



JABATAN MINERAL DAN GEOSAINS MALAYSIA
DEPARTMENT OF MINERAL AND GEOSCIENCE MALAYSIA

LAPORAN TAHUNAN | 2016 | ANNUAL REPORT



KEMENTERIAN SUMBER ASLI DAN ALAM SEKITAR MALAYSIA
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT MALAYSIA

Kandungan

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Berdiri dari kiri / **Standing from left:** Muhammad Fadzli Deraman, Noorazhar Ngatimin, Mohd. Zulkiflee Che Soh, Mohd Aznawi Haji Mat Awan, Mohamad Yusof Che Sulaiman, Ling Nan Ley, Mohd Anuar Ishak, Azizan Ali, Mazrali Alway, Azmi Abu Bakar, Wan Salmi Haji Wan Harun, Kamaruddin Abdullah, Jaithish John, Suhaimizi Yusoff

Duduk dari kiri / **Sitting from left:** Brendawati Ismail, Dr. Nazwin Ahmad, Dr. Sia Say Gee, Abdul Rahman Yusoff, Zamila Abd Rahman, Ropidah Mat Zin

Perutusan Ketua Pengarah

Message From The Director General



Walaupun berhadapan dengan potongan peruntukan mengurus yang ekstensif berikutan daripada pengurangan hasil daripada minyak dan gas, tahun 2016 merupakan satu lagi tahun yang produktif untuk Jabatan Mineral dan Geosains Malaysia (JMG) dan saya begitu bangga untuk menjadi sebahagian daripadanya. Pencapaian cemerlang JMG pada tahun 2016 dinyatakan dengan jelas oleh keupayaan Jabatan dalam memenangi beberapa anugerah antarabangsa dan tempatan yang berprestij, termasuk satu pingat emas dan satu pingat perak di International Invention & Innovation Exhibition Ke-27 (ITEX 2016), dan dua pingat emas di Invention, Innovation & Design Exposition 2016 (iidex2016). Pencapaian lain yang ketara pada tahun ini termasuklah pendaftaran hasil penyelidikan Jabatan sebagai harta intelek, dengan satu paten telah difailkan, satu reka bentuk perindustrian telah didaftarkan, dan menuntut hak cipta ke atas dua perisian. Pencapaian ini

Notwithstanding the extensive recurrent allocation cuts following the decline in oil and gas revenues, 2016 had been another productive year for the Department of Mineral and Geoscience Malaysia (JMG) and one I am very proud to be a part of. The distinctive achievements of JMG in 2016 were clearly indicated by the department winning several prestigious international and local awards, including a gold medal and a silver medal at the 27th International Invention & Innovation Exhibition (ITEX 2016), and two gold medals at the Invention, Innovation & Design Exposition 2016 (iidex2016). Other notable achievements during the year included the registration of the Department's research findings as intellectual properties, with one patent filed, one industrial design registered, and copyright

tidak akan mungkin tanpa sokongan dan komitmen yang menggalakkan daripada semua pihak yang berkenaan. Sehubungan ini, saya mengambil peluang ini untuk merakamkan terima kasih kepada Kementerian Sumber Asli dan Alam Sekitar atas sokongan dan kepercayaan yang diberikan kepada JMG. Saya juga menyampaikan setinggi-tinggi penghargaan kepada semua pegawai dan kakitangan JMG di atas komitmen dan sumbangan mereka, serta agensi kerajaan yang lain, institusi pengajian tinggi awam dan sektor swasta atas sokongan dan kerjasama rapat dalam menjayakan pelbagai aktiviti JMG.

Harga kebanyakan komoditi mineral telah meningkat daripada paras terendah pada awal tahun 2016, dan ini, bersama dengan permintaan yang semakin meningkat ke atas mineral mentah dan bahan binaan, telah merangsangkan minat dalam eksplorasi mineral dan perlombongan di negara ini. Sebagai agensi tunggal kerajaan yang bertanggungjawab ke atas sumber mineral negara, JMG telah diberikan tugas untuk melaksanakan dasar dan arahan kerajaan bagi memastikan pertumbuhan jangka panjang dan kemampanan industri mineral negara. Sehubungan ini, selain menjalankan eksplorasi mineral yang sistematik, JMG juga mengawal selia aktiviti-aktiviti perlombongan untuk memastikan sumber mineral dieksploitasi secara sistematik, selamat, cekap dan mesra alam. Pada tahun yang ditinjau, kerja eksplorasi yang dijalankan oleh Jabatan telah membawa kepada penemuan sumber baharu bauksit dan pasir silika yang berpotensi untuk dilombong di negeri Terengganu dan Kelantan masing-masing. JMG telah menerima pembiayaan untuk kajian geofizik awangan dengan menggunakan kaedah magnetik dan radiometrik untuk menentukan kawasan berpotensi sumber mineral Di Wilayah Ekonomi Pantai Timur dalam tempoh yang sama. Pada tahun 2016, JMG telah melakukan sebanyak 1343 pemeriksaan ke atas operasi perlombongan, 908 pemeriksaan ke atas operasi kuari, 132 pemeriksaan ke atas kilang amang dan loji pemrosesan mineral, serta 130 pemeriksaan ke atas urusan kedai bijih mineral dan emas mentah, selaras dengan Akta Pembangunan Mineral 1994, State Mining Enakmen atau peraturan dan Peraturan Kuari Negeri. Selain ini, JMG juga menjalankan penyelidikan mengenai teknik rawatan *acid mine drainage*, dan juga teknologi pemulihan lombong dan kuari untuk melindungi dan memulihkan alam sekitar untuk mengurangkan impak buruk daripada aktiviti pengekstrakan mineral.

claimed for two softwares. These achievements would not have been possible without the support and enthusiastic commitment of all parties concerned. In this connection, I would like to extend my gratitude to the Ministry of Natural Resources and Environment for the support and trust accorded to JMG. I would also like to express my deep appreciation to the staff of JMG for their commitment and contributions, as well as to other government agencies, public institutions of higher learning, and the private sector for their support and close co-operation in JMG's activities.

Prices of most mineral commodities rose from their lows in early 2016, and this, together with the improved demand for raw minerals and construction materials, stimulated renewed interest in mineral exploration and mining in the country. Being the sole government agency responsible for mineral resources of the country, JMG has been assigned the duty of implementing government policies and directives to ensure the long-term growth and sustainability of the country's mineral industry. In this regard, besides undertaking systematic mineral exploration, JMG also regulates mining activities to ensure that mineral resources are exploited in a systematic, safe, efficient, and environmental-friendly manner. During the year under review, mineral exploration conducted by the Department identified potentially mineable deposits of bauxite and silica sand in the states of Terengganu and Kelantan respectively. JMG received funding to conduct an airborne geophysical survey using magnetic and radiometric methods to outline mineralization areas in the East Coast Economic Region during the same period. In 2016, JMG carried out a total of 908 inspections on mining operations, 1343 on quarry operations, 132 on amang and mineral processing plant operations, and 130 on mineral ore and gold dealers, in line with the Mineral Development Act 1994, State Mining Enactments or Ordinances, and State Quarry Rules. In addition to these, JMG also conducted research on acid mine drainage treatment techniques, and on mine and quarry rehabilitation technology to protect and to restore the environment to reduce adverse impact of mineral extraction.

Walaupun geosains telah sekian lama dikaitkan terutamanya dengan penemuan dan pengekstrakan longgokan mineral, ia telah menjadi semakin relevan dengan impak buruk bagi pelbagai isu penting negara dari bidang lain sejak beberapa dekad kebelakangan. Maklumat geosains kini digunakan secara meluas sebagai input penting dalam perancangan guna tanah, pengurusan sumber air tanah, pengurusan zon pantai, dan untuk mengurangkan bahaya yang disebabkan oleh proses geologi semula jadi dan oleh aktiviti manusia. Sfera aktiviti ini mempunyai pengaruh yang penting kepada alam sekitar, dan akhirnya kepada kesejahteraan manusia. Sehubungan dengan ini, JMG terus memberi khidmat perundingan dan khidmat nasihat kepada agensi kerajaan, pihak swasta dan individu dalam aspek yang berkaitan dengan penggunaan tanah. Jabatan juga menawarkan khidmat nasihat mengenai hidrogeologi dan geologi kejuruteraan. Khidmat nasihat hidrogeologi yang diberikan termasuk menilai permohonan lesen air tanah, memberi ulasan kepada air tanah sebagai sumber air mineral semula jadi, serta menilai potensi air tanah untuk kegunaan pertanian, industri dan domestik. Khidmat nasihat geologi kejuruteraan dan pembangunan guna tanah yang disediakan oleh Jabatan merangkumi aspek perancangan pembangunan bandar baru, penjajaran jalan dan perancangan guna tanah. Pada masa ini, JMG adalah ahli kepada lebih daripada 57 jawatankuasa teknikal di negara ini termasuk Agensi Pengurusan Bencana Negara (NADMA), Jawatankuasa Khas Pengurusan Keselamatan Struktur Empangan dan Pusat Setempat (OSC). JMG juga merupakan ahli tetap di dalam Jawatankuasa Penggunaan Sumber Air Peringkat Negeri, Jawatankuasa Kelulusan Pembungkusan Sumber Air Semulajadi dan Jawatankuasa Pelesenan Sumber Air Bumi. Jabatan ini juga terlibat di beberapa jawatankuasa peringkat negeri yang berkaitan dengan geobencana, seperti Jawatankuasa Perancangan Negeri, Jawatankuasa Pengurusan Bencana Negeri, Jawatankuasa Kawasan Sensitif Alam Sekitar serta Jawatankuasa Pembangunan Tanah Tinggi dan Lereng Bukit. Pada tahun yang ditinjau, maklumat geosains telah dikumpul oleh Jabatan bagi pelbagai aktiviti geosains termasuk pemetaan geologi, warisan geologi, hidrogeologi, geologi kejuruteraan, geologi alam sekitar, geologi marin, dan penilaian sumber geoterma semasa membekalkan perkhidmatan geosains. Di samping itu, Jabatan juga terus mengumpul maklumat geosains melalui Projek Penghasilan Peta Bahaya dan Risiko Cerun, dan juga Pemetaan Sesar Aktif dan Kawasan Risiko Gempa Bumi yang meliputi kawasan seluas 225 km² dan 11,468 km², masing-masing.

Although geoscience has historically been associated predominantly with the discovery and extraction of mineral deposits, it has become increasingly relevant to other areas that impact upon a wide range of important national issues in recent decades. Geoscience information is now being widely used to provide essential input in land use planning, groundwater resources management, coastal zone management, and mitigation of hazards caused by natural geological processes and by human activity. These spheres of activities have an important bearing on sustainable development that is important to the environment, and ultimately to the well-being of humans. In connection with this, JMG continued to provide consultative and advisory services to government agencies, the private sector and individuals on aspects pertaining to land use. The Department also offered advisory services on hydrogeology and engineering geology. Hydrogeology advisory services included evaluating groundwater licence applications, providing reviews on groundwater as a natural mineral water resource, as well as assessing the potential of groundwater for agriculture, industrial and domestic usage. Engineering geology and land use advisory services provided by the Department included new township development planning, road alignment, and land use planning. Currently, JMG is a member of more than 57 technical committees in the country, including the National Disaster Management Agency (NADMA), Special Committee for Dam Structure Safety Management, and One Stop Centre (OSC). JMG is also a permanent member of the State Water Consumption Committee, Natural Water Resource Packaging Approving Committee and Groundwater Resource Licensing Committee. The department is also involved at several state level committees related to geodisasters, such as the State Planning Committee, State Disaster Management Committee, Environmentally Sensitive Area Committee, as well as the Highland and Foothill Development Committee. During the year under review, geoscience information on a diverse range of geoscience activities including geological mapping, heritage geology, hydrogeology, engineering geology, environmental geology, marine geology, and geothermal resource assessment was collected by the Department in the course of providing geoscience services. In addition to this, the Department also continued to collect geoscience information through Slope Hazard and Risk Mapping, and also Active Fault and Earthquake Risk Area Mapping covering a total area of 225 km² and 11,468 km², respectively.

Maklumat mengenai komposisi kimia dan sifat fizikal bahan batuan dan mineral merupakan asas yang sangat penting dalam banyak cabang geosains. Maklumat tersebut adalah amat relevan untuk meneroka dan pemulihan bijih dan longokan mineral, dan juga untuk kajian pencemaran alam sekitar. Jabatan ini komited untuk menyediakan pelbagai jenis analisis geokimia dan ujian fizikal yang berakreditasi ke atas bahan batuan dan mineral kepada pelanggan dalaman dan luaran Jabatan di seluruh Malaysia. Aktiviti-aktiviti ini membantu membangunkan sektor mineral, industri berasaskan mineral, aktiviti kitar semula logam dan eksplorasi/pembangunan sumber air tanah dalam negara. Pada tahun 2016, 47,255 analisis dengan nilai kerja keseluruhan RM1,199,516 telah disiapkan. Daripada ini, 3015 analisis telah diselesaikan untuk pelanggan swasta dengan kutipan hasil bernilai RM128,515. Ujian yang tepat ke atas komposisi kimia dan sifat fizikal bahan batuan dan mineral merupakan perkhidmatan penting yang disediakan oleh Jabatan, dengan itu kesemua empat Makmal Geokimia Jabatan telah diakreditasikan mengikut standard MS ISO/IEC 17025:2005. Bagi memenuhi keperluan mandatori standard pengurusan MS ISO/IEC 17025:2005 dan usaha berterusan untuk meningkatkan lagi kualiti perkhidmatan analisis kepada pelanggan Jabatan, makmal geokimia di Ipoh, Kuching dan Kota Kinabalu telah berjaya menjalankan beberapa Program Ujian Kecekapan/ Perbandingan Antara Makmal. Makmal Jabatan telah menunjukkan prestasi baik dan konsisten dalam kesemua Program Ujian Kecekapan / Perbandingan Antara Makmal yang disertai.



DATUK MIOR SALLEHUDDIN MIOR JADID
Ketua Pengarah / **Director General**
Jabatan Mineral dan Geosains Malaysia
Department of Mineral and Geoscience Malaysia

Information on the chemical composition and physical properties of rock materials and minerals is often of fundamental importance to many branches of geoscience. Such information is especially relevant to search and recovery methods for ore and mineral deposits, and also to environmental pollution studies. The Department is committed to providing a comprehensive range of accredited geochemical analyses and physical tests on rock materials and minerals to internal and external customers of the Department throughout Malaysia. These activities assist the development of mineral and mineral-based industries, metal recycling activities, and groundwater exploration and management in the country. In 2016, 47,255 analyses were completed with a total work value of RM1,199,516. Of these, 3,015 analyses were completed for the private sector, with a revenue collection of RM128,515. With accurate testing of the chemical composition and physical properties of rock materials and minerals being a vital service that the Department provides, all the four Geochemical Laboratories of the Department have been accredited to the MS ISO/IEC 17025:2005 standard. As part of the mandatory requirements for compliance with the MS ISO/IEC 17025:2005 management standard and as a continuous effort to further improve the quality of testing services provided to the Department's clients, the geochemical laboratories in Ipoh, Kuching, and Kota Kinabalu successfully conducted several Proficiency Testing / Interlaboratory Cross-check programmes. The Department's laboratories demonstrated good performance and consistency in all the Proficiency Testing / Interlaboratory Cross-check Programmes.

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Profil Korporat **Corporate Profile**

Profil Korporat

Corporate Profile

Visi

Peneraju pembangunan mineral dan geosains menjelang 2020

Misi

Menyumbang kepada peningkatan daya saing ekonomi negara dan kualiti hidup melalui penggunaan maklumat, perkhidmatan berkepakaran tinggi serta penyelidikan berkaitan mineral dan geosains yang efektif

Objektif Strategik

1. Memperkasa pengurusan modal insan dan kapasiti organisasi ke arah meningkatkan kecekapan penyampaian perkhidmatan
2. Memperkukuh keupayaan aktiviti mineral dalam eksplorasi, pembangunan dan promosi untuk memacu ekonomi negara
3. Memantap pelaksanaan perkhidmatan geosains berkepakaran tinggi ke arah pembangunan mampan yang menyumbang kepada kesejahteraan hidup dan pemeliharaan alam sekitar
4. Memperkukuh penyelidikan dan pembangunan (R&D) mineral untuk memajukan industri mineral negara

Vision

Leader in mineral and geoscience development by 2020

Mission

To contribute towards enhancement of the nation's economic competitiveness and quality of life through effective usage of mineral and geoscience information, specialised expert services and related research

Strategic Objectives

1. To strengthen the management of human capital and organisational capacity towards improving the efficiency of service delivery
2. To intensify the capability of mineral exploration, development and promotion activities to spearhead the national economy
3. To strengthen the implementation of specialised geoscience services towards sustainable development that contributes to the well-being of mankind and conservation of environment
4. To intensify research and development (R&D) on minerals for increased growth and advancement in the nation's mineral industry

Objektif

- Menyediakan maklumat komoditi mineral bagi meningkatkan pertumbuhan industri berasaskan mineral
- Menggalakkan penggunaan optimum maklumat dan perkhidmatan geosains bagi pembangunan negara yang mapan
- Memastikan perusahaan sumber mineral berkembang secara teratur, selamat, cekap dan mesra alam serta mendatangkan pulangan yang maksimum kepada negara
- Menggalak dan mempelbagai penggunaan sumber mineral tempatan bagi menyumbang kepada pembangunan sektor perindustrian negara melalui aktiviti-aktiviti penyelidikan dan pembangunan (R&D)
- Menyediakan perkhidmatan kepakaran dalam bidang mineral, geosains dan perlombongan di peringkat nasional dan antarabangsa bagi menggalakkan pelaburan dalam sektor mineral dan perancangan pembangunan negara

Fungsi

- Mengendali eksplorasi mineral secara sistematik
- Mengendali penyiasatan pelbagai bidang geosains seperti pemetaan geologi, sumber air tanah, geologi kejuruteraan, bencana geologi, geologi alam sekitar, geologi marin, geofizik, dan bidang-bidang geosains lain secara sistematik
- Menyedia perkhidmatan analisis geokimia dan ujian fizikal bahan batuan dan mineral
- Bertindak sebagai bank data nasional bagi semua maklumat berkaitan dengan geosains dan sumber mineral negara
- Mengumpul, menganalisis dan menyebarkan data dan maklumat berkaitan eksplorasi mineral, perlombongan dan aktiviti yang berkaitan
- Menyedia perkhidmatan nasihat teknikal dan kepakaran dalam bidang mineral, geosains, perlombongan dan pengkuarian
- Membantu dan bekerjasama dengan pihak swasta dan industri dalam usaha pembangunan sektor mineral
- Menentukan supaya aktiviti perlombongan mineral serta aktiviti lain yang berkaitan dengannya dijalankan dengan cara yang selamat, cekap dan sistematik
- Melaksana dasar dan arahan Kerajaan berhubung dengan industri mineral dan geosains, disamping mentadbir dan menguatkuasakan undang-undang yang berkaitan
- Menjalankan penyelidikan dan pembangunan (R&D), pemindahan teknologi, pembangunan sumber mineral serta mempromosi hasil penyelidikan supaya digunakan oleh pihak industri

Objectives

- To provide mineral commodity information to enhance the growth of mineral-based industries
- To encourage the optimal use of geoscience information and services for the sustainable development of the country
- To ensure that mineral resources are exploited in a systematic, safe, efficient and environmentally friendly manner as well as to secure their maximum returns to the country
- To encourage and diversify the use of local mineral resources so as to contribute towards the development of the country's industrialisation through research and development (R&D) activities
- To provide expert services in the fields of mineral, geoscience and mining at national and international levels so as to promote investments in the mineral sector and for national development planning

Functions

- To undertake systematic mineral exploration
- To undertake systematic investigations in various geoscience disciplines such as geological mapping, groundwater resources, engineering geology, geological hazards, environmental geology, marine geology, geophysics, and others
- To provide geochemical analyses and physical tests on rock materials and minerals
- To act as the national depository for all information related to geoscience and mineral resources of the country
- To collect, analyse and disseminate data and information pertaining to mineral exploration, mining and related activities
- To provide technical advisory and expertise services in the fields of mineral, geoscience, mining and quarrying
- To assist and co-operate with the private sector and industry to develop further the mineral sector
- To ensure that mining of minerals and related activities are carried out safely, efficiently and systematically
- To implement government policies and directives with regards to the mineral industry and geoscience, besides administration and enforcement of regulations
- To carry out research and development (R&D), technology transfer, mineral resources development and promotion of research products so that they are acceptable to the industry

Piagam Pelanggan

Maklumat Mineral dan Geosains

- Membekalkan laporan geologi (termasuk peta), mineral dan bidang-bidang geosains lain yang telah diterbitkan dan sedia ada, dalam masa 1 hari selepas permohonan diterima
- Membekalkan laporan dan peta geologi, mineral dan bidang-bidang geosains lain yang belum diterbitkan dan sedia ada, dalam masa 1 minggu selepas permohonan diterima
- Membekalkan maklumat berdigit sedia ada dalam masa 3 hari selepas permohonan diterima

Perkhidmatan Kepakaran

- Menyediakan perkhidmatan kepakaran apabila diminta dalam rangka masa yang ditetapkan atau dipersetujui bersama dengan pelanggan, terutamanya bagi bidang-bidang:
 - Pemetaan geologi
 - Siasatan mineral
 - Siasatan air tanah
 - Siasatan geofizik
 - Geologi marin
 - Siasatan geologi kejuruteraan
 - Siasatan geologi alam sekitar

Perkhidmatan Makmal

- Menyediakan perkhidmatan makmal apabila diminta bagi bidang berikut:
 - Analisis mineralogi dan petrologi
 - Analisis geokimia sampel bijih, mineral, aloi, batuan, kelodak, konsentrat, tanah dan air
 - Ujian mineral perindustrian
 - Ujian sedimentologi
 - Ujian geologi kejuruteraan

dalam tempoh yang dipersetujui, sekiranya mandatori, atau jika rutin, dalam tempoh 2 minggu selepas sampel diterima

Clients Charter

Mineral and Geoscience Information

- To supply available and published geological (including maps), mineral and other geoscience reports within 1 day upon receipt of request
- To supply available but unpublished geological maps, mineral and other geoscience reports within 1 week upon receipt of request
- To supply available digital information within 3 days upon receipt of request

Expert Services

- To provide expert services upon request, within the time frame stipulated or mutually agreed upon with the client, especially in the fields of:
 - Geological mapping
 - Mineral investigation
 - Groundwater investigation
 - Geophysical investigation
 - Marine geology
 - Engineering geology investigation
 - Environmental geology investigation

Laboratory Services

- To provide laboratory services upon request for:
 - Mineralogical and petrological analyses
 - Geochemical analyses of ores, minerals, alloys, rocks, silts, concentrates, rocks and water samples
 - Industrial mineral tests
 - Sedimentological tests
 - Engineering geology tests

within the time frame stipulated or mutually agreed upon with the client if it is mandatory, or within 2 weeks if it is routine, upon receipt of samples

Perkhidmatan Perlombongan dan Pengkuarian

- Mengeluarkan Lesen Melombong atau Lesen Kuari dalam tempoh 30 hari dari tarikh penerimaan permohonan yang lengkap
- Menyediakan laporan-laporan teknikal yang tepat dan lengkap berkaitan dengan kepentingan perlombongan, dalam tempoh 30 hari dari tarikh penerimaan permohonan yang disertakan dengan dokumen-dokumen yang lengkap

Perkhidmatan Dagangan Mineral

- Memberi ulasan ke atas permohonan untuk mengeksport mineral dalam tempoh 5 hari dari tarikh penerimaan permohonan yang disertakan dengan dokumen-dokumen yang lengkap
- Mengeluarkan Lesen Bijih Mineral dalam tempoh 30 hari dari tarikh penerimaan permohonan yang lengkap
- Mengeluarkan dan membaharukan permit pengangkutan konsentrat timah dalam tempoh 1 jam

Dasar Kualiti

Jabatan Mineral dan Geosains Malaysia komited untuk memastikan produk dan perkhidmatannya sentiasa memenuhi keperluan pelanggan. Untuk mencapai matlamat ini, pengurusan jabatan serta seluruh warga JMG adalah komited untuk:

- Melaksanakan sistem kualiti berdasarkan kepada keperluan MS ISO 9002;
- Memastikan bahawa produk dan perkhidmatan tepat pada masanya;
- Memastikan bahawa peningkatan kualiti dilaksanakan secara berterusan;
- Membina pasukan kerja yang kuat, responsif dan mempunyai etika kerja yang positif, dan
- Meningkatkan pengetahuan dan kemahiran melalui latihan.

Mining and Quarrying Services

- To issue Mining Licences or Quarrying Licences within 30 days upon receipt of duly completed application forms
- To prepare comprehensive technical reports relating to mining interest within 30 days upon receipt of application supported by duly completed documents

Mineral Commerce Services

- To provide comments on mineral export applications within 5 days upon receipt of applications accompanied by duly completed documents
- To issue Mineral Ore Licences within 30 days upon receipt of duly completed application forms
- To issue and renew permits for transportation of tin concentrates within 1 hour

Quality Policy

The Department of Mineral and Geoscience Malaysia is committed to ensuring customer satisfaction in its products and services. To achieve this goal, the JMG management as well as the constituents are committed to:

- Implementing a quality system based on MS ISO 9002 qualifications;
- Ensuring that datelines are met in both products and services;
- Continuance of quality improvement is implemented;
- Building of a strong and responsive work force with positive work ethics, and
- Development of knowledge and skills through training.

Pengurusan Tertinggi

Top Management

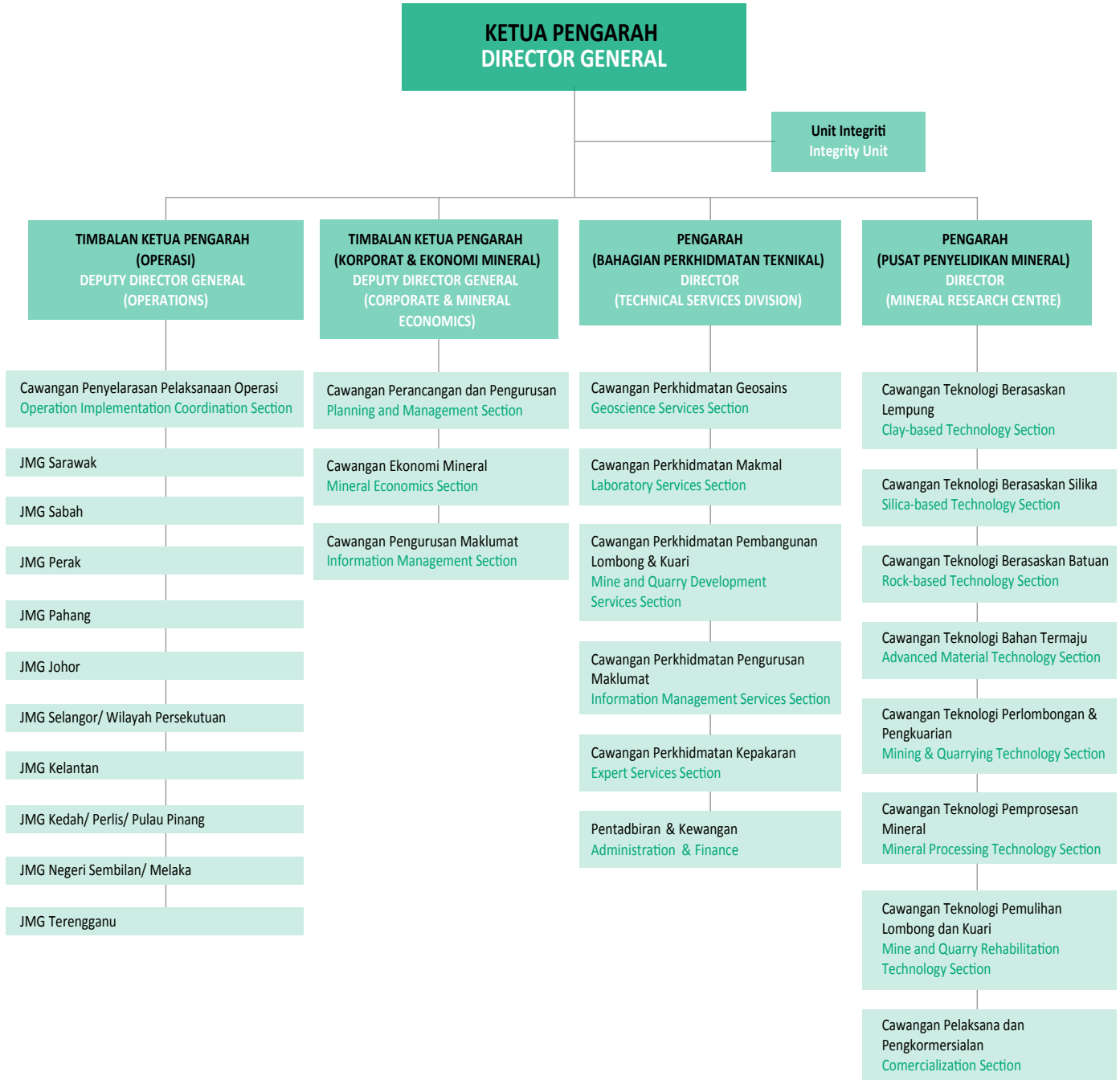


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Dari kiri / From left: Dato' Hj. Mohd Za'im Dato' Abdul Wahab, Dr. Vijayan V.V. Rajan, Datuk Mior Sallehuddin Mior Jadid, Shahar Effendi Abdullah Azizi, Md. Muzayin Alimon

- 1. Datuk Mior Sallehuddin Mior Jadid**
(Ketua Pengarah)
(Director General)
- 2. Dr. Vijayan V.V. Rajan**
(Timbalan Ketua Pengarah – Operasi)
(Deputy Director General – Operations)
- 3. Shahar Effendi Abdullah Azizi**
(Timbalan Ketua Pengarah – Korporat dan Ekonomi Mineral)
(Deputy Director General – Corporate and Mineral Economics)
- 4. Md. Muzayin Alimon**
(Pengarah – Pusat Penyelidikan Mineral)
(Director – Mineral Research Centre)
- 5. Dato' Hj. Mohd Za'im Dato' Abdul Wahab**
(Pengarah – Bahagian Perkhidmatan Teknikal)
(Director – Technical Services Division)

Carta Organisasi Organisation Chart





Hal Ehwai Korporat
Corporate Affairs

Hal Ehwal Korporat Corporate Affairs

Kewangan

Financial

Perbandingan peruntukan dan perbelanjaan mengurus 2012-2016 Comparison of recurrent allocation and expenditure 2012-2016

Tahun Year	Peruntukan Allocation (RM)	Perbelanjaan Expenditure	
		RM	%
2012	62,093,912.00	62,093,911.00	99.99
2013	63,390,568.00	63,387,855.00	99.99
2014	68,555,484.40	68,529,659.17	99.96
2015	66,931,910.00	64,911,225.24	96.98
2016	62,429,920.00	61,836,644.03	99.05

Perbandingan peruntukan dan perbelanjaan pembangunan 2012-2016 Comparison of development allocation and expenditure for 2012-2016

Tahun Year	Peruntukan Allocation (RM)	Perbelanjaan Expenditure	
		RM	%
2012	10,234,000.00	10,195,509.00	99.62
2013	8,765,700.00	8,761,881.00	99.95
2014	32,774,728.00	30,499,351.23	93.06
2015	31,519,300.00	31,513,496.01	99.98
2016	39,530,070.00	39,467,561.22	99.84

Sumber Manusia

Human Resource

Status perjawatan tahun 2016 Staffing status 2016

Kumpulan perkhidmatan Group of service	Bil. jawatan diisi No. of filled posts	Bil. jawatan belum diisi No. of vacant posts	Jumlah Total
Pengurusan Tertinggi Top Management	5	0	5
Pengurusan & Profesional (Gred 41-54) Management & Professional (Grade 41-54)	292	21	313
Kumpulan Sokongan I (Gred 17- 40) Supporting Group I (Grade 17 - 40)	470	98	568
Kumpulan Sokongan II (Gred 1-16) Supporting Group II (Grade1-16)	154	29	183
Jumlah Keseluruhan Grand Total	921	148	1069

Pembangunan Sumber Manusia

Program Latihan Dalam Jabatan

Sebanyak 483 program latihan dalam Jabatan melibatkan kursus, bengkel, taklimat, seminar, persidangan dan ceramah telah dilaksanakan oleh JMG pada sepanjang tahun 2016. Sejumlah 6800 peserta telah menghadirinya. Sebahagian besar daripada program telah dijadualkan dalam takwim latihan dirancang.

Human Resource Development

In-House Training Programme

A total of 483 in-house training programmes involving courses, workshops, briefings, seminars, conferences, and talks were implemented by JMG during 2016. A total of 6800 participants were involved in these programmes. Most of these programmes are scheduled in the planned training calendar.

Program latihan Training programme	Dalam jabatan In-house	Luar jabatan External	Luar negara Overseas	Jumlah Total
Sumber Mineral / Mineral Resources	64	53	12	129
Geosains / Geoscience	11	41	22	74
Lombong & Kuari / Mine & Quarry	17	80	2	99
Kimiabumi / Geochemistry	3	10	0	13
Penyelidikan / Research	6	22	0	28
Pengurusan Maklumat Information Management	29	90	2	121
Pengurusan Sumber Manusia Human Resource Management	223	407	1	631
Pengurusan Kewangan Financial Management	64	53	0	117
Pembangunan Kendiri / Self Development	11	41	0	52
Kualiti & Produktiviti Quality & Productivity	17	80	0	97
Kursus Wajib / Compulsory Course	3	10	0	13
Bahasa & Komunikasi Language & Communication	6	22	0	28
Lain - lain / Others	29	91	3	123
Jumlah / Total:	483	1000	42	1525



25.04.2016

Taklimat survei resistiviti telah diberikan oleh Dr. Rahman Yaacup, Timbalan Ketua Pengarah Agensi Nuklear Negara, kepada kakitangan JMG Kedah / Perlis / Pulau Pinang

A briefing on resistivity survey was given by Dr. Rahman Yaacup, Deputy Director General of Malaysian Nuclear Agency, to the staff of JMG Kedah / Perlis / Pulau Pinang

03-05.08.2016

Bengkel kajian sesar aktif dan risiko gempa bumi, Genting Highlands

Workshop on active fault and earthquake risk study, Genting Highlands



Penceramah dan peserta bengkel
Lecturers and participants of the workshop



Latih amal di lapangan
Practical training in the field

09-11.08.2016

Coal Bed Methane Lab, Keningau, Sabah



Dr. Vijayan Rajan (baris depan, tengah), Timbalan Ketua Pengarah (Operasi), bergambar bersama penceramah kursus (baris depan, ketiga dari kanan) dan peserta kursus
Dr. Vijayan Rajan (front row, center), Deputy Director General (Operations), posing with course convener (front row, third from right) and course participants



Kerja lapangan di Lembangan Batu Arang Pinangah, Sabah
Fieldwork in Pinangah Coalfield, Sabah

12-22.11.2016

Latihan Pemetaan Geologi Berdigit untuk Malaysia 2016, anjuran bersama JMG dan China Geological Survey, Alor Setar dan Sintok, Kedah

2016 Training Course on Digital Geological Mapping for Malaysia, co-organized by JMG and China Geological Survey, Alor Setar and Sintok, Kedah



Foto kumpulan
Group photo

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Dr. Tan Yongjie, ketua rombongan China Geological Survey, menerima cenderahati dari Datuk Mior Sallehuddin Mior Jadid, Ketua Pengarah JMG

Dr. Tan Yongjie, head of the China Geological Survey Delegation, receiving a memento from Datuk Mior Sallehuddin Mior Jadid, Director General of JMG



Latih amal di lapangan
Practical training in the field



Latihan kelas
Classroom training

Program Latihan Luar Jabatan (Tempatan)

Sebanyak 1000 kursus, bengkel dan seminar telah dihadiri oleh 1047 kakitangan Jabatan. Program ini melibatkan agensi penganjur seperti INSTUN, NRE, SIRIM, INTIM, JPM, JANM, INSPIN, JPA, UMS, USM, INTAN, IGM, JAKIM, IQM, IEM, IKM, SUK, NAHRIM, SIDC, UNISEL, Nuklear Malaysia, JUPEM, Persatuan Geologi Malaysia dan lain-lain.

Program Latihan Luar Negara

Sebanyak 42 program latihan, mesyuarat dan lawatan di luar negara iaitu ke USA, Taiwan, Cambodia, Vietnam, Jepun, Myanmar, China, Thailand, Indonesia, Singapura, Switzerland dan Korea Selatan telah dianjurkan oleh ASOMM, CCOP, DMR, COTI, JPA, KIGAM, CGS of China, GEOSEA, IGF, AIST, IAEA, GAI, UNEP dan pelbagai agensi luar negara. Seramai 77 anggota jabatan telah mengikuti program ini.

External Training Programme (Local)

A total of 1000 courses, workshops and seminars were attended by a total of 1047 participants. These programmes involved organising agencies such as INSTUN, NRE, SIRIM, INTIM, JPM, JANM, INSPIN, JPA, UMS, USM, INTAN, IGM, JAKIM, IQM, IEM, IKM, SUK, NAHRIM, SIDC, UNISEL, Nuklear Malaysia, JUPEM, Geological Society of Malaysia and others.

Overseas Training Programme

A total of 42 training programmes, meetings and overseas visits to USA, Taiwan, Cambodia, Vietnam, Japan, Myanmar, China, Thailand, Indonesia, Singapore, Switzerland and Korea Selatan were organised by ASOMM, CCOP, DMR, COTI, JPA, KIGAM, CGS, GEOSEA, IGF, AIST, IAEA, GAI, UNEP and other overseas agencies. A total of 77 staff of the department attended these programmes.

01-07.03.2016

Bengkel China-ASEAN Pemprosesan Data Geologi Bersepadu Di Beijing-China
[ASEAN-China Workshop on Intergrated Geological Data Processing in Beijing, China](#)



Cik Ropidah Mat Zin, Pegawai Geosains dari JMG Selangor / Wilayah Persekutuan, sedang membentangkan Laporan Negara Malaysia

[Ms Ropidah Mat Zin, Geoscience Officer from JMG Selangor / Federal Territory, presenting the Malaysia Country Report](#)



Peserta kursus dari Jabatan Mineral dan Geosains Malaysia
[Course participants from the Department of Mineral and Geoscience Malaysia](#)

Pengajian ijazah lanjutan sesi 2016/ 2017
Post-graduate for session 2016/ 2017

Bil. No.	Nama pegawai Name of officer	Universiti University	Bidang pengajian Field of study
1	Ahmad Khairut Termizi Mohd. Daud	Dalam Negara	Seismologi
2	Siti Mazatul Azwa Saiyed Mohd. Nurddin	Dalam Negara	Kejuruteraan kimia
3	Amir Mizwan Mohd. Akhir	Dalam Negara	Geofizik
4	Norinsafrina Mustaffa Kamal	Dalam negara	Teknologi hijau

Pengurniaan dan Kepujian

Awards and Accolades

Penerima Anugerah Perkhidmatan Cemerlang Tahun 2015 (Tahun Penilaian: 2014)
Recipients of Excellent Service Award 2015 (Year of Assessment: 2014)

Ibu Pejabat / Headquarters		
1	Joanes Muda	Pegawai Geosains Gred C52
2	Ahmad Zamani bin Samat	Pegawai Geosains Gred C44
3	Dr. Ferdaus bin Ahmad	Pegawai Geosains Gred C48
4	Mohd Shafiq Farhan bin Mohd Zainudin	Pegawai Geosains Gred C41
5	Gemulah Zainal bin Husin	Pembantu Geosains Gred C22
6	Sarimah binti Baada	Pembantu Tadbir Gred N22
7	Ayob Khan bin Ratu	Pembantu Operasi Gred N11
8	Afzanizam bin Ramlan	Pembantu Operasi Gred N11
9	Arbi'ah binti Musirin	Setiausaha Pejabat Gred N28
10	Samizun bin Said	Pembantu Geosains Gred C22
Bahagian Perkhidmatan Teknikal / Technical Services Division		
11	Azhari bin Ahmad	Pegawai Geosains Gred C54
12	Mohamad bin Kasim	Pegawai Geosains Gred C48
13	Noran Alwakhir bin Shaarani	Pegawai Geosains Gred C44
14	Halime bin Azhari @ Adnan	Pegawai Geosains Gred C44
15	Nur Rasyiqah binti Yusof	Penolong Pegawai Tadbir N32
16	Mohamad Tamin bin Shaari	Penolong Jurutera Gred JA29
17	Sabadun bin Yatim	Pembantu Geosains Gred C26
18	Salbiyah binti Yakob	Pembantu Tadbir (Kew) Gred W22
19	Wan Nor Azmi bin Wan Abdullah	Pembantu Geosains Gred C22
20	Mat Radzi bin Ghazali @ Che Wei	Pembantu Geosains Gred C22
21	Zuraida binti Abdul Rani	Pembantu Tadbir (P/O) Gred N17

22	Nazilah binti Ahmad Nazri	Pembantu Geosains Gred C17
23	Mat Isa bin Bakar	Pembantu Awam Gred H11
24	Mu'az bin Jusof Khadidi	Pemandu Kenderaan Gred H11
Pusat Penyelidikan Mineral / Mineral Research Centre		
25	Malek bin Selamat	Pegawai Penyelidik Gred Q48
26	Norinsafrina binti Mustaffa Kamal	Pegawai Penyelidik Gred Q41
27	Rogayah binti Saad	Pembantu Penyelidik Gred Q26
28	Loo Guek Hong	Pembantu Penyelidik Gred Q26
29	Wan Shafarina binti Wan Marzuki	Pembantu Tadbir Gred N17
30	Rodziah binti Safiee	Pembantu Tadbir Gred N22
31	Safaruddin bin Sirim	Jurufotografi Gred B22
32	Syaberi bin Mauladdin	Pembantu Operasi Gred N11
33	Roslan bin Mohd Yusof	Pembantu Awam Gred H11
JMG Kedah / Perlis / Pulau Pinang		
34	Fathullah bin Abu Naim	Pegawai Geosains Gred C44
35	Muhammad Mustadza bin Mazni	Pegawai Geosains Gred C41
36	Abu Bakar Siddik bin Abidah	Pembantu Geosains Gred C26
37	Johari bin Omar	Pembantu Geosains Gred C22
JMG Perak		
38	Tuan Rusli bin Tuan Mohamed	Pegawai Geosains Gred C48
39	Azizan anak Juhin	Pegawai Geosains Gred C41
40	Samsuddin bin Para	Penolong Pegawai Geosains Gred C38
41	Zaiton binti Mohamed Latif	Penolong Pegawai Tadbir Gred N27
42	Mohd Ihsan Alwi bin Ahmad Shazili	Pemandu Gred H11
JMG Selangor / Wilayah Persekutuan		
43	Maziadi bin Mamat	Pegawai Geosains Gred C41
44	Muhammad Ezwan bin Dahlan	Pegawai Geosains Gred C41
45	Nopazli bin Ramzi	Penolong Pegawai Geosains Gred C27
JMG Negeri Sembilan / Melaka		
46	Azizan bin Ali	Pegawai Geosain C48
47	Tahar bin Musa	Pembantu Geosains Gred C26
48	Siti Rahmah binti Yob	Pembantu Tadbir (Kew) W22
JMG Johor		
49	Nor Asmah binti Abdul Aziz	Pegawai Geosains Gred C44
50	Mohd Razman bin Yusop	Pembantu Geosains Gred C17
51	Mohd ledil bin Omar	Pemandu Kenderaan Gred R3

JMG Pahang		
52	Zainal Abidin bin Jamaluddin	Pegawai Geosains Gred C44
53	Noor Aliah binti Noordin	Pembantu Tadbir Gred N17
54	Rasri a/l Rosli	Pembantu Geosains Gred C17
55	Adrian Anik	Pembantu Geosains Gred C17
JMG Terengganu		
56	Suhaimizi bin Yusoff	Pegawai Geosains Gred C44
57	Manir binti Marwan	Penolong Juruukur Gred JA29
58	Mohd Azrul bin Aziz	Pembantu Geosains Gred C17
59	Juliana binti Husin	Pembantu Tadbir Gred N17
JMG Kelantan		
60	Aidil bin Arnolous Rema	Pegawai Geosains Gred C41
61	Ahmad Naji bin Nasir	Pembantu Geosains Gred C22
62	Zarbani bin Mat Junos	Pemandu Kenderaan Gred H11
JMG Sarawak		
63	Thomson anak Galin	Pegawai Geosains Gred C44
64	Ango Micheal anak Lawrence Sinos	Penolong Juruukur Gred JA29
65	Sidin anak Poren	Penolong Juruukur Gred JA29
66	Sapawi bin Saili	Pembantu Geosains Gred C22
67	Ron Jacklin anak Lupit	Pembantu Geosains Gred C17
68	Noorhaniza binti Mohamad	Pembantu Tadbir Gred N17
69	Connie anak Jampie	Pembantu Tadbir (Kew) Gred W17
70	Umor Baki bin Ahmad	Pemandu Kenderaan Gred H11
JMG Sabah		
71	Mohd. Yusop bin Ramli	Pegawai Geosains Gred C52
72	Morius bin Bantas	Pegawai Geosains Gred C48
73	Mazrali bin Alway	Pegawai Geosains Gred C41
74	Carrie Joe	Setiausaha Pejabat Gred N27
75	Mohd Ariss bin Abdul Salam	Pembantu Geosains Gred C22
76	Jolouis bin Supilin @ Mujahid	Pembantu Geosains Gred C22
77	Patrick bin Gindol	Pembantu Geosains Gred C22
78	Ag Besar bin Hj. Kula	Pembantu Geosains Gred C17

