situation is unfair and unacceptable.”

13. What progress has been made since March 1996, when 13 nations led by Argentina joined together at the International Maritime Organization in London to urge adoption of a comprehensive, compulsory code of practice for sea transport of radioactive materials?

The Code of Practice (INF Code) has been made mandatory and standards for shipboard safety in an emergency have been clarified. But there is no agreement regarding salvage responsibilities, liability of shippers, obligations to consult with coastal states and provide them advance notification, preparation of an environmental impact assessment, or contingency planning to handle emergencies. According to Professor Van Dyke, “Until agreements are reached on these important matters, the shipment of these extremely dangerous materials will continue to violate fundamental norms of international law and comity, because they place coastal nations that receive no benefit from the shipments at

grave risk of environmental disaster without any legal protections.”

14. How are en-route nations responding to continuing shipments of radioactive material---plutonium and vitrified, high-level nuclear waste?

- The Association of Caribbean States, meeting in Santo Domingo on April 16-17, 1999, affirmed it considers the Caribbean Sea “an invaluable asset,” deplors its “ecological degradation,” and “rejects its continuous use for the transport of nuclear and toxic waste.”

- On March 8, 1999 the Heads of Government of the Caribbean Community reiterated their “unwavering opposition” to the “blatant and persistent use of the Caribbean Sea for the transshipment of highly toxic nuclear materials.” Citing the “economic importance and ecological fragility” of the Caribbean Sea, they expressed “their outrage” at the increasing frequency and volume of the hazardous materials being shipped. They called on France, Japan and the U.K. to “desist from this dangerous misuse of the Caribbean Sea.”

- At the International Atomic Energy Agency General Conference in September 1998, the Secretary General of the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) called for “new and more comprehensive safety measures for the transport of these materials, including the appropriate safeguards, assurances, and liability measures for the states that lie along these routes, off whose coasts these increasingly dangerous nuclear shipments travel.”

- A Joint Declaration of Brazil, Argentina, Chile and Uruguay in January 1997 expressed their concern “with the risks that - due to the intrinsic danger of the cargo - this transport represents to the health of the population and to the marine environment of the region in route . . .” They called for prior notification of routes, consultation on emergency plans, commitment to salvage and other measures. At the 1998 international preparatory committee meeting for the Nuclear Non-Proliferation Treaty Review Conference, Argentina and Chile repeated these requests.

- The Caribbean High Commissioners in a January 1998 declaration expressed their “great alarm that a nuclear-waste shipment was being made despite repeated protests over the great danger which it poses to the fragile Caribbean environment and to the lives of Caribbean people.”

- The Plan of Action adopted by the Heads of State and Government at the Second Summit of the Americas in April 1998 stated that “Governments will address maritime transport of nuclear and other hazardous waste and work . . . to strengthen standards governing the transport of such goods and its safety.” (See http://www.sice.oas.org/ftaa/santiago/sapoa_e1.stm)

- The Secretary General of the South Pacific Forum stated in February 1997, “The position of the South Pacific Forum is clear on this issue. The use of the region for radioactive and other hazardous waste shipment poses continuing concerns for the South Pacific region.”

- New Zealand’s Minister of Foreign Affairs and Trade explained in a December 1996 press release, “We told Japan we did not want the shipment to come anywhere near New Zealand. . . We have pressed for strengthened international safety requirements for shipments of radioactive material and for transparency on their routing.”

For additional information, the following papers are available on the web site of the Nuclear Control Institute [<http://www.nci.org/seatrans.htm>]:

Safety Aspects of Unirradiated MOX Fuel Transport by Dr. Edwin Lyman, in Comprehensive Social Impact Assessment of MOX Use in Light Water Reactors, November 1997.

The Need for Further International Action Regarding Safety of Sea Transport of Ultrahazardous Radioactive Materials by Prof. Jon Van Dyke, University of Hawaii School of Law, August 1998.



INTERNET SITES ON NUCLEAR WASTE

A few of many sources of electronic information on nuclear waste.

INTERNATIONAL ATOMIC ENERGY AGENCY

<http://www.iaea.org/>

This site contains information about IAEA, conferences sponsored by the Agency and research activities in which the organization is engaged.

OECD NUCLEAR ENERGY AGENCY

<http://www.oecdnea.org/>

This site provides information on NEA publications, conferences and research.

NUCLEAR CONTROL INSTITUTE

<http://www.nci.org/>

This site provides information on nuclear waste materials and associated environmental risks.

GREENPEACE INTERNATIONAL

<http://www.greenpeace.org>

This site provides press releases and other articles on the Greenpeace stance against the shipment of nuclear waste.

OCEANS AND LAW OF THE SEA WEBSITE

<http://www.un.org/Depts/los/index.htm>

This site provides information on the Law of the Sea Convention.

INTERNATIONAL MARITIME ORGANIZATION

<http://www.imo.org/>

This site provides information on conventions and activities of this United Nations affiliate.

