

Uranium Mining by In-Situ Recovery (ISR) Technology

A summary review
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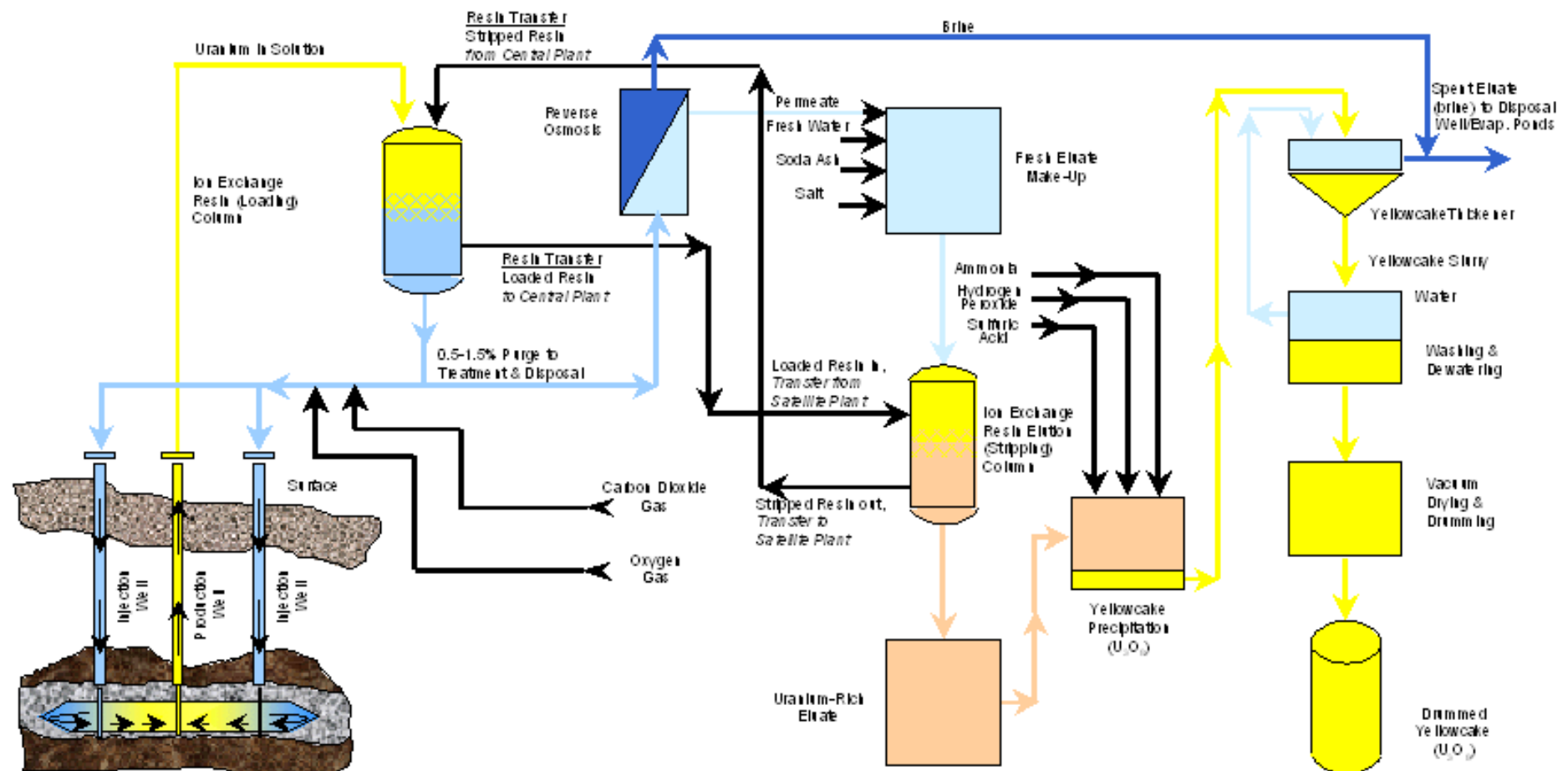
Uranium In-Situ Recovery (ISR) Mining

- Low capital costs (\$20 to \$35 million)
- Environmentally friendly (common solute is ground water enriched with oxygen and, if needed, carbon dioxide or bicarbonate of soda)
- Process essentially reverses the natural process by which the deposits were originally formed
- Works very good on solution front deposits in porous & permeable sandstones (Wyoming, Texas, Kazakhstan, Australia, etc.)
- Ideally 14 – 24 months mining, 24+ months ground water restoration and surface reclamation
- Production cost range - \$18 to \$25 per pound