Penerima Anugerah Perkhidmatan Cemerlang Tahun 2016 (Tahun Penilaian: 2015)
Recipients of Excellent Service Award 2016 (Year of Assessment: 2015)

Ibu Pejabat / Headquarters		
1	Nurzaidi bin Abdullah	Pegawai Geosains Gred C48
2	Abd. Rahim bin Harun	Pegawai Geosains Gred C48
3	Khairul Zaman bin Ibrahim	Pegawai Geosains Gred C44
4	Mohd Anuar bin Ishak	Pegawai Geosains Gred C44
5	Saidaruzza binti Shamsuddin	Pembantu Tadbir (P/O) Gred N22
6	Siti Rahmah binti Maamor	Pembantu Tadbir (P/O) Gred N19
7	Marina binti Mansor	Pembantu Tadbir (Kew) Gred W19
8	Muzzammil bin Kamal	Pemandu Kenderaan Gred H11
Bahagian Perkhidmatan Teknikal / Technical Services Division		
9	Mohd Fauzi bin Muhammad Said	Pegawai Geosains Gred C48
10	Mohd Anuar bin Md. Razali	Pegawai Geosains Gred C44
11	Noor Akhmar bin Kamarudin	Pegawai Geosains Gred C44
12	Amin Noorasid bin Abdul Jalil	Pegawai Geosains Gred C44
13	Rosiah binti Che Me	Penolong Pegawai Geosains Gred C29
14	Nordin bin Abdullah	Penolong Jurutera Gred J29
15	Ismail bin Abdullah	Pembantu Geosains Gred C26
16	Mohd Haiqal Hakimi Arania bin Abdullah	Pembantu Geosains Gred C19
17	Khairul Afendi bin Mohamed	Pembantu Geosains Gred C19
18	Noor Hartini binti Aznan	Pembantu Tadbir (Kew) Gred W19
19	Nur Azlin binti Yaacob	Pembantu Tadbir (P/O) Gred N19
20	Mohamad Yusoff bin Abu Hasan	Pembantu Penerbitan Gred N19
21	Azri bin Othman	Pembantu Operasi Gred N11
22	Fazli bin Zohari	Pembantu Awam Gred H11
Pusat Penyelidikan Mineral / Mineral Research Centre		
23	Mohd Syahrir bin Mohd Rozi	Pegawai Penyelidik Gred Q44
24	Mohd Idham bin Mustaffar	Pegawai Penyelidik Gred Q44
25	Ali bin Ismail	Pembantu Penyelidik Gred Q26
26	Yeoh Ah Heong	Pembantu Penyelidik Gred Q22
27	Samsiah binti Yaacob	Pembantu Tadbir Gred N22
28	Asrul Affendi bin Amran	Pembantu Operasi Gred N11
29	Ahmad Azlan bin Abdullah	Pembantu Operasi Gred N11
30	Asmawi bin Shahrudin	Pembantu Operasi Gred N11

JMG Kedah / Perlis / Pulau Pinang		
31	Nur Susila binti Md Saaid	Pegawai Geosains Gred C44
32	Fakhruddin Afif bin Fauzi	Pegawai Geosains Gred C41
33	Wan Bennyamin bin Rosli	Pembantu Geosains C19
34	Zulfadhli bin Zakaria	Pembantu Awam H11
JMG Perak		
35	Azmi bin Abu Bakar	Pegawai Geosains Gred C44
36	Saiful bin Abdullah	Pegawai Geosains Gred C41
37	Tan Pang Teck	Pembantu Geosains Gred C26
38	Faeros Akhbar bin Zaharudin	Penolong Pegawai Geosains Gred C29
39	Norfazura binti Abidin	Pembantu Tadbir (Kew) Gred W22
JMG Selangor / Wilayah Persekutuan		
40	Faizal bin Arshad	Pegawai Geosains Gred C48
41	Marina binti Mansor	Penolong Pegawai Tadbir Gred N29
42	Khairul Nizam bin Ahmad Rauf	Penolong Pegawai Geosains Gred C29
43	Muhammad Helmi bin Che Zilan	Pembantu Tadbir (Kew) Gred W19
JMG Negeri Sembilan / Melaka		
44	Hairul bin Mohamed Shahrudin	Pegawai Geosains Gred C44
45	Hashimah binti Ismail	Pembantu Tadbir Gred N22
46	Arif bin Minang	Pembantu Operasi Gred N11
JMG Johor		
47	Mohammed Syahrizal bin Zakaria	Pegawai Geosains C44
48	Abd Manaf bin Hanapiah	Pembantu Geosains C26
49	Masni bin Ismail	Pembantu Awam H11
JMG Pahang		
50	Mazlan bin Mohamad Zain	Pegawai Geosains Gred C44
51	Hassan bin Saru	Pembantu Geosains Gred C26
52	Normaiziera binti Abdul Rahim	Penolong Pegawai Tadbir Gred N29
53	Norkamisah binti Mazlan	Pembantu Tadbir (Kew) Gred W19
54	Kamarudin bin Mat Lela	Pembantu Awam Gred H11
JMG Terengganu		
55	Muhammad Fadzli bin Deraman	Pegawai Geosains Gred C44
56	Nailah @ Nazirah binti Abdullah	Penolong Pegawai Tadbir N29
57	Sivalingam A/L Krishnan	Pembantu Geosains Gred C19
58	Mohd Ridhuan bin A Manan	Pemandu Kenderaan H11

JMG Kelantan		
59	Mohd Nazan bin Awang	Pegawai Geosains Gred C54
60	Mohd Yuzlan bin Yusoff	Pegawai Geosains Gred C44
61	Nik Mohamad Zulkifly bin Nik Yusoff	Pemandu Kenderaan Gred H11
62	Mohd Zamri bin Abdullah	Pengawal Keselamatan Gred KP11
JMG Sarawak		
63	Setebin @ Roslan bin Rajali	Pegawai Geosains Gred C48
64	Ledyhernando Taniou	Pegawai Geosains Gred C41
65	Shahrul Ridzuan bin Zainal Rashid	Pegawai Geosains Gred C41
66	Tracy Anak Upong	Penolong Pegawai Tadbir N29
67	Halmi bin Jaraiee	Penolong Pegawai Geosains C29
68	Rosmah binti Usup	Penolong Juruukur JA29
69	Wan Dobil bin Wan Sulaiman	Penolong Juruukur JA29
70	Helda Jane Anak Edward	Setiausaha Pejabat N29
71	Phui Jin Miaw	Pembantu Geosains C26
72	Peter anak Buking	Pembantu Geosains C19
73	Anderson Ronnie Anak Anthony	Pemandu Kenderaan H11
JMG Sabah		
74	Paulius Godwin @ Paulus	Pegawai Geosains Gred C52
75	Faye Donna Edmund	Pegawai Geosains Gred C44
76	Redzuan bin Ahmad Banjar	Pegawai Geosains Gred C41
77	Besty Jenny Adim	Penolong Juruukur JA29
78	Levy @ Azhar bin Mosungkai	Pembantu Geosains Gred C22
79	Mejah binti Birud	Pegawai Khidmat Pelanggan N19
80	Rosman bin Erang	Pemandu Kenderaan Gred H11

Pelawat Luar Negara

Overseas Visitors

27-31.07.2016

Lawatan delegasi dari Department of Mineral Resources Thailand
Visit of delegation from the Department of Mineral Resources Thailand



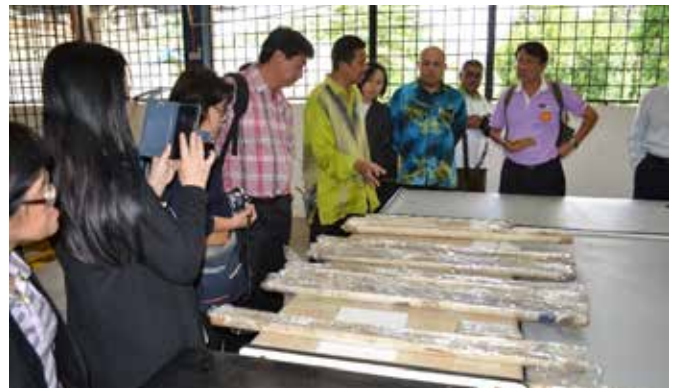
Lawatan ke Ibu Pejabat JMG
Visit to JMG Headquarters



Perbincangan bersama delegasi Thailand dan pegawai-pegawai JMG Malaysia di Ibu Pejabat JMG
Discussion between Thai delegation and JMG Malaysia officers at JMG Headquarters



Lawatan ke Makmal Kimiabumi, Bahagian Perkhidmatan Teknikal, Kompleks JMG Ipoh
Visit to Geochemical Laboratory, Technical Services Division, Ipoh JMG Complex



Lawatan ke Makmal Geologi Marin, Bahagian Perkhidmatan Teknikal, Kompleks JMG Ipoh
Visit to Marine Geology Laboratory, Technical Services Division, Ipoh JMG Complex



Lawatan ke Pusat Penyelidikan Mineral, Kompleks JMG Ipoh
Visit to Mineral Research Centre, Ipoh JMG Complex

11.11.2016

Lawatan delegasi yang diketuai oleh Dr. Liu Dawen, Director of Division of International Programs, Department of Science, Technology and International Cooperation, China Geological Survey
Visit of delegation led by Dr. Liu Dawen, Director of Division of International Programs, Department of Science, Technology and International Cooperation, China Geological Survey



Delegasi China disambut oleh pegawai-pegawai JMG
The Chinese delegation was welcomed by JMG Malaysia officers



Dr. Liu Dawen (kedua dari kanan), duduk bersama Datuk Mior Sallehuddin Mior Jadid (tengah), Ketua Pengarah JMG
Dr. Liu Dawen (second from right), seated with Datuk Mior Sallehuddin Mior Jadid (center), Director General of JMG

15.11.2016

Lawatan delegasi yang diketuai oleh Dr. Tan Yongjie, Chief Geoscientist, Development and Research Center, China Geological Survey

Visit of delegation led by Dr. Tan Yongjie, Chief Geoscientist, Development and Research Center, China Geological Survey



Dr. Tan Yongjie (kedua dari kiri), duduk bersama Tuan Haji Shahar Effendi Abdullah Azizi (kedua dari kanan), Timbalan Ketua Pengarah (Korporat dan Ekonomi Mineral) JMG
Dr. Tan Yongjie (second from left), seated with Mr. Shahar Effendi Abdullah Azizi (second from right), Deputy Director General (Corporate and Mineral Economics) of JMG



Perbincangan bersama delegasi China dan pegawai-pegawai JMG Malaysia

Discussion between China delegation and JMG Malaysia officers



Dr. Tan Yongjie menerima cenderahati dari Tuan Haji Shahar Effendi Abdullah Azizi
Dr. Tan Yongjie receiving a memento from Mr. Shahar Effendi Abdullah Azizi

18.11.2016

Lawatan Dr. Helen Hayes, Science Director, Engineering Geology of the British Geological Survey

Visit of Dr. Helen Hayes, Science Director, Engineering Geology of the British Geological Survey



Ketua Pengarah JMG Malaysia dan Dr. Helen Hayes
Director General of JMG Malaysia and Dr. Helen Hayes

Kerjasama Antarabangsa

Penyiasatan Geologi Bersama Sempadan Malaysia-Thailand (MT-JGS)

International Cooperation

Malaysia-Thailand Border Joint Geological Survey (MT-JGS)

06-12.02.2016

Workshop on Marine Triassic-Jurassic Stratigraphy of Thailand diadakan di Kanchanaburi-Tak-Lampang-Chiang Mai, Thailand
Workshop on Marine Triassic-Jurassic Stratigraphy of Thailand held at Kanchanaburi-Tak-Lampang-Chiang Mai, Thailand



Dr. Assanee Meesook, pakar stratigrafi endapan kelautan Trias-Jura Thailand, membentangkan penemuan beliau bertajuk *"The Marine Triassic-Jurassic Stratigraphy of Thailand"*

Dr. Assanee Meesook, Thailand marine deposits stratigraphy expert, presenting his findings titled *"The Marine Triassic-Jurassic Stratigraphy of Thailand"*



Kerja lapangan di Kanchanaburi, Thailand
Field work at Kanchanaburi, Thailand



Kerja lapangan di Kanchanaburi
Field work at Kanchanaburi

28.03.2016-31.03.2016

Bengkel pencirian dan penilainan geotapak di Kampar, Perak

Workshop on geosite characterization and evaluation at Kampar, Perak



Foto Kumpulan
Group photo

02.05.2016-07.05.2016

Mesyuarat Kumpulan Kerja Penyiasatan Geologi Bersama Sempadan Malaysia-Thailand Bil. 1/2016 dan Mesyuarat Penyuntingan, Kangar, Perlis

The Malaysia-Thailand Border Joint Geological Survey Working Group Meeting No. 1/2016 and Joint Editorial Meeting, Kangar, Perlis



Kerja lapangan selepas mesyuarat di kawasan yang didasari oleh Formasi Setul di Perlis
Post-meeting field trip in area underlain by the Setul Formation in Perlis

16.08.2016

Mesyuarat Kumpulan Kerja Penyasatan Geologi Bersama Sempadan Malaysia-Thailand Bil. 2/2016, Krabi, Thailand
The Malaysia-Thailand Border Joint Geological Survey Working Group Meeting No. 2/2016, Krabi, Thailand



En. Montri Luengkasoot (kiri) dan Tn. Hj. Mohd Arif Omar (kanan) mempengerusikan mesyuarat
Mr. Montri Luengkasoot (left) and Mr. Mohd Arif Omar (right) co-chaired the meeting



Mesyuarat sedang berlangsung
Meeting in progress



Ahli Kumpulan Kerja Malaysia – Thailand
Malaysia – Thailand Working Group members

17.08.2016

Mesyuarat Jawatankuasa Penyiasatan Geologi Bersama Sempadan Malaysia-Thailand (MT-JGSC) Ke-13, Krabi, Thailand
13th Malaysia-Thailand Border Joint Geological Survey Committee (MT-JGSC) Meeting, Krabi, Thailand



Mesyuarat sedang berlangsung
Meeting in progress



Pertukaran dokumen mesyuarat antara Datuk Mior Sallehuddin Mior Jadid dan Dr. Thawsaporn Nuchanong
Exchange of meeting documents between Datuk Mior Sallehuddin Mior Jadid and Dr. Thawsaporn Nuchanong



Ahli mesyuarat
Members of the meeting

18-19.08.2016

Kerja lapangan selepas mesyuarat di kawasan Krabi dan Satun, Thailand
Post-meeting field excursion in the Krabi and Satun areas, Thailand



Kerja lapangan di Taman Negara Nopparat Tara, Ban Laem Pho, Krabi, Thailand
Field work in Nopparat Tara National Park, Ban Laem Pho, Krabi, Thailand

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Lawatan ke Muzium Manek Andaman di Krabi, Thailand
Visit to Andaman Beads Museum, Krabi, Thailand

Kerjasama Teknikal dan Saintifik Malaysia – Indonesia dalam bidang geologi dan sumber mineral

Malaysia – Indonesia Scientific and Technical Co-operation in the field of geology and mineral resources

14-18.11.2016
Lawatan ke Geological Agency Indonesia, Bandung
[Visit to Geological Agency Indonesia, Bandung](#)



ASEAN Senior Official Meeting on Minerals (ASOMM)

02-04.08.2016

Mesyuarat Kumpulan Kerja ASOMM ke-13 dan Mesyuarat Lembaga Hakim pertama bagi Anugerah Mineral ASEAN, Aseania Resort & SPA, Langkawi, Kedah, Malaysia

The 13th ASOMM Working Group Meetings and the 1st Board of Judges Meeting of the ASEAN Mineral Awards, Aseania Resort & SPA, Langkawi, Kedah, Malaysia



Delegasi ASEAN ke Mesyuarat Kumpulan Kerja ASOMM ke-13, Langkawi yang telah dianjurkan oleh Malaysia
The ASEAN delegations of the 13th ASOMM Working Group Meetings, Langkawi which was hosted by Malaysia



Dato' Wan Mazlan Wan Mahmood (kiri), Setiausaha Kementerian Sumber Asli dan Alam Sekitar Malaysia, telah mempengerusikan Sesi Plenari semasa Mesyuarat Kumpulan Kerja ASOMM ke-13. Di sebelah beliau adalah Datuk Mior Sallehuddin Mior Jadid, Ketua Pengarah Jabatan Mineral dan Geosains Malaysia

Dato' Wan Mazlan Wan Mahmood (left), Under Secretary of the Ministry of Natural Resources and Environment Malaysia, was chairing the Plenary Session during the 13th ASOMM Working Group Meetings. Next to him was Datuk Mior Sallehuddin Mior Jadid, Director General of the Department of Mineral and Geoscience Malaysia



Para wakil dari Malaysia dan pegawai-pegawai ASEAN lain yang menghadiri Mesyuarat Kumpulan Kerja ASOMM ke-13, Langkawi
 Malaysian representatives and other ASEAN officials attending the 13th ASOMM Working Group Meetings, Langkawi



Mesyuarat Lembaga Hakim pertama bagi Anugerah Mineral ASEAN telah diadakan sempena Mesyuarat Kumpulan Kerja ASOMM ke-13
 The 1st Board of Judges Meeting of the ASEAN Mineral Awards was held in conjunction with the 13th ASOMM Working Group Meetings



Lawatan ke Kilim Karst Geoforest Park sempena Mesyuarat Kumpulan Kerja ASOMM ke-13, Langkawi
 A visit to Kilim Karst Geoforest Park in conjunction with the 13th ASOMM Working Group Meetings, Langkawi



Gambar kumpulan delegasi ASEAN di tempat ternakan ikan dalam sangkar, salah satu tempat menarik yang dilawati semasa melancong ke Kilim Karst Geoforest Park
 A group photo of ASEAN delegations at Fish Farm, one of the interesting places visited during Kilim Karst Geoforest Park tour

8-10.11.2016

The 16th ASOMM and the 9th ASOMM + 3 Consultations, Seri Pacific Hotel, Kuala Lumpur, Malaysia



Ketua-ketua Delegasi ASOMM ke-16, Kuala Lumpur di sesi foto bersama YB Datuk Ir Dr Haji Hamim Samuri, Timbalan Menteri Sumber Asli dan Alam Sekitar (tengah), dan Dato' Dr Nadzri Yahaya, Timbalan Ketua Setiausaha Kementerian Sumber Asli dan Alam Sekitar (ketujuh dari kiri)

The Heads of Delegations of the 16th ASOMM, Kuala Lumpur in a photo session with The Honourable Datuk Ir Dr Haji Hamim Samuri (center), Deputy Minister of Natural Resources and Environment Malaysia, and Dato' Dr Nadzri Yahaya (seventh from left), Deputy Secretary General of the Ministry of Natural Resources and Environment Malaysia

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Ketua-ketua Delegasi ASOMM + 3 Perundingan ke-9, Kuala Lumpur dengan YBhg Dato' Dr Nadzri Yahaya (tengah), Timbalan Ketua Setiausaha Kementerian Sumber Asli dan Alam Sekitar

The Heads of Delegations of the 9th ASOMM + 3 Consultations, Kuala Lumpur with Dato' Dr Nadzri Yahaya (center), Deputy Secretary General of the Ministry of Natural Resources and Environment Malaysia



Delegasi ASOMM ke-16 dan ASOMM + 3 Perundingan ke-9, Kuala Lumpur
 The Delegations of the 16th ASOMM and the 9th ASOMM+3 Consultations, Kuala Lumpur



Gambar kenangan delegasi ASEAN di Paya Indah Wetland, Dengkil, Selangor
 A commemorative photo of ASEAN delegations at Paya Indah Wetland, Dengkil, Selangor



YB Datuk Ir Dr Haji Hamim Samuri, Timbalan Menteri Sumber Asli Dan Alam Sekitar, merasmikan majlis pembukaan ASOMM ke-16, Kuala Lumpur
 The Honourable Datuk Ir Dr Haji Hamim Samuri, Deputy Minister of Natural Resources and Environment Malaysia, officiated the opening ceremony of the 16th ASOMM, Kuala Lumpur



Mesuarat sedang berlangsung
 Meeting in progress

07.03.2016: Sinar Harian

Majlis perasmian telaga tiub di Padang Terap, Naka, Kedah
Inauguration ceremony of tube wells at Padang Terap, Naka, Kedah



18.05.2016: Sinar Harian

Papan tanda geotapak di Gunung Pulai
Geosite signage at Gunung Pulai



25.08.2016: Berita Harian

Sumber air tanah di Kampung Sungai Jagung, Kedah

Groundwater resources at Kampung Sungai Jagung, Kedah



Sumber air bawah tanah terbesar ditemui

Penemuan di Pendang, Kedah pada kedalaman 60 meter

Oleh Suzalina Halid
suzalina@bh.com.my

► Pendang

Jabatan Mineral dan Geosains (JMG) menemui sumber air bawah tanah dipercayai terbesar di negara ini, di Kampung Sungai Jagung, dekat sini.

Sumber air berkenaan yang berkemampuan menghasilkan kira-kira 132 meter padu (35,000 galen) setiap jam, mampu memberi manfaat kepada 16,000 pengguna bersamaan 3,000 pemegang akaun Syarikat Air Darul Aman (SADA).

Ini sekali gus menyelesaikan masalah bekalan air di negeri ini.

Pengerusi Jawatankuasa Pembangunan Wanita, Kebajikan Masyarakat, Pertanian dan Asas Tani serta Pembangunan Usahawan negeri, Datuk Suraya Yaacob, berkata pihaknya percaya ia berupaya menyumbang kepada penyelesaian jangka pendek masalah air yang berlaku di Kedah, seperti mana digantikan kerajaan negeri sebelum ini.

Bellau yang juga Ahli Dewan Undangan Negeri (ADUN) Sungai Tiang berkata, JMG membelanjakan sebanyak RM50,000 bagi kerja menggerudi tanah sedalam 60 meter sehingga

membawa kepada penemuan sumber air baharu itu.

"Saya akan melakukan perbincangan dengan beberapa agensi termasuk SADA dan Unit Perancang Ekonomi Negeri (UPEN) bagi tujuan berkenaan pada mesyuarat EXCO, Selasa depan.

"Perkara ini juga sudah dimaklumkan kepada Datuk Badrol Hisham Hashim (Pengerusi Jawatankuasa Bekalan Air, Sumber Air dan Tenaga) bagi mencari jalan terbaik kerana kos pembinaan infrastruktur telaga tiub dijangka menelan kos yang tinggi dan memerlukan perancangan rapi.

"Kita juga akan berbincang dengan SADA dan UPEN bagaimana untuk salurkan air ke kawasan yang mengalami masalah tekanan air rendah kerana jauhnya beratus kilometer dari sini," katanya selepas melawat telaga tiub berkenaan, di sini, semalam.

Suraya berkata, pihaknya masih belum mendapat gambaran kos sebenar membabitkan pembinaan sistem peripalan, kemudahan elektrik dan pembinaan tangki air.

"Buat masa ini, sumber air itu dimanfaatkan kira-kira 200 penduduk Kampung Sungai Jagung yang diketahui adalah kawasan yang mengalami masalah air," katanya.



Kita juga akan berbincang dengan SADA dan UPEN bagaimana untuk salurkan air ke kawasan yang mengalami masalah tekanan air rendah kerana jauhnya beratus kilometer dari sini"

Suraya Yaacob,
Pengerusi Jawatankuasa Pembangunan Wanita, Kebajikan Masyarakat, Pertanian dan Asas Tani serta Pembangunan Usahawan negeri



Aktiviti Mineral **Mineral Activities**

Aktiviti Mineral

Mineral Activities

Permintaan mineral dunia semakin meningkat sejajar dengan pertumbuhan bilangan penduduk dunia serta penggunaan mineral secara meluas dalam pelbagai aplikasi. Jabatan Mineral dan Geosains Malaysia (JMG), sebagai sebuah agensi yang bertanggungjawab ke atas pengurusan sumber mineral negara, peranannya ialah menyediakan, mengumpul dan menganalisis data berkaitan eksplorasi mineral, perlombongan, pengkuarian, pengeluaran mineral, pelaburan komersial dan status perkembangan industri berasaskan mineral.

Aktiviti mineral yang dijalankan oleh JMG melibatkan penilaian sumber mineral berlogam, mineral perindustrian, dan mineral tenaga. JMG juga berperanan membekalkan maklumat komoditi mineral bagi membantu meningkatkan perkembangan industri mineral negara, serta memberi khidmat nasihat guna tanah dan pembebasan mineral kepada pihak berkuasa negeri dan swasta.

The world demand for minerals is constantly increasing in tandem with the world's population growth and also the increasing wider usages of minerals in various applications. The Department of Mineral and Geoscience Malaysia (JMG), as an agency responsible for the management of the nation's mineral resources, its role is to prepare, collect and analyse the data pertaining to mineral exploration, mining, quarrying, minerals production, commercial investment and the developmental status of mineral-based industries.

Mineral activities carried out by JMG involve resource evaluation for metallic, industrial, and energy minerals. JMG also plays a role in providing mineral commodity information to support the development of the nation's mineral industry, as well as provides advisory services pertaining to land use and mineral clearance to the state authorities, as well as in the private sector.

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Penilaian Sumber Mineral

JMG melaksanakan penilaian sumber mineral yang melibatkan penilaian sumber mineral berlogam, mineral perindustrian dan mineral tenaga. Berdasarkan penilaian tersebut, sumber baharu bauksit dan pasir silika telah dikenal pasti. Survei geofizik awangan telah di jalankan di Wilayah Ekonomi Pantai Timur (ECER) untuk mengenal pasti dan menentukan kawasan berpotensi mineral berlogam.

Mineral Berlogam

Pada tahun 2016, kerja penilaian tinjauan sumber mineral berlogam telah dilaksanakan di empat buah negeri iaitu Selangor, Negeri Sembilan, Terengganu dan Kelantan dengan jumlah kawasan liputan seluas 115 km². Penilaian susulan / terperinci sumber mineral berlogam telah dilaksanakan di dua buah negeri iaitu Terengganu dan Sabah dengan jumlah kawasan liputan seluas 24 km².

Mineral Resource Evaluation

JMG conducted mineral resources evaluation for metallic, industrial, and energy minerals. From such evaluation, new deposits of bauxite and silica sand have been identified. Airborne geophysical survey was carried out in the East Coast Economic Region (ECER) to identify potential metallic mineral deposits.

Metallic Minerals

In 2016, reconnaissance evaluation for metallic mineral resources was conducted in four states, namely Selangor, Negeri Sembilan, Terengganu and Kelantan, covering a total area of 115 km². Follow-up / detailed metallic mineral resource evaluation was carried out in two states, namely Terengganu and Sabah, covering a total area of 24 km².

Penilaian sumber mineral berlogam (tinjauan)
Metallic mineral resources assesment (reconnaissance)

Komoditi Commodity	Negeri State	Kawasan Area	Liputan Coverage (km ²)	Penemuan Findings
Timah Tin	Selangor	Lembangan Sungai Rui dan Sungai Rinting, Kuala Kubu Baru	25	Analisis awal menunjukkan beberapa lokaliti mempunyai nilai Sn yang tinggi bagi sampel kelodak (600 – 1,936 ppm) dan konsentrat (106,500 – 209,400 ppm). Initial analyses indicated that several localities are showing high Sn content in the silt samples (600 – 1,936 ppm) and in concentrates (106,500 – 209,400 ppm).
	Negeri Sembilan	Setul, Lenggeng	35	Kandungan Sn daripada tiga sampel yang dikutip adalah 973 ppm, 140,800 ppm dan 500,800 ppm. Sn contents in the three samples collected were 973 ppm, 140,800 ppm and 500,800 ppm respectively.
Emas Gold	Terengganu	Sungai Tapah, Setiu	5	Kemungkinan terdapat pemineralan emas dalam telerang kuarza di kawasan itu. There is possibility of gold mineralization in quartz veins in the area.
	Kelantan	Teleming, Gua Musang	50	Ada kemungkinan yang sangat tinggi pemineralan emas serta unsur seperti Ag-Pb-Sn-Mn di kawasan ini. Kepingan emas yang ditemui berbentuk subsegi dengan saiz sehingga 2 mm ditemui. There is a very high possibility of gold mineralization and other elements such as Ag-Pb-Sn-Mn in the area. Gold flakes found show sub-angular shape with sizes up to 2 mm.
Jumlah Liputan Total Coverage			115	

Penilaian sumber mineral berlogam (susulan / terperinci)
Metallic mineral resources assesment (follow up / detailed)

Komoditi Commodity	Negeri State	Lokasi Location	Liputan Coverage (km ²)	Penemuan Findings
Emas Gold	Terengganu	Sg. Tapah, Setiu	20	Kandungan emas untuk sampel kelodak berjulat daripada 0.003 ppm – 0.44 ppm manakala untuk sampel konsentrat berjulat daripada 0.003 ppm – 567.27 ppm. Gold content for the silt samples ranges from 0.003 ppm – 0.44 ppm and 0.003 ppm – 567.27 ppm for concentrate samples.
Mangan Manganese	Sabah	Taritipan, Kota Marudu	4	Purata kandungan mangan dalam sampel tanah adalah 0.41% manakala dalam sampel batuan adalah 61.0%. The average of manganese content in soil samples was 0.41% whereas in rock samples was 61.0%.
Jumlah liputan Total coverage			24	



Terowong bekas lombong mangan di kawasan Blanta, Taritipan, Kota Marudu, Sabah
Ex-manganese mining adit at Blanta area, Taritipan, Kota Marudu, Sabah



Sampel bijih mangan dari kawasan Blanta, Taritipan Kota Marudu, Sabah
Manganese ore sample from Blanta area, Taritipan, Kota Marudu, Sabah

Mineral Perindustrian

Pada tahun-tahun yang akan datang, permintaan negara terhadap mineral mentah dan bahan binaan dijangka akan semakin meningkat. Pelan Induk Perindustrian menyatakan keperluan inventori sumber mineral perindustrian kebangsaan untuk membolehkan perancangan program perindustrian negara yang sistematik.

Dari sudut pandangan strategik, adalah mustahak bagi negara kita terus mengenal pasti sumber-sumber mineral perindustrian tempatan bagi memudahkan pembangunan negara. Pada masa yang sama, menggunakan sumber-sumber negara sendiri dan mengurangkan kebergantungan negara terhadap mineral-mineral import.

Pada tahun 2016 penilaian telah dijalankan ke atas beberapa jenis mineral perindustrian iaitu bauksit dan pasir silika dengan jumlah kawasan liputan 46 km². Kajian yang dijalankan telah mengenal pasti anggaran 16.8 juta tan metrik bauksit dan 35.1 juta tan metrik pasir silika.

Industrial Minerals

In the years to come, the demand for raw minerals and construction materials are expected to increase. The Industrial Master Plan requires an inventory of national industrial mineral resources to enable systematic planning of the country's industrialization program.

From the strategic point of view, it is important for the country to continue to identify local industrial mineral resources to facilitate national development. At the same time, securing the country's own resources also reduces the nation's dependence on imported minerals.

In the year 2016, evaluations on several types of industrial minerals such as bauxite and silica sand were carried out, with a total coverage area of 46 km². The study has identified 16.8 million tonnes of bauxite and 35.1 million tonnes of silica sand.

Bauksit / Bauxite

Negeri State	Kawasan Area	Liputan Coverage (km ²)	Penemuan Findings
Melaka	Merlimau	25	Kandungan alumina di kawasan ini adalah tinggi iaitu 44.0 – 57.3%. Kawasan ini dikenal pasti untuk kajian lanjut. The content of alumina is high, ranging from 44.0 – 57.3%. This area has been identified for further study.
Terengganu	Tanah kerajaan Perasing Jaya, Lembah Jabor, Kemaman	1.5	Anggaran rizab adalah sebanyak 6 juta tan metrik. The estimated reserve is 6 million tonnes.
	Tanah Sime Darby Plantation, Lembah Jabor, Kemaman	3.5	Anggaran rizab adalah sebanyak 10 juta tan metrik. The estimated reserve is 10 million tonnes.
Pahang	Felcra Bt. Segumpal, Maran	1	Lapisan laterit mengandungi bauksit bergred rendah yang berketebalan 1.0 – 4.8 m dengan anggaran rizab 0.8 juta tan. Layers of laterite with low grade bauxite with thickness ranging from 1.0 – 4.8 m with an estimated reserve of 0.8 million tonnes.
Sabah	Kg. Tapaang, Telupid	10	Julat ketebalan lapisan bauksit 0.2 – 2.0 m. Kandungan alumina adalah 15 – 49%. Kawasan ini dikenal pasti untuk kajian lanjut. The thickness of the bauxite layer ranges from 0.2 – 2.0 m. Alumina content from 15 – 49%. This area has been identified for further study.
Jumlah liputan Total coverage		41	

Pasir Silika / Silica Sand

Negeri State	Kawasan Area	Liputan Coverage (km ²)	Penemuan Findings
Kelantan	Kawasan Utara Gunung Ayam, Lojing	5	Anggaran rizab adalah sebanyak 35.1 juta tan metrik. The estimated reserve is 35.1 million metric tonnes.



Pengorekan lelubang dengan menggunakan jengkaut di Felcra Bt. Segumpal Maran, Pahang
Pit excavations using a backhoe in Felcra Bt. Segumpal Maran, Pahang



Membuat log dan persampelan bauksit dalam lelubang di Felcra Bt. Segumpal Maran, Pahang
Logging and sampling for bauxite in a trial pit at Felcra Bt. Segumpal Maran, Pahang



Pengerimitan untuk menentukan ketebalan lapisan bauksit di Lembah Jabor, Kemaman
Hand augering to determine thickness of the bauxite layer at Lembah Jabor, Kemaman



Sampel bauksit dari Felcra Bt. Segumpal Maran, Pahang
Bauxite samples from Felcra Bt. Segumpal Maran, Pahang

Mineral Tenaga

Penilaian sumber batu arang telah dilaksanakan di Silantek East di Sri Aman, Sarawak meliputi kawasan berkeluasan 20 km². Tiga singkapan batu arang, dengan julat ketebalan 0.10 m hingga 0.34 m telah ditemui.

Energy Mineral

Coal resource evaluation was conducted in Silantek East in Sri Aman, Sarawak covering an area of 20 km². Three coal outcrops, ranging in thickness from 0.10 m to 0.34 m, were encountered.

Mineral Tenaga – Batu Arang Energy Mineral – Coal

Negeri State	Kawasan Area	Liputan Coverage (km ²)	Darjat Rank	Penemuan Findings
Sarawak	Silantek East, Sri Aman	20	Bituminous	Tiga singkapan batu arang dengan ketebalan berjulat dari 0.10 m hingga 0.34 m telah dijumpai. Three coal outcrops, ranging in thickness from 0.10 m to 0.34 m, were found.

Survei Geofizik Awangan

JMG secara berterusan membantu dan bekerjasama dengan NRE dalam urusan berkaitan pembangunan mineral, terutamanya dalam pelan pembangunan potensi mineral di Wilayah Ekonomi Pantai Timur (ECER). Majlis Pembangunan ECER, pada mesyuarat yang dipengerusikan oleh YAB Perdana Menteri pada 9 April 2015, telah meluluskan peruntukan sebanyak RM15 juta untuk survei geofizik awangan di kawasan ECER. Survei ini bertujuan untuk mengenal pasti longgokan mineral berlogam yang berpotensi melalui penawanan, pemprosesan dan interpretasi data radiometrik dan magnetik. Fokus utama projek ini adalah untuk mengenal pasti potensi longgokan bagi enam jenis sumber mineral yang penting untuk pembangunan industri hiliran di kawasan ECER, iaitu bijih besi, batu kapur, pasir silika, tanah liat, feldspar, dan granit.

Penerbangan untuk survei geofizik awangan telah dilaksanakan dari 27 Ogos hingga 3 November 2016, melintasi 62,937 km dan meliputi jumlah keluasan 27, 921 km persegi. Peta yang sedang disediakan daripada data yang dikumpul akan memberikan maklumat mengenai % uranium (U), % torium (Th), % kalium (K), ternari plot, magnetik rantau plot, struktur geologi dan anomali

Airborne Geophysical Survey

JMG continued to assist and cooperate with NRE in matters relating to the development of the minerals sector, especially the mineral potential development plan of the Economic Corridor of East Region (ECER). The ECER Development Council, at its meeting chaired by The Honorable Prime Minister on 9 April 2015, approved an allocation of RM15 million for the airborne geophysical survey of the ECER area. The survey was aimed at identifying potential metallic mineral deposits through the acquisition, processing, and interpretation of airborne geophysical radiometric and magnetic data. The main focus of the project was to identify potential deposits of six mineral resources in the area which are important to the downstream industrial development of ECER, namely iron ore, limestone, silica sand, clay, feldspar, and granite.

The airborne geophysical survey flights were carried out between 27 August and 3 November 2016, traversing 62,937 km and covering a total area of 27,921 km². Maps under preparation from the data collected would provide information on % uranium (U), % thorium (Th), % potassium (K), ternary plots, regional magnetic plots, structural geology and anomalies.



Majlis menandatangani Perjanjian Kontrak Perkhidmatan Survei Geofizik Awangan
 Contract signing ceremony for Airborne Geophysical Survey Services



Pentauliah magnetometer mudah alih dan radiometrik
 Commissioning the mobile magnetometer and radiometric



Pesawat yang digunakan untuk survei geofizik awangan di Lapangan terbang Kerteh, Terengganu
 Aircraft used for geophysical airborne survey at Kerteh Airport, Terengganu



Mesyuarat dan perbincangan teknikal mengenai hasil survei
 Meeting and technical discussion of the survey results



Aktiviti Penilaian Sumber Mineral 2016
Mineral Resource Evaluation Activities 2016

Ekonomi Mineral

Dalam usaha untuk menyebarkan informasi mineral dalam Negara, sebanyak lima laporan telah diterbitkan:

1. Malaysian Minerals Yearbook,
2. Industrial Mineral Production Statistics and Directory of Producers in Malaysia,
3. Malaysian Mining Industry,
4. Malaysian Mineral Trade Statistics, dan
5. Directory of Mineral-Based Industries in Malaysia.

Selain daripada menerbitkan lima laporan itu, JMG terus memberi input berkala mengenai status sektor mineral kepada Kementerian Sumber Asli dan Alam Sekitar (NRE) dan agensi-agensi kerajaan yang lain. Di antara data yang dibekalkan adalah:

1. Laporan industri perlombongan kepada Bank Negara dan Jabatan Perangkaan,
2. Laporan pengeluaran bijih timah kepada Lembaga Timah,
3. Laporan pelaburan swasta kepada MIDA, serta
4. Laporan data pengeluaran batu arang, batu kapur serta serbuk kapur kepada Malaysian Green Technology Corporation (atau dahulu dikenali sebagai Pusat Tenaga Malaysia).

Input ini bertujuan untuk pengiraan sumbangan sector perlombongan kepada ekonomi negara oleh Bank Negara. Informasi ini juga digunakan untuk membuat formulasi imbangan tenaga negara, serta mengemaskini data inventori greenhouse gas (GHG) oleh Malaysian Green Technology Corporation.

Input JMG juga digunakan untuk formulasi perjanjian dalam dagangan dua hala dan kerjasama antarabangsa. Dalam hubungan ini, sejumlah lima nota ikhtisar Negara, iaitu dengan Perancis, Kazakhstan, India, Lao PDR dan China telah disediakan dalam tahun ini.

Di peringkat ASEAN, Malaysia telah menganjurkan mesyuarat berikut:

1. The 13th ASOMM (ASEAN Senior Officials Meeting on Minerals) Working Group Meeting di Aseania Resort & SPA, Langkawi, Kedah, Malaysia, 2 – 4 Ogos, 2016
2. The 16th ASOMM (ASEAN Senior Officials Meeting on Minerals) and the 9th ASOMM+3 Consultations di Seri Pacific Hotel, Kuala Lumpur, Malaysia, 8 – 10 November, 2016

Mineral Economics

In an effort to disseminate the country's information on minerals, a total of five reports were published:

1. Malaysian Minerals Yearbook,
2. Industrial Mineral Production Statistics and Directory of Producers in Malaysia,
3. Malaysian Mining Industry,
4. Malaysian Mineral Trade Statistics, and
5. Directory of Mineral-Based Industries in Malaysia.

Besides the publication of the five main reports, JMG continued to provide periodical inputs on the status of the minerals sector to the Ministry of Natural Resources and Environment (NRE), as well as to other related government agencies. Among the data supplied were:

1. Mining industry reports to Central Bank and Statistics Department,
2. Tin ore production reports to the Tin Board,
3. Private investment reports to MIDA, and
4. Coal, limestone and lime production reports to the Malaysian Green Technology Corporation (formerly known as Pusat Tenaga Malaysia).

These inputs were necessary for the calculation of the contribution of the mineral sector to the country's economy by the Central Bank. The information was also needed in the formulation of the national energy balance and in the updating of greenhouse gas (GHG) inventory data by Malaysian Green Technology Corporation.

JMG's input on minerals was also necessary in the formulation of bilateral trade agreements and in international cooperation. In this context, a total of five country briefs namely on Jordan, China, Japan, South Korea and South Africa were prepared in the year.

At the ASEAN level, Malaysia organized the following meetings:

1. The 13th ASOMM (ASEAN Senior Officials Meeting on Minerals) Working Group Meeting at Aseania Resort & SPA, Langkawi, Kedah, Malaysia, from 2 – 4 August, 2016
2. The 16th ASOMM (ASEAN Senior Officials Meeting on Minerals) and the 9th ASOMM+3 Consultations at Seri Pacific Hotel, Kuala Lumpur, Malaysia, from 8 – 10 November, 2016

Malaysia juga terlibat dalam mesyuarat dan bengkel berikut:

1. The 5th Training Course of China-ASEAN Mining Personnel Exchange & Training Center, 16 August – 13 September 2016 (Guangxi, China)

Bagi mengekalkan hubungan jabatan dengan pihak industri, JMG telah melakukan beberapa lawatan kerja ke lombong-lombong, kuari-kuari dan juga industri berasaskan mineral dalam Negara. Selain daripada itu, tujuan lawatan itu juga untuk mengumpul maklumat berkaitan dengan pembangunan dan penggunaan bahan mineral serta produk-produk hiliran berasaskan mineral yang dihasilkan.



Pengeluaran mineral silika menggunakan kaedah “spiral” di Sungai Bakong, Marudi Sarawak
Production of silica mineral by the spiral method at Sungai Bakong, Marudi Sarawak

Malaysia also took part in the following meetings and workshops:

1. The 5th Training Course of China-ASEAN Mining Personnel Exchange & Training Center, 16 August – 13 September 2016 (Guangxi, China)

To maintain good rapport with the mineral industry, JMG organised several working visits to various mines, quarries and mineral-based industries in the country. The visits were also to collect information related to the development and utilization of minerals, as well as the production of value-added downstream mineral products.



