

## DAFTAR PUSTAKA

- Ahmed, U. A. Q. Wagner, N. J. dan Joubert, J. A., 2020, Quantification Of U, Th and Specific Radionuclides in Coal from Selected Coal Fired Power Plants in South Africa, Vol.15, No.5, Plos One, hal.1–9.
- Akhadi, M., 2021, *Radioekologi Radionuklida Kosmogenik*, Deepublish, Yogyakarta.
- Akhyariansyah, D., 2017, Penentuan Radioaktivitas Pada Abu Terbang Batubara dengan Spektrometer Gamma Detektor HPGe, *Skripsi*, FMIPA, Universitas Sumatera Utara, Medan.
- Alatas, Z., 2004, Pengkajian Kasus Sindroma Radiasi Akut, *Buletin Alara*, No.2, Vol.6, BATAN, hal.77.
- Alatas, Z. Hidayati, S. Akhadi, M. Purba, M. Purwadi, D. Ariyanto, S. Winarno, H. Rismiyanto. Sofyatingrum, E. Hendriyanto. Widyastono, H. dan Syahril., 2016, *Buku Pintar Nuklir*, BATAN Press, Jakarta.
- Alfiyan, M., 2011, Penggunaan Perangkat Lunak Resrad-Offsite untuk Memperkirakan Resiko Radiologik Suatu Fasilitas Landfill Slag Timah. *Seminar Nasional Teknologi Informasi & Komunikasi Terapan 2011*, Semarang.
- Alviandini, N.B. Muslim. Prihatiningsih, W.R. Wulandari, S.Y., 2019, Aktivitas NORM pada Sedimen Dasar di Perairan PLTU Tanjung Jati Jepara dan Kaitannya dengan Ukuran Butir Sedimen serta TOC, *EKSPLORIUM - Buletin Pusat Pengembangan Bahan Galian Nuklir*, Vol.2, No.40, Pusat Teknologi Bahan Galian Nuklir-BATAN, hal.115-126.
- Anggarini, N. H. Iskandar, D. dan Stefanus, M., 2018, Studi Peningkatan Radionuklida Alam Karena Lepas Abu Terbang di Sekitar PLTU Labuan, *Jurnal Sains dan Teknologi Nuklir Indonesia*, Vol.19, No.1, BATAN, hal.29.
- BATAN., 2013, *Analisis Sampel Radioaktivitas Lingkungan Bagian 2 : Analisis Radionuklida Pemancar Gamma*, SB.
- Beiser, A., 1994. *Concepts of Modern Physics*, Sixth Edition, McGraw-Hill Higher Education, Berg.
- BP Energy Outlook 2021., 2021, *Statistical Review Of World Energy 2021*, Vol.70, BP.
- Charro, E. dan Peña, V., 2013, Environmental Impact of Natural Radionuclide from A Coal-Fired Power Plant in Spain, *Radiation protection dosimetry*, Vol.153, Oxford University Press, No.4, hal.485–495.
- Cohen, A. S. Belshaw, N. S. dan O’Nions, R. K., 1992, High Precision Uranium, Thorium and Radium Isotope Ratio Measurements by High Dynamic Range Thermal Ionisation Mass Spectrometry\*, *International Journal of Mass*

