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THE REMOVAL OF MAGIC MARKER ON PHOTOCOPIED DOCUMENTS

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Abstract: This is a method to remove magic marker obliteration's from a photocopied document without harming the legibility of the photocopy text. A study using many different solvents and removal techniques were attempted after the infrared image converter failed to optically erase the marker. This is a chemical means of extraction.

I was sent a document by an attorney who had received some photocopied documents as part of a request for some FIA material. Certain portions of the document were obliterated with magic marker. The examination was to determine what was under the obliterations. The first step was to attempt to optically erase the marker with the infrared image converter. This was unsuccessful. An attempt to make the toner luminesce was also unsuccessful. The next attempt was on a light box. Then using our fractive index, using a high-resolution color scanner and finally liquid window. None of these tests had any results that were of any significance or noteworthy success.

Since the documents were owned by my client, I knew that a destructive test was OK to perform with the client's permission. I then talked to my father about the possibility of a chemical extraction of the obliterating marker. I then spoke to Jerry Richards, formerly of the FBI laboratory, about where to start. I then went to Michigan State University and spoke to Dr. Jay Siegel about my problem. We decided to try several different solvents and means of extraction and then use the best one. We tried:

1. Water	2. Toluene	3. Methanol
4. Ethanol	5. Alconox	6. Acetonitrile
7. Acidaldehyde	8. Ethanol/methanol	9. Hexane

Several different means of extraction were tried. First was with their agent on a swab, then in a bath, last we tried in an agitated bath. Several different methods yielded results but the best method was methanol in a bath. Most of the others were too harsh on the paper or removed the toner deposits as well. The documents were left to "soak" in the bath for about 24 hours. Then fresh methanol was added and checked for its activity 24 hours later. The new methanol had done very little to extract any more marker than the original. The text could be viewed in some spots but not in others. The critical entry was barely legible.

About 3 months later a similar case appeared with the same set of circumstances except this was a case actually in litigation. This time methanol worked the best and after 2 days of soaking in methanol the entries could all be read clearly.

Different markers have different solubility properties and this is why sometimes a better solvent can be found. The important thing is that the solvent not harm the paper or the underlying toner. Once it has been established as safe it should be OK to experiment with on the important areas.