I. Scope: Small particle reagent was devised and refined by the British Home Office as an effective procedure for processing wet surfaces. Both porous and non-porous, which are wet at the time of the latent deposit and those that become wet after deposit, seldom retain sufficient water soluble material for conventional processing methods. Non-porous items which have been allowed to dry offer some potential if the deposit contains non-water soluble oily matter. However, the drying process lessens the possibility of adequate adhesion for powders or particulate.

Molybdenum disulfide is a lipid sensitive reagent. Initial efforts to create a suspension of molybdenum disulfide in water used photoflo as a means of reducing surface tension. These met with limited success. Introduction of photoflo to the mixture requires a critical measurement as too much photoflo prevents complete adhesion of the molybdenum disulfide particles to the lipids. Organic solvents can not be used as these solvents may remove the lipid material.

Refinements in the surfactant solution have not only improved the uniformity of suspension, but have increased the application of SPR to other surfaces. SPR is very effective in the secondary treatment of cyanoacrylate ester developed impressions by adhering to faint impressions generally better that powders and particulate. Molybdenum disulfide is produced in various particle sizes. Smaller particle size is the most effective.

II. References:

Lee, Henry C.; Gaensslen, R. E., eds. *Advances in Fingerprint Technology;* Elsevier Science Publishers, NY, 1991.

Onstwedder, John III; Thomas E. Gamboe. “Small Particle reagent: Developing Latent Prints on Water-Soaked Firearms and Effect on firearms Analysis"; *Journal of Forensic Science,* 1989, 34, 2, 321-327.

Pounds, C. A.; R. J. Jones. “Physicochemical Techniques in the Development of Latent Fingerprints”; *Trends in Analytical Chemistry*, 1983, 2, 8, 180-183.

III. Apparatus/Reagents:

Surfactant Stock Solution:

1. Dissolve 8 milliliters of Tergitol 7 in 500 milliliters of distilled water. This will make approximately 10 liters of working solution.
2. SPR Suspension: Add 10 grams of molybdenum disulfide to 5 milliliters of the surfactant stock solution stirring slowly.
3. Continue to stir until the mixture is of a creamy consistency and free of any dry powder.
4. Stir in 900 milliliters of distilled water.

IV. Safety Precautions: This procedure involves the use of hazardous materials. This procedure does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution should be exercised and the use of personal protective equipment should be utilized to avoid exposure to dangerous chemicals. Consult the appropriate MSDS for each chemical prior to use.

V. Procedures:

Immersion Technique:

1. Shake the working solution well and place in a shallow tray. Pour in enough solution to cover the item being processed.
2. Stir again before placing the item into the solution.
3. Place the item being processed into the solution.
4. Allow the item to remain in the suspension long enough for the molybdenum particles to settle on the item (approx. 30 seconds).
5. Turn the item and leave for an additional 30 seconds.
6. Continue, repeating stems 4 and 5 above until all surfaces of the item have been exposed to the solution.
7. Place the item into a tray of tap water and rock until the excess SPR is removed.
8. Allow the item to dry.
9. Record any usable impressions.

Spray Bottle Application: Larger items can be processed using a spray bottle. For outdoor application to very large items, a garden sprayer can be used. Generally light to moderate flows of tap water for rinse will not dislodge the molybdenum disulfide particles.

1. Using a spray bottle, disperse enough SPR to cover the item.
2. Wash off excess SPR by running the item under a slow flow of tap water.
3. Record any usable impressions.

VI. Quality Assurance/Quality Control: Powders, such as molybdenum disulfide, work by adhering to latent print residue. Place test impressions on microscope slides and process as above. If latent prints develop, solution is working properly. The results of the test shall be recorded in the appropriate reagent log book.