- Spectrometry and Ion Processes*, Vol.116, Elsevier Science Publishers, hal.71–81.
- Ćujić, M. Dragović, S. Đorđević, M. Dragović, R. Gajić, B. dan Miljanić, Š., 2015, Radionuclides in The Soil around The Largest Coal-Fired Power Plant in Serbia: Radiological Hazard, Relationship with Soil Characteristics and Spatial Distribution, *Environmental Science and Pollution Research*, Vol.22, No.13, Springer, hal.10317–10330.
- Dewi, W. K. Yulianti, D. dan Widarto., 2016. Pemantauan Logam Berat Pada Cuplikan Air Sungai Kaligarang Menggunakan Metode Analisis Aktivasi Neutron. *Unnes Physics Journal*, Vol.5, No.1, Universitas Negeri Semarang, hal.1–8.
- Draganić, I. G. Draganić, Z. D. dan Adloff, J.-P., 1993, *Radiation and Radioactivity on Earth and Beyond*, Second Edition, CRC press, United States.
- Dwaikat, N., 2020, Analysis of Potassium-40 ( $^{40}\text{K}$ ) in Soil Samples from Dhahran City, Saudi Arabia, Using Gamma Spectrometer, *Arabian Journal for Science and Engineering*, Vol.46, No.1, hal.731–735.
- Eisenbud, M., Dan Petrow, H. G. 1964. Radioactivity in The Atmospheric Effluents of Power Plants that Use Fossil Fuels, *Science*, Vol.144, No.3616, Institute of Industrial Medicine, hal.288–289.
- El-Mekawy, A. F. Badran, H. M. Seddeek, M. K. Sharshar, T, dan Elnimr, T., 2015, Assessment of Elemental and NORM/TENORM Hazard Potential from Non-Nuclear Industries in North Sinai, Egypt, *Environmental Monitoring and Assessment*, Vol.187, No.9, Springer.
- European Commission., 1999, *Radiation Protection 112: Radiological Protection Principles Concerning The Natural Radioactivity of Building Materials*, European Commission Publication.
- Dera, F. F., 2018, Gambaran Dosis Interna dari Bioassay Sampel Urine Desa Botteng Kabupaten Mamuju, *Skripsi*, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Hasanuddin.
- Dewi, W. K. Yulianti, D. dan Widarto., 2016, Pemantauan Logam Berat pada Cuplikan Air Sungai Kaligarang Menggunakan Metode Analisis Aktivasi Neutron, *Unnes Physics Journal*, Vol.5, No.1, Universitas Negeri Semarang.
- Gruppen, C., dan Rodgers, M., 2016, *Radioactivity and Radiation What They Are, What They Do, and How to Harness Them*, Springer International Publishing, Germany.
- Habib, M.A. Basuki, T. Miyashita, S. Bekelesi, W. Nakashima, S. Techato, K. Khan, R. Majlis, A.B.K. dan Phoungthong, K., 2019, Assessment of Natural Radioactivity in Coals and Coal Combustion Residues from A Coal-Based Thermoelectric Plant in Bangladesh: Implications for Radiological Health

Hazards, *Environmental Monitoring and Assessment*, Vol.191, No.2, Springer.

Hamdi., 2016, *Energi Terbarukan*, Prenada Media, Jakarta.

Hasani, F. Shala, F. Xhixha, G. Xhixha, M.K. Hodolli, G. Kadiri, S. Bylyku, E. dan Cfarku, F., 2014, Naturally Occurring Radioactive Materials (NORMs) Generated from Lignite-Fired Power Plants in Kosovo, *Journal of Environmental Radioactivity*, Vol.138, Elsevier, hal.156–161.

Hasibuan, F., Warsito, dan Suciwati, S. W., 2015, Simulasi Model Dispersi Polutan Gas Dan Partikulat Molekul Pada Pabrik Semen Dengan Menggunakan Software Matlab 7.12, *Jurnal Teori dan Aplikasi Fisika*, Vol.03, No.02, Universitas Lampung.

Jamilah, R., 2020, Analisis Radionuklida Alam dalam Susu Bubuk Kemasan dari Berbagai Merek Sebagai Bahan Kajian Dosis Internal yang Diserap Manusia Menggunakan Detektor HPGe, *Skripsi*, Fakultas Sains dan Teknologi, Universitas Islam Negeri Sunan Gunung Djati, Bandung.

Janković, M. M. Rajačić, M. M. Todorović, D. J. Sarap, N. B. Nikolić, J. D. Pantelić, G. K. dan Krstić, M. M., 2016, Study Of Radioactivity In Environment Around Power Plants Tent A And Kolubara Due To Coal Burning For 2015, *RAD Conference Proceedings*, Belgrade.

ICRP Publication 60., 1990, *Recommendations of The International Commission on Radiological Protection*, Vol. 21, UK Pergamon Press, Oxford.

Kaplan, I., 1974, *Nuclear Physics*, Edisi Kedua, Addison-Wesley Publishing Company, London.

