M² Polymer Technologies, Inc.

P.O. Box 365
West Dundee, IL 60118 USA
Phone: 847-836-1393 Fax: 847-836-6483
www.m2polymer.com

October 2005

Subject: ***Waste Lock® 770*** Superabsorbent Polymer
Exposure of polymer gels to Cobalt-60 radiation

Study Protocol:

Samples of gels were made using 1 gram of ***Waste Lock® 770*** Superabsorbent Polymer in 100 mls of deionized water. Gels were made in 250 ml clear Wheaton glass bottles with lined plastic caps and a 45 mm neck finish.

Five (5) gel bottle samples were sent to University of Michigan/Phoenix Memorial Laboratory in Ann Arbor, Michigan for exposure to their Cobalt-60 source. The source emits at 708,700 rads/hour. A sixth sample bottle was retained here as a Control Sample. Rad doses were calculated according to residence time in the circular Co-60 chamber.

After irradiation, U of M returned the bottles for observation and for testing for free liquids (Paint Filter Test, EPA 9095).

Results and observations are below:

Rad Dosage Applied	Observations	Paint Filter Test Result
0 megarads (Control Sample)	Normal looking SAP gel	PASSES
0.5 megarads	Normal looking SAP gel	PASSES
1 megarads	Normal looking SAP gel	PASSES
2 megarads	Normal looking SAP gel	PASSES
5 megarads	Gel appears thicker & more rubbery in texture	PASSES
10 megarads	Material appears as a clear viscous liquid	Fails (a few drops of free liquid)
20 megarads	Material is clear viscous liquid	Fails (Sample is largely liquid)

Conclusions:

The ***Waste Lock® 770*** material seems to be able to withstand reasonably high energy levels and maintain the gel structure without releasing liquid water. At some point, the radiation most likely causes additional cross-linking between the polymer chains thereby increasing the "rubbery" texture of the gel. However, after some high exposure limit, the radiation energy begins to split those crosslink bonds yielding straight chain acrylic polymers and oligomers which appear as a clear, viscous, watery liquid.