guest editorial

PRACTICAL GROUND-WATER RESEARCH: A UNIVERSITY-INDUSTRIAL SOLUTION

by Michael D. Campbell[a]

The plea for research on the pressing problems of ground-water technology has been raised over the years. In the past few years the plea has become even more audible. Some commercially-oriented organizations have made significant contributions to ground-water research; many have not for reasonably sound economic reasons. Most research, however, has been done by the federal government and by various universities. But, what happens when research needs arise which are not strictly related to the classical areas of research in ground water, i.e. hydraulics, rate of movement, regional management, and surface-water–ground-water relationships? Occasionally, a problem is presented to an expert outside the ground-water field for solution, and the expert usually does the best he can on such a one-time project. Difficult problems, however, usually get pushed aside for other projects of interest and eventually become a serious gap in research. The ground-water field has a number of pressing field research problems. A few of the major ones are: *cementing technology* (i.e. detection of effectiveness, sanitary protection, longevity features, etc.), and *well corrosion–incrustation control technology* (i.e. early detection of advanced techniques in control, detailed materials resistance, economic evaluations, etc.). The petroleum industry is making progress in these areas, although the relevancy is sometimes difficult to identify. In the universities, however, research on so-called practical problems has been avoided on the grounds that they are "industrial" problems, not "academic" problems. Industry complains that they cannot afford to do such research since the areas embody "academic" problems and should be handled by the government or the universities. So the problems have been batted back and forth like a ping pong ball for years.

Although in the past, the university's role was assumed to be one of pushing the frontiers of science forward, a recent attitude has been identified within the university that, somewhere along the way, certain areas of research have indeed been overlooked, not intentionally, but because academic interdisciplinary emphasis had not fully developed. The ground-water field presently recognizes the need for input from the fields of biology and chemistry, as well as the historical input from the fields of engineering, physics, etc.; but, more importantly, those needs are being answered by a truly interdisciplinary effort from those universities which have acknowledged their new role of assisting industry with its practical problems.

At Rice University, for example, academic programs have

[a]Director, NWWA Research Facility, Department of Geology, Rice University, Houston, Texas 77001.

historically been oriented toward the theoretical and fundamental aspects of the various sciences, but now an interdisciplinary research group consisting of the Departments of Geology, Environmental Engineering and Biology has been formed to deal with water resource-related projects, including high-priority ground-water research areas. In addition, industrial committees have been organized to assist the university research group both financially and technologically, and to insure that the research has an immediate, practical impact.

Other universities have also begun to make a strong move in this direction. Whenever such activity occurs, significant contributions to a specific scientific field result.

Practical ground-water research is, at least, no longer last in line for attention but still remains too near the bottom of any list. With the growing awareness of ground water's importance to man's future needs, however, we are beginning to make significant progress, with the unified efforts of both the university and industry.

Given the potential for effective research on the practical problems besetting the ground-water industry, the question naturally arises as to funding. Who pays the bill? In the past, the federal government has passed out millions of dollars for university research on projects designed to press the scientific frontiers forward. But what about those gaps, the research topics that ask questions like: "What is the most effective sanitary well seal—a type III cement or a bentonite slurry?" or "Can a sonic log tell me if a particular well has been effectively cemented?" or "What are the most effective methods for identifying and controlling the various types of iron-bacteria and sulphate-reducing bacteria?" or "Given data on local ground-water geochemistry, at what rate will a particular well casing corrode and/or incrust?"

With the entrance of the university into the area of applied research in ground water, the stage is now set for a minor, though significant change in government funding practices: projects which address important "grass-roots" problems should be given funding priority. In addition, projects should only be undertaken by inter-disciplinary research groups consisting of qualified university, industrial and governmental personnel. Those administering such projects would need to insure that the research results were widely disseminated as quickly as possible, not just put on a shelf and buried in university and governmental libraries.

The need for research exists, and an effective approach to meeting this need is developing; funding could be available if only a simple change in policy were instituted. What is stopping us? Not a thing! We must all press for answers to these problems. Let us not forget that ground water is no better than the well that delivers it; as the well deteriorates, so does the ground water.