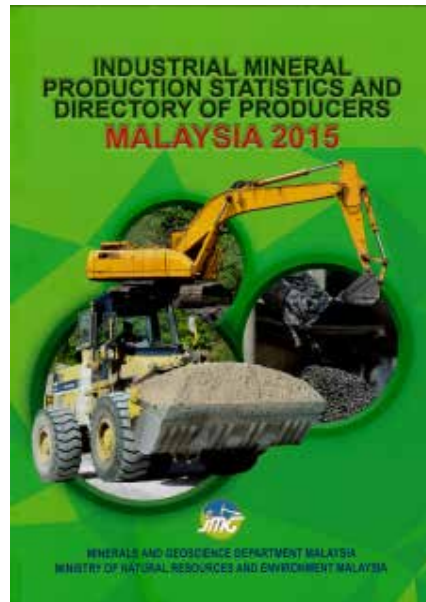
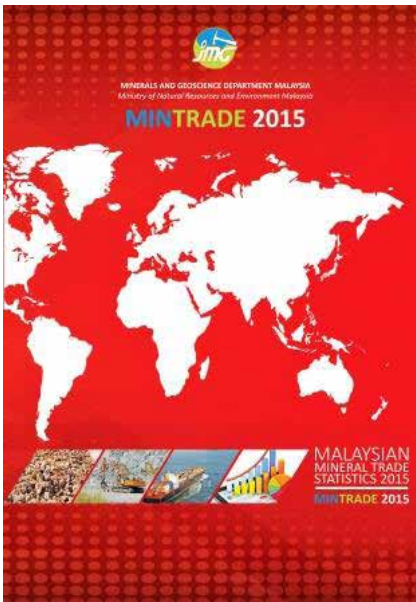
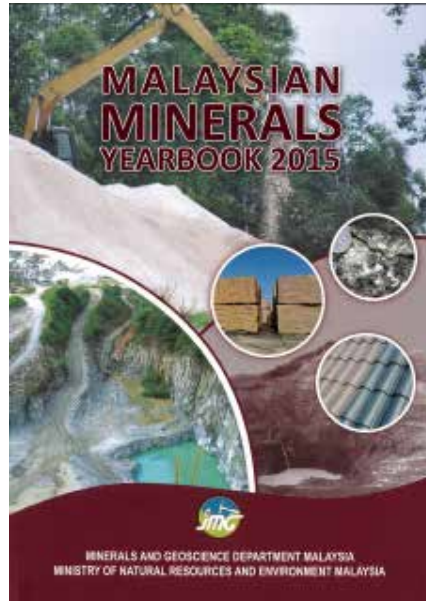
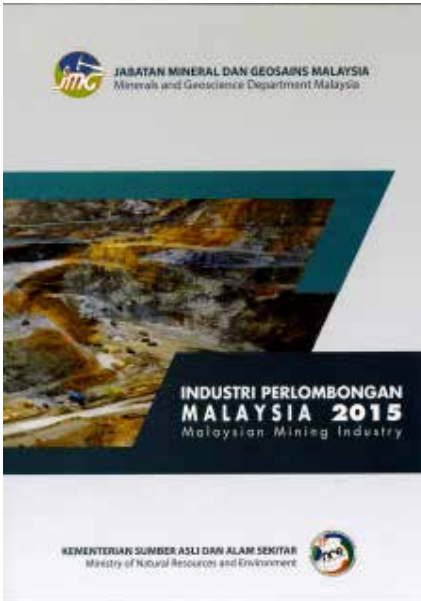
Lawatan industri ke Zircosil (Malaysia) Sdn. Bhd. di Senawang, Seremban, Negeri Sembilan
Industrial visit to Zircosil (Malaysia) Sdn. Bhd. at Senawang, Seremban, Negeri Sembilan



Lawatan industri ke Sunway VCP Sdn. Bhd. di Klang, Selangor
Industrial visit to Sunway VCP Sdn. Bhd. at Klang, Selangor

Penerbitan Berkaitan Mineral

Mineral-Related Publications



Laporan yang diterbitkan oleh JMG pada tahun 2016
Reports published by JMG in 2016

Khidmat Nasihat Mineral

Khidmat nasihat mineral telah diberikan kepada pihak berkuasa negeri dan swasta berkenaan ulasan guna tanah dan pembebasan mineral sama ada secara lisan atau ulasan bertulis.

Mineral Advisory Services

Mineral advisory services pertaining to land use and mineral clearance were provided to the state authorities as well as the private sector. The reviews were both verbal and written.

Mineral advisory services Khidmat nasihat mineral

Pejabat JMG JMG Office	Jenis khidmat nasihat Type of advisory services		
	Ulasan guna tanah Landuse review (bil. / no.)	Ulasan pembebasan mineral Mineral clearance review (bil. / no.)	Pertanyaan Enquiries (bil. / no.)
Ibu Pejabat / Headquarters	-	-	33
Johor	97	289	34
Melaka	3	-	-
Negeri Sembilan	123	-	6
Selangor	54	13	85
Perak	171	66	21
Kedah	26	7	24
Pulau Pinang	12	-	-
Perlis	7	-	-
Kelantan	4	41	12
Terengganu	89	19	18
Pahang	48	116	15
Sarawak	24	5	129
Sabah	63	-	-
Jumlah / Total:	721	556	377



Aktiviti Geosains
Geoscience Activities

Aktiviti Geosains

Geoscience Activities

Aktiviti geosains dilaksanakan oleh jabatan untuk menyediakan maklumat geologi yang berguna dalam bidang seperti pemetaan geologi, geologi warisan, hidrogeologi, geologi kejuruteraan, geologi alam sekitar, geologi marin, dan geoterma. Maklumat geosains yang berkualiti serta memenuhi kehendak pemegang taruh dan pelanggan adalah input penting yang diperlukan dalam perancangan guna tanah bagi mencapai pembangunan mampan, mengurangkan risiko bencana dan memelihara alam sekitar.

Pemetaan geologi dijalankan bagi mengumpul maklumat asas geologi yang amat diperlukan dalam kerja-kerja carigali sumber mineral, perancangan guna tanah dan juga untuk menentukan kesesuaian tapak untuk pembangunan. Pemetaan warisan geologi pula dapat menilai dan memelihara tapak geologi yang berpotensi sebagai tapak warisan negara untuk dipromosikan sebagai kawasan geopelancongan serta kelestarian alam sekitar.

Maklumat hidrogeologi adalah penting dalam pengurusan sumber air tanah bagi memastikan ia dapat terus digunakan sebagai bekalan air negara, manakala maklumat pemetaan geobencana dan penilaian risiko bencana, terutamanya di kawasan perbandaran dan penempatan, amat berguna kepada pihak berkuasa tempatan dalam merancang pembangunan yang lebih sistematik.

Geoscience activities are carried out to gather useful geological information in the field of geological mapping, geological heritage, hydrogeology, engineering geology, environmental geology, marine geology, and geothermal. Quality geosciences information, which meets the needs of stakeholders and clients, provides vital input needed in land use planning for sustainable development, reducing the risks of disaster and protects the environment.

Geological mapping is carried out to collect basic geological information that is very much needed in the exploration of mineral resources and land use planning, as well as to determine whether a land is suitability for site development. Geological heritage mapping is carried out to assess and conserve potential geological sites as national heritage while promoting geotourism and environmental sustainability.

Hydrogeological information is important in the management of groundwater resources to ensure groundwater resource remains available for the nation's water supplies, while information from geohazard mapping and disaster risk assessment, especially in the urban and settlement areas, assist the local authorities in systematic development planning.

Pemetaan Geologi Penyiasatan Geologi Sempadan Negara Sempadan Malaysia-Thailand

Projek Penyiasatan Geologi Bersama Sempadan Malaysia-Thailand dilaksanakan di bawah payung *the Malaysia-Thailand Border Joint Geological Survey Committee (MT-JGSC)*. Projek ini yang melibatkan kerjasama teknikal dalam bidang geosains dan mineral di antara Jabatan Mineral dan Geosains Malaysia dan Department of Mineral Resources Thailand telah dijalankan sejak tahun 2000. Projek dijalankan bertujuan untuk menyelaraskan sempadan geologi serta korelasi unit-unit batuan di kawasan sempadan kedua-dua Negara.

Pada tahun 2016, kajian terperinci korelasi stratigrafi telah dijalankan bersama pihak Thai di kawasan yang telah dipetakan. Kompilasi laporan geologi dan sumber mineral di sepanjang kawasan sempadan Malaysia-Thailand diteruskan pada tahun 2016. Tiga laporan yang telah siap dan terbitkan pada tahun 2016 ialah:

- i. *Detailed study on Carboniferous radiolaria in radiolarian-bearing rocks along the Malaysia-Thailand border*
- ii. *Quantitative Rockfall Hazard Assessment for Bukit Lagi, Perlis, Malaysia using LiDAR Technology*
- iii. *Geology of the Langkawi-Tarutao area along the Malaysia-Thailand border*

Dua projek yang telah dimulakan pada tahun 2016 dan akan siap pada tahun 2017, iaitu:

- i. *Stratigraphic correlation between the Setul Formation and the ThungSong Group*
- ii. *Detailed study on Permian-Triassic radiolaria in radiolarian-bearing rocks along the Malaysia-Thailand border*

Geological Mapping Cross-Border Geological Mapping Malaysia-Thailand Border

The Malaysia-Thailand Border Joint Geological Survey Project is implemented under the umbrella of the Malaysia-Thailand Border Joint Geological Survey Committee (MT-JGSC). The project which involves technical cooperation in the field of geoscience and minerals between Department of Mineral and Geoscience Malaysia and Department of Mineral Resources Thailand since its implementation in 2000. The project is carried out to correlate the geological boundary of rock units along the common border of both countries.

During 2016, a detailed study on the stratigraphic correlation was jointly carried out with the Thai counterpart in areas which were previously mapped. Compilation of report on the geology and mineral resources along the Malaysia-Thailand border was continued in 2016. Three reports that were completed and published during the period under review were:

- i. *Detailed study on Carboniferous radiolaria in radiolarian-bearing rocks along the Malaysia-Thailand border*
- ii. *Quantitative Rockfall Hazard Assessment for Bukit Lagi, Perlis, Malaysia using LiDAR Technology*
- iii. *Geology of the Langkawi-Tarutao area along the Malaysia-Thailand border*

Two projects that were initiated during 2016 and will be completed in 2017 were:

- i. *Stratigraphic correlation between the Setul Formation and the ThungSong Group*
- ii. *Detailed study on Permian-Triassic radiolaria in radiolarian-bearing rocks along the Malaysia-Thailand border.*

Pemetaan Geologi Khusus

Pemetaan Sesar Aktif dan Kawasan Risiko Gempa Bumi

Walaupun Malaysia terletak di atas pentas benua Sundaland yang agak stabil, sebahagian negara ini adalah seismik aktif disebabkan oleh pergerakan Kepingan India-Australia ke bawah Kepingan Sunda di persimpangan yang lebih dikenali sebagai Lingkaran Api Pasifik. Di mesyuarat yang telah diadakan pada 8 November 1993, bersama-sama pelbagai agensi dan wakil daripada World Seismic Safety Initiative (WSSI), Kementerian Sains, Teknologi dan Inovasi (MOSTI) telah mencapai konsensus bahawa risiko seismik perlu diambil kira dalam perancangan pembangunan fizikal negara. Kebimbangan tentang aktiviti seismik dan kesan kerosakan olehnya di Malaysia telah mendorong JMG memulakan projek kajian sesar aktif dan risiko gempa bumi di Sabah, Sarawak, dan beberapa negeri di Semenanjung untuk menilai risiko gempa bumi dan potensi kesan kerosakan mereka.

Kewujudan sesar aktif di beberapa lokasi di negara ini menunjukkan kemungkinan Malaysia mengalami gempa bumi skala sederhana pada masa hadapan walaupun terletak di luar Lingkaran Api Pasifik. Kajian Universiti Malaysia Sabah (UMS) mendapati Sabah berhadapan dengan risiko gempa bumi yang lebih besar berbanding Sarawak dan Semenanjung. Zon sesar aktif di Sabah yang mempunyai risiko gempa bumi yang lebih besar menganjur dari Kundasang-Ranau-Pitas ke Lahad Datu-Tawau-Kunak. Sepanjang tempoh 2009-2014, penyelidik Unit Kajian Bencana Alam UMS merekodkan sebanyak sembilan gegaran kecil antara 2.6 hingga 4.7 skala Richter di Ranau. Pada 5 Jun 2015, gempa bumi dengan kekuatan 6.0 pada skala Richter melanda Ranau, Sabah. Di Sarawak, Jabatan Meteorologi Malaysia mengesan beberapa gegaran di kawasan utara negeri iaitu Bintulu, Batu Niah, Suai, Miri, Limbang dan Lawas yang kesemuanya terletak disepanjang garis sesar utama gempa bumi. Di Semenanjung, gempa bumi yang kerap dialami di sepanjang zon sesar aktif dari seluruh Bukit Tinggi-Janda Baik sehingga ke Kuala Lumpur.

Specific Geological Mapping

Active Fault and Earthquake Risk Area Mapping

Although Malaysia is located on the relatively stable Sundaland continental shelf, parts of the country are seismically active due to the movement of the Indian-Australian plate as it dips beneath the Sunda Plate at the junction better known as the Pacific Ring of Fire. At a meeting, held on 8th November 1993, with various agencies of the World Seismic Safety Initiative (WSSI), the Ministry of Science, Technology and Innovation (MOSTI) arrived at a consensus that seismic risks needed to be considered in planning national physical development. JMG has initiated a mapping project on the active faults in Sabah, Sarawak and a few states in Peninsular Malaysia to assess earthquake risks and their potential damaging effects.

The existence of active faults in several locations in the country shows a likelihood that Malaysia may encounter medium scale earthquakes in the future even though it is located outside the Pacific Ring of Fire. Studies conducted by Universiti Malaysia Sabah (UMS) reveal that Sabah faces a greater risk of earthquakes as compared to Sarawak and the Peninsula. Active fault zones in Sabah that are at greater risks earthquakes extend from Kundasang, Ranau, Pitas to Lahad Datu-Tawau-Kunak. During the period from 2009-2014, researchers at the Natural Disaster Research Unit of UMS encountered nine small tremors ranging from 2.6 to 4.7 on the Richter scale recorded in Ranau. On 5 June 2015, an earthquake with a magnitude of 6.0 on the Richter scale struck Ranau, Sabah. In Sarawak, the Malaysian Meteorological Department detected a number of tremors in the northern divisions of Bintulu, Batu Niah, Suai, Miri, Limbang and Lawas, all of which are along the major fault line. In the Peninsula, frequent earthquakes are experienced along the active fault zone from around Bukit Tinggi-Janda Baik to Kuala Lumpur.

Pemetaan sesar aktif dan kawasan risiko gempa bumi
Active fault and earthquake risk area mapping

Negeri State	Kawasan Area	Liputan Coverage (km²)	Catatan / Remarks
Negeri Sembilan	Kuala Pilah	30	Rekod gempa bumi menunjukkan berlakunya aktiviti seismic di 4 lokasi bermula dari Ulu Bendol hingga ke Kg. Parit Lebar. Records indicate the occurrence of earthquake activities at 4 locations stretching from Ulu Bendol up to Kg. Parit Lebar.
Pahang	Bukit Tinggi dan Janda Baik	165	Cerapan telah dilakukan ke atas sebanyak 151 lokaliti di sekitar 32 titik gempa dengan menemui triangular facet, sungai teralih, dan sungai terpancung yang mungkin menunjukkan kehadiran sesar aktif. Observation made on a total of 151 localities around 32 epicenters has found triangular facets, offset stream and beheaded stream that may indicate the presence of active faults.
Selangor	Hulu Yam, Batang Kali, Gombak	1813	Cerapan telah dilakukan ke atas sebanyak 48 lokaliti dengan punggutan sebanyak 31 sampel batuan di kawasan sekitar 5 epicenter di kawasan Ulu Yam dan Gombak. Observation was made on a total of 48 localities with the collection of 31 rock samples at the vicinity of 5 epicenters in Ulu Yam and Gombak.
Sarawak	Niah	7503	Aktiviti projek difokuskan kepada pengumpulan data-data geologi dan geofizik, serta sampel batuan dan air. Satu draf laporan telah disediakan. The project activities were focused on the collection of geological and geophysical data, as well as rocks and water samples.
Sabah	Ranau	412	Tujuh sesar aktif telah dikenal pasti iaitu Sesar Kedamaian, Sesar Lobou-Lobou, Sesar Mensaban, Sesar Mesilau, Sesar Mamut, Sesar Nalapak dan Sesar Perancangan. Sejumlah 10 monumen dicadangkan untuk dibina bagi tujuan pemantauan. Seven active faults were identified namely Kedamaian fault, Lobou-Lobou fault, Mensaban fault, Mesilau fault, Mamut fault, Nalapak fault and Perancangan fault. A total 10 monuments will be constructed for monitoring purpose.
	Lahad Datu	715	Lapan sesar aktif telah dikenal pasti iaitu Sesar Danum, Sesar Lahad Datu, Sesar Tomanggong, Sesar Segama, Sesar Togopi, Sesar Tanduo dan Sesar Tabin. Sejumlah 10 monumen dicadangkan untuk dibina bagi tujuan pemantauan. Seven active faults were identified namely Danum fault, Lahad Datu fault, Tomanggong fault, Segama fault, Togopi fault, Tanduo fault and Tabin fault. A total 10 monuments will be construct for monitoring purpose.
Terengganu	Tasik Kenyir	800	Cerapan telah dilakukan ke atas sebanyak 75 lokaliti di Kuala Pueh, Kuala Berang dan Jalan Gawi Aring. Bukti-bukti seperti muka upam dan sungai teralih yang mungkin menunjukkan kehadiran sesar aktif telah ditemui. Observation was made on a total of 75 localities at Kuala Pueh, Kuala Berang and Jalan Gawi-Aring. Evidences such as slickenside and offset stream that may indicate an active fault were found.
Jumlah Liputan / Total Coverage:		11,468	



Pemetaan Sesar Aktif dan Kawasan Risiko Gempa Bumi 2016
Active Fault and Earthquake Risk Area Mapping 2016



Triangular facets yang dihasilkan oleh pergerakan tektonik menegak di Bukit Tinggi, Pahang
 Triangular facets produced by vertical tectonic movement at Bukit Tinggi, Pahang



Kesan-kesan muka upam akibat pergerakan sesar mendatar di Lahad Datu, Sabah
 Slickenside caused by strike slip fault movement in Lahad Datu, Sabah

Menjejak Dinosaur

Misi menjejak dinosaur diteruskan pada tahun 2016 di Bukit Panau, Kelantan dan di kawasan Felda Selancar, Pahang hingga ke kawasan Segamat, Johor.

Dinosaur Tracking

The mission to tracks dinasour is continued in 2016 at Bukit Panau, Kelantan and areas around Felda Selancar in Pahang until Segamat in Johor.

Negeri State	Kawasan Area	Liputan Coverage (km ²)	Penemuan / Catatan Findings / Remarks
Kelantan	Bukit Panau	4	Lapisan konglomerat dan lapisan syal merah yang berpotensi sebagai kawasan fosil vetebrata Jura-Kapur telah dikenal pasti. Conglomerate and shale layers potential for the Jura-Cretaceous vertebrate fossils have been identified.
Pahang dan Johor	Felda Selancar, Pahang -Segamat, Johor	-	Satu kerja lapangan telah diadakan di kawasan yang didasari oleh batuan sedimen kebenuaan berusia Jura-Kapur (JK), bermula dari Felda Selancar di Pahang hingga ke Segamat di Johor, untuk menjejak fosil. Walau bagaimanapun, tiada sebarang fosil dinosaur ditemui. A field trip was carried out in the area underlain by the Jurassic-Cretaceous (JK) continental deposits, stretching from Felda Selancar in Pahang to Segamat in Johor, to search for dinosaur fossil. However, no dinosaur fossils were found.

Geologi Warisan

Kajian geologi warisan telah dijalankan bagi memastikan khazanah alam semulajadi yang sangat berharga dapat dipulihara bagi tatapan generasi akan datang. Menerusi kajian ini, konsep tapak terpelihara, monumen geologi, taman geologi dan lanskap berpemandangan indah dapat diperkenalkan kepada orang awam. Kajian kebolehlaksanaan bagi tapak geologi warisan telah dijalankan di tapak-tapak terpilih bagi cadangan penarafan sama ada sebagai geotapak, tapak warisan geologi kebangsaan atau geopark.

Heritage Geology

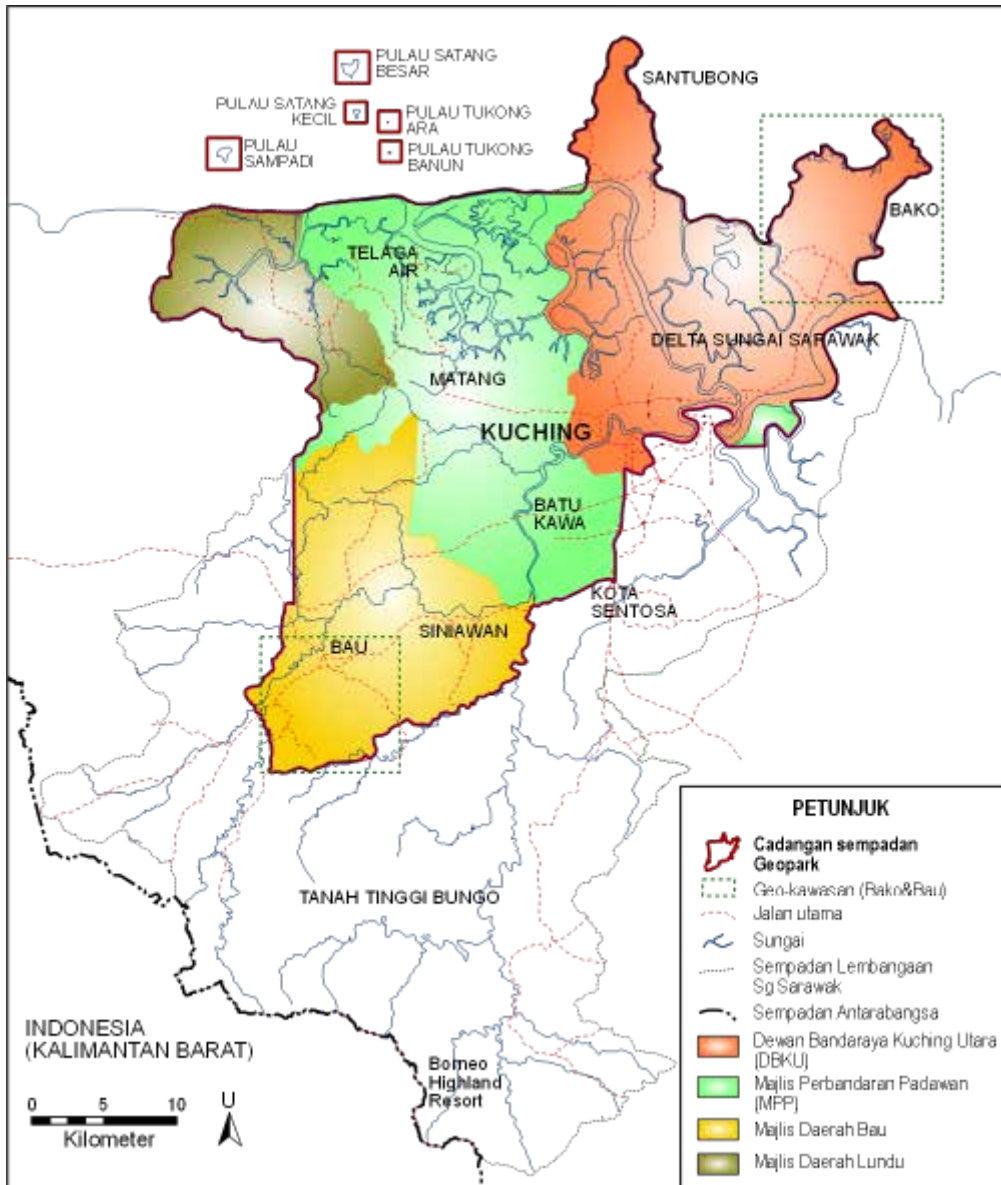
Geological heritage studies were carried out to ensure that the conservation of natural heritages for its future generations. Through these studies, the concept of preserved sites, geological monuments, geological parks and beautiful landscapes could be promoted and made known to the public. Feasibility studies for geological heritage were carried out at selected sites with the view to propose the various locations as possible geosites, national geological heritage or geoparks.

Pemetaan warisan geologi Geological heritage mapping

Negeri State	Kawasan Area	Tujuan Purpose	Penemuan / Catatan Findings / Remarks
Sarawak	Delta Sarawak	Cadangan Geopark Delta Sarawak Proposed Sarawak Delta Geopark	<p>Kertas Majlis Mesyuarat Kerajaan Negeri Sarawak telah diperhalusi dan diserahkan kepada Kementerian Perancangan Sumber dan Alam Sekitar yang akan bertanggungjawab membentangkan usul cadangan Geopark Delta Sarawak ke Kabinet Negeri Sarawak.</p> <p>Masing-masing sembilan dan empat geotapak telah dicari dan dipetakan di Geo-kawasan Bako dan Bau. Geotapak-geotapak tersebut menghimpunkan geodiversiti dan fitur-fitur geologi istimewa yang bernilai warisan pada taraf serantau, kebangsaan dan tempatan.</p> <p>The Sarawak State Executive Council paper was finalised and submitted to Ministry of Resource Planning and Environment (MRPE) which is responsible for presenting the proposed Sarawak Delta Geopark to the State Cabinet.</p> <p>Nine and four geosites have been characterised and mapped in Bako and Bau Geo-areas respectively. These geosites contains geodiversities and important geological features that are highly valuable in heritage at regional, national and local level.</p>
Perak	Lembah Kinta	Lembah Kinta Geopark Kinta Valley Geopark	<p>Kawasan cadangan pembangunan Geopark Lembah Kinta dengan keluasan 1952 kilometer persegi.</p> <p>The proposed Kinta Valley Geopark covers an area of 1952 square kilometers.</p>



Aktiviti Pemetaan Warisan Geologi 2016
Geological Heritage Mapping Activities 2016



Lokasi Cadangan Geopark Delta Sarawak
Location of the Proposed Sarawak Delta Geopark

Hidrogeologi

Aktiviti hidrogeologi telah dijalankan oleh pejabat negeri bagi mendapatkan maklumat air tanah yang bertujuan untuk menilai potensi sumber air tanah dan untuk membekalkan air bersih kepada penduduk di kawasan yang sering menghadapi masalah bekalan air. Di samping itu, pihak jabatan juga menggalakkan penggunaan air tanah sebagai sumber air alternatif. Pada tahun 2016, sebanyak 112 telaga eksplorasi telah digerudi, 36 telaga pengeluaran dan 10 telaga pemantauan telah berjaya dibangunkan untuk sumber air.

Di bawah Projek Khas Bekalan Air, jabatan telah menyumbang kepakaran dalam bidang air tanah melalui kerjasama dengan pelbagai agensi kerajaan seperti Kementerian Tenaga, Teknologi Hijau dan Air Malaysia (KeTTHA), Kementerian Luar Bandar dan Wilayah (KKLW) serta beberapa agensi kerajaan negeri yang mengawalselia sumber air.

Jalinan kerjasama juga diadakan dengan pihak Jabatan Alam Sekitar bagi mengawal kebakaran kawasan tanah gambut yang sering berlaku pada musim kering. Penggerudian dan pembinaan telaga untuk tujuan memadam kebakaran di kawasan tanah gambut telah dijalankan oleh JMG di Johor, Kelantan, Terengganu, Pahang, dan Sarawak. Pihak JMG juga membantu pihak Kementerian Kesihatan dalam membuat perakuan terhadap permohonan pengeluaran air mineral di negeri-negeri.

Pemantauan air tanah telah dijalankan sepanjang tahun sebagai sebahagian daripada usaha Jabatan untuk memastikan sumber air bebas daripada pencemaran dan digunakan secara mampan. Program pemantauan yang dijalankan termasuk pengukuran paras air tanah, pengumpulan sampel untuk analisis makmal dan penyelenggaraan Sistem Penapisan Air Tanah Ringkas (SPATR). Data daripada kerja-kerja pemantauan yang dijalankan pada tahun 2016 ke atas 563 buah telaga tidak menunjukkan perubahan yang ketara berkaitan dengan paras air dan kualiti air.

Hydrogeology

Hydrogeological activities were carried out by state offices to acquire data for the assessment of groundwater potential and to provide clean drinking water in water-constrained areas. At the same time, the department also encourages the use of groundwater as an alternative water source. A total of 112 exploration wells were drilled, 36 production wells and 10 monitoring well were successfully developed for water resources in 2016.

Under the Water Supply Special Project, the department contributed its expertise through collaboration with the various agencies, such as the Ministry of Energy, Green Technology and Water (KeTTHA), Ministry of Rural and Regional Development (KKLW) and various state agencies which manage water resources.

The department also liaised with the Department of Environment to control peat fires which commonly occurs during the seasonal dry spells. Drilling and well development for fire-fighting in peat areas were carried out by JMG in Johor, Kelantan, Terengganu, Pahang and Sarawak. JMG also assisted the Ministry of Health (KKM) in processing applications for the production of mineral water in the states.

Monitoring of groundwater was carried out throughout the year as part of the department's effort to ensure that water resources were free from pollution and were sustainably utilised. Monitoring programmes included the measurement of groundwater levels, collection of samples for laboratory analyses and maintenance of Groundwater Filtration Systems (SPATR). Data from the monitoring works in 2016 on 563 wells indicated that there were no significant changes pertaining to the water level and water quality.

Pembangunan Air Tanah

Groundwater Development

Penggerudian dan pembinaan telaga Drilling and well construction

Negeri State	Lokasi Location	TE* EW*	TP* PW*	TM* MW*	Catatan Remarks
Kedah	MRSM Beseri	1	-	-	Kedalaman telaga adalah 100 m. Telaga ini tidak berpotensi dibangunkan untuk membekal air untuk kegunaan domestik. Depth of the well was 100 m. The well had no potential as a source of water for domestic consumption.
	Parit Panjang, Baling	1	-	-	
	SMS Pokok Sena	-	1	1	Kedalaman telaga adalah 66 m dengan anggaran kadar luahan sebanyak 90 m ³ /j. Telaga ini telah dibangunkan untuk membekal air untuk kegunaan domestik. Depth of the well was 66 m and with an estimated discharge rate of 90 m ³ /h. The well has been developed to supply water for domestic consumption.
	Kg. Machang, Kuala Nerang	-	1	1	Kedalaman telaga adalah 70 m dengan anggaran kadar luahan sebanyak 102 m ³ /j. Telaga ini berpotensi dibangunkan untuk membekal air untuk kegunaan domestik. Depth of the well was 70 m and with an estimated discharge rate of 102 m ³ /h. It has potential for development to supply water for domestic consumption.
	Sg. Jagong, Pendang	-	1	1	Kedalaman telaga adalah 60 m dengan anggaran kadar luahan sebanyak 90 m ³ /j. Telaga ini berpotensi dibangunkan untuk membekal air untuk kegunaan domestik. Depth of the well was 60 m and with an estimated discharge rate of 90 m ³ /h. It has potential for development to supply water for domestic consumption.
	Kg. Hujung Keton, Pendang	-	1	1	Kedalaman telaga adalah 100 m dengan anggaran kadar luahan sebanyak 25 m ³ /j. Telaga ini telah dibangunkan untuk membekal air untuk kegunaan domestik. Depth of the well was 100 m and with an estimated discharge rate of 25 m ³ /h. The well has been developed to supply water for domestic consumption.

Negeri State	Lokasi Location	TE* EW*	TP* PW*	TM* MW*	Catatan Remarks
Perak	S.K. Iskandar Perdana, Perak Tengah	-	-	1	Kadar luahan kurang daripada 1 m ³ /j. Telaga ini tidak berpotensi dibangunkan untuk membekal air untuk kegunaan domestik. Discharge rate less than 1 m ³ /h. The well had no potential as a source of water for domestic consumption.
	S.K. Titi Gantung, Perak Tengah	-	-	1	Kadar luahan kurang daripada 1 m ³ /j. Telaga ini tidak berpotensi dibangunkan untuk membekal air untuk kegunaan domestik. Discharge rate less than 1 m ³ /h. The well had no potential as a source of water for domestic consumption.
	S.K. Layang-Layang Kanan, Perak Tengah	-	-	1	Kadar luahan adalah 1 m ³ /j. Telaga ini tidak berpotensi dibangunkan untuk membekal air untuk kegunaan domestik. Discharge rate was 1 m ³ /h. The well had no potential as a source of water for domestic consumption.
	S.J.K. (C) Kuala Rui, Gerik	-	-	1	Kadar luahan kurang daripada 1 m ³ /j. Telaga ini tidak berpotensi dibangunkan untuk membekal air untuk kegunaan domestik. Discharge rate less than 1 m ³ /h. The well had no potential as a source of water for domestic consumption.
	S.K. R.P.S. Banun, Gerik	-	1	-	Kadar luahan adalah 4.5 m ³ /j. Satu sistem SPATR telah dibina yang telah memberi manfaat kepada 200 orang. Discharge rate was 4.5 m ³ /h. A SPATR system was constructed which benefitted 200 people.
	Maahad Tahfiz Kg. Luat, Lenggong	-	1	-	Kadar luahan adalah 2 m ³ /j. Satu sistem SPATR akan dibina untuk kegunaan 100 orang. Discharge rate was 2 m ³ /h. A SPATR system will be constructed for the use by 100 people.
	Madrasatul Hidayah, Kg. Selarong, Pengkalan Hulu	-	1	-	Kadar luahan adalah 20 m ³ /j. Satu sistem SPATR telah dibina untuk kegunaan 100 orang. Discharge rate was 20 m ³ /h. A SPATR system was constructed which benefitted 100 people.

Negeri State	Lokasi Location	TE* EW*	TP* PW*	TM* MW*	Catatan Remarks
Selangor / Wilayah Persekutuan	Pusat Internet Layang Labi	1	1	-	Kedalaman telaga adalah 33 m dengan anggaran kadar luahan sebanyak 14 m ³ /j. Satu sistem SPATR telah dibina untuk kegunaan 330 orang. Depth of the well was 33 m and with an estimated discharge rate of 14 m ³ /h. A SPATR system was constructed which benefitted 330 people.
	Masjid Al-Mutmainah	1	1	-	Kedalaman telaga adalah 34 m dengan anggaran kadar luahan sebanyak 37 m ³ /j. Depth of the well was 34 m and with an estimated discharge rate of 37 m ³ /h.
	Pusat Tahfiz dan Asrama Anak Yatim Al-Habbah Batu Caves	-	1	-	Kadar luahan adalah 5 m ³ /j. Satu sistem SPATR akan dibina pada tahun 2017. Discharge rate was 5 m ³ /h. A SPATR system will be constructed in year 2017.
	Pusat Komuniti Penduduk Seksyen 4, Bangi	-	1	-	Kadar luahan adalah 5 m ³ /j. Satu sistem SPATR akan dibina pada tahun 2017. Discharge rate was 5 m ³ /h. A SPATR system will be constructed in year 2017.
Negeri Sembilan	Kg. Serampang Indah, Jempol	-	1	-	Kedalaman telaga adalah 126 m dengan anggaran kadar luahan sebanyak 5 m ³ /j. Depth of the well was 126 m and with an estimated discharge rate of 5 m ³ /h.
	Kg. Sungai Sampo, Jempol	-	1	-	Telaga berkedalaman 50 m dengan anggaran kadar luahan sebanyak 11 m ³ /j. Telaga ini telah dibangunkan untuk membekal air untuk kegunaan domestik. Well with a depth of 50 m with an estimated discharge rate of 11 m ³ /h. The well has been developed to supply water for domestic consumption.
	Felda Palong 6, Jempol	-	1	-	Telaga berkedalaman 56.5 m dengan anggaran kadar luahan sebanyak 41 m ³ /j. Telaga ini telah dibangunkan untuk membekal air untuk kegunaan domestik. Well with a depth of 56.5 m with an estimated discharge rate of 41 m ³ /h. The well has been developed to supply water for domestic consumption.
Johor	Sg Lebam, Penawar, Kota Tinggi	-	1	-	Bekalan tambahan kepada Loji Rawatan Air Sg Lebam. Kedalaman telaga adalah 72 m dengan anggaran kadar luahan sebanyak 4 m ³ /j. Additional water supply for Sg. Lebam Water Treatment Plant. Tubewell depth at 72 m with an estimated discharge rate of 4 m ³ /h.
	Kg Gembut, Sedili, Kota Tinggi	-	1	-	Bekalan tambahan kepada Loji Rawatan Air Sg Gembut. Kedalaman telaga adalah 31 m dan anggaran kadar luahan sebanyak 31 m ³ /j. Additional water supply for Sg. Gembut Water Treatment Plant. Tubewell depth at 31 m with an estimated discharge rate of 31 m ³ /h.

Negeri State	Lokasi Location	TE* EW*	TP* PW*	TM* MW*	Catatan Remarks
Terengganu	Kg. Lubuk Batu, Kemaman	-	1	-	Telaga dibina untuk bekalan air bersih. Kadar luahan air adalah 30.7 m ³ /j. The well was constructed for clean water supply. The yield was 30.7 m ³ /h.
	Kg. Seberang Tayor, Kemaman	-	1	-	Telaga dibina bagi mengatasi masalah bekalan air. Kadar luahan air adalah 47.0 m ³ /j. The well was constructed to overcome water scarcity problems. The yield was 47.0 m ³ /h.
	Kg. Lubuk Batu, Kemaman	-	-	1	Telaga digunakan sebagai telaga pemantauan. The wells were used as monitoring wells.
	Kg. Pulau Serai, Dungun	-	-	1	
	Kg. Pinang Merah, Dungun	1	-	-	Telaga dibina untuk penilaian potensi air tanah. The well was constructed for groundwater potential evaluation.
Kelantan	Pejabat Perikanan Machang	1	-	-	Telaga berkedalaman 5 m dengan anggaran kadar luahan sebanyak 5 m ³ /j. Telaga ini telah dibangunkan untuk kegunaan 30 orang kakitangan dan aktiviti perikanan. Well with a depth of 5 m with an estimated discharge rate of 5 m ³ /h. The well has been developed to supply water for for the use of 30 staff and aquaculture activities.
		-	1	-	
	Masjid Kg. Laut, Tumpat	-	1	-	Telaga berkedalaman 8 m dengan anggaran kadar luahan sebanyak 6 m ³ /j. Telaga ini telah dibangunkan untuk kegunaan lebih 450 jemaah masjid. Well with a depth of 8 m with an estimated discharge rate of 6 m ³ /h. The well has been developed to supply water for the use of more than 450 mosque congregation.
	Pengkalan Chepa (Masjid SMSTMFP)	-	1	-	Telaga berkedalaman 6 m dengan anggaran kadar luahan sebanyak 10 m ³ /j. Telaga ini telah dibangunkan untuk kegunaan lebih 765 jemaah masjid. Well with a depth of 6 m with an estimated discharge rate of 10 m ³ /h. The well has been developed to supply water for the use of more than 765 mosque congregation.
	Ladang Koperasi Alumni Faris Petra, Pengkalan Chepa	5	-	-	Eksplorasi Air Tanah. Groundwater exploration.
		Intake JKR Kemubu	5	-	-
	SMK Dewan Beta	1	-	-	Eksplorasi Air Tanah Groundwater exploration
-		1	-	Telaga untuk dimanfaatkan oleh 775 orang Production well that benefitted 775 users	

Negeri State	Lokasi Location	TE* EW*	TP* PW*	TM* MW*	Catatan Remarks
	SMK Long Yunus	-	1	-	Telaga berkedalaman 7 m dengan anggaran kadar luahan sebanyak 14 m ³ /j untuk dimanfaatkan oleh 1570 orang. Well with a depth of 7 m and with an estimated discharge rate of 14 m ³ /h that benefitted 1570 users.
	Pusat Penyelidikan Marin UM, Bachok.	4	-	-	Empat telaga eksplorasi telah dibina di Pusat Penyelidikan Marin UM, Bachok. Dengan anggaran kadar luahan sebanyak 9 m ³ /j hingga 12 m ³ /j, telaga berpotensi dibangunkan untuk membekal air untuk kegunaan Pusat Penyelidikan Marin UM, Bachok. Four exploration tubewells were constructed at the Marine Research Centre UM, Bachok. With an estimated discharge rate ranging from 9 m ³ /h to 12 m ³ /h, the tubewells have potential for development to supply water for Marine Research Centre UM, Bachok.
	SMK Kutan	1	-	-	Eksplorasi Air Tanah. Groundwater exploration.
	Pondok Darul Muttaqin, Tanah Merah	1	-	-	Eksplorasi Air Tanah. Groundwater exploration.
	Pejabat JPJ Panji	-	1	-	Telaga berkedalaman 21 m dengan anggaran kadar luahan sebanyak 14 m ³ /j untuk dimanfaatkan oleh 496 orang pengguna. Well with a depth of 21 m and with an estimated discharge rate of 14 m ³ /h that benefitted 496 users.
	Surau Tmn Keranji, PasirTumbuh	1	-	-	Eksplorasi Air Tanah. Groundwater exploration.
	Asrama YAATIM, Pengkalan Chepa	-	2	-	Dua telaga dengan kedalaman 14 m, dan anggaran kadar luahan sebanyak 4 m ³ /j untuk kegunaan 189 penghuni asrama. Two production wells with a depth of 14 m, and an estimated discharge rate of 4 m ³ /h for 189 hostel users.
	Masjid Ar-Rahim, Kok Lanas	1	-	-	Eksplorasi air tanah. Groundwater exploration.
	Tanah MARA, Gong Kulim	6	-	-	Eksplorasi air tanah. Groundwater exploration.
	SMS Tengku Muhammad Faris Petra	-	1	-	Pembinaan telaga untuk 765 orang pengguna. A well was built to benefit 765 users.
	Kem Desa Pahlawan	2	-	-	Eksplorasi Air Tanah Groundwater exploration
	Pondok Darul Muttaqin, Tanah Merah	1	-	-	Eksplorasi Air Tanah Groundwater exploration

Negeri State	Lokasi Location	TE* EW*	TP* PW*	TM* MW*	Catatan Remarks
	Taman Keranji, Pasir Tumbuh	-	1	-	Telaga dengan kedalaman 21 m, dan anggaran kadar luahan sebanyak 18 m ³ /j untuk dimanfaatkan oleh 250 orang pengguna. Well with a depth of 21 m, and an estimated discharge rate of 18 m ³ /h that benefitted 250 users.
Pahang	Kg. Tanah Merah, Paloh Hinai, Pekan	1	1	-	Kedalaman telaga adalah 100 m dengan anggaran kadar luahan sebanyak 1.5 m ³ /j. Depth of the well was 100 m and with an estimated discharge rate of 1.5 m ³ /h.
	Sek. Men. Agama Darulmakmur Ganchong, Pekan	1	1	-	Kedalaman telaga adalah 100 m dengan anggaran kadar luahan sebanyak 100 m ³ /j. Depth of the well was 100 m and with an estimated discharge rate of 100 m ³ /h.
	Chini, Pekan, Pahang	3	2	-	Telaga adalah berpotensi untuk dibangunkan untuk membekal sumber air tanah kepada loji rawatan air: The well showed potential for development to supply water for water treatment plant.
	Chini, Pekan, Pahang	43	-	-	Pembinaan telaga explorasi berdiameter 50 mm dengan kaedah pengejetan bagi kajian potensi sumber air tanah berhampiran kawasan loji rawatan air. Construction of exploration wells of 50 mm diameter by jetting method for groundwater potential study near water treatment plant.
Sabah	Kg. Dudar, Kota Belud	-	1	-	Telaga berkedalaman 93 m dengan anggaran kadar luahan sebanyak 30 m ³ /j untuk kegunaan domestik. Well with a depth of 93 m with an estimated discharge rate of 30 m ³ /h for domestic consumption.
	Kg. Gontuong, Kota Belud	1	-	-	Telaga berkedalaman 100 m telah dibina untuk profail tanah/ batuan. Well with a depth of 100 m were constructed for soil/ rock profiling.
	Kg. Batu-Batu, Tenom	2	-	-	Dua buah telaga berkedalaman 8 m dan 9.8 m masing-masing telah dibina bagi tujuan profail tanah/ batuan dan telaga pengeluaran. Two wells with 8 m and 9.8 m depth respectively were constructed for soil/ rock profiling and development of production wells.
	SK. Bonor, Keningau	1	-	-	Telaga berkedalaman 30 m telah dibina untuk profail tanah/ batuan dan telaga pengeluaran. Well with a depth of 30 m were constructed for soil/ rock profiling and development of production wells.
	Kg. Song-Song, Kota Belud	1	-	-	Telaga berkedalaman 30 m telah dibina untuk profail tanah/ batuan dan telaga pengeluaran. Well with a depth of 30 m were constructed for soil/ rock profiling and development of production wells.
	Pulau Mantanani Kota Belud	25	-	-	Telaga telah dibangunkan untuk tujuan kajian hidrogeologi. Wells were constructed for hydrogeological study.