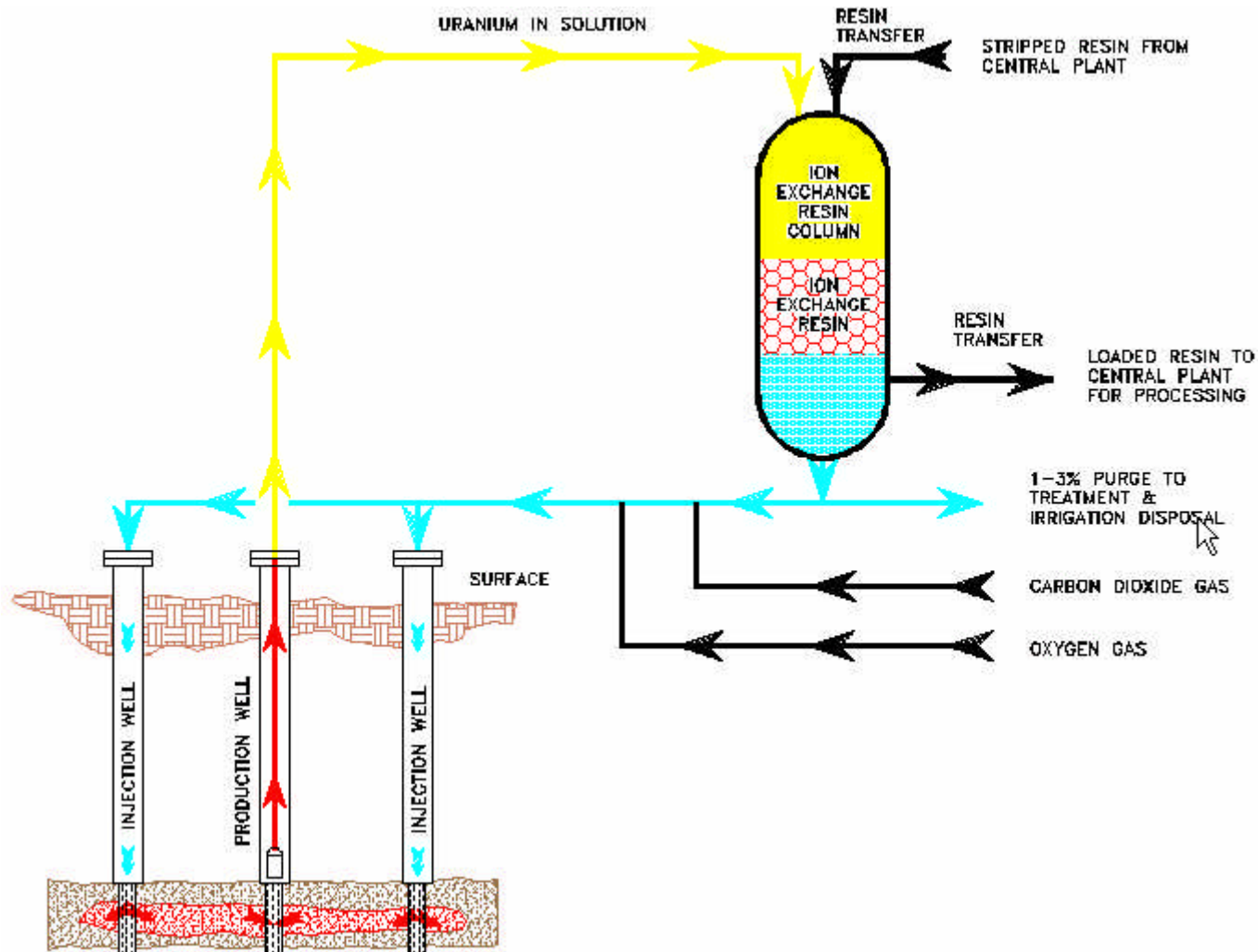
ISR Mine Production Schematic

URANIUM EXTRACTION

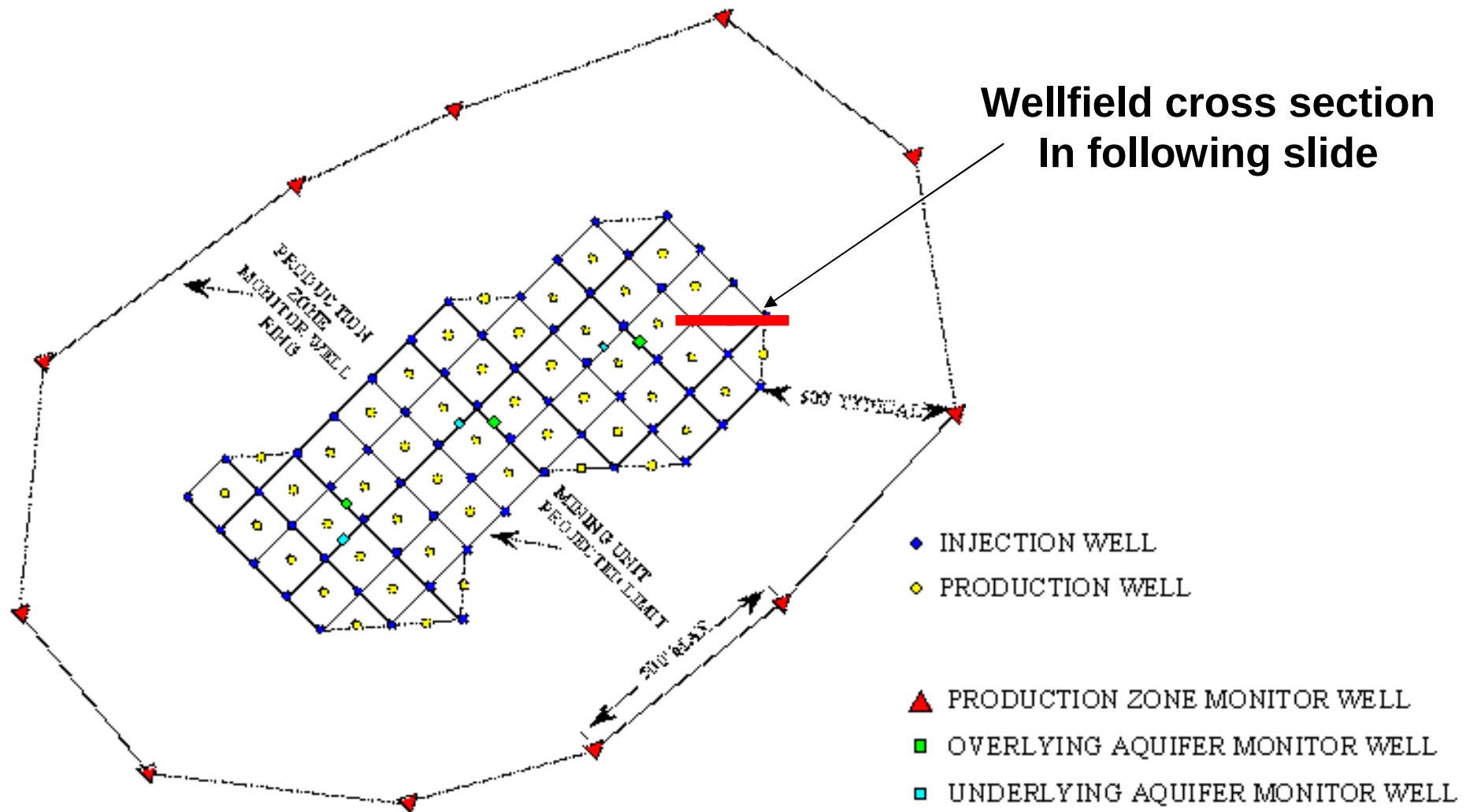
YELLOWCAKE RECOVERY



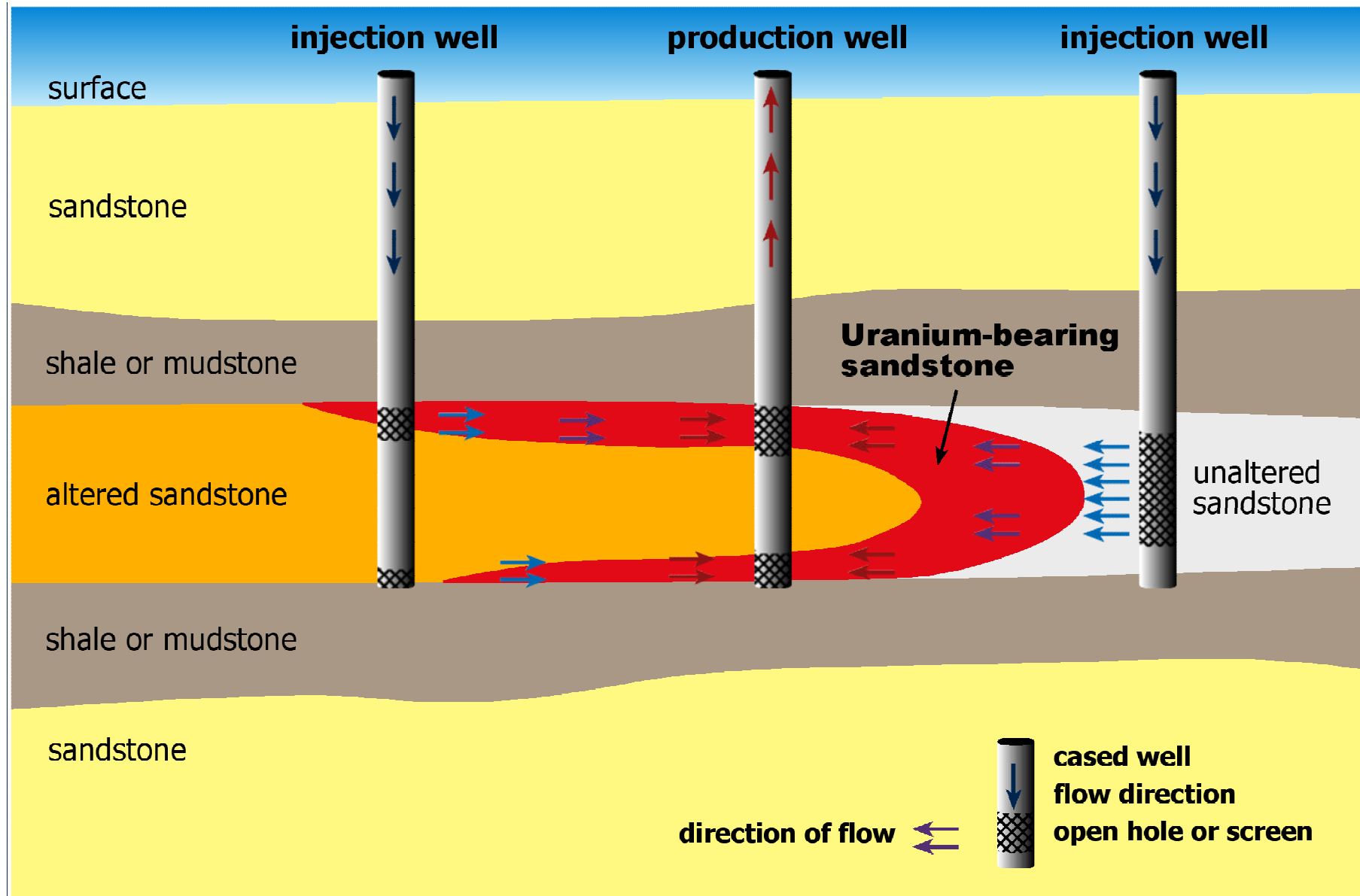
Basic ISR Process - Satellite



ISR Wellfield Layout



ISR Mining – Injection and Production Wells



Drilling to Install Wellfield

View at Christensen Ranch ISR Mine (Cogema/AREVA)
Powder River Basin, Wyoming



Photo by Tom Nicholson

ISR Wellfield Smith Ranch Mine (PRI/Cameco) Powder River Basin, Wyoming



