GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 927
TO BE ANSWERED ON 03.03.2010

THORIUM EXPLORATION

927 DR. MURLI MANOHAR JOSHI:
SHRI B.N. PRASAD MAHATO:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) whether some foreign companies have shown keen interest in the field of thorium exploration in the country;
(b) if so, the details of such companies;
(c) whether the Government has explored the potential to generate power by using thorium in the country;
(d) if so, the quantum of power likely to be generated in this field;
(e) whether the required technology for said purpose is available in the country; and
(f) if so, the details thereof?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):

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(a)&(b) The Department of Atomic Energy has no information on this.

(c) Yes, Sir

(d) Around 2,00,000 GW-yr electricity potential exists in India using domestic thorium through the route of breeder technology.

(e) Yes, Sir.

(f) India has formulated a three stage nuclear power programme to optimally use its modest uranium and vast thorium resources. Large scale thorium utilization is contemplated in the third stage of this programme, where Uranium – 233 bred in Fast Breeder Reactors of the second stage, will be used together with thorium.

While in technological terms we are ready with the design of Advanced Heavy Water Reactor which would produce around two third of its energy from Thorium, large scale deployment of Thorium for power generation will be mainly in the third stage. This can start once large generation capacity based on fast reactors has been set up in the second stage of our nuclear power programme.

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GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 936
TO BE ANSWERED ON 03.03.2010

ATOMIC PLANTS WITH US COOPERATION

936 SHRI J.M. AARON RASHID:
SHRI ARJUN MUNDA:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) whether the Government has identified locations for setting up of atomic power plants with the cooperation of United States of America;
(b) if so, the details thereof alongwith the funds allocated, plant-wise;
(c) the progress made in acquisition of land in various States for this propose; and
(d) the time by which the plants are likely to be made operational?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):
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(a) Yes, Sir

(b) Two sites, one at Kovvada in Andhra Pradesh and another at Chhayamithi Virdi in Gujarat have been approved 'in principle' for setting up nuclear power plants based on cooperation with USA. The requirement of funds for the projects has not been finalized yet. However, a provision of Rs.850 crore for each of the sites has been proposed in the Mid Term Appraisal of the XI Plan (2007-12).

(c) The land acquisition process has just started. The consultation with the states, appointment of nodal agencies and survey to arrive at the plot plan are in progress.

(d) Presently discussions in this regard are taking place with US companies.

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GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 1026
TO BE ANSWERED ON 03.03.2010

AGREEMENT FOR REPROCESSING OF BURNT FUEL

1026 SHRI J.M. AARON RASHID:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) whether India and United States of America have arrived at an agreement over right of re-processing the burnt fuel for Nuclear Power Plants;

(b) if so, the details thereof; and

(c) if not, the time by which an agreement in this regard is likely to be signed?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):

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(a) to (c) Article 6(iii) of the India-US agreement for Cooperation between the Government of India and the Government of the United States of America concerning Peaceful Uses of Nuclear Energy signed on 10 October 2008, inter-alia, states that India will establish a new national reprocessing facility dedicated to reprocessing safeguarded nuclear material under IAEA safeguards. Article 6(iii) of the Agreement calls for consultations on arrangements and procedures within six months of a request by either party and will be concluded within one year.

In March 2009 the US responded to India's request invoking Article 6(iii) of the Indo-US Agreement on arrangements and reprocessing confirming that the first round of formal consultations, would commence no later than 3 August 2009 and that final agreement on arrangements and procedures is to be reached no later than 3 August, 2010. The first round of negotiations between India and the United States had taken place on 21-22 July 2009 in Vienna. The process of negotiations is a continuous process aimed at arriving at an acceptable agreement within the stipulated time frame.

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GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 1060
TO BE ANSWERED ON 03.03.2010

ENERGY THROUGH FUSION TECHNOLOGY

1060 SHRI VIRENDER KASHYAP
SHRI ANURAG SINGH THAKUR:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) whether Government proposes to produce energy through Fusion Technology;
(b) if so, the details thereof; and
(c) the time by which it is likely to be implemented?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):
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(a) Yes, Sir.

(b) Producing energy through fusion technology is the long term objective of the scientific project in Fusion Science & Technology undertaken by Institute of Plasma Research(IPR). The principal steps in this project are: Basic Research in Magnetic Fusion using tokamaks (Aditya and SST-1) with the developments of associated technologies, participation in International Thermonuclear Experimental Reactor (ITER) Programme and Fusion Technology Programme (i.e. critical technologies development like Test Blanket, magnet, diverter, vessel, Radio Frequency & Neutral Beam etc.) and design and development of a DEMO fusion Reactor.

(c) The steps outlined in (b) above are envisaged over a period of 30-40 years.

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GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 1043
TO BE ANSWERED ON 03.03.2010

CONVERSION OF SEA WATER

1043 DR. SANJAY SINGH:
SHRI S. ALAGIRI:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) whether the sea water could be converted into potable water by means of atomic energy;
(b) if so, whether Government has set up/proposes to set up any such project;
(c) if so, the details thereof;
(d) the per litre cost of conversion of sea water into potable water by atomic energy; and
(e) the steps taken/propose to be taken by the Government for large scale conversion of sea water into potable water?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):

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(a) & (b) Yes, Sir.