Negeri State	Lokasi Location	TE* EW*	TP* PW*	TM* MW*	Catatan Remarks
Sarawak	SMK Simunjan No. 1, Simunjan, Bahagian Kota Samarahan, Sarawak	-	1	-	Pembinaan sebuah telaga pengeluaran berkedalaman 70 m yang boleh menghasilkan lebih dari 20 m ³ /j untuk dimanfaatkan oleh 600 pelajar dan kakitangan sekolah Construction of a production well with a depth of 70 m which can produce more than 20 m ³ /h which benefitted 600 students and staffs.
	SK Rumah Gudang, Marudi, Bahagian Miri	-	1	-	Pembinaan sebuah telaga pengeluaran berkedalaman 49 m dengan anggaran kadar luahan lebih dari 2 m ³ /j dan telah memberi manfaat kepada 250 pelajar dan kakitangan sekolah. Construction of a production well with a depth of 49 m which discharged more than 2 m ³ /h and benefitted 250 students and staffs.
	Rh Andam Ak Wing, Suai, Bahagian Miri, Sarawak	-	1	-	Pembinaan sebuah telaga pengeluaran berkedalaman 70.5 m yang boleh menghasilkan lebih dari 25 m ³ /j dan telah memberi manfaat kepada 200 penduduk kampung. Construction of a production well with a depth of 70.5 m which can produce more than 20 m ³ /h and benefitted 200 village folks.
Jumlah / Total:		112	36	10	

TE* / EW* = Telaga Eksplorasi / Exploration Well

TP* / PW* = Telaga Pengeluaran / Production Well

TM* / MW* = Telaga Pemantauan / Monitoring Well

Penggerudian dan pembinaan telaga di kawasan kebakaran tanah gambut
Drilling and construction of wells in fire prone peat area

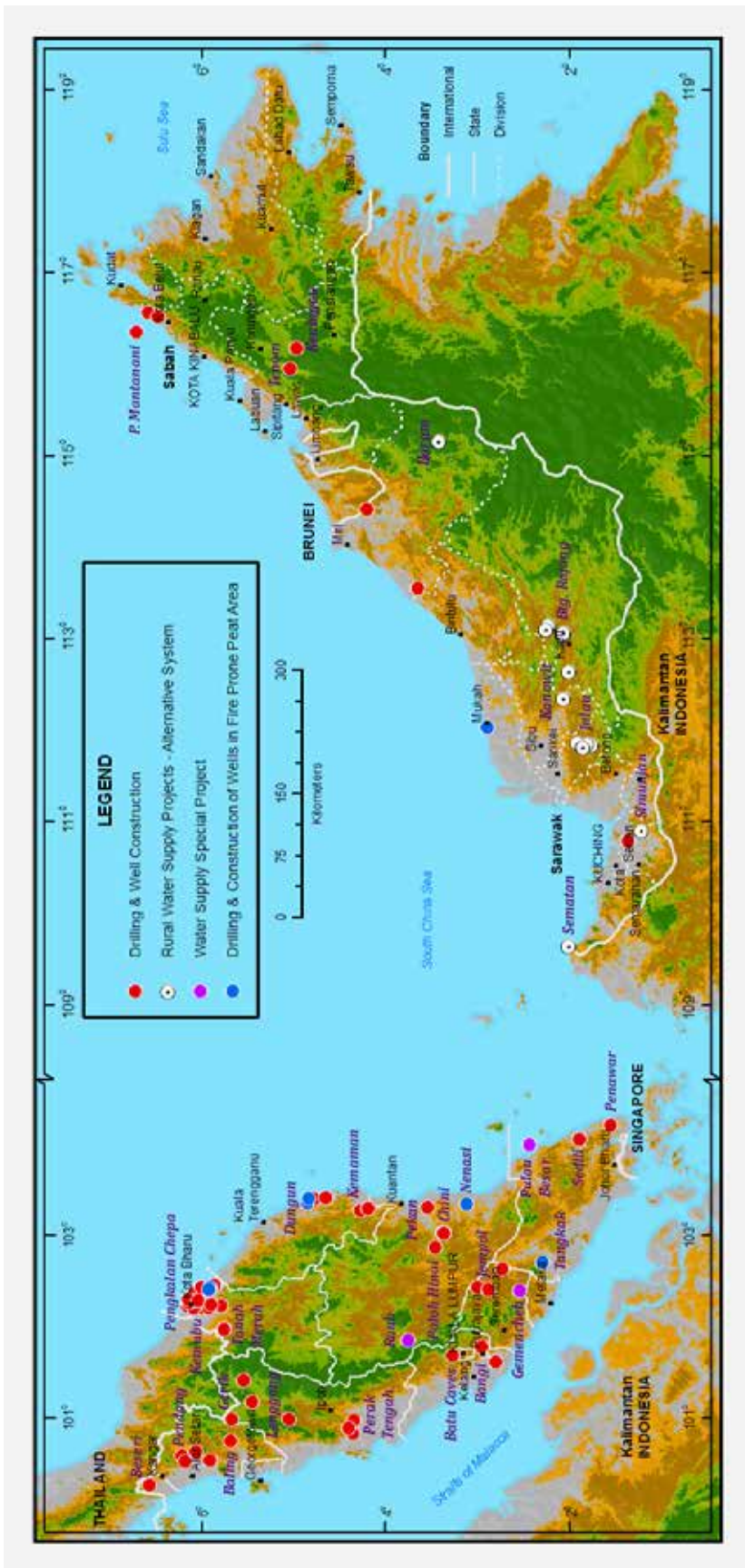
Negeri State	Lokasi Location	Luahan telaga (m ³ /j) Yield (m ³ /h)	Kedalaman Depth (m)	Catatan Remarks
Kelantan	Kg. Hujung Lidah	80	62	Kesemua telaga tersedia untuk digunakan bagi mengawal kebakaran. All the wells were ready for use to control peat fire.
	Kg. Sri Gondang	125	60	
Johor	Bukit Gambir, Tangkak	1	103	
Pahang	Ladang Yayasan Pahang Nenasi	30	72	
Terengganu	Kg. Tok Kah, Dungun	25	65	
	Kg. Rhu Batil, Dungun	9	117	
Sarawak	Mukah 1	50	98	
	Mukah 2	50	102	

Projek Khas Bekalan Air
Water Supply Special Project

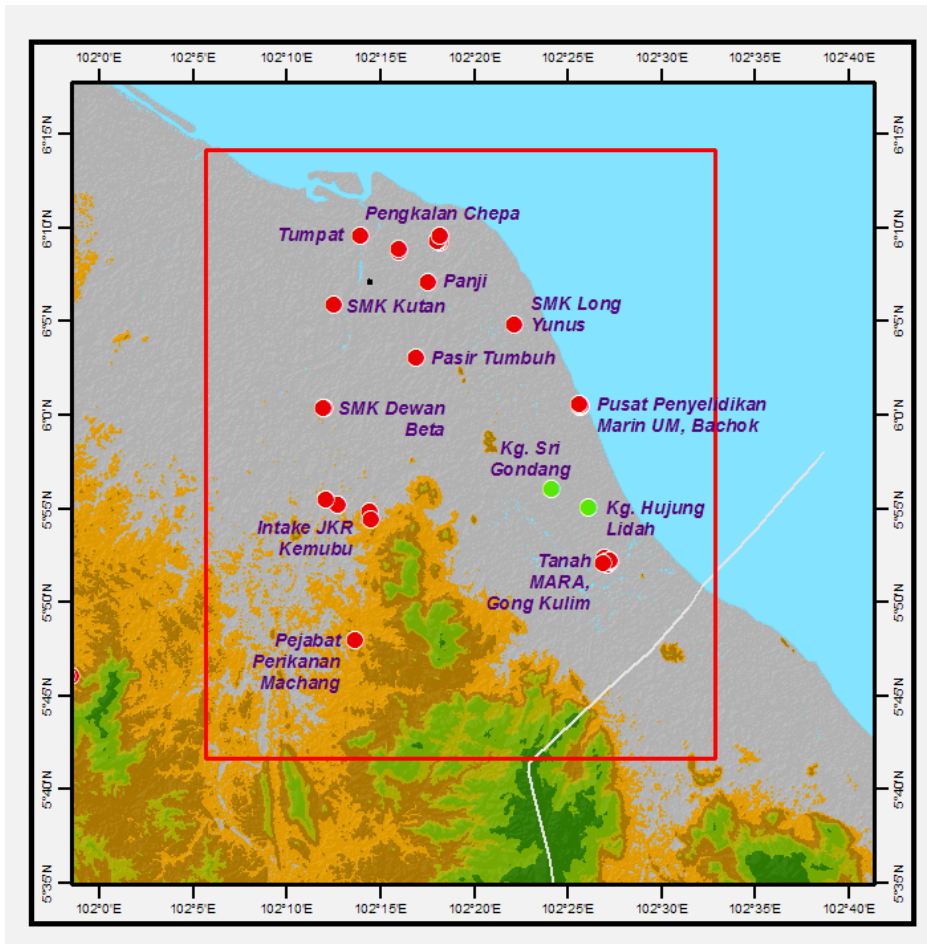
Negeri State	Lokasi Location	Projek Project	Sumber Kewangan Fund Source	Catatan Remarks
Negeri Sembilan	Kg. Gemenchek Lama	Projek pembinaan sistem susupan tebing buatan air tanah	Pembangunan Sumber Air Tanah Negara	Pembinaan sistem bekalan dan rawatan air dengan kadar luahan sebanyak 41 m ³ /j untuk penggunaan domestik. Construction of a water filtration system with an estimated yield of 41 m ³ /h for domestic consumption.
Pahang	Loji Air Bilut, Raub	Projek pembinaan sistem susupan tebing buatan air tanah	Pembangunan Sumber Air Tanah Negara	Sebagai sumber air konjungtif bagi loji rawatan air Conjunctive water source for water treatment plant.
Johor	Kg. Busong 1, Pulau Besar, Mersing	East Coast Economic Region (ECER)	East Coast Economic Region (ECER)	Kedalaman telaga adalah 70 m dengan anggaran kadar luahan sebanyak 5.5 m ³ /j untuk kegunaan domestik. Depth of the well was 70 m and with an estimated discharge rate of 5.5 m ³ /h for domestic consumption.
	Kg. Busong 2, Pulau Besar, Mersing	East Coast Economic Region (ECER)	East Coast Economic Region (ECER)	Kedalaman telaga adalah 38 m dengan anggaran kadar luahan sebanyak 3 m ³ /j untuk kegunaan domestik. Depth of the well was 38 m and with an estimated discharge rate of 3 m ³ /h for domestic consumption.

Bekalan Air Luar Bandar Sistem Alternatif 2016
Rural Water Supply Projects – Alternative System 2016

Negeri State	Projek Project	Sumber Kewangan Fund Source	Catatan Remarks
Sarawak	Projek Bekalan Air Luar Bandar –Sistem Alternatif Rural Water Supply Project – Alternative System	Kementerian Kemajuan Luar Bandar Dan Wilayah Ministry of Rural and Regional Development	Sebanyak 19 projek bekalan air luar bandar telah dijalankan dengan peruntukan sebanyak RM1,950,000. Projek telah memberi manfaat kepada 2940 penduduk dari 478 buah rumah. A total of 19 rural water supply projects were carried out on a total allocation of RM1,950,000. The project benefitted 2940 residents from 478 household. Lokasi / Location 1. Kg. Isu Lama, Simunjan 2. Rh Melaka ak Gimang, Ng Bekakap, Julau 3. Rh Billy Usit, Rantau Kasai, Sg Kabah, Kanowit 4. Rh Seliong, Sg Encheremin, Kapit 5. Rh Assan, Ng Mekey, Btg Rajang, Kapit 6. Rh Belikau, Pulau Raya, Btg Rajang, Kapit 7. Rh Berauh, Ng Senuang, Btg Rajang, Kapit 8. Rh Lawrence, Ng Ensawi III, Merit, Kapit 9. Rh Berundang, Ng Ensawie iii, Merit, Kapit 10. Rh Milang, Ng Ensawie, Merit, Kapit 11. Rh Kendawang ak Ujan, Ng Sebarik, Btg Rajang, Kapit 12. Rh Bujo, Kerangan Bangat B, Batang Rajang, Kapit 13. Kg. Telok Melano, Sematan, Lundu 14. Kpg. Long Lellang, (A), Ulu Akah, Baram 15. Kpg Long Lellang (B), Ulu Akah, Baram 16. Rh Robert Nyumbang, Ng Sebatu, Batang Rajang, Kapit 17. Rh Guma, Sg Entabai, Julau 18. Rh Sumang, Ng Bekiok, Merurun, Julau 19. Rh Barak, Merurun, Julau



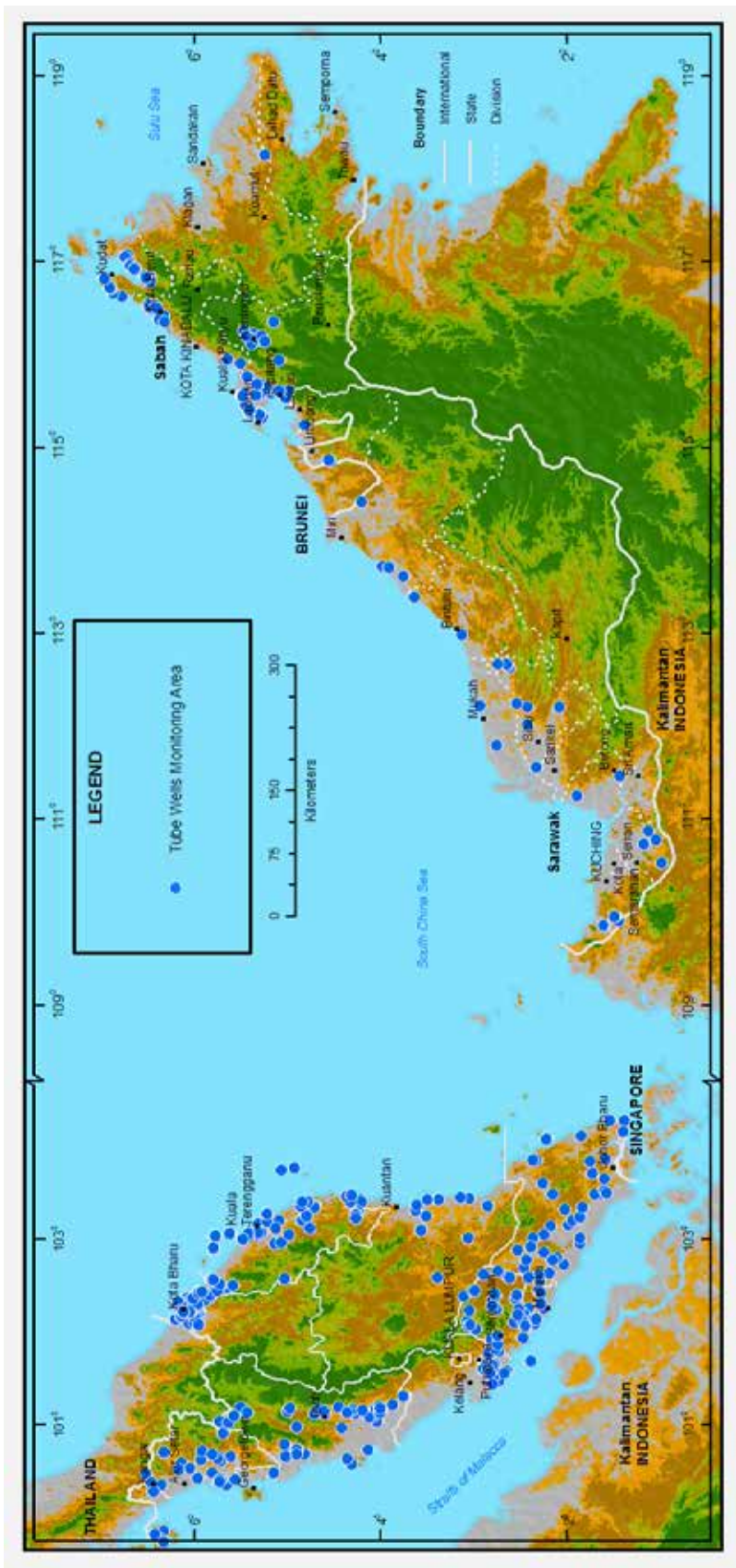
Pembangunan Air Tanah 2016
Groundwater Development 2016



Pembangunan Air Tanah di Kelantan 2016
Groundwater Development in Kelantan 2016

Program pemantauan air tanah
Groundwater monitoring programme

Negeri State	Bil. telaga dipantau No. of wells monitored	Catatan Remarks
Kedah	32	Pemantauan dijalankan dua kali setahun di seluruh negeri. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted twice a year throughout the state. No obvious change in groundwater quality.
Perlis	1	
Pulau Pinang	2	
Perak	45	Pemantauan dijalankan dua kali setahun. Monitoring was conducted twice a year.
Selangor / Wilayah Persekutuan	65	Pemantauan dijalankan dua kali setahun. Monitoring was conducted twice a year.
N. Sembilan	33	Pemantauan dijalankan sekali setahun di seluruh negeri untuk mendapatkan data asas kualiti air dan paras air tanah. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted once a year throughout the state to obtain baseline data on water quality and groundwater level. No obvious change in groundwater quality.
Melaka	12	
Johor	40	Pemantauan dijalankan dua kali setahun di seluruh negeri. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted twice a year throughout the state. No obvious change in groundwater quality.
Kelantan	102	Pemantauan dijalankan dua kali setahun di seluruh negeri. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted twice a year throughout the state. No obvious change in groundwater quality.
Pahang	15	Pemantauan dijalankan dua kali setahun di seluruh negeri. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted twice a year throughout the state. No obvious change in groundwater quality.
Terengganu	80	Pemantauan dijalankan dua kali setahun di seluruh negeri. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted twice a year throughout the state. No obvious change in groundwater quality.
Sabah	106	Pemantauan dijalankan sekali setahun di seluruh negeri. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted once a year throughout the state. No obvious change in groundwater quality.
Sarawak	30	Pemantauan dijalankan dua kali setahun di seluruh negeri. Tiada perubahan kualiti air tanah yang ketara. Monitoring was conducted twice a year throughout the state. No obvious change in groundwater quality.
Jumlah / Total:	563	



Program Pemantauan Air Tanah 2016
Groundwater Monitoring Programme 2016



Pengejetan telaga eksplorasi di Chini, Pekan, Pahang
Jetting of exploration well at Chini, Pekan, Pahang



Pengejetan telaga eksplorasi di Pulau Mantanani, Sabah
Jetting of exploration well in Pulau Mantanani, Sabah



Penghantaran paip, tangki dan kelengkapan lain untuk Sistem Air Graviti Bukit ke Rh Belikau, Bahagian Kapit, Sarawak
Delivering of pipes, tanks and accessories for the construction of a gravity-fed water system at Rh Belikau, Kapit Division, Sarawak



Persampelan air tanah yang dijalankan di Pulau Redang, Terengganu
Groundwater sampling at Pulau Redang, Terengganu



Kerja-kerja pemantauan kualiti air tanah
Groundwater quality monitoring in progress



Ujian pengempaman di Sri Gondang, Bachok Kelantan
Pumping tests at Sri Gondang, Bachok Kelantan

Geologi Kejuruteraan

Pembangunan negara yang pesat telah menyebabkan kawasan yang sesuai untuk pembangunan, terutamanya kawasan bandar dan pinggir bandar, semakin berkurangan sehingga memasuki kawasan yang dikelaskan sebagai kawasan sensitif alam sekitar termasuk lereng-lereng bukit. Sehubungan itu, jabatan telah mengambil langkah-langkah proaktif bagi mencegah atau mengurangkan berlakunya kejadian geobencana dengan menjalankan pemetaan geologi terain dan geologi kejuruteraan. Maklumat daripada aktiviti pemetaan tersebut digunakan secara meluas di dalam perancangan guna tanah oleh pihak berkuasa tempatan dan pelbagai agensi kerajaan lain untuk menghindar atau mengurangkan berlakunya geobencana seperti tanah runtuh, lubang benam dan lain-lain. Jabatan juga telah diminta untuk membantu dalam siasatan geobencana seperti tanah runtuh, lubang benam serta aliran lumpur dan puing untuk mencari punca kejadian dan faktor-faktor geologi pencetus kejadian, dan mencadangkan langkah-langkah kawalan dan pencegahan kepada kerajaan negeri dan pihak berkuasa tempatan.

Engineering Geology

The rapid pace of development has resulted in the corresponding decrease of suitable areas for development, especially in urban and suburban areas, and at times the development has encroached into environmentally sensitive areas including hillsides. Accordingly, the department has taken proactive measures to prevent or reduce geohazard incidents by implementing geological terrain mapping and engineering geological mapping. Information from these mapping activities has been extensively referred to in land use planning by the local authorities and government agencies to prevent, or at least decrease the occurrence of geohazards such as landslides, sinkholes etc. The department has also been asked to assist in geohazard investigations such as landslide, sinkhole and debris / mud flow occurrences in order to determine the possible causes and contributing geological factors, and to propose mitigation and preventive measures to the state governments and local authorities.

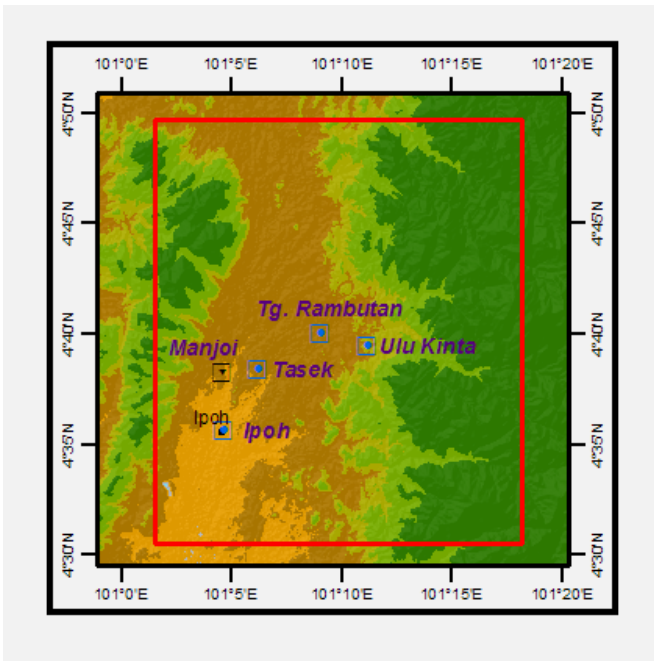
Siasatan geobencana Geohazard investigation

Negeri State	Lokasi Area	Jenis Bencana Type of Hazard	Catatan Remarks
Kedah	Gunung Keriang	Jatuhan batuan Rock fall	Siasatan kejadian jatuhan batuan yang menyebabkan debris menutupi sebahagian laluan pejalan kaki taman rekreasi. Investigation on rock fall incident that caused the debris to cover part of the recreational park's walking trail.
Perak	Kilang Timber Straits, Tasek	Mendapan tanah Land subsidence	Siasatan kejadian mendapan tanah yang berlaku di tapak kilang lama. Investigation on land subsidence that occurred at old factory site.
	Kuarters PGA Ulu Kinta	Mendapan tanah Land subsidence	Siasatan kejadian mendapan tanah yang menjejaskan kuarters di atas bukit. Investigation on land subsidence that affected quarters located on top of the hill.
	Tg. Rambutan	Lubang benam Sinkhole	Siasatan kejadian lubang benam yang berlaku di bahagian luar dapur rumah. Investigation on sinkhole that occurred outside the kitchen area.
	Kuarters Polis Padang Tembak, Ipoh	Mendapan tanah Land subsidence	Siasatan kejadian mendapan tanah yang berlaku di Kuarters Polis Padang Tembak, Ipoh. Investigation on land subsidence that occurred at Kuarters Polis Padang Tembak, Ipoh.
	Manjoi, Ipoh	Lubang benam Sinkhole	Siasatan kejadian lubang benam yang mengakibatkan runtuh tembok pagar. Investigation on sinkhole that caused the collapsed of fence wall.

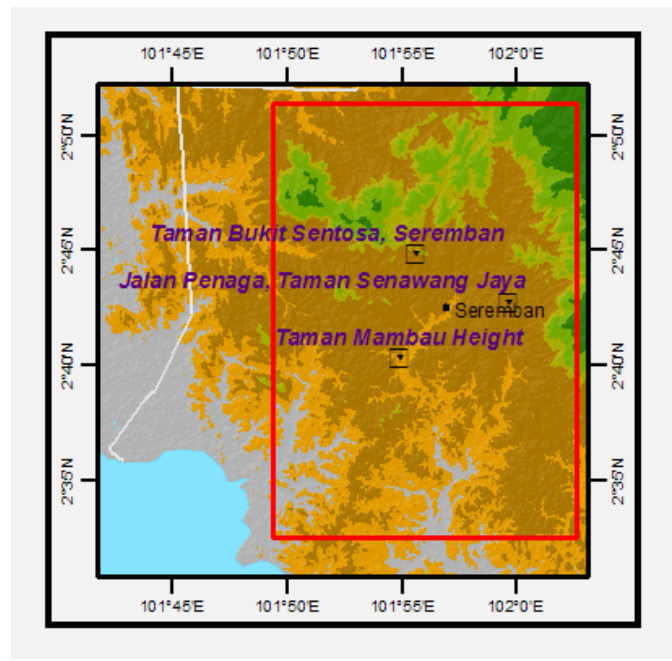
Negeri State	Lokasi Area	Jenis Bencana Type of Hazard	Catatan Remarks
Selangor	Serendah, Hulu Selangor	Tanah runtuh Landslide	Siasatan kejadian tanah runtuh yang telah mengakibatkan kerosakan deretan warong makanan dan sepuluh buah kenderaan. Investigation on landslide that caused damage to food stalls and ten vehicles.
Negeri Sembilan	Taman Senawang Jaya	Tanah runtuh Landslide	Siasatan kejadian tanah runtuh yang melibatkan tebing sungai dan cerun belakang rumah penduduk. Investigation on landslide that involved river bank and slope at the back of residence house.
	Taman Mambau Height	Tanah runtuh Landslide	Siasatan kejadian kegagalan struktur penahan cerun yang mengakibatkan runtuh berlaku. Investigation on failure of retaining wall structure that caused the landslide.
	Kg. Londah, Gemas	Mendapan tanah Land subsidence	Siasatan kejadian mendapan tanah yang menjejaskan dua baris rumah penduduk. Investigation on land subsidence that affected two rows of residence house.
	Taman Bukit Sentosa Seremban	Kegagalan cerun Slope failure	Siasatan kejadian kegagalan cerun yang berlaku di belakang rumah. Investigation of slope failure occurrence at the back of residence house.
Pahang	Kuantan	Tanah runtuh Landslide	Siasatan terhadap potensi kegagalan cerun pada masa hadapan. Investigation on the potential for slope failure in the future.
	Cameron Highlands	Tanah runtuh Landslide	Siasatan kejadian limpahan lumpur dan debris tanah akibat tanah runtuh di Cameron Highlands. Investigation on mud and debris flow caused by landslide that occurred at Cameron Highlands.



Aktiviti Geologi Kejuruteraan 2016
Engineering Geology Activities 2016



Siasatan Geobencana Di Ipoh, Perak
 Geohazard Investigation In Ipoh, Perak



Siasatan Geobencana Di Seremban, Negeri Sembilan
 Geohazard Investigation In Seremban, Negeri Sembilan



Kejadian tanah runtuh di Tanah Rata, Cameron Highlands,
 Pahang
 Landslide occurrence at Tanah Rata, Cameron Highlands,
 Pahang



Kejadian limpahan lumpur di Rumah Peranginan Sharples,
 Jalan Tengkolok, Tanah Rata, Cameron Highlands, Pahang
 Debris flow incident at Sharples Homestay, Jalan Tengkolok,
 Tanah Rata, Cameron Highlands, Pahang

Projek Peta Bahaya dan Risiko Cerun

Projek Peta Bahaya dan Risiko Cerun (PBRC) adalah antara inisiatif Pelan Tindakan di bawah Pelan Induk Cerun Negara 2009-2023. Ia bertujuan untuk menyediakan maklumat bahaya dan risiko cerun di kawasan terpilih yang akan digunakan oleh Pihak Berkuasa Tempatan untuk pengurusan cerun yang lebih baik. Maklumat ini juga akan membantu Agensi Kerajaan dan Pihak Berkuasa Tempatan dalam perancangan guna tanah untuk penggunaan tanah yang lestari. Pelaksanaan projek ini melibatkan gabungan pelbagai bidang termasuk geologi, kejuruteraan geologi, Sistem Maklumat Geografi (GIS), geoteknik, LiDAR dan juruukur.

Slope Hazard and Risk Mapping Project

The Slope Hazard and Risk Mapping Project (PBRC) is among the initiatives under the National Slope Master Plan 2009-2023 Action Plan. The project aims to produce slope hazard and risk information in selected areas to be used by local authorities for better slope management. The information would also assist government agencies and local authorities in land-use planning for sustainable land management. Project implementation would involve participation in multidisciplinary fields including geology, engineering geology, Geographic Information System (GIS), geotechnical, LiDAR and surveying.

Projek peta bahaya dan risiko cerun Slope hazard and risk mapping project

Negeri State	Kawasan Area	Liputan Coverage (km ²)	Catatan / Remarks
Sabah	Kota Kinabalu	155	Menyediakan peta bahaya dan risiko cerun serta cadangan konsep dan anggaran kos pemulihan cerun bagi membantu pihak berkuasa tempatan di dalam pengurusan cerun dan guna tanah yang lestari. Preparation of slope hazard and risk map, as well as concept proposal and cost estimation for slope rehabilitation to help the local authorities for a sustainable slope and land use management.
	Kundasang	70	
Jumlah Liputan / Total Coverage:		225	

Geologi Alam Sekitar

Environmental Geology

Ulasan Laporan Penilaian Kesan Alam Sekeliling

Review of Environmental Impact Assessment Reports

Sejumlah 215 ulasan berkaitan EIA dalam berbagai sektor telah dilakukan oleh Jabatan sepanjang tahun 2016.

A total of 215 technical reviews in various sectors were carried out in the year 2016.

Ulasan laporan penilaian kesan alam sekeliling untuk projek pembangunan Review of environmental impact assessment reports for development projects

Negeri State	Bil. ulasan No. of review	Catatan Remarks
Perlis	1	Memberi khidmat nasihat berhubung dengan cadangan pembangunan kawasan perindustrian Lembah Chuping. Provided advisory services pertaining to the proposed development of the Lembah Chuping industrial area.
Kedah	5	Memberi khidmat nasihat berhubung cadangan pembangunan perumahan, perhotelan, resort, pembangunan kawasan perindustrian, dan pembangunan bercampur. Provided advisory services pertaining to proposals for housing development, hotels, resorts, industrial development, and mixed development.
Pulau Pinang	20	Memberi khidmat nasihat berhubung cadangan pembangunan perumahan, pembangunan bercampur, pengorekan pasir dan tanah, stesen pemindahan sisa, loji rawatan air kumbahan, pembinaan stesen dan laluan kereta kabel. Provided advisory services pertaining to proposals for housing development, mixed development, sand and earth extraction, waste transfer station, wastewater treatment plant, as well as station and cable car routes.
Perak	8	Menyediakan ulasan teknikal EIA bagi pelbagai projek. Provided technical review of EIA for various projects.
Selangor / WP	30	Memberi khidmat nasihat berhubung cadangan pembangunan perumahan, perhotelan, pembangunan kawasan perindustrian dan pembangunan bercampur. Provided advisory services pertaining to proposals for housing development, hotels, industrial development and mixed development.
Negeri Sembilan	3	Memberi khidmat nasihat berhubung cadangan pembangunan kawasan perindustrian dan pembangunan bercampur. Provided advisory services pertaining to proposals for industrial development and mixed development.
Melaka	1	Memberi khidmat nasihat berhubung pembangunan bercampur. Provided advisory services pertaining to proposals for mixed development.
Johor	12	Memberi khidmat nasihat berhubung cadangan pembangunan kawasan perumahan, perindustrian dan empangan. Provided advisory services pertaining to proposals for housing, industrial and dam development.
Pahang	41	Menyediakan ulasan teknikal EIA bagi kawasan sensitif alam sekitar termasuk kawasan pembangunan, projek hidro elektrik, pembalakan dan skim penanaman semula ladang untuk pokok hutan-balak, hutan getah dan ladang kelapa sawit. Provided technical reviews of EIA for environmental sensitive areas including development areas, hydro-electric projects, logging and land replanting scheme for forest, rubber forest and palm oil plantations.

Negeri State	Bil. ulasan No. of review	Catatan Remarks
Terengganu	8	Memberi khidmat nasihat berhubung cadangan pembangunan perumahan, perhotelan, operasi kuari dan pertanian. Provided advisory services pertaining to proposals for housing, hotel, quarry operation and agricultural development.
Kelantan	12	Menyediakan ulasan teknikal EIA bagi pelbagai cadangan pembangunan perumahan, industri dan empangan. Provided technical reviews of EIA for proposed projects on housing development, industrial and dam.
Sarawak	34	Menyediakan ulasan teknikal EIA bagi pelbagai projek. Provided technical reviews of EIA for various projects.
Sabah	48	Menyediakan ulasan teknikal bagi laporan EIA bagi projek-projek pembangunan infrastruktur, perumahan, serta kuari batu dan pasir. Provided technical review for EIA reports for infrastructure projects, housing, as well as stone and sand quarries.
Jumlah / Total:	215	

Geologi Marin

Pada tahun 2016, aktiviti Unit Geologi Marin tertumpu kepada pelaksanaan lima projek iaitu Kajian Sumber Pasir Laut Negara Fasa 3, Kajian Perlombongan Pasir Laut Mapan di Permatang Sedepa dan kawasan sekitarnya, Pelabuhan Kelang, Kajian Lembangan Muka Sauk Loji Air Chini, Kajian Lembangan Sungai Selangor, dan Ekspedisi Pelayaran Saintifik Kebangsaan 2016.

Permohonan ulasan ke atas permohonan lesen melombong pasir laut di bawah Seksyen 4 Akta Pelantar Benua 1966 (disemak 1972) telah diterima dari Jabatan Ketua Pengarah Tanah dan Galian (JKPTG). Pada tahun 2016, sebanyak 21 ulasan telah dikemukakan kepada JKPTG dan beberapa mesyuarat One Stop Center juga telah dihadiri. Permohonan tersebut melibatkan perlombongan pasir laut di kawasan lepas pantai di Kedah, Johor, Labuan, Melaka, Negeri Sembilan, Pahang, Perak, Pulau Pinang dan Selangor.

Marine Geology

In 2016, Marine Geology activities were focused on the implementation of five projects, namely National Offshore Sand Resource Study Phase 3, Offshore Sand Mining Sustainability studies at the One Fathom Bank and its surrounds, Port Klang, Water Intake Chini Basin Study, Selangor River Basin Study, and the National Scientific Expedition Cruise 2016.

Applications for review by various companies to obtain offshore sand mining licences, under Section 4 of the Continental Shelf Act 1966 (revised 1972) were received from the Department of Director-General Land and Mines (JKPTG). In 2016, a total of 21 applications were reviewed and submitted to the Department of Director-General, Land and Mines (JKPTG), and there were several One Stop Center meetings attended by officers from Marine Geology Unit. The applications involved sand mining in offshore waters of Kedah, Johor, Labuan, Melaka, Negeri Sembilan, Pahang, Perak, Pulau Pinang and Selangor.

Survei Geologi Marin Marine Geological Survey										
Kajian Study	Negeri State	Kawasan Area	Liputan Coverage (km ²)	Jenis Pemetaan Type of Mapping	Geofizik Geophysics	Sampel Sampling	Analisa Analyses			Catatan Remarks
							Saiz Butiran/ Karbonat/ Organik Grain Size/ Carbonate/ Organic	Geokimia Geochemistry	QME	
Kajian Sumber Pasir Laut Negara Fasa 3 National Offshore Sand Resource Study Phase 3	Johor	Lepas Pantai Johor Timur Offshore East Johor	20,800	Survei geofizik marin Marine geophysical survey	1400 garis-km (Batimetri, Sonar imbasan sisi, Seismik sub bottom profiler) 1400 line-km (Bathymetry, Side scan sonar, Seismic sub bottom profiler)	Tiada Nihil	Tiada Nihil	Tiada Nihil	Tiada Nihil	Tiada Nihil
Kajian Perlombongan Pasir Laut: Mapan di Permatang Sedepa dan sekitarnya, Pelabuhan Kelang Offshore Sand Mining Sustainability studies at the One Fathom Bank and its surrounds, Port Klang	Selangor	Lepas Pantai Selangor Offshore Selangor	60	Morfologi dasar laut Seabed Morphology	Multibeam Multibeam	12 (Sampel cekau/ Grab sample)	Tiada Nihil	Tiada Nihil	Tiada Nihil	Projek E-Science Fund MOSTI dengan kerjasama antara JMG dengan Pusat Hidrografi Nasional, TLDM E-Science Fund MOSTI Project with collaboration between JMG and Nasional Hydrography Centre, TLDM
Kajian Lembangan Muka Sauk Loji Air Chini Water Intake Chini Basin Study	Pahang	Sungai Mentiga, Chini, Pekan	Sepanjang 5km Sungai Mentiga 5km along Sungai Mentiga	Survei batimetri dan persampelan cekau Bathymetry survey and grab sampling	Alat pengukuran kedalaman mudah alih Depthmate portable sounder	60 (Sampel cekau/ Grab sample)	Tiada Nihil	Tiada Nihil	Tiada Nihil	Tiada Nihil
Kajian Lembangan Sungai Selangor Selangor River Basin Study	Selangor	Sungai Selangor	Sepanjang 62km Sungai Selangor	Survei batimetri, persampelan cekau dan parameter- parameter air sungai Bathymetry survey, grab sampler and river water parameters	Perum- gema Echo-sounder	82 (Sampel cekau/ Grab sample)	Tiada Nihil	Tiada Nihil	Tiada Nihil	Tiada Nihil
Ekspedisi Pelayaran Saintifik Kebangsaan 2016 National Scientific Cruise Expedition 2016	Negeri-negeri Pantai Timur Semenanjung Malaysia East Coast Peninsular Malaysia States	Perairan Pantai Timur Semenanjung Malaysia East Coast Peninsular Malaysia waters	65,800	Sedimen dasar laut Seabed sediment		25 (Sampel cekau/ Grab sample)	25	Tiada Nihil	Tiada Nihil	Tiada Nihil

Kajian Sumber Pasir Laut Negara Fasa 3

National Offshore Sand Resource Study Phase 3



Sonar imbasan sisi
Side scan sonar



Seismik sub bottom profiler
Seismic sub bottom profiler

90

Kajian Lembangan Muka Sauk Loji Air Chini

Water Intake Chini Basin Study



Survei kedalaman dan persampelan sedimen dasar sungai di Muka Sauk Loji Air Chini, Pekan, Pahang
Bathymetry survey and river bed sediment sampling at Muka Sauk Loji Air Chini, Pekan, Pahang

Kajian Lembangan Sungai Selangor



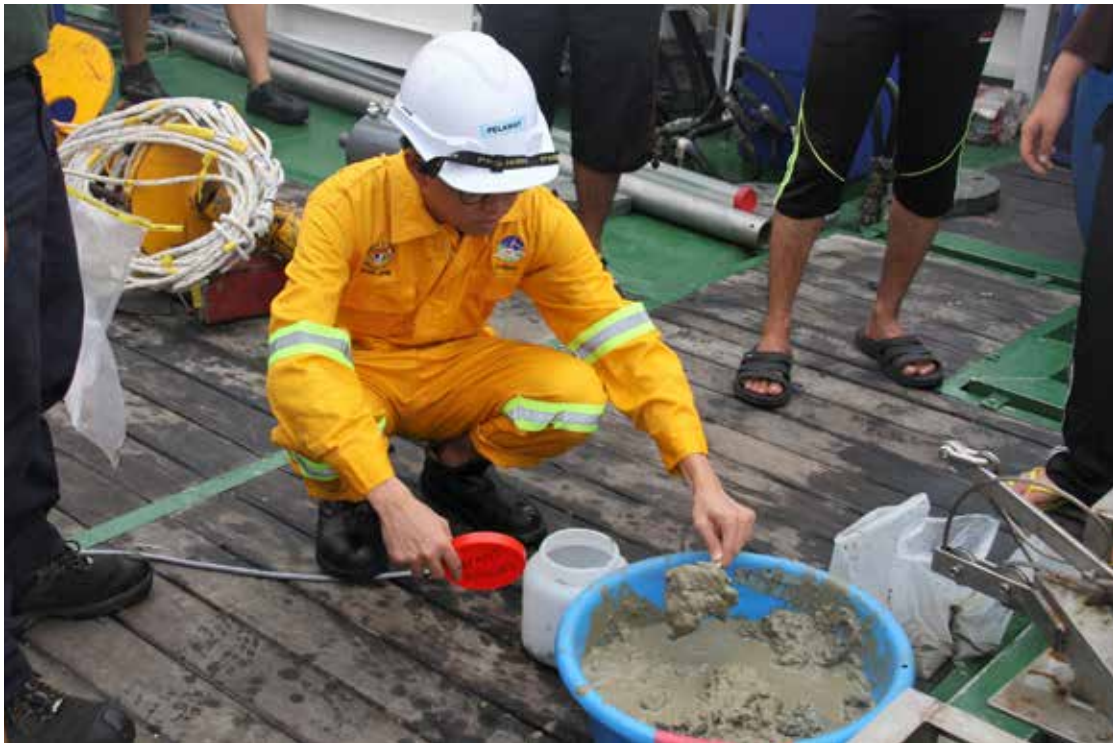
Survei kedalaman dan persampelan sedimen dasar sungai di Sungai Selangor
Bathymetry survey and river bed sediment sampling at Sungai Selangor

Selangor River Basin Study



Pemasangan echo sounder
Installation of echo sounder

Ekspedisi Pelayaran Saintifik Kebangsaan 2016 National Scientific Cruise Expedition 2016



Persampelan sedimen dasar laut
Seabed sediment sampling

Penilaian Sumber Geoterma

JMG telah dilantik oleh Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia (SEDA) sebagai agensi pelaksana bagi Projek Penilaian Sumber Geoterma di Ulu Slim, Perak. Kajian yang bermula pada 1 September 2013 ini telah selesai sepenuhnya pada 30 April 2016.

Geothermal Resource Assessment

JMG was appointed by Sustainable Energy Development Authority (SEDA) Malaysia as the implementing agency for the Geothermal Resource Assessment Project at Ulu Slim, Perak. The project which began on 1st September, 2013 was completed on 30th April, 2016.

Negeri State	Kawasan Area	Liputan Coverage (km ²)	Penemuan / Catatan Findings / Remarks
Perak	Ulu Slim	75	Enam kluster takungan geoterma dikenal pasti dengan anggaran potensi kapasiti penjana tenaga elektrik antara 2.6 hingga 90.2 Mwe. Six clusters of geothermal reservoirs were identified with the estimated potential electricity generation capacity of between 2.6 to 90.2 MWe.

Khidmat Nasihat Geosains

JMG secara aktif memberi khidmat perundingan dan khidmat nasihat kepada agensi kerajaan, pihak swasta dan individu dalam aspek ulasan perancangan guna tanah, serta khidmat nasihat mengenai hidrogeologi dan geologi kejuruteraan.

Khidmat nasihat hidrogeologi termasuk penyediaan ulasan dalam permohonan pelesenan air tanah dan air tanah sebagai sumber air mineral semulajadi serta penilaian potensi air tanah untuk tujuan pertanian, industri dan domestik. JMG adalah ahli tetap di dalam Jawatankuasa Penggunaan Sumber Air Peringkat Negeri, Jawatankuasa Kelulusan Pembungkusan Sumber Air Semulajadi dan Jawatankuasa Pelesenan Sumber Air Bumi.

Khidmat nasihat geologi kejuruteraan dan pembangunan guna tanah pula merangkumi aspek perancangan pembangunan bandar baru, penjajaran jalan dan perancangan guna tanah. Jabatan ini terlibat di dalam beberapa jawatankuasa peringkat negeri berkaitan dengan geobencana, seperti Jawatankuasa Perancangan Negeri, Jawatankuasa Pengurusan Bencana Negeri, Jawatankuasa Kawasan Sensitif Alam Sekitar serta Jawatankuasa Pembangunan Tanah Tinggi dan Lereng Bukit.

Geoscience Advisory Services

JMG also provides consultative and advisory services to government agencies, the private sectors and individuals on aspects regarding land use planning reviews and geoscience information such as hydrogeology and engineering geology.

Hydrogeology advisory services include providing reviews on groundwater licence applications and groundwater as a natural mineral water resource and assessment of the potential of groundwater for agriculture, industrial and domestic usage. JMG is a permanent member of the State Water Consumption Committee, Natural Water Resource Packaging Approving Committee and Groundwater Resource Licensing Committee.

Engineering geology and land use advisory services includes new township development planning, road alignment and land use planning. The department is also involved at several state level committees related to geodisasters, such as the State Planning Committee, State Disaster Management Committee, Environmentally Sensitive Area Committee, as well as Highland and Foothill Development Committee.