Photo by Bill Boberg – July 2005

ISR Mining – A Plumbers World



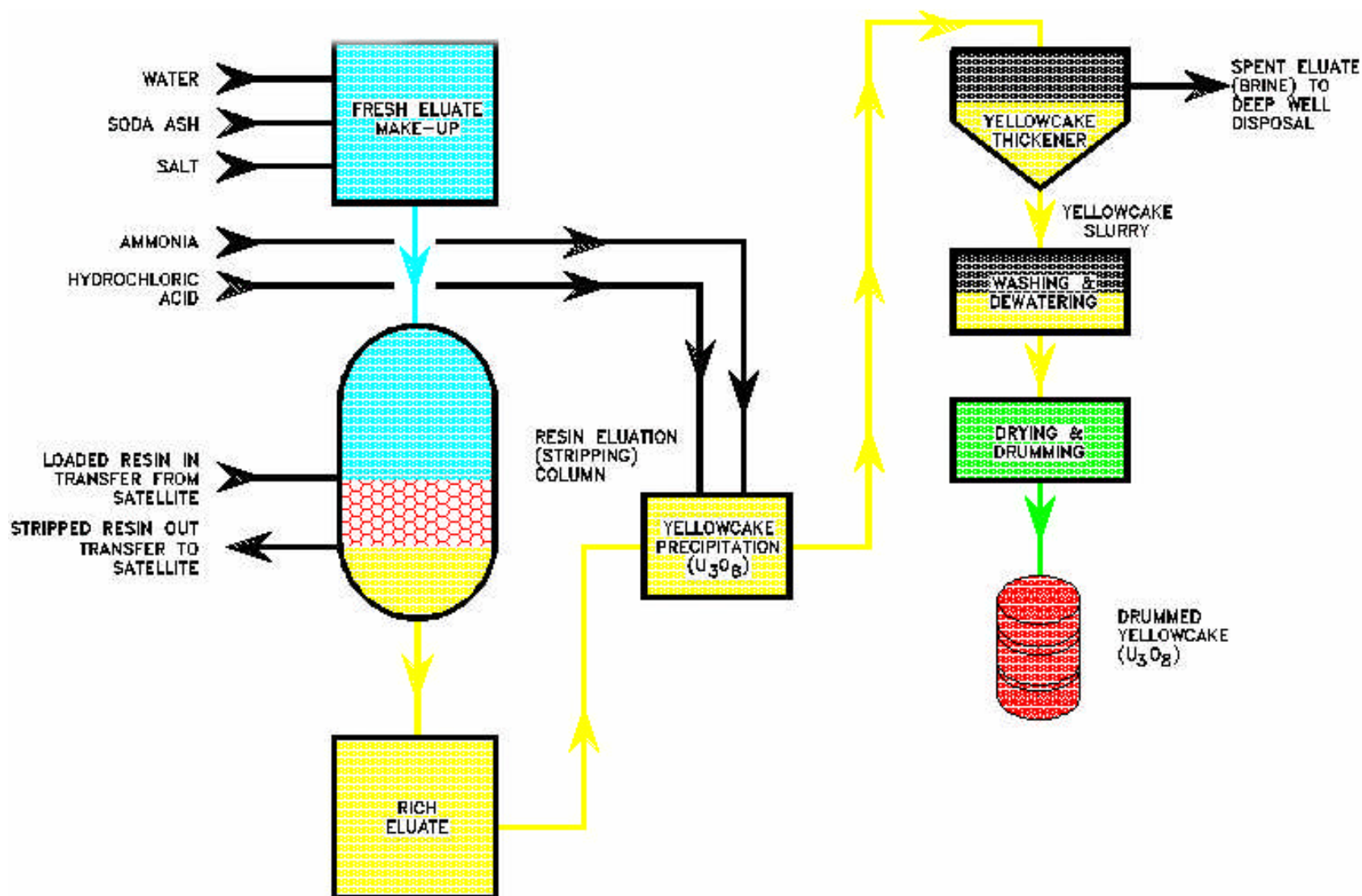
Header House, controlling both injection as well as production from many wells in wellfield

A production well and insulating cover



**Photos by Bill Boberg, Taken at PRI/Cameco
Smith Ranch ISL Mine, Powder River Basin
Wyoming – July 2005**

Basic ISR Plant Processing



From the ISR Wellfield to the Plant



From the production well the produced fluid goes through resin tanks where the uranium is stripped from the fluid and is then returned to the wellfield

The resin is then transported to the mill where it is stripped and the uranium is taken into solution

Photos by Bill Boberg, Taken at PRI/Cameco Smith Ranch ISL Mine, Powder River Basin Wyoming – July 2005



From Solution to Yellowcake



After stripping from the resin, the uranium is taken through several steps in solution before being precipitated and dried

The final step in the mill is to package the dry yellowcake in drums

Photos by Bill Boberg, Taken at PRI/Cameco
Smith Ranch ISL Mine, Powder River Basin
Wyoming – July 2005



Yellowcake – The Product



Yellowcake

uranium oxide (U_3O_8)

800+ pounds per drum

US\$80,000 per drum @ \$100/lb

Filled drums of yellowcake awaiting shipment at Smith Ranch

Photos by Bill Boberg, Taken at PRI/Cameco
Smith Ranch ISL Mine, Powder River Basin
Wyoming – July 2005



ISR Mining

Ground Water Restoration