Karo, R. M., 2018, Penentuan Aktivitas Radionuklida Alam ( $^{226}\text{Ra}$ ,  $^{232}\text{Th}$  &  $^{40}\text{K}$ ) dalam Debu Vulkanik Gunung Sinabung, Pupuk Fosfat dan Tanah Pertanian dengan Metode Spektrometri Gamma Serta Perkiraan Dampaknya pada Lingkungan, *Tesis*, PPs Kimia, Universitas Sumatera Utara, Medan.

Khan, I.U. Sun, W. dan Lewis, E., 2020, Estimation of Various Radiological Parameters Associated with Radioactive Contents Emanating with Fly Ash from Sahiwal Coal-Fuelled Power Plant, Pakistan, *Environmental Monitoring and Assessment*, Vol. 192, No. 715, Springer.

Knoll, G.F., 1979, *Radiation Detection and Measurement*, Edisi Ketiga, John Wiley & Sons, New York.

L'Annunziata, M. F., 2007, *Radioactivity Introduction and History*, Elsevier, UK.

Lewis, J. L. dan Wenham, E. J., 1970, *Radioactivity*, Longman Physics Topics, London.

Liandy, M. K. G., Suswantoro, E., dan Yulinawati, H. 2015. Analisis Sebaran Total Suspended Particulate (TSP), Sulfur Dioksida ( $\text{SO}_2$ ), dan Nitrogen Dioksida ( $\text{NO}_2$ ) di Udara Ambien dari Emisi Pembangkit Listrik Tenaga

- Uap (PLTU) Banten 3 Lontar Dengan Model Gaussian, *Indonesian Journal of Urban and Environmental Technology*, Vol.7, No.2, Universitas Trisakti, hal.47.
- Liu, G. Luo, Q. Ding, M. dan Feng, J., 2015, natural Radionuclides in Soil Near a Coal-Fired Power Plant in The High Background Radiation Area, South China, *Environmental Monitoring and Assessment*, Vol. 187, No. 356, Springer.
- Lu, X. Li, L. Y. Wang, F. Wang, L. dan Zhang, X., 2012, Radiological Hazards Of Coal And Ash Samples Collected From Xi'an Coal-Fired Power Plants Of China, *Environmental Earth Sciences*, Vol.66, No.7, Springer-Verlag, hal.1925–1932.
- Lu, X. Li, X. Yun, P. Luo, D. Wang, L. Ren, C. dan Chen, C., 2012, Measurement of Natural Radioactivity and Assessment of Associated Radiation Hazards in Soil around Baoji Second Coal-Fired Thermal Power Plant, China, *Radiation Protection Dosimetry*, Vol. 148, No. 2, Oxford University Press, hal. 219-226.
- Mandal, A. dan Sengupta, D., 2003, Radioelemental Study Of Kolaghat, Thermal Power Plant, West Bengal, India: Possible Environmental Hazards, *Environmental Geology*, Vol.44, No.2, Springer-Verlag, hal.180–186.
- Mardimin. Willian, N. dan Muzahar., 2014, Analisis Kandungan Radionuklida Alam pada Sedimen di Perairan Batam, *Skripsi*, Jurusan Ilmu Kelautan, Universitas Maritim Raja Ali Haji, Tanjungpinang.
- Megalovasilis, P. Papastergios, G. dan Filippidis, A., 2013, Behavior Study of Trace Elements in Pulverized Lignite, Bottom Ash, and Fly Ash of Amyntaio Power Station, Greece, *Environmental Monitoring and Assessment*, Vol. 185, Springer, hal. 6071-6076.
- Negm, H. H. Ahmed, N. K. Abbady, A. dan Reda, M. M., 2019, Study of Radionuclides and Radon Exhalation Rate in Soil and Sand Samples from Tiba, Luxor, Governorate, *World Journal of Nuclear Science and Technology*, Vol.09, No.02, hal.84–95.
- Ozden, B. Guler, E. Vaasma, T. Horvath, M. Kiisk, M. dan Kovacs, T., 2017, Enrichment of Naturally Occurring Radionuclides and Trace Elements in Yatagan and Yenikoy Coal-Fired Thermal Power Plants, Turkey, *Journal of Enviromental Radioactivity*, Vol. 188, Elsevier, hal. 100-107.
- Pandit, G.G. Sahu, S.K. dan Puranik, V.D., 2011, Natural Radionuclides from Coal Fred Thermal Power Plants – Estimation of Atmospheric Release and Inhalation Risk, *ICRER 2011 – International Conference on Radioecology & Environmental Radioactivity: Environment & Nuclear Renaissance*. Vol. 46, EDP Sciences. hal. 173-179.
- Pe, O. Bm, I. So, O. Ab, N. dan Ao, B., 2017, Radiological Assessment Of Coal