Ulasan pembangunan tanah dan maklumat geosains am
Review of land development and general geosciences information


Negeri State	Jenis Ulasan Type of Review		
	Pusat Setempat One Stop Centre (OSC) (bil. / no.)	Pembangunan guna tanah Land use development (bil. / no.)	Maklumat geosains am General geoscience information (bil. / no.)
Perlis	77	13	3
Kedah	373	27	5
Pulau Pinang	95	37	8
Perak	356	0	0
Selangor / WP	1136	12	37
Negeri Sembilan	362	0	0
Melaka	190	0	0
Johor	1137	5	7
Pahang	784	54	71
Terengganu	966	15	15
Kelantan	335	273	3
Sarawak	0	0	0
Sabah	12	161	0
Jumlah / Total:	5823	597	149

Khidmat nasihat hidrogeologi
Hydrogeology advisory services

Negeri State	Bil. ulasan No. of review	Catatan Remarks
Kedah	16	Menyediakan ulasan teknikal bagi tujuan permohonan baru dan pembaharuan lesen pengabstrakan air tanah. Provided technical reviews on new applications and renewal of the groundwater abstraction licence.
Negeri Sembilan	25	Menyediakan ulasan teknikal bagi tujuan permohonan baru dan pembaharuan lesen pengeluaran air tanah kepada Badan Kawal Selia Air (BKSA). Memberi khidmat nasihat berkaitan potensi air tanah serta cadangan pembangunan air mineral kepada agensi kerajaan, pihak swasta dan orang perseorangan. Provided technical reviews on new applications and renewal of the groundwater abstraction licence for Badan Kawal Selia Air (BKSA). Provided technical advice regarding groundwater potential and proposed development of mineral water to government agencies, the private sector, and individuals.
Melaka	10	Menyediakan ulasan teknikal bagi tujuan permohonan baru dan pembaharuan lesen pengeluaran air tanah kepada Badan Kawal Selia Air (BKSA). Memberi khidmat nasihat berkaitan potensi air tanah serta cadangan pembangunan air mineral kepada agensi kerajaan, pihak swasta dan orang perseorangan. Provided technical reviews on new applications and renewal of the groundwater abstraction licence for Badan Kawal Selia Air (BKSA). Provided technical advice regarding groundwater potential and proposed development of mineral water to government agencies, the private sector, and individuals.
Johor	12	Memberi khidmat nasihat berkenaan potensi sumber air tanah untuk pertanian, kegunaan domestik, dan sektor industri. Provided advisory services on the potential of groundwater sources for agriculture, domestic use, and industrial sector.
Pahang	5	Khidmat nasihat, lawatan tapak dan ulasan permohonan perakuan perlesenan air mineral kepada syarikat swasta tempatan. Advisory services, site visits and mineral water licensing certification reviews for the private sector.
Terengganu	10	Menyediakan ulasan teknikal berkaitan potensi air tanah kepada agensi kerajaan, pihak swasta dan orang perseorangan. Provided technical reviews on on the potential of groundwater sources for government agencies, the private sector, and individuals.
Kelantan	11	Memberi khidmat nasihat berkaitan potensi air tanah serta cadangan pembangunan air mineral kepada agensi kerajaan, pihak swasta dan orang perseorangan. Provided technical advice regarding groundwater potential and proposed development of mineral water to government agencies, the private sector, and individuals.
Sabah	6	Memberi khidmat nasihat berkaitan cadangan pembangunan telaga tiub bagi kegunaan individu dan industri. Provided advisory services on tube well development proposal for individual and industrial usage.
Jumlah / Total:	95	

Khidmat nasihat geologi kejuruteraan
Engineering geology advisory services

Negeri State	Bil. ulasan No. of review	Catatan Remarks
Perlis	2	Memberi khidmat nasihat berkenaan permohonan kebenaran merancang dan pelan kerja tanah projek pembangunan. <i>Provided advisory services regarding applications on planning permission and work plan for land development projects.</i>
Kedah	5	Memberi khidmat nasihat berkenaan permohonan kebenaran merancang dan pelan kerja tanah projek pembangunan. <i>Provided advisory services regarding applications on planning permission and work plan for land development projects.</i>
Pulau Pinang	11	Memberi khidmat nasihat berkenaan permohonan kebenaran merancang dan pelan kerja tanah projek pembangunan. <i>Provided advisory services regarding applications on planning permission and work plan for land development projects.</i>
Selangor	20	Menyediakan ulasan teknikal bagi pembangunan khususnya bagi kawasan sensitif geologi. <i>Provided technical reviews on development in the geological sensitive area.</i>
Johor	2	Memberi khidmat nasihat berkaitan kejadian tanah runtuh, tanah mendap dan pembangunan di kawasan bercerun. <i>Provided advisory services on landslide and land subsidence incidents, and the development of slope area.</i>
Pahang	71	Memberi khidmat nasihat berkenaan permohonan kebenaran merancang dan pelan kerja tanah projek pembangunan. <i>Provided advisory services regarding applications on planning permission and work plan for land development projects.</i>
Terengganu	3	Memberi khidmat nasihat berkaitan kejadian tanah runtuh, tanah mendap dan pembangunan di kawasan bercerun. <i>Provided advisory services on landslide and land subsidence incidents, and the development of slope area.</i>
Kelantan	10	Memberi khidmat nasihat berkenaan permohonan kebenaran merancang dan pelan kerja tanah projek pembangunan. <i>Provided advisory services regarding applications on planning permission and work plan for land development projects.</i>
Sabah	157	Memberi khidmat nasihat dan ulasan teknikal berkenaan projek pembangunan kepada pihak berkuasa tempatan. <i>Provided advisory services and technical reviews on land development projects to the local authorities.</i>
Jumlah / Total:	281	



Aktiviti Lombong dan Kuari **Mine and Quarry Activities**

Aktiviti Lombong dan Kuari

Mine and Quarry Activities

Kawalseliaan & Penguatkuasaan

Antara fungsi utama jabatan adalah untuk menentukan aktiviti perlombongan mineral dan aktiviti berkaitan dijalankan secara selamat, efisien dan memenuhi standard alam sekitar dan amalan kejuruteraan terbaik. Jabatan terus melaksanakan tugasnya dalam bidang penguatkuasaan, pengeluaran lesen dan permit, serta memantau operasi perlombongan dan pengkuarian. Terdapat sebanyak 168 buah lombong, 379 kuari serta 108 peniaga bijih dan loji pemprosesan mineral beroperasi pada akhir tahun 2016.

Pemeriksaan Teknikal Operasi Lombong dan Kuari

Pemeriksaan teknikal operasi perlombongan, pengkuarian dan pemprosesan mineral telah dijalankan bertujuan untuk memastikan pematuhan syarat-syarat lesen atau kelulusan yang berkaitan dengan keselamatan dan perlindungan alam sekitar. Jabatan ini juga menjalankan pemeriksaan dan penyiasatan lapangan yang merupakan sebahagian daripada pra-syarat untuk penyediaan laporan yang berkaitan dengan permohonan tenemen mineral, kelulusan kerja peletupan, aduan serta kejadian kemalangan di lombong dan kuari.

Pada tahun 2016, sebanyak 2513 pemeriksaan teknikal telah dilaksanakan meliputi 908 pemeriksaan ke atas operasi perlombongan, 1343 pemeriksaan ke kuari, 132 pemeriksaan ke kilang amang (hasil samping perlombongan bijih timah) dan loji pemprosesan mineral, serta 130 pemeriksaan ke atas urus niaga pemegang lesen bijih mineral dan emas mentah.

Tambahan kepada pengawalseliaan ke atas kerja peletupan yang dijalankan di lombong dan kuari, pihak JMG juga dirujuk oleh Pihak Berkuasa Tempatan untuk membantu menilai serta memantau kerja-kerja peletupan yang dijalankan dalam kawasan pembangunan. Kerja peletupan untuk 198 projek pembangunan telah diperiksa dan dinilai sepanjang tahun ini.

Monitoring & Enforcement

Among the primary functions of the department is to ensure that mining, quarrying and related activities are carried out safely and efficiently, and conforming to environmental standards and best engineering practices. The department continued to discharge its duties in the areas of enforcement, issuance of licenses and permits, and also the monitoring of mining and quarrying operations. There were 168 mines, 379 quarries, as well as 108 ore dealers and mineral processing plant operating at the end of 2016.

Technical Inspection of Mine and Quarry Operations

Technical inspections of mining, quarrying and mineral processing operations were conducted to ensure compliance with the conditions stipulated in the licences or approvals with regard to safety and the protection of the environment. The department also carried out field inspections and investigations, a prerequisite for the preparation of reports pertaining to applications for mineral tenements, blasting works approvals, complaints, and mine or quarry accidents.

In 2016, a total of 2513 technical inspections were carried out, covering 908 inspections on mining operations, 1343 on quarries, 132 inspections on amang (a tin mining by-product) and mineral processing plant operations, and 130 on mineral ores and raw gold licence holders.

In addition to the supervision of blasting works carried out in mines and quarries, the state JMG offices were also referred to by the Local Authorities for assistance in the evaluation and monitoring of blasting activities in areas undergoing development. Blasting works in 198 developmental projects were assessed and evaluated during the year.

Pemantauan dan Kawalseliaan Aktiviti Perlombongan dan Pengkuarian

Tugas pemantauan dan pengawalseliaan yang dijalankan ke atas aktiviti perlombongan dan pengkuarian adalah untuk memastikan aktiviti perlombongan dan pengkuarian dijalankan secara teratur dan sistematik, mengikut amalan kejuruteraan terbaik dan mematuhi peruntukan perundangan. Aspek keselamatan operasi perlombongan adalah tertakluk di bawah Akta Pembangunan Mineral 1994 dan Enakmen atau Ordinan Perlombongan Negeri manakala bagi operasi pengkuarian pula adalah tertakluk kepada Peraturan Kuari Negeri.

Operasi perlombongan dan pengkuarian pada lazimnya akan memberi kesan kepada alam sekitar. Oleh itu, adalah penting operasi tersebut melaksanakan langkah secukupnya untuk menangani kemungkinan pencemaran terhadap air dan udara serta kesan gegaran bumi dan kebingitan bunyi akibat kerja peletupan. Justeru itu bagi memastikan aktiviti perlombongan dan pengkuariaan dijalankan dengan baik, kerja pemantauan berkala telah dilakukan. Sepanjang tahun 2016, sebanyak 518 persampelan efluen lombong dan 316 kerja pemantauan gegaran dan peletupan telah dijalankan.

Pihak jabatan amat mengambil perhatian terhadap aduan pihak awam berkaitan aktiviti perlombongan dan pengkuarian. Sejumlah 98 aduan telah diterima dan disiasat manakala sebanyak 38 perintah dan arahan telah dikeluarkan kepada pengusaha.



Pengawalseliaan peletupan detonator elektronik di Kuari Bentara Gemilang Sdn. Bhd., Bandar Seri Alam, Johor
Supervision of electronic detonator blasting at Kuari Bentara Gemilang Sdn. Bhd., Bandar Seri Alam, Johor

Monitoring and Supervision of Mining and Quarrying Activities

The task of monitoring and supervising mining and quarrying activities was to ensure that these operations were carried out in an orderly and systematic manner in accordance with the best engineering practices and that they complied with the relevant laws and regulations. The safety aspects of mining operations come under the purview of the Mineral Development Act 1994 and State Mining Enactments or Ordinances while quarry operations are regulated by State Quarry Rules.

Mine and quarry operations inevitably have an impact on the environment. Therefore, it is important for such operations to implement necessary measures to mitigate potential water and air pollution as well as the impact of ground vibration and air blast (noise) due to blasting. Thus, to ensure that mine and quarry activities are carried out properly, periodic monitoring is conducted. In 2016, a total of 518 mine effluent samplings, as well as 316 monitoring exercises on vibration and blasts were undertaken by the department throughout the year.

Public complaints on mine and quarry operations are of concern to the department. Following the department's investigation into 98 complaints, 38 orders and instructions were issued to errant miners and quarry operators.



Siasatan tanah runtuh akibat peletupan batuan di Kuari CMS Sdn. Bhd., Kuching, Sarawak
Investigation of blast-induced landslides at CMS Quarries Sdn. Bhd., Kuching, Sarawak

Pelesenan

Di bawah Akta Pembangunan Mineral (APM) 1994, pemegang pajakan melombong hendaklah mengemukakan dan mendapatkan kelulusan bagi suatu skim pengendalian melombong daripada Pengarah Galian sebelum sebarang operasi pembangunan dan perlombongan dilaksanakan. Pada tahun 2016, pihak jabatan telah meluluskan sejumlah 117 Skim Pengendalian Melombong di bawah APM dan 165 Surat Kebenaran Pengkuarian di bawah Peraturan Kuari Negeri kepada pengusaha kuari di Perak, Selangor, Pahang, Kelantan, Terengganu dan Negeri Sembilan.

Lesen Bijih Mineral dan Lesen Pembeli Emas yang dikeluarkan di bawah Enakmen Bijih Mineral dan Enakmen Pembeli Emas Mentah membenarkan pemegangnya untuk membeli, menjual, menyimpan dan memproses bijih mineral dan emas mentah masing-masingnya. Lesen ini dikeluarkan secara tahunan dan luput pada akhir tahun kalendar. Sebanyak 78 Lesen Bijih Mineral, dan 4 Lesen Pembeli Emas telah dikeluarkan sepanjang 2016. Selain itu pihak jabatan juga telah mengeluarkan sebanyak 183 Permit Mengangkut Bijih Padat Timah bagi tujuan mengangkut konsentrat timah dari lombong, kedai pembeli bijih atau loji pemrosesan amang ke kilang pelebur timah, Malaysia Smelting Corporation, di Pulau Pinang.

Seperti yang diperuntukkan dalam Peraturan Kuari, semua operasi yang ditakrifkan sebagai kuari di bawah Peraturan Kuari mesti diurus oleh seorang Pengurus Kuari. Mereka yang dilantik sebagai Pengurus Kuari mesti menunjukkan kecekapan beliau dengan melulusi ujian Pengurus Kuari yang dijalankan oleh Jabatan. Pada tahun 2016, sebanyak 5 ujian Pengurus Kuari telah dilaksanakan oleh Jabatan.

Adalah menjadi objektif jabatan untuk memastikan semua kerja peletupan di lombong, kuari dan juga projek pembangunan di bawah kawal seliaan jabatan dijalankan dengan selamat. Justeru, jabatan telah menjalankan Ujian Pembedil Amali kepada calon yang telah lulus Peperiksaan Pembedil Teori. Hanya calon yang lulus kedua-dua ujian akan dikeluarkan Sijil Pembedil sebagai pembedil berkelayakan dan dibenarkan menjalankan kerja peletupan. Pada tahun 2016, pihak Jabatan telah menjalankan sebanyak 41 Ujian Amali Pembedil, mengeluarkan sejumlah 32 Sijil Pembedil baru dan juga telah memperbaharui 157 sijil kepada pemohon yang layak. Sehingga akhir tahun 2016, terdapat sejumlah 803 pemegang Sijil Pembedil di seluruh negara.

Sebahagian mineral yang dihasilkan di negara ini dieksport ke luar negara. Bagi tujuan mengeksport bahan mineral dan batuan, pengeksport memerlukan permit eksport yang dikeluarkan oleh Kementerian Sumber Asli dan Alam Sekitar (NRE). Satu laporan penilaian teknikal yang disediakan oleh JMG perlu disertakan untuk setiap permohonan. Pada tahun 2016, sebanyak 870 dan 1445 laporan penilaian teknikal telah disediakan bagi eksport mineral dan bahan batuan masing-masing.

Licensing

Under the Mineral Development Act (MDA) 1994, a mining lease holder needs to submit and obtain approval from the Director of Mines for an operational mining scheme before any development or mining commences. For the year 2016, the department approved a total of 117 Operational Mining Schemes under the Mineral Development Act 1994, and issued 165 Letters of Authority to Quarry under the state Quarry Rules to quarry operators in Perak, Selangor, Pahang, Kelantan, Terengganu and Negeri Sembilan.

The Mineral Ores and Gold Buyers Licences issued under the Mineral Ores Enactment and Gold Buyers Enactment authorise licence holders to buy, sell, store, and treat mineral ores and raw gold respectively. These licences are issued annually and they expire at the end of each calendar year. A total of 78 Mineral Ore Licences, and 4 Raw Gold Buyers Licences were issued in 2016. Apart from that the department also issued a total of 183 Tin Ore Concentrate Transport Permits for the purpose of transporting tin concentrates from the mines, tin ore dealers or amang processing plants to the tin smelter, Malaysia Smelting Corporation, in Pulau Pinang.

As stipulated in the Quarry Rules, all operations defined as quarries under the Quarries Rules must be managed by a Quarry Manager. The person appointed as a Quarry Manager must demonstrate his competency by passing the department's Quarry Manager Test. In 2016, a total of 5 Quarry Manager Tests were conducted by the department.

It is the objective of the department to ensure that all blasting works in mines, quarries, and other development projects under the supervision of the department are carried out in a safe manner. Thus, the department conducted Shotfirer Practical Tests for candidates who had passed the Shotfirer Theory Examination. Only candidates who had passed both tests were issued Shotfirer Certificates as qualified shotfirers and allowed to carry out blasting work. In 2016, the department conducted 41 Shotfirer Practical Tests, and issued a total of 32 new Shotfirer Certificates. The department also renewed 157 certificates to qualified applicants. As of the end of 2016, there were a total of 803 shotfirer certificate holders in the country.

Some of the minerals produced in the country are exported. For the purpose of exporting minerals and rock material, an exporter needs to have an export permit issued by the Ministry of Natural Resources and Environment (NRE). A technical assessment report prepared by JMG has to be attached to each application. In 2016, a total of 870 and 1445 technical assessment reports were prepared for the export of minerals and rock material respectively.



Kursus pembedil anjuran bersama Persatuan Kuari Sarawak (SQA) dan JMG Malaysia di Kuching, Sarawak pada 06-07.09.2017
 Shot-firer course jointly-organised by Sarawak Quarry Association (SQA) and JMG Malaysia at Kuching, Sarawak on the 06-07.09.2017



Kursus Pengurus Lombong yang diadakan pada 28-29.09.2016 di Kuantan, Pahang
 Mining Management Course held on 28-29.09.2016 at Kuantan, Pahang

Khidmat Nasihat dan Kepakaran

Selain daripada menjalankan penguatkuasaan undang-undang dan pemantauan operasi perlombongan/ pengkuarian, jabatan juga berperanan dalam memberikan khidmat nasihat dan kepakaran kepada Pihak Berkuasa Negeri, industri dan juga orang ramai. Sebagai sebuah jabatan teknikal, Pihak Berkuasa Negeri kerap merujuk permohonan-permohonan berkaitan tanah lombong, tapak kuari dan lain-lain bagi mendapatkan pandangan dan perakuan teknikal sebelum sesuatu keputusan dibuat.

Pada tahun 2016, jabatan telah menyediakan sebanyak 341 laporan Perakuan Permohonan Carigali/ Pajakan lombong. Manakala bagi permohonan tapak kuari, sebanyak 21 laporan teknikal telah disediakan kepada pihak berkuasa negeri.

Jabatan juga terlibat dengan laporan EIA, sebanyak 81 laporan ulasan EIA dan 227 laporan teknikal lain yang berkaitan dengan aktiviti perlombongan dan pengkuarian telah disediakan. Selain dari itu, sebanyak 231 laporan pembebasan mineral telah disediakan dalam tahun 2016. Disamping itu pihak jabatan juga menerima sebanyak 1777 pertanyaan berkaitan aktiviti perlombongan dan pengkuarian.

Advisory and Expertise Services

Apart from the enforcement and monitoring of the mining/ quarrying operations, the department's duties include the rendering of advisory technical services to the State Authorities, industry, and also to the public. Being a technical department, the State Authorities frequently refer to this department for comments and assessment on applications for mining land, quarries and other legal aspects before any decision were taken.

In 2016, the Department prepared a total of 341 reports on applications for prospecting and mining rights. With regard to applications for quarries, 21 technical reports were prepared and sent to various State Authorities.

The department was involved in EIA reports, and 81 reports and 227 other technical reports were prepared in relation to mining and quarrying proposals. In addition, 231 Mineral Clearance reports were prepared in 2016. Apart from that the department also received a total of 1777 enquiries on mine and quarry activities.



Pemeriksaan konsainan mineral bersama oleh pegawai JMG Malaysia dan Jabatan Kastam Diraja Malaysia di Pelabuhan Kuching, Sarawak
Joint inspections of mineral consignments by officers of JMG Malaysia and Royal Malaysian Customs Department at Kuching Port, Sarawak

Aktiviti-aktiviti lain

Pihak jabatan juga menjalankan dialog, seminar dan pameran bagi meningkatkan kesedaran pihak awam terhadap industri mineral serta juga sebagai wadah untuk menyelesaikan masalah yang dihadapi penduduk berkaitan dengan aktiviti perlombongan dan pengkuarian. Sebanyak 14 seminar/dialog/pameran telah dibuat pada 2016.

Other Activities

The department also conducted dialogues, seminars and exhibitions so as to increase the public awareness on the mineral industry as well as, to solve issues and problems faced by the public pertaining to mining and quarrying activities. A total of 14 seminars/ dialogues/ exhibitions was conducted in 2016.

Senarai Aktiviti Pembangunan Lombong & Kuari Dalam Tahun 2016
List of Mine & Quarry Development Activities in 2016

	Johor	Negeri Sembilan	Melaka	Selangor	Perak	Kedah	Perlis	Pulau Pinang	Kelantan	Terengganu	Pahang	Sarawak	Sabah	JUMLAH
Pemeriksaan Teknikal Operasi Lombong dan Kuari / Technical Inspection of Mine & Quarry Operations														
Pemeriksaan teknikal operasi lombong Mining operation technical inspection	105	5	0	24	300	33	0	0	107	43	248	28	15	908
Pemeriksaan teknikal operasi kuari Quarrying operation technical inspection	77	150	18	150	453	38	18	166	74	20	85	15	79	1343
Pemeriksaan teknikal operasi kilang amang /loji pemrosesan mineral Amang plant / mineral processing plant operations technical inspection	16	0	0	2	104	4	0	6	0	0	0	0	0	132
Pemeriksaan teknikal tapak peletupan (selain kuari) Technical inspection of blasting sites (other than quarries)	7	1	0	35	27	14	0	112	0	0	0	2	0	198
Pemeriksaan teknikal kawasan carigali Technical inspection of exploration areas	0	0	0	0	0	0	0	0	4	0	0	0	0	4
Pemeriksaan buku urusniaga mineral (termasuk kedai bijih / kedai emas) Account books inspection on mineral dealings (including tin ore dealer / gold dealer)	38	0	0	19	48	11	0	4	5	0	5	0	0	130
Pemantauan dan Kawalselia Aktiviti Perlombongan dan Pengkuarian / Monitoring of Mining & Quarrying Activities														
Persampelan efluen lombong Mine effluent sampling	0	0	0	0	460	6	0	0	0	0	47	2	3	518
Siasatan aduan Complaint investigation	8	5	0	8	14	4	2	24	17	1	9	2	4	98
Perintah dan arahan Orders and instructions	3	0	0	4	6	3	0	7	0	0	0	2	13	38
Kompaun Compounds	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laporan kemalangan lombong dan kuari Mining and quarrying accident reports	0	0	0	0	6	1	0	2	2	0	0	1	0	12
Kerja ukur tanah sempadan dan cerun Survey works on land boundary and slope	0	0	0	0	0	0	0	0	6	6	82	0	1	95

	Johor	Negeri Sembilan	Melaka	Selangor	Perak	Kedah	Perlis	Pulau Pinang	Kelantan	Terengganu	Pahang	Sarawak	Sabah	JUMLAH
Kerja ukur gegaran/habuk/kebingitan dan pemantauan peletupan Vibration and blast monitoring	2	11	0	50	112	4	2	102	9	0	10	3	11	316
Pelesenan / Licensing														
Skim Pengendalian Melombong Operational Mining Scheme	18	1	0	2	15	7	0	0	14	14	32	13	1	117
Surat Kebenaran Pengkuarian Letter of Authority to Quarry	0	19	0	25	68	0	0	0	11	13	29	0	0	165
Lesen Bawah Tanah Underground Licence	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lesen Air Tahanan / Negeri/ Permit Air Annual /State Water Licence/Water Permit	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Lesen Membeli Emas Mentah Gold Buyers Licence	0	0	0	0	0	0	0	1	1	0	2	0	0	4
Lesen Bijih Mineral Mineral Ores Licence	0	0	0	0	56	13	0	9	0	0	0	0	0	78
Permit Mengangkut Bijih Padat Timah Tin Ore Concentrate Transport Permit	19	0	0	2	144	2	0	0	0	2	14	0	0	183
Laporan penilaian teknikal eksport mineral Technical assessment report for mineral export	139	32	0	120	471	6	0	26	40	16	14	6	0	870
Laporan teknikal perakuan eksport bahan batuan Technical assessment report for rock material export	272	0	0	176	700	205	0	0	3	12	0	39	38	1445
Permit Letupan Blasting Permit	6	2	8	0	68	21	5	16	0	2	0	0	0	128
Laporan perakuan magazin letupan Report for explosives magazine approval	5	3	0	0	0	1	0	0	0	0	0	1	4	14
Pengeluaran / pembaharuan Sijil Pembidil Issuance / renewal of Shot Firer Certificate	13	8	0	23	34	7	1	21	5	16	12	16	22	178
Lencongan sungai River diversion	0	0	0	0	0	0	0	0	1	0	0	0	0	1

	Johor	Negeri Sembilan	Melaka	Selangor	Perak	Kedah	Perlis	Pulau Pinang	Kelantan	Terengganu	Pahang	Sarawak	Sabah	JUMLAH
Ujian pengurus lombong/kuari Test for mine / quarry managers	0	0	0	0	0	0	0	0	1	0	2	2	0	5
Ujian amali pembedil Shot firer practical test	4	7	0	19	4	5	0	0	2	0	0	8	3	52
Khidmat Nasihat dan Kepakaran / Advisory and Professional Services														
Ulasan laporan EIA EIA report review	3	0	0	20	0	1	0	2	3	0	0	5	47	81
Laporan permohonan lesen carigali / pajakan Prospecting and mining lease application report	31	2	2	0	38	8	0	0	25	42	181	4	8	341
Laporan permohonan tanah kuari Quarry land application report	1	0	0	0	0	0	0	0	0	10	8	2	0	21
Laporan pembebasan mineral Mineral clearance report	0	0	0	0	90	5	0	2	2	10	117	5	0	231
Lain-lain laporan teknikal untuk agensi lain Miscellaneous technical report for other agencies	30	7	4	35	0	23	6	36	6	0	0	1	79	190
Pertanyaan mengenai maklumat lombong/kuari Enquiries on mining / quarrying information	60	12	0	2	0	25	4	23	90	16	1242	95	208	1777
Lain-lain / Others														
Seminar / Dialog / Pameran Seminar / Dialogue / Exhibition	2	0	0	0	0	0	1	0	0	0	0	3	8	14



Penyelidikan & Pembangunan **Research & Development**

Penyelidikan & Pembangunan

Research & Development

Pusat Penyelidikan Mineral (PPM) merupakan bahagian penyelidikan dan pembangunan (R&D) kepada Jabatan Mineral dan Geosains (JMG) Malaysia.

Objektif PPM adalah:

- Untuk menggalak dan mempelbagai penggunaan sumber mineral tempatan bagi menyumbang kepada pembangunan sektor perindustrian negara melalui R&D
- Untuk menggalak pengusahahasilan sumber mineral secara mapan melalui R&D

Antara fungsi PPM ialah:

- Menjalankan R&D berasaskan mineral tempatan supaya dapat menghasilkan bahan mula dan bahan tambah nilai untuk digunakan oleh industri
- Membangun teknologi pemprosesan mineral dan kitar semula yang bersesuaian
- Menjalankan penyelidikan bersama Institusi Pengajian Tinggi, agensi R&D yang lain serta pihak industri dalam bidang mineral
- Mengkomersil hasil R&D yang signifikan melalui pemindahan teknologi kepada pihak yang berminat
- Berperanan sebagai penasihat dan pusat rujukan dalam perkara-perkara yang berkaitan dengan penyelidikan mineral tempatan
- Menjalankan R&D berkaitan pengusahahasilan mineral, impak alam sekitar dan pemulihan serta menyediakan perkhidmatan sokongan kepada jabatan dalam menangani masalah yang berkaitan

The Mineral Research Centre (PPM) is the research and development (R&D) arm of the Department of Mineral and Geoscience Malaysia (JMG)

The objectives of PPM are:

- To encourage and diversify use of local mineral resources so as to contribute towards the development of the country's industrial sector through R&D
- To encourage the development of mineral resources in a sustainable manner through R&D

Among its functions are:

- To carry out R&D on local minerals in order to produce starting and value added materials for industrial use
- To develop suitable mineral processing and recycling technologies
- To carry out collaborative research with institutes of higher learning, other R&D agencies and industries in the field of minerals
- To commercialise significant R&D results through technology transfer to interested parties
- To assume advisory role and act as a reference centre in areas related to research in local minerals
- To undertake R&D in mineral extraction, environmental impact and rehabilitation as well as providing support services to the department in overcoming related problems

Teknologi Berasaskan Lempung

Clay-Based Technology

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
1	Teknologi penghasilan jasad seramik teknikal	<p>i. Penghasilan jasad porselin tahan kejutan haba Dua jasad porselin keras tahan kejutan haba yang mempunyai kekuatan patah (MOR) tinggi dan pekali pengembangan terma (CTE) rendah telah dihasilkan menggunakan spodumen sebagai bahan fluks utama, serta bahan-bahan mentah seramik tempatan iaitu lempung bebola dari Kg. Coldstream, kaolin dari Bidor dan pasir silika dari Bintulu. Salah satu daripada jasad porselin telah memenangi pingat emas di pertandingan iidex2016.</p> <p>ii. Penghasilan jasad porselin kalis nyala Usaha pertama projek ini ditumpukan kepada fabrikasi bahan prabakar rendah CTE untuk digunakan sebagai komponen utama dalam penghasilan jasad-jasad porselin yang boleh tahan pembakaran terus dan haba yang tidak sekata dengan nyalaan yang tinggi. Bahan prabakar rendah CTE menghasilkan kawasan-kawasan tumpat bersaiz sesuai dalam matrik jasadnya di mana agregat-agregat tumpat telah dihasilkan melalui proses-proses penggilingan. Usaha kedua bertujuan untuk merekabentuk campuran-campuran jasad porselin yang sesuai menggunakan bahan-bahan prabakar dan lempung telah menghasilkan produk ujian yang mempunyai CTE setinggi $3.16 \times 10^{-6} / ^\circ\text{C}$ yang sesuai untuk porselin kalis nyala.</p>
	Technical ceramic body production technology	<p>i. Production of anti-thermal shock porcelain body Two anti-thermal shock hard porcelain bodies with high rupture strength (MOR) and low coefficient of thermal expansion (CTE) were produced using spodumene as the main flux and local raw ceramic materials such as ball clay from Kg. Coldstream, kaolin from Bidor and silica sand from Bintulu. One of the porcelain bodies won a gold medal at the iidex2016 competition.</p> <p>ii. Production of flameproof porcelain body The first attempt in this project was focused on the fabrication of a suitable pre-fired material of low CTE for incorporation as the chief component in the making of porcelain bodies that could withstand direct and uneven contact with intense flames. The low CTE pre-fired material developed dense regions of sufficient size in its fired body matrix from which dense aggregates were produced by the milling processes. The second attempt aimed at formulating suitable porcelain body mixtures using the pre-fired material and clay materials produced a test product with CTE of $3.16 \times 10^{-6} / ^\circ\text{C}$ which was suited to flameproof porcelain ware.</p>

Teknologi penghasiian jasad seramik teknikal Technical ceramic body production technology



Butir-butir bahan prabakar yang dihasilkan
Pre-fired granular material produced



Ujian tahan kejutan haba sedang dijalankan
Anti-thermal shock testing



Porselin tahan kejutan haba yang dihasilkan
Anti-thermal shock porcelain produced

Teknologi Berasaskan Batuan

Rock-Based Technology

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
1	<p>Teknik penghasilan kalsium karbonat sintetik berongga bagi kegunaan teknologi tinggi</p> <p>Techniques to produce hollow synthetic calcium carbonate for high technology applications</p>	<p>i. Penghasilan kalsium karbonat sintetik (PCC) berongga menggunakan teknik semburan Sungguhpun PCC berongga boleh dihasilkan dengan menggunakan teknik semburan, produk yang terhasil dalam kajian ini didapati tidak berongga sepenuhnya. Kajian akan diteruskan dengan teknik yang sama, tetapi dengan perubahan yang sesuai dibuat ke atas parameter aliran gas CO₂, kadar adukan dan bahan tambah.</p> <p>ii. Penghasilan PCC berongga menggunakan kaedah ais kisar ionik bersukrosa Teknik lain yang digunakan dalam penghasilan PCC berongga adalah dengan pengkarbonatan ais kisar ionik bersukrosa. Didapati PCC yang terhasil dalam kajian ini juga tidak berongga, tetapi lebih halus berbanding PCC yang terhasil menggunakan teknik semburan.</p> <p>i. Production of hollow PCC using the spray technique While hollow PCC can be produced using spray techniques, the product obtained in the present study was found not to be completely hollow. The study will continue with the same technique being used, but with appropriate changes made to the parameters of gas flow rate, stirring rate and additives.</p> <p>ii. Production of hollow PCC using the ice blended ionic sucrose method Another technique used in the production of hollow PCC is by the carbonation of ice blended ionic sucrose. The PCC produced in the present study was also found not to be hollow, but was finer than the product obtained using the spray technique.</p>
2	<p>Penghasilan pulpa kenaf berpengisi PCC menggunakan teknik <i>in situ</i> untuk penghasilan perkakas biodegradasi (BDU)</p> <p>Production of PCC loaded kenaf pulp by the <i>in situ</i> technique for the production of biodegradable utensil (BDU)</p>	<p>Atas permintaan dari Lembaga Kenaf dan Tembakau Negara (LKTN), kajian ini telah dijalankan untuk mengurangkan penggunaan pulpa kenaf dalam penghasilan BDU. Kajian ini menunjukkan BDU dapat dihasilkan dengan menggunakan pulpa tersebut.</p> <p>At the request of National Kenaf and Tobacco Board (LKTN), this study was undertaken to reduce the use of kenaf pulp in the production of BDU. The study showed that kenaf pulp could be used to produce BDU.</p>
3	<p>Perkhidmatan ujian batu dimensi Dimension stone testing services</p>	<p>Sejumlah 150 spesimen dari pihak swasta telah diuji. A total of 150 specimens from private sectors were tested.</p>

Teknologi Berasaskan Silika

Silica-Based Technology

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
1	Penghasilan kaca seramik berliang daripada sisa kaca soda-kapur-silikat dan abu terbang	Satu kajian telah dijalankan untuk menghasilkan kaca seramik berliang untuk digunakan sebagai penebat haba, penebat bunyi, agregat ringan atau penapis air daripada kombinasi sisa kaca soda-kapur-silikat, abu terbang dan silikon karbida komersil (sebagai ejen pembuihan). Kaca seramik berliang yang dihasilkan dengan kaedah ini adalah berkost rendah kerana ia menggunakan bahan kitar semula sebagai bahan mentah, dan ia dijalankan pada suhu pemrosesan yang agak rendah (<1000 °C). Keputusan kajian mendapati bahawa perubahan suhu pensinteran, masa rendaman dan kadar pemanasan tidak memberikan sebarang kesan kepada jenis fasa kristal yang terbentuk termasuk intensitinya, tetapi ia memberi kesan kepada ketumpatan pukal, kekuatan mampatan, keliangan ketara dan penyerapan air.
	Production of porous glass ceramics from the waste of soda-lime-silicate glass and fly ash	A study was undertaken to produce porous glass ceramic for the fabrication of heat insulation, sound insulation, and lightweight aggregate for water filters using a combination of soda-lime-silicate glass, fly ash and commercial silicon carbide (as a foaming agent) to form a porous structure. Porous glass ceramic produced by this method is low cost because it uses recycled materials as raw materials, and is carried out at a relatively low processing temperature (<1,000 °C). The results of this study showed that changes in the sintering temperature, soaking time, and heating rates had no impact on the nature of the crystalline phase formed including its intensity, but it affected bulk density, compressive strength, apparent porosity, and water absorption.

Penghasilan kaca seramik berliang daripada sisa kaca soda-kapur-silikat dan abu terbang

Production of porous glass ceramics from the waste of soda-lime-silicate glass and fly ash



Teknologi Bahan Termaju

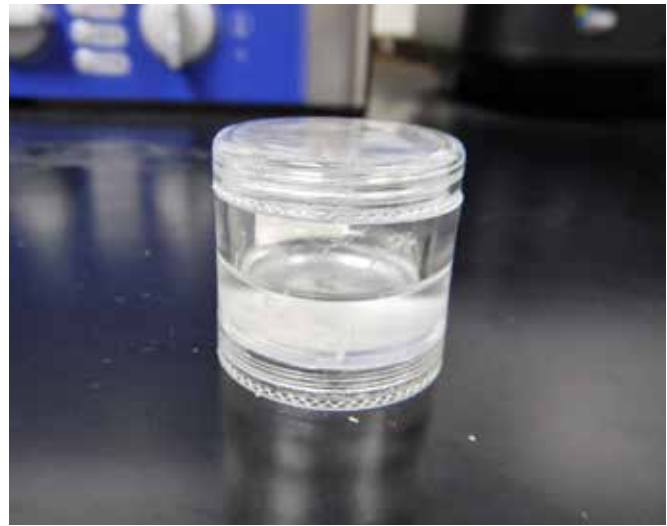
Advanced Material Technology

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
1	<p>Penyediaan granit bersaiz nano daripada sisa kuari menggunakan teknik pemendakan basah</p> <p>Preparation of nano-sized granite from quarry waste via the wet precipitation method</p>	<p>Kajian ini memfokuskan kepada penyediaan granit bersaiz nano dari sisa kuari bagi menambahbaik sifat-sifat fizikal, mekanikal dan kimia marmar sintetik. Sisa granit dari kuari granit di Keramat Pulai, Ipoh telah digunakan sebagai bahan mentah untuk penghasilan granit bersaiz nano dengan teknik pemendakan basah. Kaedah ini melibatkan tindakbalas sisa kuari dengan larutan alkali natrium hidroksida (NaOH) dan kalium hidroksida (KOH). Dalam kajian ini, kesan penggunaan peralatan ultrasonik dan parameter suhu tindakbalas berjulat dari suhu bilik sehingga 100 °C telah dikaji. Hasil kajian mendapati dengan menggunakan larutan alkali NaOH pada suhu tindakbalas antara 80-100 °C disertai pengadukan ultrasonik menghasilkan sisa kuari granit bersaiz di bawah 100 nm. Granit bersaiz nano ini akan digunakan sebagai pengisi dalam kajian penghasilan produk marmar sintetik.</p> <p>The study focused on the preparation of nano-sized granite from quarry waste to further improve the physical, mechanical and chemical properties of synthetic marble. Granite quarry waste from Keramat Pulai, Ipoh, was used as raw material to produce nano-sized granite by the wet precipitation method. The procedure involved reaction of the quarry waste with an alkaline solution of sodium hydroxide (NaOH) and potassium hydroxide (KOH). In this study, the effect of using ultrasonic equipment and reaction temperatures ranging from room temperature up to 100 °C was investigated. The results revealed that the use of NaOH at reaction temperatures between 80-100 °C accompanied by ultrasonic agitation produced a granite quarry waste preparation below 100 nm in size. This nano-sized granite will be used as a filler in the production of synthetic marble.</p>
2	<p>Penghasilan marmar sintetik menggunakan sisa industri pengkuarian batu kapur dan granit</p> <p>Production of synthetic marble using industrial quarry waste of limestone and granite</p>	<p>Kajian ini bertujuan mempelbagai dan menambah penggunaan sisa industri pengkuarian dengan penghasilan produk marmar sintetik berkualiti tinggi yang memenuhi spesifikasi produk global. Sisa kuari batu kapur dan sisa kuari granit dari Keramat Pulai, Ipoh, Perak telah digunakan sebagai pengisi semulajadi dalam penghasilan marmar sintetik. Penggunaan 60-70% sisa kuari batu kapur dan 10% sisa kuari granit dalam formulasi telah meningkatkan sifat mekanikal yang memenuhi spesifikasi produk komersial. Marmar sintetik yang dihasilkan mempunyai aplikasi yang luas dalam produk <i>solid surface</i> seperti kaunter dapur, mangkuk dan sinki, tab mandi, dinding bilik mandi dan lain-lain lagi.</p> <p>The aim of this study was to diversify and to increase the uses of industrial quarry waste by producing high quality synthetic marble that meets global product specifications. Limestone quarry waste and granite quarry waste from Keramat Pulai, Ipoh, Perak, were used as natural filler in the production of synthetic marble. The use of 60-70% limestone waste and 10% of granite quarry waste in the formulations increased the mechanical properties of the preparation that met the specifications of the commercial product. Synthetic marble produced has wide applications in solid surface products such as kitchen countertops, vanity sinks and bowls, bathtubs, shower walls, etc.</p>

Penyediaan granit bersaiz nano daripada sisa kuari menggunakan teknik pemendakan basah
Preparation of nano-sized granite from quarry waste via the wet precipitation method



Sisa kuari granit yang digunakan untuk penghasilan granit bersaiz nano
Granite quarry waste used for the preparation of nano-sized granite



Sisa kuari granit bersaiz nano dalam bentuk gel
A nano-sized granite quarry waste in gel form

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Penghasilan marmar sintetik menggunakan sisa industri pengkuarian batu kapur dan granit
Production of synthetic marble using industrial quarry waste of limestone and granite



Marmar sintetik yang dihasilkan dari sisa kuari batu kapur dan granit
Synthetic marble produced using industrial quarry waste of limestone and granite

Teknologi Pemulihan Lombong Dan Kuari

Mine And Quarry Rehabilitation Technology

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
1	Kajian teknik pitoremediasi bagi pemulihan kolam bekas lombong	Pitoremediasi merujuk kepada teknologi yang menggunakan tumbuh-tumbuhan yang hidup untuk membersihkan tanah, udara, dan air yang tercemar dengan bahan kimia berbahaya. Ia adalah satu pendekatan penyah toksikan yang berasaskan tumbuhan yang mengambil kesempatan daripada keupayaan tumbuhan untuk mengumpul unsur-unsur dan sebatian dari alam sekitaran seterusnya memetabolismakan pelbagai sebatian berbahaya dalam tisu mereka. Kaedah yang dikaji oleh Pusat Penyelidikan Mineral (PPM) adalah kombinasi pitoremediasi dan penggunaan "Floating Platform for Plantation (FPP)". Dengan menggunakan pendekatan ini, pokok-pokok ditanam secara terapung di dalam kolam bekas lombong akan menyerap logam berat melalui akar dan menggumpulkan mereka di batang dan daunnya. Satu spesies yang tahan lasak, rumput <i>vertiver</i> , telah digunakan dalam kajian awal ini. FPP telah didaftarkan di Perbadanan Harta Intelek Malaysia (MyIpo) di kategori Industrial Design pada 15 Julai 2016.
	Phytoremediation study for the rehabilitation of ex-mining ponds	Phytoremediation refers to technologies that use living plants to clean up soil, air, and water contaminated with hazardous chemicals. Phytoremediation is a cost-effective plant-based approach of environmental de-toxification that takes advantage of the ability of plants to concentrate elements and compounds from the environment and to metabolize various hazardous compounds in their tissues. The method studied by PPM is a combination of a phytoremediation technique and the use of the "Floating Platform for Plantation (FPP)". Using this approach, plants grown on platforms floated in ex-mining ponds will absorb heavy metals through their roots and accumulate in stems and leaves. A hardy species, vertiver grass, was used in this initial study. FPP was registered with the Intellectual Property Corporation of Malaysia (MyIpo) in the Industrial Design category on 15 July 2016.
2	Punca pembahagian habuk bawaan udara di sekitar Stesen Janakuasa Sultan Azlan Shah (SASPS) menggunakan analisis kuantitatif	Penyelidikan bersama ke atas corak pembahagian debu halus telah dijalankan di sekitar kawasan SASPS atas permintaan Enviro Exceltech Sdn Bhd (EESB) sebagai perkhidmatan profesional dari PPM. Gangguan yang disebabkan oleh habuk bawaan udara akan dikaji bagi tempoh 12 bulan, yang melibatkan kawasan kajian 15 km radius dari SASPS. Cadangan komprehensif dan Terma Rujukan (TOR) telah disediakan untuk projek ini, objektif utama kajian ini adalah untuk mengukur kepekatan kadar pendedapan habuk (DDR), jumlah habuk terampai (TSP), habuk halus kurang daripada 10 mikron (PM10) dan habuk halus kurang daripada 2.5 micron (PM2.5).
	Source apportionment of airborne dust surrounding the Sultan Azlan Shah Power Station (SASPS) using quantitative analysis	Collaborative research on the apportionment pattern of fine dust of adjacent to the Sultan Azlan Shah Power Station (SASPS) was undertaken at the request of Enviro Exceltech Sdn Bhd (EESB) for professional services from PPM. The nuisance caused by airborne dust would be studied over 12 months, involving a study area of 15 km radius from SASPS. A comprehensive proposal and the Terms of Reference (TOR) had been prepared for this project, the main objectives of which were to measure the concentration of dust deposition rate (DDR), total suspended particulates (TSP), particulate matter less than 10 microns (PM10) and particulate matter of less than 2.5 microns (PM2.5).

