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High-Recovery Desalination Process for Brackish Groundwater

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Investigators from Israel, Jordan and the United States have worked on a project since July 2007 to demonstrate a desalination process for brackish (salt-containing) groundwater. Desalination uses reverse osmosis (RO) for the removal of salt from seawater or other brackish water sources. RO is a pressure-driven process in which water is forced through a polymeric membrane while salts are retained. A major barrier to efficient desalination is the precipitation of sparingly soluble salts on the surface of the membrane, a process termed “scaling”. The key innovation in this work is the method proposed to prevent this process. The project participants will build demonstration desalination pilot plants in Jordan and Israel that should extract 90-95% of brackish groundwater and generate ~50 m³/day of product water. The Middle East is plagued by a severe scarcity of freshwater sources, and so seawater is the most commonly used raw water source for desalination. By exploiting brackish groundwater to such a high degree and reducing brine volumes, these demonstration plants will encourage the development of additional marginal water sources in Jordan and Israel. This will relieve pressure on existing water sources, with the intention that water scarcity will not become a driver of future conflict between nations in the Middle East.

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