THE CORE URANIUM INSTITUTE

<http://www.uilondon.org/>

The Core Uranium Institute conducts research related to the nuclear fuel cycle and this site provides links to statistics, relevant news articles and information on radioactive waste management.

INTERNATIONAL NUCLEAR SOCIETIES COUNCIL

<http://www2.biglobe.ne.jp/~INSC/index.html>

This organization represents over 50,000 professionals in the nuclear field. The site provides information on activities of the council and information about international conventions governing radioactive waste transport.

*Current
Nuclear*

*Conferences
Waste*



September 20-24, 1999 -- *6th International Conference on Nuclear Criticality Safety (ICNC'99)*, Versailles, France. This conference aims to provide an international technical forum for the Nuclear Criticality Safety Issues concerned with handling and manufacturing nuclear materials, transporting spent fuel and managing fuel waste. Contact: Patrick Cousinou, E-mail: satori@nea.fr; Website: <http://www.ipsn.fr/icnc99/>

November 29-December 3, 1999 -- *International Symposium on Restoration of Environments With Radioactive Residues*, Arlington, VA. Contact: Mr. P. Stegnar, International Atomic Energy Agency, Telephone: 43 1 22711; Fax: 43 1 26007; Email: p.stegnar@iaea.org or official.mail@iaea.org.

March 13-17, 2000 -- *International Conference on the Safety of Radioactive Waste Management*, Cordoba, Spain. Contact: Mr. E. Warnecke, International Atomic Energy Agency, Telephone: 43 1 22676; Fax: 43 1 26007; Email: e.warnecke@iaea.org.

RELATED JOURNALS

Hazardous Emergency Response (ISSN 1062-8069) - Legislation, enforcement & technology of emergency response to spills of hazardous materials.

Hazardous Substances and Public Health (No ISSN) - US Dept. of Health & Human Services Agency for Toxic Substances & Disease Registry publication covers issues of and corrective measures for hazardous waste as it effects human health.

Nuclear Waste News (ISSN 0276-2897) - Management of radioactive waste from energy production, weapons production and medicine.

Radioactive Waste Management (ISSN 0275-3707) - Put out by the US Dept. of Energy and covers spent-fuel transport & storage, radioactive effluents from nuclear facilities & techniques of processing wastes, their storage and ultimate disposal.

Guidelines for Contributions to *CARIBBEAN CURRENTS*

Any organization or individual operating or involved in the English and French-speaking Caribbean Region is welcome to contribute to the newsletter. Contributions should be addressed to:

Caribbean Currents Coordinator
INFOTERRA/USA
U.S. Environmental Protection Agency
Headquarters Library, 3404
401 M Street, S.W.
Washington, D.C. 20460
UNITED STATES
Telephone: (202) 260-5917; Fax: (202) 260-3923; E-mail: library-infoterra@epa.gov

Please note that submissions should meet the following criteria:

- They are relevant to environmental issues
- They must be of interest to or directly involve the Region
- They must not endorse or recommend any product or commercial service, explicitly or implicitly
- They must be received by the posted deadline (see below)

Please feel free to contact the *CARIBBEAN CURRENTS* coordinator if you are interested in submitting an article. Please note that once your article is submitted, it is subject to editing as needed. Final decisions on editing and inclusion of any contributions are left to the INFOTERRA/USA Manager.

DEADLINE FOR CONTRIBUTIONS TO Vol. 7, No. 4: September 8, 1999

Welcome to The *CARIBBEAN CURRENTS* Bulletin Board

Each issue, we will publish questions or concerns of interest to CURRENTS readers. Anyone who has materials or information that they are seeking or that they feel will be helpful should feel free to contribute. We will post queries and offerings of general interest on the Bulletin Board. You may respond by contacting the reader who has placed the item, or the RSC.

Bulletin Board



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Website: [http://www.nci.org/
home.html](http://www.nci.org/home.html)

US Nuclear Regulatory
Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738



Related Organizations

US Department of Energy
Energy Information Administration
Telephone: (202) 586-8800
Fax: (202) 426-1278
Website: [http://www.eia.doe.gov/
fuelnuclear.html](http://www.eia.doe.gov/fuelnuclear.html)

COGEMA
(one of the facilities which reprocesses
Japan's nuclear fuel and ships it
back to Japan)

COGEMA -Velizy
2, rue Paul Dautier, BP-4
78141 Velizy Cedex FRANCE
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Fax: 33 1 39 26 27 00
Website: <http://www.cogema.fr/>

Caribbean Currents is available on the Internet at <http://www.epa.gov/earlink1/currents/>

About the NFP Directory

This directory reflects changes and additions to the INFOTERRA Directory of National Focal Points distributed by INFOTERRA/PAC, dated November 1998. Please check this information to verify that it is correct and up-to-date. If you have any changes or corrections, please notify the RSC as soon as possible. We will be happy to relay the information to the PAC.

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