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
3	<p>Seni bina dan pemodelan sistem kuari berasaskan objek data bersepadu - projek kerjasama dengan UKM</p> <p>Architecture and modelling of quarry system based on integrated data object - collaborative project with UKM</p>	<p>Pembangunan seni bina dan pemodelan sistem alam sekitar menggunakan objek data bersepadu adalah penyelesaian bertujuan untuk mengembangkan pengurusan set data alam sekitar yang dinamik supaya ia lebih mudah dikongsikan. Kajian ini dijalankan dalam lima fasa, meliputi: 1) reka bentuk konsep, 2) perwakilan dan penggubalan objek data, 3) seni bina dan reka bentuk sistem, 4) pembangunan sistem dan pelaksanaan, dan 5) pengakuan dan pengesahan sistem. Kajian utama bertujuan untuk membangunkan cara bagaimana komponen kuari alam sekitar seperti pencemaran habuk, getaran dan bunyi bising (PVN) berkait antara satu sama lain dan dapat dimodelkan ke dalam bentuk objek digital (DO). Objek bersepadu kemudiannya dimasukkan ke dalam sistem repositori utama untuk manipulasi DO dengan lebih mudah.</p> <p>The development of architecture and modelling for an environmental system of integrated data object is a solution aimed at expanding the management of the dynamic environmental data-sets to be more amenable to sharing. The research would be conducted in five phases covering: 1) conceptual design, 2) data object representation and formulation, 3) architecture and system design, 4) system development and implementation, and 5) system validation and confirmation. The main study seeks to establish how particulate environmental quarry components such as pollutants, vibrations and noise (PVN) and their relationships can be modelled into forms of digital objects (DO). The integrated objects are then incorporated into a primary repository system for easy manipulation of the DOs.</p>
4.	<p>Pembangunan Perisian Quarry Environmental Modelling Software (QEMs)</p> <p>Development of Quarry Environmental Modelling Software (QEMs)</p>	<p>Dalam tahun 2016, Pusat Penyelidikan Mineral (PPM) telah menjalankan kajian untuk membangunkan satu lagi perisian baru iaitu Quarry Environmental Modelling Software (QEMs). Perisian ini adalah satu modul baru yang menggabungkan penambahbaikan Indeks Particulate Quarry dan perisian Noise Software (QPIN) yang dibangunkan pada tahun sebelumnya.</p> <p>Perisian baru yang direka sendiri oleh PPM untuk mengenal pasti punca debu, bunyi bising dan gegaran akibat aktiviti pembedilan di kuari-kuari. Hak cipta untuk perisian ini telah didaftarkan dengan Perbadanan Harta Intelek Malaysia (MyIPO) pada 17 November 2016.</p> <p>In 2016, the Mineral Research Centre conducted a study to develop a new software called Quarry Environmental Modelling Software (QEMs). This software is a new module that incorporates enhancements to the Quarry Particulate Index and Noise Software (QPIN) software developed the previous year.</p> <p>This new software was designed by PPM to identify the cause of dust pollution and its control, and noise and blasting vibration in quarries. Copyright for the software was registered with the Intellectual Property Corporation of Malaysia (MyIPO) on 17 November 2016.</p>

Teknologi Pemrosesan Mineral

Mineral Processing Technology

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
1	Aktiviti penyelidikan ke atas bijih kompleks tempatan Research activities on local complex ores	Penyelidikan ini tertumpu kepada bijih emas kompleks yang diambil dari lombong emas di Pahang. Ujian imbasan FESEM menunjukkan bahawa bijih ini mengandungi zarah emas submikroskopik < 5 µm dalam mineral sulfida (pirit dan arsenopirit). Ujian-ujian pemrosesan telah dijalankan menggunakan kaedah fizikal (meja ayun) dan fiziko-kimia (pengapungan buih). Gred Au telah meningkat daripada 2.3 ppm kepada 120 ppm dengan cara ini. The research focused on complex gold ores collected from gold mines in Pahang. FESEM scanning tests showed that the ore contained submicroscopic particles of gold <5 µm in sulfide minerals (pyrite and arsenopyrite). Processing tests were carried out using physical methods (shaking table) and by procedures for physico-chemical properties (froth flotation). Au grade was increased from 2.3 ppm to 120 ppm by such means.
2	Aktiviti penyelidikan untuk proses penghasilan produk dan pengekstrakan unsur nadir bumi dari sumber tempatan Research activities for production and extraction of rare earth elements (REEs) from local sources	Objektif projek ini adalah untuk menghasilkan unsur nadir bumi (REEs) daripada amang (hasil sampingan perlombongan bijih timah) dengan menggunakan pemrosesan secara fizikal dan pengekstrakan secara kimia. Sampel dari kilang amang di Perak telah tertakluk kepada proses pemisahan secara fizikal menggunakan meja ayun, alat pemisah bermagnet dan alat pengasingan bervoltan tinggi. Produk mineral yang terhasil dari proses ini adalah monazit dan xenotim yang mengandungi REEs. Berdasarkan kepada analisis pencirian ke atas produk yang terhasil, kandungan monazit telah ditingkatkan daripada 9.17% kepada 62.96% manakala kandungan xenotim meningkat daripada 1.23% kepada 21.86%. The objective of this project was to produce rare earth elements (REEs) from amang (a by-product of tin mining) using physical processing and chemical extraction. Samples from the amang plant in Perak were subjected to a physical separation process using a shaking table, magnetic separator, and a high voltage separator. Mineral products resulting from this process were monazite and xenotime which contained REEs. Based on a characterization analysis of the products, monazite content was increased from 9.17% to 62.96% while the xenotime content increased from 1.23% to 21.86%.
3	Penyelidikan kontrak berkaitan pemrosesan mineral untuk industri Contract research related to mineral processing for the industry	Penyelidikan kontrak yang dilaksanakan termasuk: i) Pemrosesan dan pencirian sampel pasir bekas lombong yang diterima daripada pelanggan individu. ii) Ujian pengasingan magnetik dan pengasingan elektrostatik bagi sampel 'black sand' untuk pelajar sarjana dari Universiti Malaysia Perlis. Contract research undertaken included: i. Processing and characterization tests of ex-mining sand sample received from individual customers. ii. Magnetic and electrostatic separation tests for a 'black sand' sample received from a postgraduate student of University Malaysia Perlis.
4	Perkhidmatan ujian pemrosesan bijih timah Tin ore processing testing service	Sejumlah 3 ujian pemrosesan bijih timah telah dijalankan untuk pihak swasta A total of 3 tin ore processing tests were done for private sectors.

Aktiviti penyelidikan ke atas bijih kompleks tempatan
Research activities on local complex ores



Lawatan teknikal dan pengambilan sampel bijih emas kompleks dan bijih timah di Pahang
Technical visit and sampling of complex gold ore and tin ore in Pahang

Teknologi Perlombongan dan Pengkuarian

Mining and Quarrying Technology

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
1	Penyelidikan dan pembangunan teknologi hijau dalam perlombongan dan pengkuarian - teknologi rawatan AMD di kawasan Bukit Besi, Terengganu Research and development in mining and quarrying green technology - treatment technology for AMD at Bukit Besi, Terengganu	Aktiviti projek ini tertumpu kepada kajian lapangan, persampelan sedimen dan persampelan air di sekitar kawasan Bukit Besi. Sejumlah 22 lokasi persampelan air dan 12 lokasi persampelan sedimen telah dikenal pasti. Ujian <i>in situ</i> untuk kualiti air telah dilakukan sementara analisis sedimen telah dijalankan untuk menilai potensi sampel sedimen untuk menjana asid (AMD). Project activities were focused on field studies, sediment sampling, and water sampling at Bukit Besi and the surrounding areas. A total of 22 water sampling points and 12 sediment sampling points were identified. <i>In situ</i> tests for water quality were carried out while analyses for sediment were conducted to assess the potential of the sediment samples to generate acid (AMD).
2	Program pemantauan ke atas impak perlombongan bauksit di kawasan berkepentingan awam di Kuantan, Pahang Monitoring programme for impact of bauxite mining in a public interest area at Kuantan, Pahang	Tiga puluh lima titik pensampelan telah dipilih untuk kajian yang dijalankan untuk menentukan kualiti asas air di 21 lombong bauksit di Kuantan yang merupakan sebahagian daripada audit ke atas aktiviti-aktiviti dalam tempoh moratorium perlombongan bauksit. Analisis logam berat telah dijalankan di Pusat Penyelidikan Mineral di Ipoh, Perak. Satu laporan bertajuk " <i>Baseline Water Quality Data of Bauxite Mines in Kuantan, Pahang</i> " telah diterbitkan. Thirty-five sampling points were selected for a study undertaken to determine the baseline water quality at 21 bauxite mines in Kuantan as part of an audit on activities during a moratorium on bauxite mining. Analyses of heavy metals were conducted at the Minerals Research Centre in Ipoh, Perak. A report titled <i>Baseline Water Quality Data of Bauxite Mines in Kuantan, Pahang</i> was published.
3	Pemantauan dan penganalisan kualiti air di Pengkalan Hulu, Perak Monitoring and analysis of water quality at Pengkalan Hulu, Perak	Ini adalah projek kolaborasi yang dijalankan bersama JMG Perak sejak tahun 2014. Aktiviti projek ini tertumpu kepada kajian lapangan, persampelan dan analisis sampel air di 22 lokasi, termasuk 4 lombong (untuk efluen mereka) dan 18 sungai dan anak sungai di sekitar Pengkalan Hulu, Perak. Ujian pencirian secara <i>in situ</i> bagi kualiti air dilakukan setiap bulan sementara analisis kandungan logam berat pula dijalankan di makmal Pusat Penyelidikan Mineral di Ipoh, Perak, setiap tiga bulan. This is a collaborative project carried out with JMG Perak since 2014. The project activities focused on field studies, sampling and analysis of water samples at 22 points, including 4 mine sites (for their effluents) and 18 rivers and streams around Pengkalan Hulu, Perak. <i>In situ</i> tests for water quality were conducted monthly while heavy metals analyses were carried out every three months in the laboratory at the Minerals Research Centre, Ipoh, Perak.

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks
4	<p>Analisis dan ujian sampel untuk potensi penjanaan asid</p> <p>Analysis and testing of samples for potential in generating acid</p>	<p>Analisis dan ujian sampel untuk potensi penjanaan AMD telah dijalankan bagi menilai potensi sesuatu batuan, tanah dan juga hampas loji di kawasan lombong berlogam untuk menjana AMD apabila terdedah kepada udara dan air. Analisis ini merangkumi beberapa ujian seperti Net Acid Generation Test (NAG), Acid Neutralizing Capacity (ANC) dan Ujian Kandungan Karbon dan Sulfur (CSA). Sampel-sampel yang telah dianalisis diklasifikasikan kepada tiga (3) kategori iaitu; Potential Acid Forming (PAF), Non Acid Forming (NAF) dan Uncertain (UC). Pada tahun 2016, sebanyak 69 sampel telah diterima dari pihak industri untuk menentukan potensi penjanaan AMD. Sebanyak 150 ujian telah dijalankan dan lima (5) laporan analisis telah diserahkan kepada pihak industri.</p> <p>Analysis and testing of samples for potential acid mine drainage (AMD) generation were conducted to assess the potential of rocks, soils and tailings from metallic mining area to generate AMD when exposed to air and water. This analysis included several tests such as the Net Acid Generation (NAG) Test, Acid Neutralizing Capacity (ANC) and Carbon and Sulfur (CSA) Determination Test. Analysed samples were classified into three categories, viz. Potential Acid Forming (PAF), Non Acid Forming (NAF) and Uncertain (UC). Sixty-nine samples were received from the industry in 2016 to determine their AMD potential. A total of 150 tests were conducted and five analysis reports were issued to the industry.</p>

Penyelidikan dan pembangunan teknologi hijau dalam perlombongan dan pengkuarian
Research and development in mining and quarrying green technology



Persampelan sedimen di Bukit Besi
 Sediment sampling in Bukit Besi

Cawangan Pelaksana dan Pengkomersialan

Commercialization Section

Bil. No.	Aktiviti / Projek R&D R&D Activity / Project	Hasil / Penemuan / Catatan Output / Findings / Remarks																				
1	Harta intelek bagi hasil penyelidikan Intellectual properties of research findings	<p>Hasil dari penyelidikan Jabatan, satu paten telah difailkan, satu reka bentuk perindustrian telah didaftarkan dan dua perisian telah difailkan untuk hakcipta pada tahun 2016.</p> <p>Arising from research of the Department, one patent was filed, an industrial design was registered while two softwares were filed for copyright in 2016.</p> <p>Senarai hasil penyelidikan PPM di bawah pendaftaran harta intelek List of research findings registered under intellectual property</p> <table border="1"> <thead> <tr> <th>Bil. No.</th> <th>Tajuk Title</th> <th>Tarikh Pendaftaran Filing Date</th> <th>No. Permohonan Application No.</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Floating Platform for Plantation</td> <td>15.07.2016</td> <td>16-E0153-0101</td> </tr> <tr> <td>2.</td> <td>Quarry Dust Deposition Rate Modelling Software (QDDRM V3.1)</td> <td>17.11.2016</td> <td>LY2016003082a LY2016003082b</td> </tr> <tr> <td>3.</td> <td>Quarry Environmental Modelling Software (QEM V1.0)</td> <td>17.11.2016</td> <td>LY2016003083a LY2016003083b</td> </tr> <tr> <td>4.</td> <td>A Method of Producing Precipitated Calcium Carbonate</td> <td>28.12.2016</td> <td>PI 2016704847</td> </tr> </tbody> </table>	Bil. No.	Tajuk Title	Tarikh Pendaftaran Filing Date	No. Permohonan Application No.	1.	Floating Platform for Plantation	15.07.2016	16-E0153-0101	2.	Quarry Dust Deposition Rate Modelling Software (QDDRM V3.1)	17.11.2016	LY2016003082a LY2016003082b	3.	Quarry Environmental Modelling Software (QEM V1.0)	17.11.2016	LY2016003083a LY2016003083b	4.	A Method of Producing Precipitated Calcium Carbonate	28.12.2016	PI 2016704847
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2	Pensijilan MS ISO 9001:2008 MS ISO 9001:2008 Certification	<p>PPM-JMG telah melaksanakan Sistem Pengurusan Kualiti yang menepati MS ISO 9001:2008 sejak tahun 2012. Pada tahun 2016, pensijilan ini telah diperbaharui dan akan kekal sah sehingga tahun 2018.</p> <p>PPM-JMG has implemented the Quality Management System conforming to MS ISO 9001: 2008 since 2012. In 2016, this certification was renewed and would remain valid until 2018.</p>																				

3 Penyertaan Dalam Pameran Dan Pertandingan

Participation in Exhibitions and Competitions

a) 27th International Invention and Innovation Exhibition (ITEX 2016)

Pada International Invention and Innovation Exhibition Ke-27 (ITEX 2016) yang telah diadakan pada 12 – 14 Mei 2016 di Pusat Konvensyen Kuala Lumpur (KLCC), hasil rekacipta Dr. Rohaya Othman dan pasukannya yang bertajuk *Eco Green Paper: Carbide Lime Waste As Paper Filler* telah memenangi pingat emas, manakala hasil rekacipta Dr. Izhar Abadi Ibrahim Rais yang bertajuk *Quarry Particulate Pollution Index And Noise Software Volume 1.0.0 (QPINS V1.0.0)* telah menerima pingat perak.

At the 27th International Invention and Innovation Exhibition (ITEX'16) held on 12 – 14 May 2016 at the Kuala Lumpur Convention Centre (KLCC), the invention of Dr. Rohaya Othman and her team titled *Eco Green Paper: Carbide Lime Filler Paper Waste as Paper Filler* won the gold medal, while the invention of Dr. Izhar Abadi Ibrahim Rais titled *Quarry Particulate Pollution Index Volume and Noise Software 1.0.0 (V1.0.0 QPINS)* was awarded a silver medal.

b) Invention, Innovation & Design Exposition 2016 (iidex2016)

Pada Invention, Innovation & Design Exposition 2016 (iidex2016) yang telah diadakan pada 20 – 23 September 2016 di Shah Alam, Selangor, hasil rekacipta Pn. Siti Mazatul Azwa Saiyed Mohd Nurddin dan pasukannya yang bertajuk *Malaysian Low Cost Leucite Ingot for Restorative Dental Applications* dan hasil rekacipta Pn. Aspaniza Ahmad dan pasukannya yang bertajuk *Anti Thermal Shock Porcelain Tablewares* telah merangkul pingat emas.

At the Invention, Innovation & Design Exposition 2016 (iidex2016) held on 20 – 23 September 2016 in Shah Alam, Selangor, the invention of Pn. Siti Mazatul Azwa Saiyed Mohd Nurddin and her team titled *Malaysian Low Cost Ingots Leucite for Restorative Dental Applications* and the invention by Pn. Aspaniza Ahmad and her team titled *Anti Thermal Shock Porcelain Tablewares* won gold medals.

c) Pertandingan Strategi Lautan Biru kebangsaan 2016 (NBOS Competition 2016)

National Blue Ocean Strategy (NBOS) Competition 2016

Pada Pertandingan Strategi Lautan Biru kebangsaan 2016, penyertaan dari PPM yang bertajuk *Simple and Cost Effective Method of Producing Paper with Addition of Filler, High Impact and Sustainable to Malaysia* oleh Dr. Rohaya Othman dan pasukannya telah memenangi hadiah saguhati Top 20 daripada lebih 2000 penyertaan dari pelbagai sektor industri, kerajaan dan swasta di seluruh negara.

At the National Blue Ocean Strategy (NBOS) Competition 2016, the entry from the Mineral Research Centre, Mineral and Geoscience Department Malaysia (PPM-JMG) titled *Simple and Cost Effective Method of Producing Paper with Addition of Filler: High Impact and Sustainable to Malaysia* by Dr. Rohaya Othman and her team won a Top 20 consolation prize from among more than 2000 entries from various sectors of industry, government and private sector in Malaysia.

27th International Invention and Innovation Exhibition (ITEX 2016)



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Invention, Innovation & Design Exposition 2016 (iidx2016)





**Perkhidmatan
Sokongan Teknikal
Technical Support Services**

Perkhidmatan Sokongan Teknikal

Technical Support Services

Pengurusan Maklumat

Infrastruktur, Keselamatan dan Aplikasi ICT

Pusat Data JMG berjaya mengekalkan persijilan MS ISO/IEC 27001:2013 Information Security Management System (ISMS) bagi tempoh tiga tahun bermula tahun 2016 sehingga 2019. Ianya diperolehi setelah menjalani proses persijilan semula oleh pihak audit luar SIRIM QAS pada 4 dan 5 Julai 2016.

Pada awal tahun 2016, satu aplikasi baru yang dikenali sebagai “Sistem Maklumat Geospasial Terain Dan Cerun Negara (NaTSIS)” melibatkan 15 modul telah dibangunkan dan ditempatkan di Bahagian Perkhidmatan Teknikal (BPT). NaTSIS merupakan salah satu komponen dalam Projek Penghasilan Peta Bahaya dan Risiko Cerun (PBRC), inisiatif di bawah Pelan Tindakan 2009-2023 di bawah Pelan Induk Cerun Negara (PICN). Objektif sistem ini, yang memerlukan perolehan perkakasan dan perisian, adalah untuk membangunkan infrastruktur pangkalan data geospasial terain dan cerun negara. Projek ini melibatkan penambahan *server, storage, tape library system, server racks, switch, bandwidth tool* dan perisian baru di Pusat Data JMG. Selain peralatan ICT, infrastruktur di Pusat Data juga telah dipertingkatkan dengan pendawaian elektrik baru dan penambahan satu unit pendingin udara.

JMG dalam perancangan untuk menaik taraf bandwidth rangkaian Kompleks JMG Ipoh bagi memenuhi keperluan Sistem NaTSIS. Manakala permohonan naik taraf bandwidth untuk Makmal Kuantan dari 2 Mbps kepada 6 Mbps masih dalam semakan MAMPU.

Penglibatan Pusat Data JMG dalam pelaksanaan projek Government Data Center (GDC-2) masih diteruskan. Walau bagaimanapun, Pengujian Pemulihan Bencana (DR Test) tidak dapat dilaksanakan seperti yang dijadualkan kerana penghijrahan Pusat Pemulihan Bencana ke Pusat Data Kerajaan, Bandar Enstek, sebagaimana yang diarahkan oleh MAMPU.

Information Management

ICT Infrastructure, Security and Application

JMG Data Center successfully maintained its MS ISO/IEC 27001:2013 Information Security Management System (ISMS) certification for another three years, from 2016 until 2019. The certification was obtained after undergoing a re-certification process carried out by the external auditor SIRIM QAS on 4th and 5th July 2016.

In early 2016, a new application known as “National Geospatial Terrain and Slope Information System (NaTSIS)” involving 15 modules was developed and assigned to the Technical Services Division (BPT). NaTSIS is a component in the Slope Hazard and Risk Mapping Project, the initiatives under the National Slope Master Plan 2009-2023 Action Plan. The objective of this system, which required the procurement of both hardware and software, was to develop the database infrastructure for national geospatial terrain and slopes. The project involved the increment of server and storage capacity, and upgrades in the tape library system, server racks, switches, bandwidth tools and new software in the JMG Data Centre. Besides ICT equipment, infrastructure in the Data Center was also enhanced with new electrical wiring and additional air conditioning.

JMG is planning to upgrade network bandwidth in the Ipoh JMG Complex to meet the needs of NaTSIS System. The application to upgrade bandwidth from 2 Mbps to 6 Mbps for Kuantan Laboratory is being reviewed by MAMPU.

Participation of the JMG Data Centre in the Government Data Centre (GDC-2) project continued during the year. However, the Disaster Recovery Test (DR Test) could not be performed as scheduled because of the migration of the Disaster Recovery Center to the Government Data Centre, Bandar Enstek, as directed by MAMPU.

Pengurusan Data Berkomputer

Pada tahun ini, server-server Sistem Maklumat Mineral dan Geosains (MINGEOSIS) di BPT telah dipindahkan ke Pusat Data Sektor Awam (PDSA) di Putrajaya, sementara server-server MINGEOSIS di Pusat Pemulihan Bencana (DRC) JMG telah dipindahkan dari Bangunan STRATEQ di Petaling Jaya ke PDSA beralamat di:

Institut Aminuddin Baki,
Kompleks Pendidikan Nilai,
Bandar Enstek,
71760 Labu,
Negeri Sembilan.
Koordinat GPS: 2.725299, 101.796205

JMG telah komited dengan lima *business case* di bawah Rangka Kerja Big Data Kementerian Sumber Asli Dan Alam Sekitar (Geologi) iaitu:

- i. Pemeliharaan Kawasan Warisan Geologi
- ii. Pemantauan Kawasan Lombong dan Kuari
- iii. Penggunaan Bersepadu Maklumat Potensi Air Tanah
- iv. Maklumat Potensi Sumber Mineral Ekonomi
- v. Pemantauan *Geohazard*

Sistem Maklumat Geografi dan Kartografi Berdigit

Pada tahun 2016, aktiviti penyediaan peta geologi digital, penghasilan peta tematik, pengumpulan dan perkongsian data spatial serta percetakan peta telah diteruskan. Di samping itu, kerja kartografi untuk penghasilan peta dan rajah dengan menggunakan perisian grafik masih diteruskan.

Tugasan utama Unit Aplikasi Sistem Maklumat Geografi dan Kartografi di Ibu Pejabat adalah aktiviti penjanaan peta tematik serta penyediaan set data geospatial bagi kegunaan secara dalaman dan agensi luar. Di samping itu, penyediaan maklumat melalui aplikasi perkhidmatan sesawang dan aplikasi MyGDI Explorer bagi tujuan perkongsian data dan maklumat turut dilaksanakan. Pada tahun 2016, sejumlah peta, set data, metadata dan perkhidmatan melalui sesawang telah disediakan bagi manfaat pengguna yang berkepentingan.

Computerized Data Management

During this year, Minerals and Geoscience Information System (MINGEOSIS) servers at BPT were transferred to the Public Sector Data Center (PDSA) in Putrajaya, while MINGEOSIS servers at the JMG Disaster Recovery Center (DRC) were moved from the STRATEQ Building in Petaling Jaya to the PDSA located at:

Institut Aminuddin Baki,
Kompleks Pendidikan Nilai,
Bandar Enstek,
71760 Labu,
Negeri Sembilan.
GPS coordinates: 2.725299, 101.796205

JMG made a commitment to five business programmes under the Big Data Framework of the Ministry of Natural Resources and Environment (Geology), namely:

- i. Geological Heritage Conservation Area
- ii. Mines and Quarries Monitoring Area
- iii. Use of Integrated Information on Groundwater Potential
- iv. Information on the Potential Economics Mineral Resource
- v. Geohazard Monitoring

Geographical Information System and Digital Cartography

In 2016, activities such as the preparation of digital geological maps, thematic map production, spatial data collection and sharing, as well as printing of maps continued. In addition, cartographic work for the production of diagrams and figures using graphics software was continued.

The major task of the Unit of Application of Geographic Information Systems and Cartography at the Headquarters was to generate thematic maps and to prepare geospatial data sets for the use of both internal and external agencies. In addition, preparation of information through the application of web services and the application of MyGDI Explorer for the purpose of data and information sharing were also implemented. In 2016, a number of maps, data sets, metadata and services were prepared through the website for the use of interested users.

Bil. No.	Aktiviti Activities	Pelanggan Customers	Bil. Peta/ data No. of map/ data
1.	Penjanaan Peta tematik Generation of Thematic maps	Dalaman / Internal	21 peta / maps
2.	Perkongsian set data geospasial Geospatial data sets sharing	Dalaman / Internal	86 set data / data sets
		Agensi Luar External agencies	10 set data / data sets
3.	Perkongsian melalui perkhidmatan sesawang Sharing through web services	MaCGDI, NRE	1 perkhidmatan / service
4.	Penyediaan maklumat melalui aplikasi MyGDI Explorer Preparation of information through the application of MyGDI Explorer	MaCGDI, NRE	24 metadata

Penerbitan dan Perpustakaan

Salah satu fungsi penting JMG adalah untuk mengumpul, menganalisis dan menyebarkan data dan maklumat yang berkaitan dengan mineral dan geosains. Dalam memenuhi peranan penting ini, JMG menerbitkan penemuan dan hasil penyelidikan dalam pelbagai laporan teknikal dan peta, dan juga menyebarkan penerbitan ini melalui perpustakaan negeri di seluruh Malaysia.

Di samping enam terbitan berkala tahunan, JMG juga telah menerbitkan laporan bertajuk *“Geology of the Langkawi-Tarutao Transect area along the Malaysia-Thailand Border”* dan juga Technical Papers Vol. 9.

JMG telah menerima seramai 2502 orang pelawat yang membuat rujukan, penyelidikan serta membeli laporan dan peta di perpustakaan. Jumlah kutipan hasil pada tahun 2016 adalah sebanyak RM65,493, sedikit penurunan berbanding tahun lepas.

Publications and Library

One of the important functions of JMG is to collect, analyse and disseminate data and information pertaining to minerals and geoscience. In fulfilling this important role, JMG publishes its findings and research results in various technical reports and maps, and also disseminates these publications through its libraries in various states in the country.

Apart from six annual publications, a map report titled *“Geology of the Langkawi-Tarutao Transect area along the Malaysia-Thailand Border”* and Technical Papers Vol. 9 were also published.

A total of 2502 visitors visited the libraries for reference, research, and the purchase of reports and maps. The total revenue collected for 2016 was RM65,493, a slight decrease compared to the previous year’s.

Penjualan bahan terbitan jabatan
Sales of departmental publication

Perpustakaan Library	Jumlah pelawat No. of visitor	Laporan Report		Peta Map		Lain-lain Others	Jumlah penjualan Total sales (RM)
		Bil. No. of item	Jumlah Amount (RM)	Bil. No. of item	Jumlah Amount (RM)	Jumlah Amount (RM)	
Ibu Pejabat / Headquarters	745	190	12,535	200	16,977	30	29,542
Bahagian Perkhidmatan Teknikal / Technical Services Division	107	49	2900	28	2520	-	5420
Sarawak	872	114	9400	38	4050	240	13,690
Sabah	96	5	400	14	1350	-	1750
Johor	14	7	350	16	1480	-	1830
Negeri Sembilan / Melaka	30	6	286	5	500	-	786
Kedah / Perlis / Pulau Pinang	118	33	2305	14	1400	50	3755
Terengganu	70	27	1420	10	1000	-	2420
Pahang	420	28	2200	21	2150	-	4350
Kelantan	30	29	1050	9	900	-	1950
Jumlah Total	2502	488	32,846	355	32,327	320	65,493

*Nota: Ibu Pejabat JMG bertanggungjawab ke atas penjualan laporan dan peta di Selangor dan Wilayah Persekutuan Kuala Lumpur.

Notes: JMG headquarters is responsible for the sales of reports and maps in Selangor and the Federal Territory of Kuala Lumpur.

Muzium Geologi

Muzium geologi yang ditempatkan di BPT (Ipoh), JMG Sarawak (Kuching) dan JMG Sabah (Kota Kinabalu) memainkan peranan penting sebagai pusat pembelajaran dan pendidikan geosains di negara ini. Jumlah pelawat ke muzium geologi di Ipoh dan Kuching adalah masing-masing 7848 dan 135, sementara muzium geologi di JMG Sabah telah ditutup untuk ubahsuai.

Muzium Geologi Ipoh

Muzium Geologi Ipoh terletak di Bahagian Perkhidmatan Teknikal, Kompleks JMG Ipoh yang terletak di Sultan Azlan Shah Road dan kira-kira 5 km dari Ipoh, ibu negeri Perak. Muzium ini telah dirasmikan pada tahun 1957 sebagai sebahagian daripada Jabatan Penyiasatan Kajibumi Malaysia pada ketika itu. Muzium ini telah dibuka kepada orang ramai sejak tahun 1978.

Muzium ini diakui antara yang mempunyai koleksi batuan dan mineral yang terbaik dan paling lengkap di Malaysia. Muzium ini juga terkenal dengan koleksi menarik fosil, batu permata dan pelbagai spesimen batu yang ditemui dan dikumpulkan selama ini. Satu sampel batu tertua di negara ini, berumur kira-kira 600 juta tahun turut dipamerkan. Muzium ini juga mempamerkan pelbagai aktiviti perlombongan di Malaysia.

Pameran dalam muzium dibahagikan kepada tujuh zon, iaitu Zon A: sejarah Jabatan dan sejarah muzium, sejarah bumi dan mural struktur geologi; Zon B: dinosaur & fosil, batuan; Zon C: mineral, hablur dan batu permata; Zon D: kegunaan mineral; Zon E: aktiviti perlombongan; Zon F: aktiviti eksplorasi mineral dan geologi marin; dan Zon G: bencana geologi, lombong dan kuari, hidrogeologi, geologi dan pembangunan negara, sumber mineral, geologi warisan, produk JMG, penyelidikan dan pembangunan, dan perkhidmatan makmal.

Geological Museum

Geological museums located at BPT (Ipoh), JMG Sarawak (Kuching), and JMG Sabah (Kota Kinabalu) play an important role as centres of learning and education of geoscience in the country. The number of visitors to geological museum at Ipoh and Kuching was 7848 and 135, respectively; the geological museum at JMG Sabah was closed for renovation.

Geological Museum Ipoh

The Geological Museum Ipoh is within the Technical Services Division, Ipoh JMG Complex which is located at Sultan Azlan Shah Road and is about 5 km from Ipoh, the state capital of Perak. The museum was officiated in 1957 as part of the then Geological Survey Department Malaysia. The museum was opened to the public since 1978.

The museum is acknowledged as having among the best and most complete collection of rocks and minerals in Malaysia. The museum is also famous for the impressive collections of fossils, precious stones and various rock specimens found and collected over the years. A sample of the oldest rock of the country, dating back to some 600 million years ago is also on display. The museum also showcases various mining activities in Malaysia.

Exhibits in the museum are divided into seven zones, namely Zone A: history of the Department and the museum, history of the earth, geological structure mural; Zone B: dinosaur & fossils, rocks; Zone C: minerals, crystals and gemstone; Zone D: uses of minerals; Zone E: mining activities; Zone F: mineral exploration and marine geology activities; and Zone G, geological hazards, quarry and mines, hydrogeology, geology and nation building, mineral resources, geological heritage, JMG products, research and developments and laboratory services.

Waktu melawat / Visiting hours:

Isnin hingga Khamis Monday to Thursday	9.00 a.m. - 12.30 p.m. 2.00 p.m. - 4.30 p.m.
Jumaat Friday	9.00 a.m. - 12.00 p.m. 3.00 p.m. - 4.30 p.m.
Sabtu, Ahad dan Hari Kelepasan Am Saturday, Sunday and Public Holidays	Tutup Closed

Jumlah pelawat pada tahun 2016 / Numbers of visitors in the year 2016:

Bulan Month	Awam Public	Sekolah School	Institusi pengajian tinggi Higher learning institution	Luar negara Foreign country	Jumlah Total
Jan	211	17	21	96	345
Feb	340	91	151	15	597
Mac	359	208	212	12	791
Apr	128	266	205	5	604
Mei	256	344	80	344	682
Jun	330	111	66	39	546
Julai	132	23	6	29	190
Ogos	135	69	71	55	330
Sept	297	111	84	2	494
Okt	129	62	168	10	369
Nov	383	775	66	3	1227
Dis	1435	101	105	32	1673
Jumlah / Total					7848

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Lawatan delegasi dari Department of Mineral Resources Thailand (DMR) ke Muzium Geologi Ipoh pada 31.07.2016
Visit by delegation from Department of Mineral Resources Thailand (DMR) to Geological Museum Ipoh on 31.07.2016

Perkhidmatan Lombong & Kuari

Pada tahun 2016, Cawangan Perkhidmatan Lombong & Kuari (CPLK) di BPT masih berdepan dengan masalah kekosongan jawatan yang masih belum diisi. Dengan kekosongan-kekosongan tersebut, fungsi Unit Kejuruteraan Perlombongan dan Pengkuarian, CPLK untuk memberi khidmat pemantauan seperti habuk, gegaran dan ledakan udara pada 2016 tidak dapat dilaksanakan sama sekali. Walau bagaimanapun, Unit Pengurusan Dasar dan Perundangan, CPLK terus mengorak langkah memainkan peranan penting untuk industri perlombongan dan pengkuarian.

Pengurusan Dasar dan Perundangan

Kejayaan besar yang dicapai oleh CPLK pada 2016 ialah penggabungan sijil pembedil yang dikeluarkan oleh JMG dan sijil juruletup yang dikeluarkan oleh Polis Diraja Malaysia kepada satu pensijilan untuk kerja-kerja peletupan. Dengan penggabungan yang berkuatkuasa mulai 1 Januari 2017, penyampaian perkhidmatan kerajaan dapat dipertingkatkan dan pada masa yang sama mengurangkan karenah birokrasi. Penggabungan kepada pensijilan baharu yang diberi nama Lesen Pembedil akan sah laku untuk kerja-kerja peletupan bukan sahaja di lombong atau kuari, tetapi juga untuk industri pembinaan seperti perumahan, jalan raya dan terowong.

Selain itu, Unit Pengurusan Dasar dan Perundangan, CPLK juga berjaya menyiapkan penggubalan dan pewartaan dua peraturan di bawah Akta Pembangunan Mineral 1994 iaitu Peraturan-Peraturan Pembangunan Mineral (Pelesenan) 2016 dan Peraturan-Peraturan Pembangunan Mineral (Efluen) 2016 yang mula berkuatkuasa pada 1 Januari 2017. Peraturan Pelesenan ialah keperluan mempunyai lesen untuk aktiviti pembelian, penyimpanan, penjualan, pemprosesan mineral dan bijih mineral. Peraturan ini menggantikan Enakmen Bijih Mineral dan Enakmen Pembeli Emas. Manakala Peraturan Efluen pula ialah berkenaan efluen lombong yang dilepaskan keluar tidak boleh melebihi limit kepekatan yang ditetapkan.

Mines and Quarry Services

In 2016, the Mines & Quarry Services Section (CPLK) in BPT continued to face the problem of vacant posts that remained unfilled. As a result, the CPLK Mining and Quarrying Engineering Unit was unable to provide services such as the monitoring of dust, vibration and airblast in 2016. Nevertheless, the Policy Management and Legislation Unit of the CPLK continued with its essential role in the mining and quarrying industry.

Policy Management and Legislation

A significant achievement of the CPLK in 2016 was the merger of the shotfirer certificate and the blaster certificate (issued by JMG and the Royal Malaysia Police respectively) into a single unified certification for blasting works. With the merger effective on 1 January 2017, there was reduced bureaucracy and service delivery was enhanced. The merged new certification called Shotfirer Licence would be valid for blasting works not only in mines and quarries, but also for the construction of buildings, roads and tunnels.

The Policy Management and Legislation Unit of the CPLK successfully completed the drafting and gazetting of two regulations under the Mineral Development Act 1994, i.e. the Mineral Development Regulations (Licensing) 2016 and the Mineral Development Regulations (Effluent) 2016. Both regulations would come in effect on 1 January 2017. The Licensing Regulations, which govern activities in the purchase, storage, selling, and processing of minerals or mineral ores replace the Mineral Ores Enactment and the Gold Buyers Enactment. On the other hand, the Effluent Regulations deal with prescribed concentration limits of discharged mine effluents.



Khidmat Pemantauan Kualiti Udara

Seperti yang telah dimaklumkan, kekosongan staf sokongan yang masih belum diisi di CPLK BPT menyebabkan khidmat pemantauan kualiti udara seperti pengukuran menggunakan High Volume Sampler (HVS) dan Dustfall Deposition Gauge (DDG) tidak dapat dijalankan. Begitu juga, khidmat pemantauan gegaran dan ledakan udara daripada aktiviti peletupan tidak juga dapat dijalankan.

Latihan

Disebabkan oleh kekangan kewangan yang dihadapi oleh JMG amnya dan negara khususnya, peruntukan untuk latihan telah dipotong dengan begitu drastik. Justeru, tiada latihan dapat diberikan kepada pegawai dan staf Lombong & Kuari di JMG.

Air Quality Monitoring Services

As mentioned above, monitoring services for air quality such as those using the High Volume Sampler (HVS) and the Dust Deposition Gauge (DDG) could not be carried out as the vacancies for the required personnel were unfilled. Likewise, monitoring services for vibration and air blast from blasting activities were also not undertaken.

Trainings

Due to financial constraint faced by the JMG in general and the country in particular, the budget for trainings was drastically cut. Therefore, training was not able to be provided to the mines and quarry staff of the JMG.

Peperiksaan Pembedil

Selaku urusetia peperiksaan pembedil jabatan, CPLK, BPT telah menganjurkan tiga siri peperiksaan pembedil teori pada bulan Mac, Ogos dan November 2016 melibatkan seramai 231 orang calon.

Bagi peperiksaan pembedil amali pula, CPLK dengan kerjasama pejabat JMG negeri telah mengendalikan 29 peperiksaan amali untuk seramai 105 orang calon dari pelbagai negeri seperti Johor, Perak, Selangor, N. Sembilan, Kedah, Terengganu, Sarawak dan Sabah.

Shotfirer Examinations

As the Secretariat for the Department's shotfirer examinations, the CPLK had organised three series of Shotfirer Examination (Theory) in Mac, August and November 2016 respectively involving a total number of 231 candidates.

For the shotfirer practical exam, CPLK in collaboration with the state JMG offices conducted 29 practical tests for a total of 105 candidates from various states like Johor, Perak, Selangor, N. Sembilan, Kedah, Terengganu, Sarawak and Sabah.

Peperiksaan Pembedil (Teori) 2016 Shotfirer Examination (Theory) 2016

Peperiksaan pembedil (teori) Shotfirer examination (theory)	Bilangan pusat peperiksaan Number of examination centre	Bilangan calon Number of candidates
Sesi/ Session 1/2016 (31.03.2016)	10	94
Sesi/ Session 2/2016 (18.08.2016)	10	56
Sesi/ Session 3/2016 (24.11.2016)	8	81

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Peperiksaan pembedil (teori) dilaksanakan di JMG Pahang
Shot firer examination (theory) held in JMG Pahang



Peperiksaan pembedil (amali) diadakan di Kuari Shin Yang Sdn Bhd, Bau, Kuching
Shotfirer examination (practical) held at Kuari Shin Yang Sdn. Bhd., Bau, Kuching

Perkhidmatan Geofizik

Perkhidmatan geofizik yang telah diberikan adalah survey keberintangan imej 2-D, survei graviti rantau, pengelogan geofizik dan survei *real time kinematic (RTK)*. Survei Keberintangan 2D telah dijalankan di 16 lokasi meliputi sejumlah 29,120 meter-garis untuk kajian air tanah dan pemetaan struktur sub permukaan dan litologi untuk Projek Penilaian Sumber Thorium.

Survei graviti rantau yang dijalankan di Pulau Mantanani dan Kota Belud, Sabah meliputi sejumlah 6339 stesen bagi kajian air tanah. Pengelogan Geofizik telah dijalankan ke atas enam telaga untuk kajian hidrogeologi termasuk untuk tujuan kelulusan perakuan dan pelesenan air mineral. Objektif utama siasatan pengelogan geofizik adalah untuk menentukan kedalaman lubang gerudi, kedudukan skrin, lokasi selongsong dan mengesan kebocoran pada selongsong sekiranya ada. Survei Geofizik RTK telah dijalankan di 15 loji rawatan air untuk mendapatkan koordinat dan ketinggian lokasi dengan kejituan yang tinggi.

Geophysical Services

The geophysical services provided by the department included 2-D resistivity imaging, regional gravity survey, geophysical logging activities, and real time kinematic survey. 2-D Resistivity Survey was conducted at 19 locations covering 29,120 line-meters for groundwater studies and subsurface geological structure and lithology mapping for Thorium Resource Assessment Project.

Regional gravity survey was conducted in the Mantanani Island and Kota Belud, Sabah covering 6339 stations for groundwater study. Geophysical logging was carried out at six wells for hydrogeological study including for approval of certification and licensing of mineral water. The main objective for geophysical logging is to determine the depth of boreholes, screen location, casing location and to detect casing leakage if any. Geophysical Survey RTK survey was carried out at 15 water treatment plants to obtain the coordinates and the altitude with high accuracy.

Keberintangan pengimejan 2-D 2-D resistivity imaging

Negeri State	Kawasan Area	Liputan (meter-garis) Coverage (line-metres)	Penemuan / Catatan Findings / Remark
Negeri Sembilan	1. Jempol 2. Felda Palong 2,4,5,6, Bahau	6960	Kajian air tanah / Groundwater study
Terengganu	1. Dungun a. Tok Kah b. Rhu Batil 2. Kemaman a. Air Puteh b. Seberang Tayor c. Kg. Batu 3. Paka a. Pusat Maahad Tahfiz	3200	Kajian air tanah / Groundwater study
Perak	1. Sekolah Maahad Tahfiz Al-Quran Lid Dakwah Wal-Imamah, Lenggong	800	Kajian air tanah / Groundwater study
Kelantan	1. Kem Desa Pahlawan, Kok Lanas 2. Pusat Penyelidikan Marin, Bachok 3. Pusat Akuakultur Perikanan, Machang 4. Pusat Akhlak, Machang	2080	Kajian air tanah / Groundwater study

Negeri State	Kawasan Area	Liputan (meter-garis) Coverage (line-metres)	Penemuan / Catatan Findings / Remark
Johor	<ol style="list-style-type: none"> Loji Rawatan Air Sg. Lebam, Pengerang Kg. Seri Paya, Bkt. Gambir, Ledang Pusat Latihan Kecemerlangan Perhutanan Gunung Pantii, Kota Tinggi Loji Rawatan Air Sultan Iskandar, Pasir Gudang Loji Rawatan Air Sg. Gembut, Sedili Loji Rawatan Air Lok Heng, Kota Tinggi 	8000	Kajian air tanah / Groundwater study
Pahang	<ol style="list-style-type: none"> Raub 	2800	Pemetaan struktur sub permukaan dan litologi untuk Projek Penilaian Sumber Thorium Subsurface geological structure and lithology mapping for Thorium Resource Assessment Project
	<ol style="list-style-type: none"> Loji Rawatan Air Chini 	4800	Kajian air tanah / Groundwater study
Selangor	<ol style="list-style-type: none"> Taman Idaman Serendah, Hulu Selangor 	480	Kajian air tanah / Groundwater study
Jumlah liputan / Total coverage		29,120	



Survei keberintangan 2-D di kawasan Tasik Chini
[2-D resistivity survey at Tasik Chini Area](#)

Mikrograviti / Graviti
Microgravity / Gravity

Negeri State	Kawasan Area	Liputan (bil. stesen) Coverage (no. of stations)	Penemuan / Catatan Findings / Remark
Sabah	Pulau Mantanani	552	Kajian air tanah / Groundwater study
	Kota Belud	87	Kajian air tanah / Groundwater study
Jumlah liputan Total coverage		639	



Survei graviti di Kota Belud, Sabah
Gravity survey at Kota Belud, Sabah



Survei graviti di Pulau Mantanani, Sabah
Gravity survey at Pulau Mantanani, Sabah

Pengelogan geofizik
Geophysical logging

Negeri State	Kawasan Area	Liputan (bil. telaga) Coverage (no. of wells)	Penemuan / Catatan Findings / Remark
Selangor	Syarikat Spring Fresh Sdn. Bhd. Lot 919, Mukim Batang Kali, Batu 31, Jln Ipoh, Selangor	2	Perakuan air mineral Mineral water certification
	Syarikat Jant Marketing Sdn. Bhd. Lot no. 15861, Mukim Kerling, Hulu Selangor	1	
Kedah	Syarikat Kencana Mineral Water Sdn. Bhd., Kg. Alor Batu, Mukim Gelong, Kubang Pasu	1	Perakuan air mineral Mineral water certification
Sabah	Kg. Dudar, Jalan Kudat, Kota Belud	1	Kajian Hidrogeologi Hydrogeology study
	Telaga JBA Sabah, Kg. Bobot, Kota Belud	1	
Jumlah liputan / Total coverage		6	



Pengelogan geofizik di Kota Belud, Sabah
Geophysical logging at Kota Belud, Sabah



Pengukuran lokasi menggunakan *real time kinematic* GNSS di Gurun, Kedah
Real time kinematic GNSS positioning measurement at Gurun, Kedah

Pengukuran lokasi menggunakan *Real Time Kinematic* GNSS
Real Time Kinematic GNSS Positioning Measurement

Negeri State	Kawasan Area	Liputan (bil.) Coverage (no.)	Penemuan / Catatan Findings / Remark
Perlis	Loji Air Timah Tasoh	1	Kajian telah dijalankan bagi mendapatkan koordinat dan ketinggian lokasi dengan kejituan yang tinggi. The study was carried out to obtain the coordinates and the altitude with high accuracy.
Kedah	Loji Rawatan Air Gurun Loji Rawatan Air Tupah Loji Rawatan Air Merbuk Loji Rawatan Air Jalan Baru	4	
Perak	Loji Rawatan Air Semanggol	1	
Pahang	Loji Rawatan Air Chini	1	
Johor	Loji Rawatan Air Lok Heng Loji Rawatan Air Sg. Gembut	2	
Melaka	Loji Rawatan Air Merlimau Kolam Takungan Air Bersih, Bukit Bulat	2	
Negeri Sembilan	Loji Rawatan Air Gemenchek	1	
Selangor	Loji Rawatan Air Sg. Labu Loji Rawatan Air Sg. Selisik	2	
Kelantan	Loji Rawatan Air Bendang Nyior	1	
Jumlah liputan / Total coverage		15	

Mineralogi & Petrologi

Semenanjung Malaysia

Sebanyak 965 unit kerja dengan nilai kerja RM65,030 telah dijalankan untuk jabatan, agensi kerajaan dan sektor swasta.