(c) Bhabha Atomic Research Centre (BARC) has developed desalination plants based on both Reverse Osmosis (RO) as well as thermal processes. RO plants that have been developed have capacities ranging from five thousand litres per day to eighteen lakh litres per day. An 18 (eighteen) lakh litres per day capacity desalination plant operating on the RO process has been set up at Kalpakkam, Tamil Nadu. Multi Stage Flash (MSF) evaporation based thermal process plant with capacity of forty five lakh litre per day has been set up at Kalpakkam.

BARC has also set up desalination plants at Sheelgaon village in Barmer District, Rajasthan (30,000 litres/day capacity) and Satlana village in Jodhpur District, Rajasthan (30,000 litres/day capacity) in cooperation with Defence Laboratory, Jodhpur for providing drinking water from borewell/brackish water sources. Three desalination plants (5000 litres/day capacity each) have been set up in the Tsunami affected areas of Tamil Nadu for providing drinking water.

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(d) The cost of conversion of seawater into potable water using the above technologies varies between 5 to 10 paise/litre depending on local conditions, quality of end product and the technology in use.

(e) Department of Atomic Energy (DAE) has developed and demonstrated technologies which are made available to Government agencies for large scale conversion of sea water into potable water.

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GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 1023
TO BE ANSWERED ON 03.03.2010

MONITORING OF EXPLORATION WORK

1023 SHRI ASHOK KUMAR RAWAT:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) the main functions of Atomic Mineral Directorate (AMD);
(b) whether the Government has constituted a Committee to monitor exploration on atomic mineral resources in the country; and
(c) If so, the details thereof and the reasons therefor?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):
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(a) The Atomic Minerals Directorate for Exploration and Research (AMD), a constituent Unit of the Department of Atomic Energy, is engaged in survey and exploration for atomic minerals required for the Nuclear Power Programme of the Country.

(b) & (c) No, Sir. However, the Government has constituted a Committee under the chairmanship of the Cabinet Secretary, which inter alia examines the various issues relating to exploration and mining of uranium so as to help remove the bottlenecks and speed up the activities. The Committee meets periodically.

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GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 931
TO BE ANSWERED ON 03.03.2010

FIRE IN BHABHA ATOMIC RESEARCH CENTRE

931 SHRI DATTA MEGHE:
SHRI SARDAR SUKHDEV SINGH LIBRA:
SHRI SARVEY SATHYANARAYANA:
DR. BHOLA SINGH:
PROF. (DR.) RANJAN PRASAD YADAV:
SHRI ASADUDDIN OWAISI:
SHRI MILIND DEORA:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) whether a major fire broke out at Bhabha Atomic Research Centre in Mumbai leading to death of two young scientists';
(b) if so, the main reason of the fire;
(c) whether the Government has constituted a Committee to look into the causes of fire;
(d) if so, the outcome of the enquiry; and
(e) the steps taken or being taken by the Government to avoid such incidents in future especially in highly protected sensitive security zones?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):
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(a) A fire incident took place on December 29, 2009 in one of the chemical laboratories in Bhabha Atomic Research Centre (BARC) resulting in the death of two Ph.D. Students.

(b) Reason for the fire accident as indicated by the report of Investigation Committee set up by BARC is low intensity explosive energy released from accidental mixing of small quantities of reactive chemicals stored in the Chemical laboratory.

(c) Yes, Sir. A Committee has been set up by BARC to inquire into the causes of fire. The Police are also conducting forensic and other investigations.

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(d) & (e) The BARC Investigation committee has made several recommendations to prevent recurrence of similar incidents. Remedial measures have also been recommended to improve not only safety but also the emergency response to an incident, which can prevent escalation of the incident and can mitigate the consequences. BARC Safety Council is taking further steps for implementation of the recommendations of the Committee to enhance the safety status of all the laboratories.

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GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO : 1116
TO BE ANSWERED ON 03.03.2010

CIVIL NUCLEAR AGREEMENT

1116 SHRI MANISH TEWARI:
SHRI SURESH KUMAR SHETKAR:
SHRI SARVEY SATHYANARAYANA:

WILL THE PRIME MINISTER BE PLEASED TO STATE:

(a) the details of Civil Nuclear Energy Co-operation Agreements with various other countries signed by India between 1st Jan, 2005 and 1st Feb. 2010;
(b) the significant commonalities between these various agreements and the difference unique to each of these agreements when contrasted in juxtaposition to each other alongwith a comparative clause wise chart that maps out the similarities or differences in the substantive clauses of each agreement;
(c) whether the non-introduction/non-passage of a law to regulate liability in case of nuclear accidents called the Nuclear Liability Bill is an impediment in foreign investment flowing into the Civilian Atomic Energy Sector;
(d) whether a Nuclear Liability Bill has been approved by the Government and is awaiting introduction in Parliament.
(e) If so, the time by which the Government plans to introduce the proposed bill; and
(f) the guidelines that permit Indian companies to participate in the Civilian Nuclear Energy Sector?