- Samples From Selected Coal Mines In Nigeria, *Chemistry Research Journal*, Vol.2, No.3, hal.22–28.
- Peraturan Pemerintah Republik Indonesia Nomor 101 Tahun 2014 tentang *Pengelolaan Limbah Bahan Berbahaya dan Beracun (B3)*, Jakarta.
- Prasetia, I. Ma'ruf. dan Riswan., 2016, Potensi Pemanfaatan Limbah Abu Batubara Sebagai Bahan Konstruksi di Daerah Rawa, *Jurnal Teknologi Berkelanjutan*, Vol. 5, No. 2, Fakultas Teknik Universitas Lambung Mangkurat, hal. 71-78.
- Putri, R. D. Taufiq, I. dan Norokhim., 2019, Analisis Radionuklida Pada Fly Ash Dan Bottom Ash PLTU Teluk Sirih Menggunakan Spektrometer Gamma, *Jurnal Fisika Unand*, Vol.8, No.4, Jur. Fisika Unand, hal.387–393.
- Rasito. Zulfakhri. Arianta, P.A. dan Suherman, A., 2007, Konsentrasi Uranium, Thorium dan Kalium dalam Berbagai Produk Semen yang Dipasarkan Di Indonesia, *Prosiding Seminar Nasional Sains dan Teknologi Nuklir PTNBR – BATAN*, Bandung.
- Sanjuán, M. Á., Suárez-Navarro, J. A., Argiz, C., dan Mora, P. 2020. Assessment of Natural Radioactivity and Radiation Hazards Owing to Coal Fly Ash and Natural Pozzolan Portland Cements. *Journal of Radioanalytical and Nuclear Chemistry*, Vol.325, No.2, Springer, hal.381–390.
- Santoso, B., 2015, *Petrologi Batubara Sumatera dan Kalimantan: Jenis, Peringkat, dan Aplikasi*, LIPI Press, Jakarta.
- Saueia, C. H. R. dan Mazzilli, B. P., 2006, Distribution of Natural Radionuclides in The Production and Use of Phosphate Fertilizers in Brazil, *Journal of Environmental Radioactivity*, Vol.89, No.3, Elsevier, hal.229–239.
- Soedjo, P., 2001, *Azas-Azas Ilmu Fisika, Fisika Modern*, UGM Press, Yogyakarta.
- Sofyan, H. dan Akhadi, M., 2004, Radionuklida Primordial untuk Penanggalan Geologi dan Arkeologi, *Buletin Alara*, No.2, Vol.6, BATAN, hal.85.
- Suhardi. Siswanti. Muljon. dan Iswantoro., 2011, Penentuan Radioaktivitas Pemancar Gamma Total dan Beta Total dalam Limbah Rumah Sakit di Daerah Istimewa Yogyakarta, *Prosiding Seminar Penelitian dan Pengelolaan Perangkat Nuklir*, Yogyakarta.
- Sukirno, Murniasih, S. Rosidi, dan Sutanto.W.W., 2016, Radioaktivitas Alam Hasil Pembakaran Batubara dari Pltu Pacitan, *Prosiding Pertemuan dan Presentasi Ilmiah - Penelitian Dasar Ilmu Pengetahuan dan Teknologi Nuklir 2016*, Surakarta.
- Susetyo, W., 1988, *Spektrometri Gamma dan Penerapannya dalam Analisis Pengaktifan Neutron*, UGM-Press, Yogyakarta.
- Syaifudin, M., 2014, Mengenal Genetika Radiasi dan Peranannya Dalam Prediksi