Mineralogy & Petrology

Peninsular Malaysia

A total of 965 units of routine work valued at RM65,030 were completed for the department, other government agencies and the private sector.

Khidmat analisis yang dijalankan oleh Unit Mineralogi dan Petrologi, Bahagian Perkhidmatan Teknikal Analytical services carried out by the Mineralogy and Petrology Unit, Technical Services Division

	Untuk industri mineral For the mineral industry		Untuk agensi kerajaan For government agencies	
	Bil. unit kerja Number of work unit	Nilai kerja Value of work (RM)	Bil. unit kerja Number of work unit	Nilai kerja Value of work (RM)
Pengenalan batuan dan mineral Identification of hand specimen	14	980	15	1050
Pemeriksaan petrografi terperinci Detailed petrographic examination	27	8100	4	120
Mendulang Panning	3	60	0	0
Pengasingan magnetik / Magnetic separation	133	6650	37	1850
Pengasingan Bromoform / Bromoform separation	133	2660	63	1260
Anggaran mineral kuantitatif Quantitative mineral estimation	132	11,880	11	990
Penyediaan keratan mikro Micro section preparation	41	1640	46	1840
Penyediaan sampel dan Belauan Sinar-X Sample preparation and X-ray Diffraction	39	4680	168	20,160
Ujian kimia Chemical test	0	0	0	0
Koleksi batuan dan mineral Rock and mineral collection	1	70	1	70
Kerja fotografi Photographic work	0	0	97	970
Ujian kekerasan Hardness test	0	0	0	0
Jumlah kecil / Sub -total	523	36,720	442	28,310
Jumlah unit kerja Total number of work units	965	Jumlah nilai kerja Total value of work		65,030

Sarawak

JMG Sarawak telah melaksanakan 292 unit kerja rutin dengan nilai kerja sebanyak RM7050 atas permintaan dalam dan luar jabatan. Kerja-kerja yang dilakukan merangkumi penyediaan keratan nipis batuan, pengenalan batuan dan penyediaan laporan petrografi.

Sabah

Aktiviti Mineralogi dan Petrologi telah menjalankan pelbagai tugas, seperti menyediakan keratan nipis batuan untuk kajian petrografi, mengenal pasti batuan dan mineral serta menyediakan gambar mikro. Sebanyak 134 kerja mineralogi dan petrografi dengan nilai kerja RM5230 telah dilaksanakan atas permintaan dalam dan luar jabatan. Kebanyakan kerja tersebut adalah atas permintaan pihak swasta.

Sarawak

Routine work totalling 292 units with a work value of RM7050 was carried out by JMG Sarawak on internal and outside request. The work carried out included the preparation of rock thin-sections, petrographical examinations and the preparation of petrographic reports.

Sabah

The Mineralogy and Petrology Activity performed various tasks such as the preparation and petrographical studies of rock thin sections, identification of rocks and minerals, as well as preparation of photomicrographs. A total of 134 mineralogy and petrography studies with a work value of RM5230 were carried out on internal and outside request. Most of the work was carried out at the request of the private sector.

Kerja yang dijalankan oleh Unit Mineralogi dan Petrologi, JMG Sarawak dan Sabah Work carried out by the Mineralogy and Petrology Activity, JMG Sarawak and Sabah

Tugas / Task	Jumlah unit Number of units	
	Sarawak	Sabah
Penyediaan keratan nipis batuan / Rock thin-section preparation		
a. Permintaan dalaman (JMG) / Internal request	4	5
b. Permintaan luar (Luar Jabatan) / External request	72	82
Analisis petrografi / Petrographical analysis:		
a. Permintaan Dalaman (JMG) / Internal request	216	-
b. Permintaan Luaran (Luar Jabatan) / External request	-	46
Pemeriksaan kuantitatif mineral / Quantitative mineral examination	-	1
Jumlah kerja / Total number of work unit	292	134
Nilai kerja / Value of work	7050	5230
Gambar mikro keratan nipis / Photomicrographs of rock thin section	-	92
Bilangan pelanggan / Client		
a. Orang awam / General public	17	32
b. Pelajar / Students	66	5

Fotogeologi Dan Penderiaan Jauh **Photogeology And Remote Sensing**

Fotogeologi dan penderiaan jauh Photogeology and remote sensing

Bil. No	Kawasan Area	Luas Coverage (km ²)	Tujuan Purpose	Catatan Remarks
A Pemetaan fotogeologi Photogeological mapping				
1	Kawasan Seremban (Syit 130) Seremban area (Sheet 30)	1200	Menyiapkan Laporan Peta Geologi Semenanjung Malaysia. Completion of Peninsular Malaysia Geological Map Report.	Peta fotogeologi telah disediakan. Photogeological map has been prepared.
B Perkhidmatan tafsiran fotoudara / imej satelit Airphoto / satellite images interpretation services				
1.	Kawasan Perikanan Machang, Ladang Kerilla Tanah Merah dan Kem Desa Pahlawan Kelantan Aquaculture Machang Area, Ladang Kerilla Tanah Merah and Desa Pahlawan Camp Kelantan	50	Interpretasi lineamen menggunakan fotoudara bagi kajian sumber air tanah. Lineament interpretation using airphoto for groundwater resources study.	Peta tafsiran lineamen telah disediakan. Lineament interpretation map has been prepared.
2.	Kawasan Loji Rawatan Air Chini, Pekan, Pahang Chini Water Treatment Plant Area, Pekan, Pahang	100	Interpretasi lineamen menggunakan imej satelit IFSAR bagi kajian sumber air tanah. Lineament interpretation using IFSAR satellite images for groundwater resources study.	Peta tafsiran lineamen telah disediakan. Lineament interpretation map has been prepared.
C Perkhidmatan lain Other services				
1.	Kawasan Bukit Tinggi, Pahang Bukit Tinggi Area, Pahang	110	Latihan Industri Pelajar UiTM Perlis Industrial Training for students from UiTM Perlis	Tempoh: 3 bulan Duration: 3 months

Perkhidmatan Makmal

Makmal Geokimia

Perkhidmatan Analisis Geokimia

Makmal-makmal Geokimia di Ipoh, Kuantan, Kuching dan Kota Kinabalu terus memberi perkhidmatan analisis kimia / ujian fizikal dan khidmat nasihat kepada pelanggan dalaman dan luaran Jabatan seluruh Malaysia. Aktiviti-aktiviti ini adalah untuk membantu pembangunan sektor mineral, industri berasaskan mineral, aktiviti kitar semula logam dan eksplorasi/pembangunan sumber air bawah tanah dalam negara. Dalam tahun 2016 sejumlah 47,255 analisis telah disiapkan dengan nilai kerja keseluruhan RM1,199,516 di mana 3015 analisis telah diselesaikan untuk pelanggan swasta Jabatan dengan kutipan hasil bernilai RM128,515.

Sistem Pengurusan dan Akreditasi Makmal MS ISO/IEC 17025:2005

Dalam tahun 2016, keempat-empat Makmal Geokimia berjaya melaksana dan mengekalkan sijil akreditasi MS ISO/IEC 17025:2005. Makmal Batu Arang JMG Sarawak telah menambah skop ujian akreditasi (*Moisture, Ash & Volatile Matter*) menggunakan *Thermogravimetry Analyzer* (TGA).

Laboratory Services

Geochemical Laboratory

Geochemical Analytical Services

The Geochemical Laboratories in Ipoh, Kuantan, Kuching and Kota Kinabalu continued to provide testing and consultancy services to internal dan external customers of the Department throughout Malaysia. These activities assist the development of the mineral and mineral-based industries, metal recycling activities and ground water exploration/development in the country. For the year 2016 a total of 47,255 analyses were completed with a total work value of RM1,199,516 of which 3015 analyses were completed for the private sector with a revenue collection of RM128,515.

MS ISO/IEC 17025:2005 Laboratory Management System and Accreditation

For the year 2016, all the four Geochemical Laboratories successfully implemented and retained their MS ISO/IEC 17025:2005 accreditation certificate. Coal Quality Laboratory JMG Sarawak has an additional scope of testing (*Moisture, Ash, and Volatile Matter*) using *Thermogravimetry Analyzer* (TGA).

Persijilan Akreditasi MS ISO/IEC 17025:2005
MS ISO/IEC 17025:2005 Accreditation Certification

Makmal Laboratory	No. Sijil Certificate No.	Sah sehingga Valid until	Tempoh persijilan Certification duration	Skop akreditasi Scope of accreditation	Penandatanganan Sijil Ujian SAIMM Approved signatory for SAIMM test certificates
Ipoh	SAMM 116	31 Ogos 2017	1997-2016 19 tahun / years	Pasir silika / silica sand: 11 Batu kapur / limestone: 14 Bullion emas / gold bullion: 1 Air tanah / groundwater: 15 Jumlah ujian / test: 41	12 Pegawai Geosains (Kimiabumi) / Geoscience Officers (Geochemistry)
Kuching	SAMM 173	12 Ogos 2017	1999-2016 17 tahun / years	17 ujian batu arang / coal test	5 Pegawai Geosains (Kimiabumi) / Geoscience Officers (Geochemistry)
Kota Kinabalu	SAMM 263	07 Jan 2018	2004-2016 12 tahun / years	3 ujian tanah / soil test	4 Pegawai Geosains (Kimiabumi) / Geoscience Officers (Geochemistry)
Kuantan	SAMM 508	04 Apr 2017	2011-2016 6 tahun / years	1 ujian sampel geokimia / geochemical sample test	4 Pegawai Geosains (Kimiabumi) / Geoscience Officers (Geochemistry)
Jumlah / Total:				62 ujian / tests	25 Pegawai Geosains (Kimiabumi) / Geoscience Officers (Geochemistry)

Nota:- SAIMM :- Skim Akreditasi Makmal Malaysia / Malaysian Laboratory Accreditation Scheme

Disamping itu, audit dalaman di antara makmal serta mesyuarat kajian semula pengurusan berjadual terus diadakan mengikut jadual yang ditetapkan untuk memantau dan memastikan sistem pengurusan MS ISO/IEC 17025 dilaksanakan dengan efektif.

Program-program ujian kecekapan/perbandingan di antara makmal adalah mandatori dalam sistem standard pengurusan MS ISO/IEC 17025:2005 dan usaha diteruskan untuk meningkatkan lagi kualiti perkhidmatan analisis kepada pelanggan jabatan. Pada keseluruhannya, kesemua Makmal Jabatan telah menunjukkan prestasi baik dan kecekapan teknikal yang tinggi dalam melaksanakan ujian-ujian tertentu dalam semua program ujian kecekapan / perbandingan di antara makmal yang disertai.

In addition, Interlaboratory internal audits and management review meetings were conducted regularly as scheduled to monitor and ensure the effective implementation of the MS ISO/IEC 17025 management system.

Proficiency testing (PT) / Interlaboratory Cross-check programmes is a mandatory requirements for compliance with the MS ISO/IEC 17025:2005 management standard and efforts is continuously done to further improve the quality of testing services provided to the Department's customers. The Department's laboratories have demonstrated good performance and competency in all the Proficiency Testing / Interlaboratory Cross-check programmes participated.

Penyertaan dalam Program Ujian Kecekapan / Perbandingan antara makmal
Participation in Proficiency Testing and Interlaboratory Cross-check Programmes

Bil. No.	Nama Program Ujian Kecekapan / Perbandingan di antara makmal Name of Proficiency Testing (PT) / Interlaboratory X-check programme	Penganjur / Pengelola program Programme provider / Organiser	Penyertaan Participation
1.	8 PT programme on Water testing:- ENVITEST 2 (Round 1) - Trace metals Al, Cd, Cr & Cu ENVITEST 2 (Round 2) - Trace metals Fe, Mn, Pb, Ni & Zn ENVITEST 4 - Total Solids, Suspended Solids & Total Dissolved solids ENVIEST 5 - Turbidity & Alkalinity ENVITEST 6 - Hg & As WAPAS 1 – Anions - Cl, SO ₄ , NO ₃ & F WAPAS 5 - Na & K WAPAS 6 - Hardness, Ca & Mg	Jabatan Kimia Malaysia Chemistry Department Malaysia	Makmal Ipoh Ipoh Laboratory
2.	Determination of SiO₂, Fe₂O₃, TiO₂, CaO and MgO in Silica Sand by a) Wet classical method b) XRF determination	Makmal Ipoh Ipoh Laboratory	5 private and 4 government laboratories

Penyertaan dalam Pembangunan Standard Malaysia

Pegawai-pegawai Geosains, Makmal Ipoh terus mewakili Jabatan dalam beberapa Jawatankuasa Teknikal / Kumpulan Kerja Pembangunan Standard dan telah menyumbang secara aktif dalam pembangunan Standard Malaysia (MS) yang baru dan yang dikaji semula selepas melebihi usia lima tahun.

Participation in the development of Malaysian Standards

Geoscience officers of the Ipoh Geochemical Laboratory continued to represent the Department in several Technical Committees / Working Groups and have contributed actively to the development of new Malaysian Standards as well as revision of Malaysian Standards which were more than five years old.

Bil. No.	Jawatankuasa / Kumpulan Kerja Teknikal Technical Committee / Working Group
1.	Industrial Standard Committee B for Chemicals and Materials (ISC B)
2.	Working Group for Lime and Lime Products
3.	Working Group for Clay and Clay Products
4.	Technical Committee on Soil Quality
5.	Technical Committee on Raw materials for Iron and Steel and Intermediary products
6.	Technical Committee on “Non-Ferrous Metals and Ores”
7.	Working Group on Precious Metals

Penghasilan kerja perkhidmatan makmal geokimia tahun 2016
Geochemical laboratory services work output for 2016

Jenis sampel Type of sample	Penghasilan Output	Perkhidmatan makmal (Semenanjung)						Perkhidmatan makmal (Sarawak)			Perkhidmatan makmal (Sabah)		
		Laboratory services (Peninsular)		Laboratory services (Sarawak)		Laboratory services (Sabah)		Laboratory services (Sarawak)		Laboratory services (Sabah)			
		Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector	Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector	Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector	Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector
Sampel geokimia (Sedimen, tanah, konsentrat & batuan)	Bilangan analisis Number of analysis	9936	5	187	308	-	-	63	44	-	25	-	-
Geochemical (Sediment, soil, concentrate & rock)	Nilai Kerja Work value (RM)	141,260	320	8560	3805	-	-	1260	1700	-	760	-	-
Air (Air tanah, air permukaan, effluen)	Bilangan analisis Number of analysis	21,730	-	160	1726	-	-	4478	20	-	43	-	-
Water (Groundwater, surface water, effluents)	Nilai Kerja Work value (RM)	539,258	-	3285	40,555	-	-	76,600	700	-	1145	-	-
Arang Batu Coal	Bilangan analisis Number of analysis	-	-	-	183	-	624	-	-	-	-	-	-
	Nilai Kerja Work value (RM)	-	-	-	9173	-	24,075	-	-	-	-	-	-
Silikat (batuan silikat, agregat & debu arang batu)	Bilangan analisis Number of analysis	1487	199	88	-	-	-	-	-	-	-	-	-
Silikates (silicate rock, aggregate & coal ash)	Nilai Kerja Work value (RM)	73,540	10,655	4216	-	-	-	-	-	-	-	-	-
Mineral perindustrian (pasir silika, batu kapur, lempung, feldspar)	Bilangan analisis Number of analysis	713	362	1655	124	52	7	25	-	-	84	-	-
Industrial minerals (silica sand, limestone, clay, feldspar)	Nilai Kerja Work value (RM)	21,555	17,890	75979	8040	1560	410	1670	-	-	4645	-	-

Jenis sampel Type of sample	Penghasilan Output	Perkhidmatan makmal (Semenanjung) Laboratory services (Peninsular)			Perkhidmatan makmal (Sarawak) Laboratory services (Sarawak)			Perkhidmatan makmal (Sabah) Laboratory services (Sabah)		
		Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector	Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector	Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector
Bijih berlogam (limenit, bijeh besi, struverit, zircon)	Bilangan analisis Number of analysis	202	11	134	-	-	-	-	-	-
Metalliferous ores (limenite, iron ore, struverite, zircon)	Nilai Kerja Work value (RM)	9460	2800	5125	-	-	-	-	-	-
Logam & aloi (Emas, ingot logam & pelbagai aloi)	Bilangan analisis Number of analysis	-	29	3	-	-	-	2543	-	5
Metals & Alloy (gold, metal ingot & miscellaneous alloy)	Nilai Kerja Work value (RM)	-	2170	100	-	-	-	107,030	-	215
Pelbagai sampel (Sludge, sisa industri) Miscellaneous (sludges, industrial waste etc.)	Bilangan analisis Number of analysis	-	-	-	-	-	-	-	-	-
	Nilai Kerja Work value (RM)	-	-	-	-	-	-	-	-	-
Jumlah Total	Bilangan analisis Number of analysis	34,068	606	2227	2341	52	631	7109	64	157
	Nilai Kerja Work value (RM)	785,073	33,835	97,265	61,573	1560	24,485	186,560	2400	6765
Jumlah keseluruhan Overall total	Bilangan analisis Number of analysis		36,901			3024			7330	
	Nilai Kerja Work value (RM)		916,173			87,618			195,725	
Bilangan analisis / Number of analysis										
		Nilai kerja (RM) Work value (RM)			Nilai kerja termasuk bayaran (RM) Work value including payment (RM)			Kutipan Hasil (RM) Revenue collection (RM)		
Jumlah besar Grand total	Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector	Jumlah Total	Sampel dalam jabatan Internal sample	Agensi kerajaan Government agencies	Sektor swasta Private sector	1,199,516	128,515	
	43,518	722	3015	47,255	1,033,206	37,795	128,515			

Makmal Geologi Kejuruteraan

Makmal Geologi Kejuruteraan di Bahagian Perkhidmatan Teknikal telah menjalankan perkhidmatan ujian penentuan ciri-ciri mekanikal, fizikal dan kekuatan agregat batuan dan tanah. Ia juga memberi perkhidmatan sokongan geoteknik kepada aktiviti geologi kejuruteraan, perlombongan, pengkuarian dan aktiviti-aktiviti lain jabatan. Makmal ini juga menawarkan perkhidmatan geoteknik kepada agensi-agensi kerajaan dan pihak industri. Dalam tahun 2016, sebanyak 498 unit sampel telah diuji dengan jumlah nilai kerja sebanyak RM19,783.

Engineering Geology Laboratory

Engineering Geology Laboratory at the Technical Service Division provides test to determine mechanical and physical properties and strength of rock aggregates and soil. It also provides geotechnical support services to the engineering geology, mining, quarrying and other activities of the department. This laboratory also offers geotechnical test services to other government agencies and private sectors. In 2016, a total of 498 unit samples were tested with the total work value of RM19,783.

Senarai terperinci kerja yang dijalankan oleh Makmal Geologi Kejuruteraan
Details of work carried out by the Engineering Geology Laboratory

Ujian agregat / tanah Aggregate / soil test	Untuk industri For the industry		Untuk agensi kerajaan For government agencies	
	Unit (Bil. / No.)	Nilai kerja Work value (RM)	Unit (Bil. / No.)	Nilai kerja Work value (RM)
Specific gravity	134	2680	-	-
Water absorption	20	500	-	-
Moisture content	0	0	-	-
Sound value	20	1600	-	-
Flakiness index	13	390	-	-
Elongation index	8	240	-	-
Impact value	19	760	-	-
Crushing value	17	850	-	-
Ten % fines value	12	600	-	-
Los angeles abrasion	22	1320	-	-
Sieve analysis	173	8650	-	-
Cube test	9	171	-	-
Plasticity index	0	0	-	-
Mechanical sieving	24	672	-	-
Crush to size	17	850	-	-
Fractured Face (flakiness)*	0	0	0	0
Bulk density (SG)*	0	0	0	0
Clay silt dust content (SA)*	10	500	0	0
Hardness number test	0	0	0	0
Crushing strength	0	0	0	0
Porosity	0	0	0	0
Shell content	0	0	0	0
Rebound hammer	0	0	0	0
Gradation (hydrometer)	0	0	0	0
Sieve analysis (soil)	0	0	0	0
Atterberg limits	0	0	0	0
Moisture content	0	0	0	0
Specific gravity	0	0	0	0
Linear limit	0	0	0	0
Shrinkage limit	0	0	0	0
Jumlah kecil / Sub-total	498	19,783	0	0
			Jumlah bilangan unit / Total no. of unit	Jumlah nilai kerja / Total work value (RM)
			498	19,783

Makmal Geologi Marin

Makmal Geologi Marin di Bahagian Perkhidmatan Teknikal, Ipoh telah menjalankan analisis sampel sedimen bagi Projek Kajian Tumbesaran dan Kematian Kerang di Tapak Ternakan Kerang di Selangor, kajian bersama JMG-Universiti Malaysia Terengganu (UMT)-East Carolina University (ECU), Projek kajian bersama JMG-Institut Oseanografi dan Sekitaran (Higher Institutions' Center of Excellence (HiCoE), UMT, Ekspedisi Pelayaran Sainifik Kebangsaan 2016-2017 (EPSK 2016-2017) dan Kajian Muka Sauk Loji Air Chini, Pekan, Pahang. Di samping itu, makmal juga telah melaksanakan perkhidmatan analisis sampel kepada pihak swasta. Bilangan analisis yang dijalankan adalah sebanyak 688. Kaedah analisis yang dijalankan adalah *Laser Particle Size Analyzer (LPSA)* sebanyak 129, kandungan karbonat sebanyak 153, kandungan organik sebanyak 212 dan ayakan saiz butiran sebanyak 194. Kerja-kerja penyelenggaraan peralatan makmal dan latihan industri kepada empat pelajar dari Universiti Malaysia Terengganu selama lapan minggu turut dikendalikan oleh Makmal Geologi Marin.

Marine Geology Laboratory

The Marine Geology Laboratory of the Technical services Division, Ipoh has carried out analysis for the Study of Cockle Growth and Death at Cockle Farm Selangor (JMG-Fisheries Research Institute), Joint research project between JMG-UMT-ECU, Joint research project JMG-Institute of Oceanography and Environment (HiCoE-UMT), National Scientific Cruise Expedition 2016-2017 (EPSK 2016 -2017) and Chini Water Intake Plant Studies, Pekan, Pahang. The laboratory also performed grain size analysis for private company. The number of samples analysed were 688. The analysis conducted includes 129 Laser Particle Size Analyzer (LPSA), 153 carbonates content, 212 organic content and 194 grain size analysis. Maintenance for laboratory equipment and industrial training for four students from Universiti Malaysia Terengganu for a period of eight weeks were also conducted.



**Penerbitan
Publications**

Penerbitan Publications

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Sarawak

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- **Pembangunan Lombong dan Kuari /
Mine and Quarry Development**

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Profil Pejabat **Office Profiles**

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Ibu Pejabat Headquarters

Cawangan Pengurusan Maklumat Information Management Section

Cawangan Pengurusan Maklumat,
Jabatan Mineral Dan Geosains Malaysia
Lantai 19, Bangunan Tabung Haji,
Jalan Tun Razak, 50658 KUALA LUMPUR
Tel: (6) 03-21611033
Faks: (6) 03-21611036
E-mail: jmgkll@jmg.gov.my

Pengarah / Director: Abdul Rahman Yusoff
E-mail: armyf@jmg.gov.my



Berdiri dari kiri / **Standing from left:** Mohd Zulkiflee Che Soh (KPP, Unit Aplikasi GIS & Kartografi), Che Aslinaliza Che Ahmed (Ketua Pegawai Teknologi Maklumat, Unit Infrastruktur dan Keselamatan ICT), Dr. Sia Say Gee (KPP, Unit Penyuntingan & Perpustakaan)
Duduk / **Sitting:** Abdul Rahman Yusoff (Pengarah)

Cawangan Ekonomi Mineral Mineral Economics Section

Cawangan Ekonomi Mineral,
Jabatan Mineral Dan Geosains Malaysia
Lantai 22, Bangunan Tabung Haji,
Jalan Tun Razak, 50658 KUALA LUMPUR
Tel: (6) 03-21611033
Faks: (6) 03-21611036
E-mail: jmgkll@jmg.gov.my

Pengarah / Director: Kamal Daril
E-mail: kamal@jmg.gov.my



Dari kiri / **From left:** Joanes Muda (Timbalan Pengarah / KPPK, Unit Risikan Mineral), Yusari Basiran (KPP, Unit Perhubungan Industri), Kamal Daril (Pengarah), Nurul Huda Romli (KPP, Unit Tekno Ekonomi), Haniza Zakri (KPP, Unit Dagangan Antarabangsa),

Cawangan Perancangan Dan Pengurusan Planning and Management Section

Cawangan Perancangan Dan Pengurusan,
Jabatan Mineral Dan Geosains Malaysia
Lantai 20 & 21, Bangunan Tabung Haji,
Jalan Tun Razak, 50658 KUALA LUMPUR
Tel: (6) 03-21611033
Faks: (6) 03-21611036
E-mail: jmgkll@jmg.gov.my

Pengarah / Director: Kamuradin Md Slar
(bersara pada / retired as of 13.06.2016)
E-mail: kams@jmg.gov.my



Dari kiri / **From left:** Azemi Hj. Eki (KPPK, Unit Pembangunan Sumber Manusia), Mohd Badzran Mat Taib (Timbalan Pengarah / KPPK, Unit Perancangan & Pemantauan Pembangunan), Kamuradin Md. Slar (Pengarah), Danial Lee Abdullah (KPPK, Unit Pentadbiran Dan Kewangan), Ling Nan Ley (KPPK, Unit Perancangan Geosains), Habibah Tahir (KPP, Unit Perhubungan Awam & Perundingan)

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Cawangan Penyelarasan Pelaksanaan Operasi Operation Implementation Coordination Section

Cawangan Penyelarasan Pelaksanaan Operasi,
Jabatan Mineral Dan Geosains Malaysia
Lantai 21, Bangunan Tabung Haji,
Jalan Tun Razak, 50658 KUALA LUMPUR
Tel: (6) 03-21611033
Faks: (6) 03-21611036
E-mail: jmgkll@jmg.gov.my

Pengarah / Director: Mustafar Hamzah
(mulai / from 01.09.2016)
E-mail: mbh57@jmg.gov.my



Dari kiri / **From left:** Kamaruddan Abdullah (Timbalan Pengarah, KPPK, Unit lombong & Kuari), Mustafar Hamzah (Pengarah), Siti Aminah Abdul Sarif (KPP, Unit Geosains)

Bahagian Perkhidmatan Teknikal Technical Services Division

Bahagian Perkhidmatan Teknikal,
Jabatan Mineral Dan Geosains Malaysia
Jalan Sultan Azlan Shah,
31400 IPOH, Perak Darul Ridzuan
Tel.: (6) 05-540 6000
Faks: (6) 05-540 6100
E-mail: jmbgpt@jmg.gov.my

Pengarah / Director: Dr. Kamaludin Hassan
(bersara pada / retired as of 30.07.2016)
E-mail: kamaludin@jmg.gov.my



Dari kiri / From left: Mat Niza Abd Rahman (KUPG), Nur Rasyiqah Yusof (PPT), Mahisham Ibrahim (KPPKPM), Hisamuddin Termidi (TPLK), Azhari Ahmad (TPGS), Dr. Kamaludin Hassan (Pengarah), Mohd Ariff Omar (TPMK), Zamri Ramli (KUGK), Asminah Rajuli (KUHG), Wong Vui Chung @ Webster Wong (KUSM)

Pusat Penyelidikan Mineral Mineral Research Centre

Pusat Penyelidikan Mineral,
Jabatan Mineral Dan Geosains Malaysia
Jalan Sultan Azlan Shah,
31400 Ipoh,
Perak Darul Ridzuan
Tel: (6) 05-547 7053
Faks: (6) 05-547 7185
Email: jmgppm@jmg.gov.my

Pengarah / Director: Md. Muzayin Alimon
E-mail: muzayin@jmg.gov.my



Berdiri dari kiri / Standing from left: Aminudin Mahmud, Dr. Izhar Abadi Ibrahim Rais, Dr. Shamsul Kamal, Kori Mohammad, Mahadi Abu Hassan, Md. Muzayin Alimon (Pengarah), Dr. Rohaya Othman, Dr. Nazwin Ahmad, Hasnita Mat Isa, Dr. Rashita Abd Rashid

Pejabat JMG Negeri State JMG Offices

Johor

Jabatan Mineral Dan Geosains Malaysia, Johor
Tingkat 9, Menara Tabung Haji,
Jalan Ayer Molek,
80000 JOHOR BAHRU,
Johor Darul Takzim

Tel : (6) 07-2227622

Faks : (6) 07-2228622

E-mail : jmgjohor@jmg.gov.my

Pengarah / Director: Zakaria Hussain
(bersara pada / [retired as of 24.11.2016](#))
E-mail: zbh99@jmg.gov.my



Berdiri dari kiri / [Standing from left](#): Rosazanaain Mohd Salleh (PPT), Mohamed Hizam Abdul Kadir (KULK), Abdullah Sani H. Hashim (Timbalan Pengarah / KUSM), Noorazhar Ngatimin (KUGS), Nor Asmah Abdul Aziz (KUPM)

Duduk / [Sitting](#): Zakaria Hussain (Pengarah)

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Negeri Sembilan / Melaka

Jabatan Mineral dan Geosains Malaysia,
Negeri Sembilan / Melaka
Jalan Tunku Kurshiah,
70400 SEREMBAN,
Negeri Sembilan Darul Khusus.

Tel : (6) 06-7624664 / 7679042

Faks : (6) 06-7639404

E-mail : jmg_nsm@jmg.gov.my

Pengarah / Director: Azemi Hj Eki
(Menanggung / [covering](#))
E-mail: azemi@jmg.gov.my



Dari kiri / [From left](#): Masrita Mohd Aras (KUPM), Azizan Ali (KUSM), Azemi Hj Eki (Timbalan Pengarah / KUGS), Hairul Mohamed Shaharudin (KULK), Siti Haslinda Abdul Wahid (PPT)

Selangor / Wilayah Persekutuan Selangor / Federal Territories

Jabatan Mineral Dan Geosains Malaysia,
Selangor / Wilayah Persekutuan
Tingkat 6 dan 7, Bangunan Darul Ehsan,
No. 3, Jalan Indah, Seksyen 14,
40000 SHAH ALAM,
Selangor Darul Ehsan
Tel : (6) 03-55101833
Faks : (6) 03-55101918
E-mail : jmgsselwp@jmg.gov.my

Pengarah / Director: Henry Litong Among
E-mail: henry@jmg.gov.my



Dari kiri / From left: Che Ibrahim Mat Saman (KUSM), Marina Mansor (PPT), Henry Litong Among (Pengarah), Ropidah Mat Zin (KUPM), Faizal Arshad (KULK)

Perak

Jabatan Mineral Dan Geosains Malaysia,
Perak
Jalan Sultan Azlan Shah,
31400 IPOH,
Perak Darul Ridzuan
Tel : (6) 05-5485219 / 5470624
Faks : (6) 05-5462815
E-mail : jmgprk@jmg.gov.my

Pengarah / Director: Mohd. Sidi Daud
E-mail: sidi@jmg.gov.my



Dari kiri / From left: Mohd. Zaidi Mohd. Hasan (Timbalan Pengarah / KUSM), Juna Azleen Abdul Ghani (KULK), Mohd. Sidi Daud (Pengarah), Suzannah Akmal (KUPM), Zaiton Mohamed Latif (PPT), Tuan Rusli Tuan Mohamed (KUGS)

Kedah / Perlis / Pulau Pinang

Jabatan Mineral Dan Geosains Malaysia,
Kedah/Perlis/Pulau Pinang,
Jalan Perak Seberang Jalan Putra,
05150 Alor Setar,
Kedah Darul Aman
Tel: (6) 04-7338504
Faks: (6) 04-7333838
E-mail: jmgkpp@jmg.gov.my

Pengarah / Director: Zainol Husin
(bersara pada / *retired as of* 02.09.2016)
E-mail: zainolh@jmg.gov.my



Berdiri dari kiri / *Standing from left*: Saiful Nizam (PPT), Fathullah Naim (KUPM), Ir. Tony Chew (KULK)
Duduk dari kiri / *Sitting from left*: Badrol Mohamad (KUSM), Zainol Husin (Pengarah), Hamdan Arifin (KUGS)

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Kelantan

Jabatan Mineral Dan Geosains Malaysia,
Kelantan
Wisma Persekutuan,
Tingkat 3 & 9, Jalan Bayam,
15658, KOTA BHARU,
Kelantan Darul Naim
Tel : (6) 09-7411300
Faks : (6) 09-7411308
E-mail : jmgkel@jmg.gov.my

Pengarah / Director: Mohd Nazan Awang
E-mail: nazan@jmg.gov.my



Dari kiri / *From left*: Mat Wadi Ab Satar (KULK), Mohamad Yusof Che Sulaiman (KUPM), Mohamad Hussein Jamaluddin (Timbalan Pengarah / KUSM), Mohd Nazan Awang (Pengarah), Yusuf Bujang (KUGS), Azliyah Che Long (PPT)

Terengganu

Jabatan Mineral Dan Geosains Malaysia,
Terengganu
Lot PT 3102K,
Jalan Sultan Sulaiman,
20000 KUALA TERENGGANU,
Terengganu Darul Iman
Tel : (6) 09-6251000
Faks : (6) 09-6251100
E-mail : jmgtgg@jmg.gov.my

Pengarah / Director: Mohd. Zukeri Ab. Ghani
E-mail: zukeri@jmg.gov.my



Dari kiri / **From left:** Nailah @ Nazirah Abdullah (PPT), Suhaimizi Yusoff (KUPM), Tan Hai Hong (KULK), Mohd. Zukeri Ab. Ghani (Pengarah), Che Abdul Rahman Jaafar (Timbalan Pengarah / KUSM), Hamlee Ismail (KUGS)

Pahang

Jabatan Mineral Dan Geosains Malaysia, Pahang
Jalan IM 4/1,
Bandar Indera Mahkota,
25640 KUANTAN,
Pahang Darul Makmur
Tel : (6) 09-5733237
Faks : (6) 09-5733249
E-mail : jmgpahang@jmg.gov.my

Pengarah / Director: Dato' Mohd Zaim Dato' Hj. Abdul Wahab
E-mail: mohdzaim@jmg.gov.my



Dari kiri / **From left:** Normaiziera Abd Rahim (PPT), Shari Ismail (KUSM), Dato' Ahmad Zukni Ahmad Khalil (KULK), Dato' Mohd Zaim Dato' Hj. Abdul Wahab (Pengarah), Wan Saiful Bahri Wan Mohamad (Timbalan Pengarah / KUGS), Mohammad Aznawi Hj. Mat Awan (KUPM)

Sarawak

Jabatan Mineral Dan Geosains Malaysia,
Sarawak
Lot 6045,
Jalan Wan Abdul Rahman,
Kenyalang Park,
93658 KUCHING,
Sarawak

Tel : (6) 082-244666 / 240152 / 240966

Faks : (6) 082-415390 / 422067

E-mail : jmgswk@jmg.gov.my

Pengarah / Director: Enggong Aji

(Menanggung / covering)

E-mail : enggong@jmg.gov.my



Dari kiri / **From left:** Tracy Upong (PPT), Ismail Hanuar (KUMK), Enggong Aji (Timbalan Pengarah / KUSM), Sulong Enjop (KUGS), Sallehuddin Mohamad (KULK), Manggon Abot (KUPM)

Sabah

Jabatan Mineral Dan Geosains Malaysia, Sabah
Jalan Penampang,
Beg Berkunci 2042,
88999 KOTA KINABALU,
Sabah

Tel : (6) 088-260311 / 252496 / 254926

Faks : (6) 088-240150

E-mail : jmgshb@jmg.gov.my

Pengarah / Director: Mustafar Hamzah

(sehingga / until 31.08.2016)

E-mail: mbh57@jmg.gov.my



Dari kiri / **From left:** Jenneth @ Liliana Cyril (KUPM), Jontih Inggihon @ Enggihon (KUSM), Mohd Yusop Ramli (Timbalan Pengarah / KUGS), Mustafar Hamzah (Pengarah), Abdul Kadir Ahmad (KUMK), Ir. Azman Ab. Majid (KULK), Jeffery Paping (PPT)



Sorotan Peristiwa **Event Highlights**

Sorotan Peristiwa Event Highlights

22.02.2016

Jabatan Mineral dan Geosains Malaysia, dengan kerjasama Kementerian Sumber Asli dan Alam Sekitar, telah menjadi tuan rumah kepada Perhimpunan Bulanan Kementerian Sumber Asli dan Alam Sekitar bagi Februari 2016

Department of Mineral and Geoscience Malaysia in collaboration with the Ministry of Natural Resources and Environment, hosted the Monthly Assembly of the Ministry of Natural Resources and Environment for February 2016



YB Dato' Sri Dr. Haji Wan Junaidi Tuanku Jaafar (tengah), Menteri Sumber Asli dan Alam Sekitar, melancarkan buku baru JMG Malaysia yang bertajuk "Menyingkap Kepelbagaian Geologi Malaysia – Batuan, Mineral dan Fosil"

The Honourable Dato' Sri Dr. Haji Wan Junaidi Tuanku Jaafar, Minister of Natural Resources and Environment (centre), launches a new book of JMG Malaysia titled "A Glimpse of the Geodiversity of Malaysia – Rocks, Minerals and Fossils"

26.02.2016

Lawatan kerja ke Pelabuhan Kuantan mengenai isu-isu berkaitan moratorium perlombongan bauksit

Working visit to the Port of Kuantan on issues pertaining to bauxite mining moratorium



Ketua Pengarah (kelima dari kiri) dan Timbalan Ketua Pengarah (kedua dari kiri) JMG Malaysia mengiringi YB Menteri Sumber Asli dan Alam Sekitar (keenam dari kiri) dan YB Menteri Besar Pahang (keempat dari kiri) semasa lawatan

The Director General (fifth from left) and the Deputy Director General (second from left) of JMG Malaysia accompanied the Honourable Minister of Natural Resources and Environment (sixth from left) and the Honourable Chief Minister of Pahang (fourth from left) during the visit

08.06.2016

Majlis penyerahan poster berkaitan tapak terpelihara geowarisan di Perlis kepada Pengarah Jabatan Perhutanan Negeri Perlis (kiri) oleh Pengarah JMG Kedah / Perlis / Pulau Pinang

Handing over ceremony of poster related to the conserved geoheritage sites in Perlis to the Director of Perlis Forestry Department (left) by the Director of JMG Kedah / Perlis / Pulau Pinang



28.06.2016

Lawatan kerja Dato' Dr. Nadzri Bin Yahaya (baris depan, keempat dari kiri), Timbalan Ketua Setiausaha Kementerian Sumber Asli dan Alam Sekitar, ke Kompleks JMG Ipoh
Working visit of Dato' Dr. Nadzri Bin Yahaya (front row, fourth from left), Deputy Secretary General of Ministry of Natural Resources and Environment, to Ipoh JMG Complex



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23.07.2016

Majlis perasmian Aspiring Jerai Geopark
Inauguration ceremony of the Jerai Geopark



Majlis telah dirasmikan oleh YB Dato' Dr. Ku Abd. Rahman Ku Ismail, Ahli Majlis Mesyuarat Kerajaan Negeri Kedah
The ceremony was officiated by the Honourable Dato' Dr. Ku Abd. Rahman Ku Ismail, a member of the Kedah State Executive Council



Taklimat mengenai Jerai Geopark telah disampaikan oleh Tuan Haji Zainol Husin (ketiga dari kiri), Pengarah JMG Kedah / Perlis / Pulau Pinang, kepada YB Mejar Jeneral (B) Dato' Seri Jamil Khir bin Baharom (keempat dari kiri), Menteri Di Jabatan Perdana Menteri merangkap Ahli Parlimen Jerai
Briefing on Jerai Geopark was presented by Mr. Zainol Husin (third from left), Director of JMG Kedah / Perlis / Pulau Pinang, to the Honourable Major General (B) Dato' Seri Jamil Khir bin Baharom (fourth from left), Minister in the Prime Minister's Department and the Member of Parliament for Jerai



22.08.2016

Kembara Mahkota Johor 2016
Johor Royal Excursion 2016

Duli Yang Maha Mulia Sultan Johor, Sultan Ibrahim Ibni Almarhum Sultan Iskandar (kanan), menerima cenderahati dari Pengarah JMG Johor, Tuan Haji Zakaria Hussain (kiri), semasa lawatan Tuanku ke Gerai pameran JMG

His Royal Highness The Sultan of Johor, Sultan Ibrahim Ibni Almarhum Sultan Iskandar (right), receives a memento from the Director of JMG Johor, Mr. Zakaria Hussain (left), during the visit of His Royal Highness to the exhibition booth of JMG

13.10.2016

Program Penanaman Pokok di tapak bekas lombong sekitar Tasik Chini anjuran Kerajaan Negeri Pahang
Trees Planting Program at former mining sites around the Tasik Chini organized by the Pahang State Government



JMG mengambil bahagian dalam program ini
JMG took part in this program

20.12.2016

Lawatan YB Menteri Sumber Asli dan Alam Sekitar ke Kuantan
Visit of the Honourable Minister of Natural Resources and Environment to Kuantan



YB Dato' Sri Dr. Haji Wan Junaidi Tuanku Jaafar (ketiga dari kiri), ditemani oleh Ketua Pengarah JMG Malaysia (keempat dari kiri) dan Pengarah JMG Pahang (kelima dari kiri), semasa sidang akhbar
The Honourable Dato' Sri Dr. Haji Wan Junaidi Tuanku Jaafar (third from left), accompanied by the Director General of JMG Malaysia (forth from left) and Director of JMG Pahang (fifth from left), during a press conference

Persidangan Conference

14-15.11.2016

Persidangan Geosains Malaysia 2016 di Kuantan, Pahang
National Geoscience Conference 2016 at Kuantan, Pahang



Majlis perasmian Persidangan Geosains Malaysia 2016 anjuran bersama Jabatan Mineral dan Geosains Malaysia, Universiti Malaysia Pahang dan Persatuan Geologi Malaysia
Opening ceremony of the National Geoscience Conference 2016 jointly organised by the Minerals and Geoscience Department Malaysia, Universiti Malaysia Pahang and Geological Society of Malaysia

Media / Publisiti Media / Publicity

12.03.2016 – 12.04.2016

Pameran Senjata Cantik Dan Batu Permata Di Muzium Adat Istiadat Diraja (Istana Jahar) Negeri Kelantan
Nice Weapons and Gemstones Exhibition at Muzium Adat Istiadat Diraja (Istana Jahar) Negeri Kelantan



YB Mejar (B) Dato' Hj Md Anizam Ab. Rahman, Pengerusi Jawatankuasa Kebudayaan Pelancongan dan Warisan Negeri Kelantan merangkap Pengerusi Perbadanan Muzium Negeri Kelantan, melawat gerai pameran JMG Kelantan
The Honourable Major (B) Dato' Hj Md Anizam Ab. Rahman, Chairman of the Kelantan Cultural Tourism and Heritage Committee and also Chairman of the Kelantan State Museum Corporation, visit to the exhibition booth of JMG

28.05.2016

Pameran Hari UNESCO Malaysia 2016
Malaysia UNESCO Day Exhibition 2016



Lawatan YB Menteri Sumber Asli dan Alam Sekitar ke Gerai pameran JMG
Visit of the Honourable Minister of Natural Resources and Environment to the exhibition booth of JMG

25.04.2016

Pameran di SMK Kubur Panjang, Pendang, Kedah
Exhibition at SMK Kubur Panjang, Pendang, Kedah



10.11.2016

11th Asia-Pacific Mineral Resource Exhibition & Conference 2016



Khidmat Masyarakat Community Services

Memenuhi Keperluan Bekalan Air Bersih Meeting the Needs of Clean Water Supply

12.05.2016

Majlis perasmian dan penyerahan sistem rawatan air tanah di Kampung Duku, Pulau Sibul, Mersing oleh YB Datuk Ir Dr. Haji Hamim bin Samuri, Timbalan Menteri Sumber Asli dan Alam Sekitar

