



## Stephen Hancock (1938–2022)

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Another International Mine Water Association great has passed away. Stephen Hancock served as the first Vice President of the first elected IMWA Executive Council and was heavily involved with organizing the 1988 IMWA Congress in Melbourne. That congress introduced many Australian hydrogeologists to IMWA and provided many of them their first opportunity to meet with colleagues from Western Europe, the “Iron Curtain” countries, Africa, and the Americas.

For those of us who have long enjoyed Steve’s deep, endearing, and sincere friendship, this is a very heavy blow. Steve is remembered for his strong professional experience, and his open and collaborative spirit. We will always remember him for his enormous energy, vigour, kindness, and especially the friendship he and his dear wife Jill extended to so many of us.

John Stephen Hancock was born in Melbourne, Australia, on 21st December 1938. He was the second son of Sadie

Cave Hancock (née Scarlett) and Stuart Oswald Hancock, from Irish and English families who emigrated to Australia around 1850.

Steve was one of the best-known hydrogeological consultants in Australia from the late-1960s until his death in January this year. Initially, in the early 1960s, he worked for the Broken Hill Proprietary company on groundwater-related aspects of mining projects in South Australia and elsewhere. Later he joined the Geological Survey of Victoria. He set up Stephen Hancock and Associates to begin his consulting career, and the soon joined the fledgling Australian Groundwater Consultants (AGC) in 1967. He then drove its expansion to become one of the leading employee-owned, specialist groundwater consulting groups in Australia, with numerous projects overseas, notably in Indonesia, and even an operation in South Africa for a while.

AGC developed many groundwater supplies for mining and industrial operations. In the 1960s and 1970s, the expansion of mining in remote locations, often in arid environments, provided great opportunities for emerging groundwater consultancies in Australia. AGC explored and found groundwater resources in a wide range of situations and designed and installed numerous groundwater supply well-fields. These ranged from small gold mine water supplies in Western Australia to large, remote wellfields for major operations such as the Olympic Dam copper–gold–uranium mine in South Australia with its large and complex metallurgical plant. AGC evolved to provide surface water expertise, artificial recharge scheme designs, tailings storage work, groundwater contamination studies and more, all with the common element, water.

Many older hydrogeologists in Australia remember Steve as an active director of AGC, which merged with the similar but larger U.S. company, Woodward-Clyde Consultants (Denver, USA) in the early 1990s and retained much of its identity for some years. He remained in a senior role after AGC was incorporated into Woodward-Clyde and, later when that company became part of URS Corporation in 1997. Eventually, Steve retired from full-time work in 2008, albeit with a contract for casual work with URS for specialist

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input. He retired from consulting under the URS flag in 2013 when that company was acquired by another, even larger group, AECOM.

While working with full-time with AGC, Steve undertook sabbaticals, travelling with his ever-supportive wife Jill and sons Ben and James to investigate technical developments across the world including, for example, artificial recharge with water from sewage treatment plants. He applied for and was awarded a Winston Churchill Foundation Fellowship for a nine-week trip with his 19-year-old son Ben, to study the use of clay grouts in the Soviet Union, where our late colleague Ernest Kipko's Company in Antratsyt (Ukraine) had developed a very sound approach for formulating clay-based grout properties specifically for each situation. This approach offered (and offers) a substantial improvement over conventional, and sometimes very expensive cementitious grouts. Typically, Steve had the vision to see the potential benefits of this improved technical approach.

In the Donetsk coal basin, he held meetings with the technical staff, inspected their research facilities and visited several mines to learn about the ongoing slurry injection mining projects and the places where the clay for the slurry was mined. He would later write, *"After two weeks of activity around mine sites, we were convinced that a great deal of research work had been done on stabilised clay grouting and on the design components which needed to be assessed on each site for optimal success to be achieved."*

The trip continued to Warsaw, Poland, where they received full support from one of IMWA's founders, Jacek Libicki, head of a large mining services company (Poltegor). Jacek took them to visit a subway coal mine penetrated by several salt diapirs, where the drainage water posed problems related to salt pollution downstream of the discharge, in highly valued agricultural and industrial areas. The solution at the time relied on vacuum desalination to remove the salt from the water and then re-inject the residual brine into the diapir, away from the mine, and under the shelter of a stabilized clay slurry injection.

Steve suggested conducting an inventory of water inputs into the mine, to locate where the saline water was entering. In this way, these waters could be sealed off, or collected separately from the rest, providing a more suitable brine source for salt production, while the rest of the non-saline water could be discharged without problems. This proved to be the best system, since all the brine would enter through a single level. The other inflows (low salinity water) were suitable for discharge into local streams, after simpler treatment.

Jacek invited Steve to visit the Bełchatów coal mine, a large open pit with a long ring of peripheral boreholes to

extract the large amount of water required to drain the sediment down to about 300 m below the plain. The extracted waters were somewhat acidic, turbid, and high in tannic acids, which meant that release to local waterways would badly impact downstream environments. These issues were exacerbated by pathogen-polluted runoff. The solution adopted was an unsophisticated system of wetlands with reed beds to filter much of the nutrients and suspended sediments to allow the water to be discharged into the hydrographic network.

From Warsaw he flew on the Polish national airline, bound for Katowice, an important coal mining centre in Upper Silesia, to attend the IMWA Congress there. Steve would later write that the real strength of IMWA was that *"such Congresses and its journal circumvented political barriers as much as possible and used personal interactions to spread the science"*. Upon his return to Australia, he applied Russian injection technology to several projects, and it worked well.

Steve is remembered for his strong professional experience, and his open and collaborative spirit. After retirement from full-time work, Steve was active as a member of Planning Panels Victoria, available to sit on review panels when his technical expertise was needed. He also worked hard with the Australasian Institute of Mining and Metallurgy to stimulate, in his own none-too-subtle but likely accurate words *"bringing the mining industry policy into the 21st Century"*. It is an evolving situation but, to use Steve's own words, *"AusIMM will be the first major mining industry professional representative body in the world to adopt a position on Sustainability and on Social Responsibility and Performance into the future."* Steve regarded this as the best thing he did, professionally.

Steve consistently showed a combination of self-confidence and lateral thinking, both when seeking solutions and identifying opportunities. As the phrase goes, *'he did not suffer fools gladly'*, arguing against conservative attitudes that could not or would not embrace his vision of what seemed obvious.

Steve's intense activity in the last 20 years of his life, when his retired status could have exempted him from it, is striking. He participated responsibly in numerous forums, striving to integrate corporate social responsibility in mining projects while addressing sustainability aspects, and attempted to enhance the understanding between mining companies and landowners. The two of us, along with his many other colleagues and friends, mourn Steve's passing, but celebrate a life well lived. He certainly has left his mark!