- Risiko Akibat Paparan Radiasi, *Buletin Alara*, No.2, Vol.16, BATAN, hal.93–99.
- Tanić, M. Mandić, L. Čujić, M. Onjia, A. Dinić, D. dan Dragović, S., 2018, Human Health Risk Assessment Due to Natural Radionuclides in Soil Affected by Coal Combustion: A Case Study from The Surroundings of The Largest Thermoelectric Power Plant in Serbia, *Scientific Professional Society for Environmental Protection of Serbia*, No. 89, Vol. 25, ECOLOGICA.
- UNSCEAR., 1988, *Sources, Effects and Risks of Ionizing Radiation, United Nations Scientific Committee on the Effects of Atomic Radiation 1988 Report to the General Assembly, with annexes*, United Nations, New York.
- UNSCEAR (United Nations Scientific Committee on the Effects of Atomic Radiation)., 2000, *Sources and Effects of Ionizing Radiation, Report to the General Assembly with Scientific Annexes*, Vol. 1, United Nations, New York.
- Valkovic, V., 2000, *Radioactivity in The Environment: Physicochemical Aspects and Applications*, Edisi Kedua, Elsevier Science, Amsterdam.
- Varinlioglu, A. Akyuz, T. dan Kose, A., 2000, Natural and Artificial Radionuclides in Selected Lignites from Istanbul, *Journal of Radioanalytical and Nuclear Chemistry*, Vol.246, No.2, Akadémiai Kiadó, hal.391–394.
- Ventura, J.S., 2019, Determination of The Radioactive Potassium Content in Bananas, *Treball Final de Grau*, Facultat de Química, Universitat de Barcelona, Barcelona.
- Wahyudi, Bunawas, Wiyono, M. dan Putri, H.R., 2009, Distribusi Konsentrasi  $^{40}\text{K}$ ,  $^{226}\text{Ra}$ ,  $^{228}\text{Ra}$  dan  $^{228}\text{Th}$  Dalam Sampel Tenorm di Fasilitas Penelitian Tenorm di PTKMR - BATAN, *Seminar Nasional Keselamatan Kesehatan dan Lingkungan V*, Depok.
- Wahyudi. Iskandar, D. dan Marjanto, D., 2007, Pengaruh Matriks Terhadap Pencacahan Sampel Menggunakan Spektrometer Gamma, *Jurnal Forum Nuklir*, Vol. 1, No. 2, Sekolah Tinggi Teknologi Nuklir – BATAN, hal. 65–78.
- Wexler, P. Anderson, B. Peyster, A. de. Gad, S. Hakkinen, P. J. Kamrin, M. Locey, B. Mehendale, H. Pope, C. dan Shugart, L., 2005, *Encyclopedia of toxicology*, Edisi Kedua, Academic Press, USA.
- Wiyono, M. Iskandar, D. Wahyudi, Kusdiana, dan Syarbaini., 2016, Environmental Radiation and Radioactivity Levels Around The Coal-Fired Power Plant in Banten Province, *2nd International Conference on the Sources, Effects and Risks of Ionizing Radiation (SERIR2) & 14th Biennial Conference of the South Pacific Environmental Radioactivity Association*, Vol.1, No.1, BATAN, hal.139–144.
- Yao, Z.T. Ji, X.S. Sarker, P.K. Tang, J.H. Ge, L.Q. Xia, M.S. dan Xi, Y.Q., 2015,

A Comprehensive Review on The Applications of Coal fly Ash, *Earth-Science Reviews*, Vol. 141, Elsevier, hal. 105-121.

Agency for Toxic Substances and Disease Registry (ATSDR), 1999, Radium, <https://www.atsdr.cdc.gov/toxfaqs/tfacts144.pdf>, diakses Juli 1999.

Connecticut Department of Public Health (DPH), 2019, What You Need to Know About Radium in Private Well Water, [https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental\\_health/private\\_wells/Radium-in-well-water\\_March2019.pdf](https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/private_wells/Radium-in-well-water_March2019.pdf), diakses Maret 2019.

United States Environmental Protection Agency (EPA), 2021, Radionuclide Basics: Radium, <https://www.epa.gov/radiation/radionuclide-basics-radium>, diakses 14 Juli 2021.

United States Environmental Protection Agency (EPA), 2021, Radionuclide Basics: Thorium, <https://www.epa.gov/radiation/radionuclide-basics-thorium>, diakses 14 Juli 2021.

World Nuclear Association, 2020, Thorium, <https://world-nuclear.org/information-library/current-and-future-generation/thorium.aspx>, diakses November 2020.