Commissioning and handing over ceremony of groundwater treatment system at Kampung Duku, Pulau Sibul, Mersing by the Honourable Datuk Ir Dr. Haji Hamim bin Samuri, Deputy Minister of Natural Resources and Environment



26.10.2016

Pelancaran Program Sumber Air Tanah di Kampung Gembut Sedili oleh Ahli Dewan Undangan Negeri Johor Kawasan Sedili, YB Tuan Hj Rasman Hj Ithnain

Launching of the Groundwater Resources Programme at Kampung Gembut Sedili by the Johor State Legislative Assemblyman for Sedili, the Honourable Haji Rasman Hj Ithnain

Mengawal Kebakaran Kawasan Tanah Gambut Control of Fires in Peatlands

31.05.2016

Lawatan YB Timbalan Menteri Sumber Asli Dan Alam Sekitar, Datuk Ir Dr Haji Hamim Samuri, ke telaga tiub di kawasan tanah gambut di Bachok, Kelantan

Visit of the Honourable Deputy Minister of Natural Resources and Environment, Datuk Ir Dr Haji Hamim Samuri, to the tube wells at the peatlands area at Bachok, Kelantan



01.06.2016

Lawatan Ketua Pengarah Jabatan Bomba Dan Penyelamat Malaysia, YBhg. Datuk Wira Hj Wan Mohd Nor Hj Ibrahim, ke tapak pengepaman air tanah untuk mengawal kebakaran gambut di Bachok, Kelantan

Visit of the Director General of the Fire and Rescue Department of Malaysia, Datuk Wira Haji Wan Mohd Nor Haji Ibrahim, to the groundwater pumping station for the control of peatlands fire at Bachok, Kelantan





Senarai Pegawai Profesional **List of Professional Officers**

Senarai Pegawai Profesional

List of Professional Officers

Ibu Pejabat / Headquarters		
Ketua Pengarah, JUSA A Director General	Mior Sallehuddin bin Mior Jadid, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Environmental and Ecological Science) (Lancaster)
Timbalan Ketua Pengarah (Operasi), JUSA B Deputy Director General (Operations)	Dr. Vijayan a/l V.V. Rajan, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Geophysics) (UM) MSc (Marine Geophysics) (Mississippi) PhD (Marine Geology) (Mississippi)
Timbalan Ketua Pengarah (Korporat dan Ekonomi Mineral), JUSA C Deputy Director General (Corporate and Economic Minerals)	Shahar Effendi bin Abdullah Azizi	BSc(Hons) (Mining Eng.) (Leeds) Postgraduate Diploma, Mining Project Evaluation (DESS), Paris School of Mines, France
Pengarah, C54 Director	Ab Halim bin Hamzah, P.Geol (bersara pada / retired as of 01.08.2016)	BSc(Hons) (Geology) (UKM) MSc (Mineral Resources Eng.) (USM)
	Mustafar bin Hamzah (mulai / from 01.09.2016)	BSc(Hons) (Geology) (UKM) Dip (GIS) (University of Leicester, UK)
	Kamal bin Daril, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Mineral Economics) (Michigan)
	Kamuradin bin Md Slar, P.Geol (bersara pada / retired as of 13.06.2016)	BSc(Hons) (Geology) (UKM)
	Abdul Rahman bin Mohd Yusoff, P.Geol	BSc(Hons) (Earth Science) (UKM)
Timbalan Pengarah, C52 Deputy Director	Joanes Muda, P.Geol	BSc(Hons) (Earth Science) (UKM) MSc (Geology) (UMS)
	Mohd Badzran bin Mat Taib, P.Geol	BSc(Hons) (Geology) (UKM)
	Kamaruddin bin Abdullah	BEng(Hons) (Mineral Resources Eng.) (USM) MSc (Occupational Safety & Health) (Murray State of University, USA)
Ketua Penolong Pengarah Kanan, C52 Senior Principal Assistant Director	Ling Nan Ley @ Ling Nan Leh, P.Geol	BSc(Hons) (Earth Science) (UKM) MSc (Engineering Geology) (Durham University, UK)
	Azemi bin Hj Eki, P.Geol (sehingga / until 31.03.2016)	BSc(Hons) (Geology) (UKM) MSc (Material Eng.) (USM)
Ketua Penolong Pengarah Kanan, M52 Senior Principal Assistant Director	Danial Lee bin Abdullah (sehingga / until 25.09.2016)	MSc (Genetik) (UKM)
	Mohd. Azalizam bin Alias (mulai / from 15.11.2016)	BSc(Hons)(Biologi) (UKM)

Ketua Penolong Pengarah, C48 Principal Assistant Director	Siti Aminah binti Abdul Sarif, P.Geol	BSc(Hons) (Applied Geology) (UM)
	Mohd. Zulkiflee bin Che Soh, P.Geol	BSc(Hons) (Geology) (UKM)
	Nurul Huda bin Romli	BEng(Hons) (USM) MSc (OSH) (UNSW)
	Habibah binti Tahir	BSc(Hons) (Geology) (UKM) MSc (Environment) (UPM)
	Yusari bin Basiran, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Mineral Industry) (UKM)
	Dr. Sia Say Gee, P.Geol	BSc(Hons) (Applied Geology) (UM) PhD (Coal Geology) (UM)
	Haniza binti Zakri, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Geology) (UKM)
Ketua Pegawai Teknologi Maklumat, F48 Principal IT Officer	Che Aslinaliza binti Che Ahmed	BSc (Information Technology) (UKM) MSc (Information Technology) (UiTM)
Ketua Penolong Pengarah, M48 Principal Assistant Director	Mas Ayu Siti Asmah Hani binti Zainul Abidin (sehingga / until 01.08.2016)	BBA(Hons) (UIAM)
	Zahirul Fahmi Bin Zaini (mulai / from 22.08.2016)	BAcc(Hons) (UPM)
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Norsham binti Samsudin, P.Geol	BSc(Hons) (Geology) (UKM)
	Nurzaidi bin Abdullah, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Remote Sensing) (UPM)
	Dr. Ferdaus bin Ahmad, P.Geol	BSc(Hons) (Geology) (UM) MSc (Engineering Geology) (Leeds) PhD (Engineering Geology) (Leeds)
	Abd Rahim bin Harun, P.Geol	BSc(Hons) (Geology) (UKM)
	Basharuddin bin Ismail, P.Geol	BSc(Hons) (Geology) (UKM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Ummi Daeimah binti Hussin, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Environment) (UPM)
	Brendawati binti Ismail	BSc(Hons) (Geology) (UM)
	Ahmad Zamani bin Samat	BSc(Hons) (Geology) (UM) MSc (Engineering & Geophysics) (UKM)
	Mohd Anuar bin Ishak, P.Geol	BSc(Hons) (Geology) (UM)
	Zamila binti Abd Rahman	BSc(Hons) (Geology) (UKM)
	Zahidi Bin Hamzah, P.Geol	BSc(Hons) (Geology) (UM)
	Khairul Zaman bin Ibrahim	BSc(Hons) (Geology) (UKM) MSc (Industrial Mineral) (UKM)
	Iszaynuddin bin Abd. Hamid	BSc(Hons) (Geology) (UKM)
	Rosni binti Lokmanul Hakim	BSc(Hons) (Geology) (UM)
	Safura binti Alias	BEng(Hons) (Mineral Resources Eng.) (USM)
	Salmiah binti Nawi @ Mohamad (mulai / from 01.04.2016)	BEng(Hons) (Mineral Resources Eng.) (USM)

Pegawai Geosains C41 Geoscience Officer	Ir. Suhaimi bin Nordin (bersara pada / retired as of 11.07.2016)	BSc(Hons) (Mining Eng.) (Newcastle-Upon-Tyne, England) MSc (Rock Mechanics & Excavation Eng.) (Newcastle- Upon-Tyne, England)
	Abdul Razak bin Zainal Abidin	BSc(Hons) (Applied Geology) (UM)
	Nightingale Lian Marto	BSc(Hons) (Geology) (UKM) MSc (Environmental Management) (UMS)
	Mohd Shafiq Farhan bin Mohd Zainudin	BSc(Hons) (Geology) (UM)
	Maziadi Bin Mamat (mulai / from 01.08.2016)	BEng(Hons) (Mineral Resources Eng.) (USM)
Pegawai Tadbir, M41 Administration Officer	Abd Jalil bin Tahir	MBA (Hawaii Pacific University, USA)

Bahagian Perkhidmatan Teknikal

Technical Services Division

Pengarah, JUSA C Director	Dr. Kamaludin bin Hassan, P.Geol (bersara pada / retired as of 30.07.2016)	BSc(Hons) (Geology) (UM) MSc (Palynology) (Sheffield) PhD (Quaternary Envi. Change) (Durham)
Timbalan Pengarah, C54 Deputy Director	Azahari bin Ahmad	BSc(Hons) (Geophysics) (USM)
	Mohd Ariff bin Omar	BSc(Hons) (Chemistry) (Nottingham) AMIC
	Hisamuddin bin Termidi	BEng (Mining) (Laurention University)
Ketua Pegawai Geosains, C52 Principal Geoscience Officer	Chan Fook Onn (bersara pada / retired as of 20.03.2016)	BSc(Hons) (Chemistry) (UM) MSc (Analytical Chemistry and Instrumentation) (Loughborough) AMIC
	Baharuddin bin Wanik (bersara pada / retired as of 01.02.2016)	BSc(Hons) (Chemistry) (USM)
	Mahisham bin Ibrahim	BSc(Hons) (Geology) (UKM)
	Hazan Maheran binti Mohd	BSc(Hons) (Chemistry) (UKM) AMIC
	Thangavelu a/l Ramen (bersara pada / retired as of 18.06.2016)	BSc(Hons) (Chemistry/ Mathematic) (USM) MSc (IT) (Nottingham) AMIC
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Abdullah bin Sulaiman, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Oceanography) (Southampton)
	Zamri bin Ramli, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Environment) (UPM)
	Mohamad Sari bin Hasan, P.Geol	BSc(Hons) (Geology) (UKM)
	Ahmad Zulkifli bin Kamaruzaman	BSc(Hons) (Geophysics) (USM)
	Asminah binti Rajuli, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Environment) (UPM)
	Mohamad bin Kasim	BSc(Hons) (Chemistry) (USM) AMIC
	Mohd. Saad bin Samsudin	BSc(Hons) (Chemistry) (UKM) AMIC
	Dr. Pauline Dushyanthi a/p Paul Nesaraja	BSc(Hons) (Chemistry) (UM) MSc (Hydrogeology) (Birmingham) PhD (Environmental Chemistry) (University of Buffalo, State University of New York) AMIC
	Mohd Rais bin Ramli	BAppSc(Hons) (Geophysics) (USM)
	Webster Wong @ Wong Vui Chung, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Environmental Management) (UMS)
	Hairani Sham binti Manas	BAppSc(Hons) (Geophysics) (USM)
	Mat Niza bin Abd Rahman	BSc(Hons) (Geology) (UKM)

	Mohamad bin Abd Manap, P.Geol	BSc(Hons) (Earth Science) (UKM) MSc (Remote Sensing) (UPM) PhD (Environmental Hydrology and Hydrogeology) (UPM)
	Mohd Fauzi bin Muhammad Said	BSc(Hons) (Chemistry) (UKM) AMIC
	Wan Ibrahim bin Wan A Rahman	BSc(Hons) (Chemistry) (UKM) AMIC
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Halim bin Darahim	BAppSc(Hons) (Geophysics) (USM)
	Hamid bin Ariffin	BSc(Hons) (Applied Geology) (UM)
	Mohd Anuar bin Md Razali	BAppSc(Hons) (Geophysics) (USM)
	Syed bin Omar (Cuti belajar / study leave)	BSc (Hons) (Applied Geology) (UM) MSc (Eng. Geology) (Newcastle-Upon-Tyne, England)
	Amin Noorasid bin Abd Jalil, P.Geol	BSc(Hons) (Geology) (UMS)
	S. Pasupathi a/I Subramaniam	BSc(Hons) (Chemistry) (USM)
	Noran Alwakhir bin Shaarani, P.Geol	BSc(Hons) (Geology) (UM) MSc (Applied Marine Geoscience) (Bangor University, UK)
	Sharizan bin Ibrahim	BAppSc(Hons) (Applied Chemistry) (UiTM) MSc (Mechanical Eng.) (UNIMAP)
	Yusril A'mali bin Mohd Yusuf @ Hamid	BSc(Hons) (Chemistry) (UPM) AMIC
	Azrul bin Arifin	BSc(Hons) (Applied Chemistry) (UiTM)
	Noor Akhmar bin Kamarudin	BSc(Hons) (Chemistry) (UPM)
	Mohd Fahami bin Abas	BAppSc(Hons) (Analytical Chemistry) (USM) MSc (Management) (UUM)
	Halime bin Azahari @ Adnan	BSc(Hons) (Applied Chemistry) (UiTM)
	Mohd Fuzi bin Hashim	BSc(Hons) (Chemistry) (UM)
	Lee Beng Huat, P.Geol	BSc(Hons) (Geology)(UKM) MSc (Geology) (UKM)
	Salmiah binti Nawi @ Mohamad (Cuti belajar / study leave) (sehingga / until 31.03.2016)	BEng(Hons) (Mineral Resources Eng.) (USM)
Pegawai Teknologi Maklumat Kanan, F44 Senior IT Officer	Syamilah bt Samsudin @ Murad	BSc(Hons) (Information Technology) (UUM)
Pegawai Geosains, C41 Geoscience Officer	Mohd Zahar bin Ibrahim	BSc(Hons) (Chemistry) (USM)
	Mohamed Fadzli bin Rahman, P.Geol (Cuti belajar / study leave)	BSc(Hons) (Geology) (UM)
	Muhamad Safid bin Saad, P.Geol (mulai / from 01.12.2016)	BAppSc (Hons) (Geophysics) (USM)
	Nurul Husna binti Ismayatim	BSc(Hons) (Chemistry) (UKM)
	Intan Shazwani binti Abdul Ghani	BSc(Hons) (Chemistry) (UM) AMIC
	Amir Mizwan bin Mohd Akhir, P.Geol (mulai / from 01.09.2016)	BSc(Hons) (Geology) (UKM)
	Akrimi Masua binti Mohamad (mulai / from 16.05.2016)	BAppSc(Hons) (Analytical Chemistry) (USM) AMIC

Muhammad Fawwaz bin Zainal Abedin, P.Geol (mulai / from 05.09.2016)	BSc(Hons) (Geology) (UMS)
Mohd Farid bin Abd Kadir, P.Geol	BSc(Hons) (Geology) (UKM)
Nur Sarah binti Othman (mulai / from 04.10. 2016)	BSc(Hons) (Applied Geology) (UM)
Nurul Zulaikha Akma binti Mohd Zaki (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UMS) MSc (Geofizik Kejuruteraan & Persekitaran) (UKM)
Norshakira binti Ab Ghani (mulai / from 04.10.2016)	BSc(Hons) (Applied Geology) (UM) MSc (Petroleum Geology) (UM)

Pusat Penyelidikan Mineral / Mineral Research Centre

Pengarah, JUSA C Director	Md Muzayin bin Alimon	BSc(Hons) (Chemistry) (UKM) MSc (Mineral Processing) (Pennsylvania State University, USA)	
Pegawai Penyelidik Kanan, Q54 Senior Research Officer	Nasharuddin bin Isa (bersara pada / retired as of 5.4.2016)	BAppSc(Hons) (Minerals Science and Technology) (USM) MSc (Minerals Engineering) (Exeter) MCSM	
	Mahadi bin Abu Hassan	BSc(Hons) (Geology) (UKM)	
	Kori bin Mohammad, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Engineering Geology) (Leeds)	
	Aminudin bin Mahmud, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Engineering Geology) (Leeds)	
	Abdul Rois bin Abdul Mois	BAppSc(Hons) (Minerals Science and Technology) (USM) MSc (Ceramic Engineering) (Sheffield)	
	Mohamad Haniza bin Mahmud	BEng(Hons) (Mineral Resources Eng.) (USM) Adv. Diploma (Environmental Engineering) (Manchester) MSc (Materials Engineering) (USM)	
	Dr. Shamsul Kamal bin Sulaiman	BSc(Hons) (Mining Engineering) (Alabama) MSc (Mineral Resources Eng.) (USM) PhD (Advanced Material) (Leeds)	
	Dr. Nazwin binti Ahmad	BEng(Hons) (Mining Engineering) (Nova Scotia) PhD (Advanced Material) (Leeds)	
	Pegawai Penyelidik Kanan, Q52 Senior Research Officer	Dr. Ismail bin Ibrahim	BEng(Hons) (Mineral Resources Eng.) (USM) MSc (Mineral Resources Eng.) (USM) PhD (Mineral Processing) (USM)
		Dr. Izhar Abadi bin Ibrahim Rais	BEng(Hons) (Mineral Resources Eng.) (USM) MSc (Mineral Resources Eng.) (USM) PhD (Mineral Resources Processing) (USM)
Dr. Rashita binti Abd Rashid		Diploma (Chemical Engineering) (UTM) BEng(Hons) (Chemical Engineering) (UTM) MSc (Mineral Resources Eng.) (USM) PhD (Materials Science) (UKM)	
Malek bin Selamat		BEng(Hons) (Mineral Resources Eng.) (USM) MPhil (Advanced Material) (Leeds)	
Salmah binti Baharuddin		BSc(Hons) (Computer Science) (USM) MSc (Image Processing) (USM)	
Abdullah bin Hussin	Diploma (Land Survey) (ITM) Adv. Diploma (Land Survey) (ITM)		

Pegawai Penyelidik Kanan, Q48 Senior Research Officer	Marlinda binti Daud	BEng(Hons) (Materials Engineering) (USM)
	Siti Mazatul Azwa binti Saiyed Mohd Nurddin	Diploma (Science) (ITM) BAppSc(Hons) (Industrial Chemistry) (USM) MSc (Advanced Materials Engineering) (UPM)
	Dr. Rohaya binti Othman	Diploma (Textile Technology) (ITM) BSc(Hons) (Textile Technology) (UITM) PhD (Materials Science) (UKM)
Pegawai Penyelidik, Q44 Research Officer	Hamdan bin Yahya	BSc(Hons) (Materials Science) (UKM)
	Mohd Syahrir bin Mohd Rozi	BEng(Hons) (Chemical Engineering) (UTM)
	Mohd Idham bin Mustaffar	BEng(Hons) (Chemical Engineering) (UTM) MEng. (Bioprocess Engineering) (UTM)
Pegawai Penyelidik, Q41 Research Officer	Norinsafrina binti Mustaffa Kamal (Cuti belajar / study leave)	BEng(Hons) (Environmental Engineering) (Melbourne)
	Anuar bin Othman	BSc(Hons) (Industrial Chemistry) (UTM)
	Roshaida binti Arbain	BEng(Hons) (Mineral Resources Eng.) (USM) MSc (Mineral Resources Eng.) (USM)
	Aspaniza binti Ahmad	BEng(Hons) (Materials Engineering) (USM) MSc (Materials Engineering) (USM)
	Fatihah binti Azmi	BEng(Hons) (Civil Engineering) (UMP) MSc (Environmental Engineering) (USM)
	Hamizah binti Abdul Samad	BEng (Hons) (Materials Engineering) (USM) MSc (Materials Engineering) (USM)
	Siti Noorzidah binti Mohd Sabri	BEng(Hons) (Materials Engineering) (USM) MSc (Materials Engineering) (USM)

Sarawak

Pengarah, C54 Director	Kosong / Vacant	
Timbalan Pengarah, C52 Deputy Director	Enggong ak Aji, P.Geol	BSc(Hons) (Earth Science) (UKM) MSc (Exploration Mineral) (UKM)
Ketua Unit, C52 Head Of Unit	Rushtom bin Rushdi (bersara pada / retired as of 31.01.2016)	BSc(Hons) (Mining Eng.) (Newcastle-Upon-Tyne, England)
	Sulong ak Enjop, P.Geol	BSc(Hons) (Earth Science) (UKM) MSc (Hydrogeology) (London)
	Ismail bin Hanuar	BSc (Chemistry) (USM)
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Richard Batoi @ Lipai ak Jantau, P.Geol (bersara pada / retired as of 21.10.2016)	BSc(Hons) (Geology) (UM)
	Siti Faridah binti Yusuf	BSc(Hons) (Geology) (UM)
	Ajon ak Winnie	BSc(Hons) (Earth Science) (UKM)
	Setebin @ Roslan bin Rajali	BSc(Hons) (Applied Geology) (UM) MSc (Env. Hydrogeology) (Cardiff, UK)
	Jaithish John	BSc(Hons) (Applied Geology) (UM) MSc (Applied Geology) (University of Pennsylvania, USA)
	Edward ak Muol	BSc(Hons) (Applied Geology) (UM)
	Segar a/l Velayutham	BSc(Hons) (Chemistry) (USM) AMIC
	Hussein bin Mohd Juni	BSc(Hons) (Geology) (Texas, USA)

Ketua Unit, C44 Head Of Unit	Manggon ak Abot	BSc(Hons) (Geology) (UKM) Dip. Ed. (IPGGBL) MSc (Geology, Mineralogy & Petrology) (Oregon State, USA)
	Zamzuri bin Ghazalee	BSc(Hons) (Geology) (UM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Japri bin Bujang, P.Geol	BSc(Hons) (Geology) (UKM)
	Azzudin bin Shebli	Adv. Diploma (Applied Chemistry) (UiTM) BSc(Hons) (Chemistry) (UNIMAS) MSc (Chemistry) (UNIMAS) AMIC
	Rengga ak Gendang, P.Geol	BSc(Hons) (Geology) (UM)
	Dr. Joseph Jubin ak Aruh @ Aro, P.Geol	BSc(Hons) (Geology) (UM) MSc (Pengurusan Sumber Lestari) (UPM) PhD (Environmental Hydrology and Hydrogeology) (UPM)
	Freddy ak Heward Chinta, P.Geol	BSc(Hons) (Earth Science) (UKM)
	Mohd Aswandi bin Ariff	BSc(Hons) (Industrial Chemistry) (UPM)
	Dana ak Badang, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Environment) (UKM)
	Julia ak Kaya, P.Geol	BSc(Hons) (Geology) (UKM)
	Hermawati binti Tambeng	BSc(Hons) (Applied Chemistry) (UiTM)
	Salehuddin bin Mohamad	BEng(Hons) (Mineral Resources Eng.) (USM)
	Thomson ak Galin, P.Geol	BSc(Hons) (Geological Science) (Leeds) MSc (Geology) (London)
	Balachandar a/l Subramaniyan	BSc(Hons) (Applied Chemistry) (UM) MSc (Analytical Chemistry and Instrumental Analysis) (UM)
	Luqman bin Hj. Kaluni	BSc(Hons) (Geology) (UKM)
	Mohd Irwan bin Ariff, P.Geol	BSc(Hons) (Geology) (UKM)
	Pegawai Teknologi Maklumat, F44 IT Officer	Silvia ak Joseph
Shahrul Ridzuan bin Zainal Rashid, P.Geol		BAppSc(Hons) (Geophysics) (USM)
Pegawai Geosains, C41 Geoscience Officer	Nik Mohd Nishamuddin bin Nik Rahimi (sehingga / until 31.08.2016)	BSc(Hons) (Geology) (UKM)
	Clarence Anyau ak Tibu, P.Geol	BSc(Hons) (Geology) (UKM)
	Nazirrahmat bin Suleiman	BSc(Hons) (Geology) (UKM)
	Ledyhernando Taniou, P.Geol	BSc(Hons) (Geology) (UMS)
	Zaidulhair bin Jasmi	BSc(Hons) (Geology) (UKM)
	Mohd Firdaus bin Noor Azman	BSc(Hons) (Geology) (UMS)
	Mohd Afiq bin Mohd Atan, P.Geol	BSc(Hons) (Geology) (UMS)
	Angela Ee	BSc(Hons) (Geology) (UMS)
	Benson Ling Jin Yaw (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UKM)

Sabah		
Pengarah, C54 Director	Mustafar bin Hamzah (sehingga / until 31.08.2016)	BSc(Hons) (Geology) (UKM) Dip (GIS) (University of Leicester, UK)
Timbalan Pengarah, C52 Deputy Director	Mohd Yusop bin Ramli, P.Geol	BSc(Hons) (Geology) (UKM)
Ketua Unit, C52 Head Of Unit	Jontih Inggihon @ Enggihon	BSc(Hons) (Geology) (UKM) Adv. Diploma (Computer Science) (UKM)
	Ir. Azman bin Ab. Majid	BSc(Hons) (Mining Eng.) (University of Leeds, UK)
	Abdul Kadir bin Ahmad	BSc(Hons) (Chemistry) (UKM) AMIC
Ketua Pegawai Geosains Kanan, C52 Senior Principal Geoscience Officer	Paulius Godwin @ Paulus	BSc(Hons) (Geology) (UKM)
Ketua Unit, C48 Head Of Unit	Jenneth Cyril @ Liliana, P.Geol	BSc(Hons) (Geology) (UKM)
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Hilary Muyan ak Nicholas Thomas	BSc(Hons) (Geology) (UM)
	Che Aziz bin Che Soh	BSc(Hons) (Geology) (UKM)
	Dr. Frederick Francis Tating, P.Geol	BSc(Hons) (Earth Science) (UKM) MSc (Environment) (Kumamoto University) PhD (Eng. Geology & Rock Mechanic) (University of Twente, Netherlands)
	Rokiah binti Abdullah	BSc(Hons) (Chemistry) (UKM) AMIC
	Morius Bantas	BSc(Hons) (Chemistry) (UKM) MSc (IT Management) (UTM) AMIC
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Fredolin Javino, P.Geol	BSc(Hons) (Applied Geology) (UM)
	Daulip @ Dee Dee Langkait, P.Geol	BSc(Hons) (Earth Science) (UKM)
	Jaineh Lingi, P.Geol	BSc(Hons) (Applied Geology) (UM)
	Bailon Golutin, P.Geol	BSc(Hons) (Geology) (UMS)
	Cleafos Totu	BSc(Hons) (Earth Science) (UKM)
	Jayawati Fanilla Sahih binti Montoi	BSc(Hons) (Geology) (UM)
	Faye Donna Edmund, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Applied Geosciences) (University of Pennsylvania, USA)
	Khairun Nasir bin Mokhtar	BSc(Hons) (Chemistry) (UM) AMIC
	Arthur Clement Makulim, P.Geol	BSc(Hons) (Geology) (UMS)
	Eddie Affandy bin Mohd Yuslee, P.Geol	BSc(Hons) (Geology) (UMS)
	Farid bin Zainudin, P.Geol	BSc(Hons) (Geology) (UMS)
	Alvyn Clancey Mickey, P.Geol	BSc(Hons) (Geology) (UMS) MSc (Geology) (UMS)

Pegawai Geosains, C41 Geoscience Officer	Mazrali bin Always, P.Geol	BSc(Hons) (Applied Geology) (UM)
	Muhammad Umar bin Sarimal (Cuti belajar / study leave)	BSc(Hons) (Geology) (UMS)
	Mahadi bin Santa	BSc(Hons) (Geology) (UMS)
	Mison bin Ajum	BSc(Hons) (Geology) (UMS)
	Kennedy bin Mohd Imran	BSc(Hons) (Applied Geology) (UM) MSc (Eng. Geology) (University of Newcastle Upon-Tyne, England) MD (Zamboanga Medical School Foundation)
	Redzuan bin Ahmad Banjar, P.Geol	BSc(Hons) (Geology) (UM)
	Mazuan bin Roslan	BSc(Hons) (Geology) (UMS)
	Ahmad Khairut Termizi bin Mohd Daud, P.Geol	BSc(Hons) (Geology) (UMS) MSc (Geology) (UMS)
	Lim Li Chien, P.Geol	BSc(Hons) (Geology) (UMS)
	Goh Khean Siong, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Geology) (UKM)
	Akrimi Masua binti Mohamad (sehingga / until 15.05.2016)	BAppSc(Hons) (Analytical Chemistry) (USM) AMIC
	Mohd Shafreen bin Mad Isa	BEng(Hons) (Mineral Resources Eng.) (USM)
	Nurul Sakinah binti Ab. Satar (mulai / from 16.06.2016)	BSc(Hons) (Chemistry) (UiTM)
	Pegawai Teknologi Maklumat, F41 IT Officer	Azlan bin Ahmad

Pahang

Pengarah, C54 Director	Dato' Hj. Mohd Za'im bin Dato' Abdul Wahab	Diploma Kejuruteraan Jentera (UTM) BSc(Hons) (Mining Eng.) (Newcastle-Upon-Tyne, England) Postgraduate Diploma, Mining Project Evaluation (DESS), Paris School of Mines, France
Timbalan Pengarah, C52 Deputy Director	Wan Saifulbahri bin Wan Mohamad, P.Geol	BSc(Hons) (Geology) (UKM)
Ketua Unit, C52 Head Of Unit	Dato' Ahmad Zukni bin Ahmad Khalil	BEng(Hons) (Mineral Resources Eng.) (USM)
Ketua Unit, C48 Head Of Unit	Shari bin Ismail, P.Geol	BSc(Hons) (Applied Geology) (UM)
Ketua Unit, C44 Head Of Unit	Mohammad Aznawi bin Hj. Mat Awan, P.Geol	BSc(Hons) (Geology) (UKM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Mazlan bin Mohamad Zain, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Engineering Geology) (UKM)
	Zainal Abidin bin Jamaluddin, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Eng. & Environmental Geophysics) (UKM)
	Yusuf bin Imbun, P.Geol	BSc(Hons) (Geology) (UKM)
	Adha Syuraini bin Abd Ghani	BEng(Hons) (Mineral Resources Eng.) (USM)
	Zaki bin Alias	BSc(Hons) (Applied Geology) (UM)

Pegawai Geosains, C41 Geoscience Officer	Mohd Asnizam bin Ayub	BSc(Hons) (Geology) (UKM)
	Mohammad Sobri bin Borhan (mulai / from 15.07.2016)	BEng(Hons) (Mineral Resources Eng.) (USM)
	Muhammad bin Abdullah (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UMS)
	Zaidi bin Mat Zin (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UKM)
	Nafizah binti Md. Padzin (mulai / from 04.10.2016)	BSc(Hons) (Sains Gunaan) (UMK)
	Khairunnisa binti Alias (mulai / from 15.11.2016)	BSc(Hons) (Geoscience) (Pennsylvania State University, USA)

Perak

Pengarah, C54 Director	Mohd. Sidi bin Daud, P.Geol	BSc(Hons) (Geology) (UKM)
Timbalan Pengarah, C52 Deputy Director	Mohd. Zaidi bin Mohd. Hasan, P.Geol	BSc(Hons) (Geology) (UKM)
Ketua Unit, C48 Head Of Unit	Tuan Rusli bin Tuan Mohamed, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Eng. Geology) (UKM)
	Juna Azleen bin Abdul Ghani	BEng(Hons) (Mineral Resources Eng.) (USM) MSc (Mineral Resources Eng.) (USM)
	Nor Azian bin Hamzah	BSc(Hons)(Geology)(UKM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Othman bin Kangsar, P.Geol	BAppSc(Hons) (Geophysics) (USM) MSc (Eng. & Environmental Geophysics) (UKM)
	Mustaza bin Mustafa	BEng(Hons) (Mineral Resources Eng.) (USM)
	Suzannah binti Akmal, P.Geol (Cuti belajar / study leave)	BSc(Hons) (Geology) (UM)
	Azmi bin Abu Bakar, P.Geol	BSc(Hons) (Applied Geology) (UM)
Pegawai Geosains, C41 Geoscience Officer	Mohd. Shahrizal bin Mohamed Sharifodin, P.Geol (Cuti belajar / study leave)	BSc(Hons) (Geology) (UKM)
	Zaiton binti Abdullah	BEng(Hons) (Mineral Resources Eng.) (USM)
	Azizan ak Juhin	BSc(Hons) (Geology) (UMS)
	Saiful bin Abdullah, P.Geol	BSc(Hons) (Geology) (UKM)
	Muhammad Azfar bin Kamaruddin, P.Geol (mulai / from 01.11.2016)	BSc(Hons) (Geology) (UMS)
	Hanizam Shah bin Saidin	BEng(Hons) (Mineral Resources Eng.) (USM) MSc (Mineral Resources Eng.) (USM)
	Nurul Amalina binti Md. Nor	BSc(Hons) (Geology) (UM) MSc (Geotechnical Eng.) (UiTM)
	Asman bin Alias	BSc(Hons) (Geology) (UMS)
	Nur Asikin binti Rashidi, P.Geol (mulai / from 01.09.2016)	BSc(Hons) (Geology) (UKM) MA (Archaeology) (USM)

Johor		
Pengarah, C54 Director	Zakaria bin Hussain, P.Geol (bersara pada / retired as of 24.11.2016)	BSc(Hons) (Geology) (UKM) MSc (Mineral Exploration) (UKM)
Timbalan Pengarah, C52 Deputy Director	Abdullah Sani bin H. Hashim, P.Geol	BSc(Hons) (Geology) (UKM)
Ketua Unit, C48 Head Of Unit	Noorazhar bin Ngatimin, P.Geol	BSc(Hons) (Geology) (UM)
	Mohamed Hizam bin Abdul Kadir	BEng(Hons) (Mineral Resources Eng.) (USM)
Ketua Unit, C44 Head Of Unit	Nor Asmah binti Abd Aziz	BSc(Hons) (Geology) (UKM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Mohd Fauzi bin Rajimin @ Jeman	BSc(Hons) (Geology) (UKM)
	Muhammad Hazli bin Mohamed Hanapi, P.Geol	BSc(Hons) (Applied Geology) (UM)
	Mohammed Syahrizal bin Zakaria, P.Geol	BSc(Hons) (Geology) (UKM)
	Noraini binti Basiri, P.Geol	BSc(Hons) (Geology) (UKM)
	Norhazidi bin Masrom, P.Geol	BSc(Hons) (Geology) (UKM)
	Mohd Hisham bin Md Nawi	BEng(Hons) (Mineral Resources Eng.) (USM)
Pegawai Geosains, C41 Geoscience Officer	Arda Anasha binti Jamil	BSc(Hons) (Geology) (UM)
	Nur Syahidatul Zubaida binti Abilah @ Abdillah (mulai / from 04.10.2016)	BSc (Geoscience opt Hydrogeology) (Pennsylvania State University, USA)
	Yong Adilah binti Mustafa (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UM)
	Ahmad Fadhil bin Ahmad, P.Geol (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UMS)
	Muhammad Falah bin Zahri (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UMS)
Selangor/ Wilayah Persekutuan		
Pengarah, C54 Director	Henry Litong Among, P.Geol	BSc(Hons) (Geology) (UKM)
Timbalan Pengarah, C52 Deputy Director	Kosong / Vacant	
Ketua Unit, C48 Head Of Unit	Che Ibrahim bin Mat Saman, P.Geol	BSc(Hons) (Geology) (UKM)
	Faizal bin Arshad	BEng(Hons) (Mineral Resources Eng.) (USM)
Ketua Unit, C44 Head Of Unit	Ropidah binti Mat Zin	BSc(Hons) (Applied Geology) (UM) MSc (GIS) (UiTM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Hasnida binti Zabidi @ Zainudi	BSc(Hons) (Earth Science) (UKM)
	Mahat bin Sibon, P.Geol	BSc(Hons) (Geology) (UM) MSc (Geology) (UKM)
	Qalam A'zad bin Rosle	BSc(Hons) (Geology) (UM) MSc (Structural Geology with Geophysics) (Leeds)
	Mazatul Akmar binti Aros	BSc(Hons) (Geology) (UM)

Pegawai Geosains, C41 Geoscience Officer	Muhamad Ezwan bin Dahlan	BSc(Hons) (Geology) (UKM)
	Maziadi bin Mamat (sehingga / until 31.07.2016)	BEng(Hons) (Mineral Resources Eng.) (USM)
	Nur Diyana binti Yahya (mulai / from 15.07.2016)	BEng(Hons) (Mineral Resources Eng.) (USM)
	Ahmad Khuzer bin Mohamad Azmi (mulai / from 15.07.2016)	BEng(Hons) (Mineral Resources Eng.) (USM)
	Mohammad Ramzanee bin Mohd Noh (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UKM)
	Muhammad Anasrullah bin Abd Rahim, P.Geol (mulai / from 04.10.2016)	BSc(Hons) (Applied Geology) (UM)
	Wan Neqhaikal bin Wan Abdul Karim (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UM)

Kelantan

Pengarah, C54 Director	Mohd Nazan bin Awang, P.Geol	BSc(Hons) (Geology) (UKM)
Timbalan Pengarah, C52 Deputy Director	Mohamad Hussein bin Jamaluddin	BSc(Hons) (Geology) (UKM)
Ketua Unit, C48 Head Of Unit	Yusuf bin Bujang, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Hydrogeology) (London)
Ketua Unit, C44 Head Of Unit	Mohamad Yusof bin Che Sulaiman, P.Geol	BSc(Hons) (Applied Geology) (UM)
	Mat Wadi bin Ab Satar	BEng(Hons) (Mineral Resources Eng.) (USM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	John ak Joseph Jinap	BSc(Hons) (Applied Geology) (UM)
	Mohd Yuzlan bin Yusoff, P.Geol	BSc(Hons) (Applied Geology) (UM)
	Ahmad Rosli bin Othman, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Alam Sekitar & Pembangunan) (UKM)
	Mohamed Asri bin Omar, P.Geol	BSc (Hons) (Geology) (UKM)
Pegawai Geosains, C41 Geoscience Officer	Amir Mizwan bin Mohd Akhir, P.Geol (sehingga / until 31.08.2016)	BSc(Hons) (Geology) (UKM)
	Aidil bin Arnolous Rema	BEng(Hons) (Mineral Resources Eng.) (USM)
	Nur Asikin binti Rashidi, P.Geol (sehingga / until 31.08.2016)	BSc(Hons) (Geology) (UKM) MA (Archaeology) (USM)
	Muhammad Azri bin Ismail (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UM)
	Muhammad Kamal bin Kamarudin (mulai / from 20.11.2016)	BSc(Hons) (Geology) (UKM)

Negeri Sembilan/ Melaka		
Pengarah, C54 Director	Zulkipli bin Che Kasim, P.Geol (bersara pada / retired as of 07.07.2016)	BSc(Hons)(Geology)(UM) MSc(Mineral Exploration and Mining Geology) England
Timbalan Pengarah, C52 Deputy Director	Azemi bin Hj Eki, P.Geol (mulai / from 01.04.2016)	BSc(Hons) (Geology) (UKM) MSc (Material Eng.) (USM)
Ketua Unit, C48 Head Of Unit	Azizan bin Ali, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Engineering Geology) (UKM)
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Dorsihah binti Mohamad Jais, P.Geol	BSc(Hons) (Geology) (UM)
Ketua Unit, C44 Head Of Unit	Hairul bin Mohamed Shaharudin Norhayati binti Mohd Rawi, P.Geol (Cuti belajar / study leave)	BEng(Hons) (Mineral Resources Eng.) (USM) BSc(Hons) (Geology) (UKM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Azhar bin Ahmad Nazri, P.Geol Masrita binti Mohd Aras, P.Geol Mohd Nizam bin Md Nordin	Bsc(Hons) (Earth Sciences) (UKM) BSc(Hons) (Geology) (UKM) BSc(Hons) (Geology) (UKM)
Pegawai Geosains, C41 Geoscience Officer	Muhammad Fawwaz bin Zainal Abedin, P.Geol (sehingga / until 04.09.2016) Muhammad Nursafwan bin Mustafa (mulai / from 04.10.2016) Siti Fariza binti Abdul Hamid, P.Geol (mulai / from 04.10.2016) Noran Nabilla binti Nor Azlan (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UMS) BSc(Hons) (Applied Geology) (UM) BSc(Hons) (Geology) (UKM) BSc(Hons)(Geology)(UKM)
Terengganu		
Pengarah, C54 Director	Mohd. Zukeri bin Ab. Ghani, P.Geol	BSc(Hons) (Geology) (UKM)
Timbalan Pengarah, C52 Deputy Director	Che Abdul Rahman bin Jaafar, P.Geol	BSc(Hons) (Earth Science) (UKM)
Ketua Unit, C48 Head Of Unit	Hamlee bin Ismail	BSc(Hons) (Geology) (UKM) MSc (Industrial Mineral) (UKM)
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Abdul Hadi bin Abdul Rahman, P.Geol	BSc(Hons) (Geology) (UM) MSc (Industrial Mineral) (UKM)
Ketua Unit, C44 Head Of Unit	Tang @ Tan Hai Hong Suhaimizi bin Yusoff, P.Geol	BEng(Hons) (Mineral Resources Eng.) (USM) BSc(Hons) (Earth Science) (UKM) MSc (Geomatic Engineering) (UPM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Muhammad Fadzli bin Deraman, P.Geol	BSc(Hons) (Applied Geology) (UM) BEng(Hons) (Civil) (UiTM)

Pegawai Geosains, C41 Geoscience Officer	Norzuhairil bin Zubir, P.Geol	BSc(Hons) (Geology) (UM)
	Muhamad Safid bin Saad, P.Geol (sehingga / until 30.11.2016)	BAppSc(Hons) (Geophysics) (USM)
	Razaidi Shah bin A Kadir, P.Geol	BSc(Hons) (Geology) (UMS)
	Khairul Nazri bin Yaakub, P.Geol	BSc(Hons) (Geology) (UM)
	Muhammad Azfar bin Kamaruddin, P.Geol (sehingga / until 31.10.2016)	BSc(Hons) (Geology) (UMS)
	Nor Azrah binti Md Atan, P.Geol (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UKM)
	Mohd Faiz bin Ahmad Roshdi (mulai / from 04.10.2016)	BSc(Hons) (Applied Geology) (UM)

Kedah / Perlis / Pulau Pinang

Pengarah, C54 Director	Zainol bin Hj. Husin, P.Geol (bersara pada / retired as of 02.09.2016)	BSc(Hons) (Geology) (UKM)
Timbalan Pengarah, C52 Deputy Director	Kosong / Vacant	
Ketua Unit, C48 Head Of Unit	Hamdan bin Ariffin, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Mineral Resources Eng.) (USM)
Ketua Unit, C44 Head Of Unit	Badrol bin Muhammad, P.Geol	BSc(Hons) (Earth Science) (UKM)
	Ir. Tony Chew	BEng(Hons) (Mineral Resources Eng.) (USM) MBA (UMS)
	Fathullah bin Abu Naim	BSc(Hons) (Geology) (UM)
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Nur Susila binti Md Saaid, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Sedimentology & Stratigraphy) (UKM)
	Wan Salmi bin Wan Harun, P.Geol	BSc(Hons) (Applied Geology) (UM) MSc (Eng. & Environmental Geophysics) (UKM)
Pegawai Geosains, C41 Geoscience Officer	Azihan bin Mat Arshad	BEng(Hons) (Mineral Resources Eng.) (USM)
	Muhammad Mustadza bin Mazni	BSc(Hons) (Geology) (UMS)
	Fakhruddin Afif bin Fauzi, P.Geol	BSc(Hons) (Geology & Geophysics) (University of Adelaide)
	Anis Nasuha binti Mustapha @ Rosli	B.Sc(Hons) (Applied Science Geophysics) (USM) MSc (Applied Geophysics) (USM)
	Amer Ekram bin Azmi (mulai / from 04.10.2016)	BSc(Hons) (Geology) (UM)

Jawatan Kader di Agensi luar

Cader Posts in other Agencies

Jabatan Kerja Raya Public Works Department		
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Nicholas Jacob a/l T. Jacob, P.Geol	BSc(Hons) (Geology) (UKM) MSc (Environment) (UPM)
	Zaidi bin Daud, P.Geol	BSc(Hons) (Geology) (UM)
	Ab. Rashid bin Ahmad	BSc(Hons) (Geology) (UKM)
	Afandi bin Muda, P.Geol	BSc(Hons) (Applied Geology) (UM)
Cawangan Kejuruteraan Jalan & Geoteknik Road & Geotechnique Engineering Branch		
Pegawai Geosains Kanan, C44 Senior Geoscience Officer	Hisam bin Haji Ahmad, P.Geol	BSc(Hons) (Geology) (UM)
Kementerian Tenaga, Teknologi Hijau & Air Ministry of Energy, Green Technology & Water		
Pasukan Projek Penyaluran Air Mentah Pahang-Selangor		
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Kamarulbahrin bin Hashim, P.Geol	BSc(Hons) (Applied Geology) (UM)
Jabatan Bekalan Air		
Pegawai Geosains, C41 Geoscience Officer	Nik Mohd Nishamuddin bin Nik Rahimi (mulai / from 01.09.2016)	BSc(Hons)(Geology)(UKM)
Kementerian Wilayah Persekutuan Malaysia Ministry of Federal Territories		
Ketua Pegawai Geosains, C48 Principal Geoscience Officer	Nizarulikram bin Abdul Rahim, P.Geol	BSc(Hons) (Geology) (UM) Master of Intellectual Property (MIP)
Pegawai Geosains, C41 Geoscience Officer	Mohamad Zahir bin Che Ahmad, P.Geol	BSc(Hons) (Geology) (UM)