ANSWER

THE MINISTER OF STATE FOR SCIENCE & TECHNOLOGY AND EARTH SCIENCES (INDEPENDENT CHARGE), PMO, PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PARLIAMENTARY AFFAIRS.
(SHRI PRITHVIRAJ CHAVAN):

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(a) India has signed following Civil Nuclear Energy Cooperation Agreements during 01st Jan 2005 and 1st Feb 2010:

(i) Cooperation Agreement between the Government of the Republic of India and the Government of the French Republic on the Development of Peaceful Uses of Nuclear Energy was signed on 30 September 2008. This Agreement has since been ratified.

(ii) Agreement for Cooperation between the Government of India and the Government of the United States of America Concerning Peaceful Uses of Nuclear Energy was Signed on 10 October 2008. This Agreement has since been ratified.

(iii) Agreement between the Government of the Republic of India and the Government of the Republic of Namibia on Cooperation in Peaceful Uses of

Nuclear Energy was signed on 31 August 2009. This Agreement has to be ratified.

In addition, the following were signed/ initialed:

(i) Agreement between the Government of the Republic of India and the Government of the Russian Federation on Cooperation in the Construction of Additional Nuclear Power Plants Units at Kudankulam site as well as in the Construction of Russian designed Nuclear Power Plants at new sites in the Republic of India was signed on 05 December 2008.

(ii) Memorandum of Understanding between Department of Atomic Energy of the Government of the Republic of India and the Nuclear Energy Agency, Regulatory Agency of the Government of Mongolia on Cooperation in the Field of Peaceful Use of Radioactive Minerals and Nuclear Energy was signed on 14 September 2009.

(iii) Agreement between the Government of the Argentine Republic and the Government of the Republic of India for Cooperation in the Peaceful Uses of Nuclear Energy was initialed on 14 October 2009.

(iv) Agreement for Cooperation between the Government of the Republic of India and the European Atomic Energy Community in the field of Fusion Energy Research was signed on 06 November 2009.

(v) An agreement between the Government of the Republic of India and the Government of the Russian Federation on cooperation in the use of Atomic Energy for peaceful purposes was initialled on 07 December 2009.

(b) As mentioned above, Agreement with France and US have been ratified and the highlights are indicated below. The Agreement dated 5 December 2008 with Russia is specific on cooperation in the Construction of Additional Nuclear Power Plants at Kudankulam Site as well as in the construction of Russian Designed Nuclear Power Plants at New Sites in the Republic of India.

Agreement with France	**Agreement with USA**
A general agreement covering wide areas including nuclear reactors, nuclear fuel and nuclear fuel cycle management; to be followed by specific agreements between the Parties or persons designated by the Parties.	A general agreement covering wide areas including nuclear reactors and aspects of associated nuclear fuel cycle; to be followed by contracts pursuant to the agreement.
Provides of technology transfer on industrial or commercial scale between the Parties or designated persons.	Provides for technology transfer on an industrial or commercial scale between the Parties or authorized persons.
Provides for progressive localization in the territory of the recipient Party.	No specific mention of these issues, however, provides for transfer of information for the design and construction of reactors.
Specifically provides for non-hindrance.	Specifically provides for non-hindrance.

Provides for facilitating fuel supplies for the lifetime operation of supplied nuclear power plants, establishment of long-term contracts between designated entities of the Parties, developing a strategic reserve of nuclear fuel, Termination of cooperation is without prejudice to the implementation of fuel supply commitments.	Provides for fuel supply throughout the operational period of the reactors on contractual basis at prices to be negotiated.
Provides for IAEA safeguards and linkage of safeguards to fuel supplies. Provides for verification measures in case application of IAEA safeguards is not possible.	Provides for IAEA safeguards and linkage of safeguards to fuel supplies. Provides for verification measures in case application of IAEA safeguards is not possible.
Provides reprocessing consent' reprocessing to be done in a national nuclear facility under IAEA safeguards.	Provides consent for reprocessing, but in a new national reprocessing facility dedicated to reprocessing safeguarded nuclear material under IAEA safeguards following the Parties agreeing on arrangements and procedures.
Provides for termination. Termination of cooperation to be without prejudice to the implementation of contracts, ongoing projects and fuel supply commitments made prior to termination.	Provides for termination including right of return; no commitment made with regard to honouring ongoing contracts and projects.

(c) The Government's Foreign Direct Investment Policy does not permit Foreign Direct Investment in the atomic energy sector.

(d) & (e) The draft legislation on civil nuclear liability has been approved by the Cabinet and the same is likely to be introduced in the current session of Parliament.

(f) The Atomic Energy Act 1962 allows the Central Government to produce, develop, use and dispose of atomic energy either by itself or through any authority or corporation established by it or a Government company. As of today Nuclear Power Corporation of India Limited and Bharatiya Nabhikiya Vidyut Nigam Limited are two public sector undertakings authorized for this purpose. Private sector can participate in setting up of nuclear power plants as a junior equity partner. Private sector in India can also participate in civil nuclear energy sector through supply of components, equipment and works contracts.

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