THE MINISTER OF STATE IN THE DEPARTMENT OF ATOMIC ENERGY (DR. JITENDRA SINGH): (a) Yes, Sir.

(b) Atomic Minerals Directorate for Exploration and Research (AMD), a constituent unit of Department of Atomic Energy (DAE), is mandated to survey and establish atomic minerals including uranium resources in the country. AMD, accordingly, continues its efforts by conducting multidisciplinary survey and exploration *viz.*, (i) heliborne radiometric and geophysical (magnetic and time-domain electromagnetic) surveys and (ii) ground geophysical, radiometric, geological and geochemical surveys. Further, exploration of the potential areas to identify new uranium reserves are carried out through subsurface drilling by using modern hydrostatic drill-rigs. The survey and exploration activities are supported by petro-mineralogical, radiometric and chemical analyses by utilizing modern analytical techniques. So far AMD has established 2,14,158 (t) of *in-situ* resources of Uranium Oxide (U_3O_8).

Identification of Critical Seismotectonic Regions

2037. DR. R. LAKSHMANAN: Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether Government had identified any 'critical seismotectonic regions' across the country; and

(b) if so, the details of the regions which are identified as 'seismotectonic region' and the steps taken to forecast/predict the occurrence of earth quakes?

THE MINISTER OF EARTH SCIENCES (DR. HARSH VARDHAN): (a) Yes Sir.

(b) A Seismic Zoning Map of India has been prepared and later modified (BIS, 2001) which shows four seismic zones from II to V. Geological Survey of India, has prepared a seismotectonic atlas for Indian region (Seismotectonics Atlas of India and its Environ, 2000).

Due to tectonic process of continent-continent collision between Indian and Eurasian plate along Himalayas, subduction of the Indian plate underneath the Burma plate in the east and intra-plate activities in the peninsular region, the Indian region is seismo-tectonically active. The critical seismotectonic regions are inter-plate boundary areas. These are the great Himalayan mountain range covering Jammu and Kashmir, Himanchal Pradesh, Uttarakhand, Uttar Pradesh-Bihar and Nepal border region, Sikkim, Arunanchal Pradesh and adjoining areas; remaining regions of NE India and Andman Nicobar Islands. The other critical seismotectonic regions in India are; Bhuj (Gujarat), Koyna and Latur (Maharastra), Delhi, Jabalpur (Madhya Pradesh) and adjoining areas.

To date, there is no proven scientific technique available, anywhere in the world, to forecast/predict the occurrence of earthquakes with reasonable degree of accuracy with regard to space, time and magnitude. However, Earth System Science Organisation-National Centre of Seismology (ESSO-NSC) maintains a country wide seismological network, to detect and locate earthquakes occurring in and around the country. A tsunami early warning system is also in place at ESSO-Indian National Centre for Ocean Information Services (ESSO-INCOIS), Hyderabad to provide early warning on tsunamis likely to be generated on the Indian Coastal areas by large magnitude under sea earthquakes.

To study earthquake precursors in an integrated manner, India had set up Multi-Parameter Geophysical Observatories (MPGOs) at Ghuttu, Central Himalaya and Shillong, Eastern Himalaya. Supplemented by the dense network of broadband seismometers, the MPGOs are designed to record precursory signals resulting from stress-induced changes in density, magnetization, resistivity, seismic wave velocity, fracture propagation, crustal deformation, electromagnetic and radon gas emission as well as fluctuations in hydrological parameters. In addition, 3- field stations located at hot-spring and mud-volcano at Bakreswar, West Bengal; Tatta Pani (J & K) and Baratang (A & N Islands) were upgraded with advanced instrumentation for recording hourly concentration changes in stable gases as well as the radioactive constituents. During the last 12-months, the installed network recorded 5-anomalies that were correlated with regional earthquakes of magnitude $\geq$4.0M that have occurred in hypocentral distances ranging from 250-1500 Kms. Preparatory level pilot studies have been initiated to carry out scientific investigations and select the suitable site for deep borehole drilling in the Koyna-Warna region. The investigations include, Seismological, Geophysical (seismic, gravity, magnetic), LIDAR, geomorphology and structural geological studies, apart from a few shallow (~ 1 km) exploratory boreholes.

Efforts made to less green house gases emission

2038. SHRIMATI AMBIKA SONI: Will the Minister of ENVIRONMENT, FORESTS AND CLIMATE CHANGE be pleased to state:

(a) whether any study made to find out the extent of emission of green house gases due to use of domestic refrigerators and air conditioners, if so, the details thereof;

(b) the trend in the next five years; and

(c) the efforts are being made to ensure energy efficient appliances to get both savings on power bills and less greenhouse gases emission ?

THE MINISTER OF STATE IN THE MINISTRY OF ENVIRONMENT, FORESTS AND CLIMATE CHANGE (SHRI PRAKASH JAVADEKAR): (a) No, Sir.