Advice & Counsel



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Comments on Proposed MP&M Rule

The following is a condensed version of my written testimony on the proposed Metal Products & Machinery (MP&M) Rule that was submitted to the U.S. Environmental Protection Agency (EPA) on March 8, 2001, at the public hearing in Chicago. I have made some changes and additions to the text handed over to the EPA prior to the three-minute oral presentation I made. At the time of this writing, EPA has extended the deadline for submitting data to July 3. My full, updated text is available for downloading at www.aesf.org. As time goes by, this document will be modified. By the July 3rd deadline, parts or all of this document will be incorporated into the "official" comments on the MP&M rule, which are overseen by **The Policy Group and Government** Advisory Committee (GAC) for the metal finishing industry.

We are asking our readers to review the issues raised and either incorporate their own comments/ data in support of these issues, or provide us with your information so that it can be added as support to our positions.

The Policy Group has provided sample letters that you can use to contribute your own comments about the proposed rule. The sample letters are posted at www.aesf.org.

Comments on the Proposed MP&M Regulations

(*FR*, Vol. 66, No. 2, Wednesday, January 3, 2001, Docket Number W-99-23).

1. The Agency does not need to re-90 **regulate this industrial category.** The Agency bases these proposed regulations upon:

- (a) A perceived benefit to the environment.
- (b) Economic justifications.
- (c) A perceived level of treatment that the Agency feels can be achieved with a combination of basic pollution prevention and technology that was first prescribed by the Agency over 20 years ago.

I would like to comment on all three justifications:

(a) The benefit to the environment as a result of the MP&M Rule is grossly overstated.

The Agency believes that one of the major environmental benefits from this proposed rule, as it applies to jobshop metal finishers, (as stated in Table XII. C-1, of the cited FR) to be the elimination of 1 million lb of cyanide per year from the environment out of a total discharge of cyanide of 3.5 million lb to POTWs, which the Agency believes originates from 1,514 metal finishing jobshops. This averages to about 2,300 lb of cyanide discharged annually by each of the 1,514 jobshop metal finishers.

This estimate by EPA is terribly wrong, unjustified by reality, and unnecessarily creates an erroneous perception on the part of the environmental community that this industry is a serious pollution source, when the exact opposite is the case.

The Agency estimates that 65% of all facilities covered under MP&M do not treat cyanide-bearing wastes. When challenged at public hearings, the Agency has clarified that its estimate covers all facilities covered by MP&M, not just metal finishers. However, this does not match up with the Agency's estimates, as published in the Federal Register, which indicate the Agency believes the rule will remove about 1.1 million lb of PE related to cyanide, and the Agency also estimates the rule will remove 1 million lb of cyanide estimated to be discharged by jobshop metal finishers. The Agency is clearly making a connection between the statement that 65% of MP&M-regulated industries do not treat their cyanide wastes and jobshop metal finishers.

Such a connection is totally unwarranted. I have been serving the jobshop metal finishing industry for over 34 years, and I can categorically state that I have never been at a jobshop metal finishing facility, using cyanide plating processes, that did not have a treatment system in place to destroy cyanide. This statement by the Agency demonstrates a serious lack of knowledge about this industry.

I have personally investigated the level of cyanide discharged by 12 jobshop metal finishers located in the Chicago area, arbitrarily chosen from our laboratory database. A quick look at the data for these 12 jobshop (cyanide) electroplaters, indicates that the average amount of cyanide annually discharged to the POTW (MWRDGC) for each of these 12 shops is **31 lb**, not **2300 lb**. While this was not a statistically scientific survey, the huge difference (a factor of 74) between the Agency's estimate and what appears to be reality, at minimum, warrants a review of the Agency's data and assumptions.

Aside from mis-stating the environ-

mental benefit from MP&M regulation of the jobshop metal finishing industry, the Agency also ignores the fundamental difference in toxicity between various cyanide compounds and speaks in the FR of "cyanide" as if it were one highly toxic compound, with one level of environmental hazard.

In fact, there are numerous cyanide compounds, some of which are quite low in toxicity. As examples of lowtoxicity cyanide compounds, the Agency should be well aware of iron cyanide compounds such as:

- Prussian blue, ferric-ferrocyanide, Fe₄ [Fe(CN)₆]₃, containing 54.5% Cyanide.
- Yellow prussiate of soda, Na₄Fe(CN)₆, containing 51.36 % cyanide (for the anhydrous salt).

I am informed that the latter cyanide is approved by FDA at up to 13 ppm, in food products. An old copy of the Merck Index reports that several grams of yellow prussiate of soda have been swallowed repeatedly by individuals attempting to commit suicide, without any apparent ill effects.

I am pointing this out to demonstrate to the Agency that it should NOT speak of cyanide as one, singular, highly toxic compound, when in fact cyanide may or may not be highly toxic, depending on the complexing involved. The Agency needs to reduce the toxicity weighting factor (TWF) for cyanide complexed with iron commensurate with the difference in toxicity.

The above are two examples of cyanides that are relatively **low** in toxicity, and are, in fact, used every snowy winter day by hundreds of municipalities throughout the USA, for the purpose of melting snow efficiently.

According to the Morton Salt Company, road salt is treated with 75 ppm of prussian blue and 25 ppm of yellow prussiate of soda. In round numbers, road salt contains about 50 ppm of the "cyanide" the Agency talks about in the proposed MP&M rule.

According to the Salt Institute, its members sold 15,690,000 tons of road salt during the year 1999, and the Institute emphasizes that this is far from the total amount of road salt used in this country.

At 50 ppm, this would account for approximately 1.6 million lb of May 2001

"cyanide" spread into the environment during 1999. The institute pointed out that this is not the full total, but only the amount sold by their members. A large portion of this road salt is spread in the northern cities and finds its way into the POTWs, and that might explain why the Agency feels that several million lb of cyanide enter the POTWs each year.

Based upon the above and my understanding of the metal finishing industry, it is my firm opinion that the vast majority of the cyanide entering the POTWs of this country does not originate from the metal finishing industry. Further, the cyanide that does originate from the metal finishing industry is of similar complex iron compounds as used by the road salt industry to prevent caking of the salt.

The latter opinion is supported by the fact that the metal finishing industry is currently regulated and must employ alkaline chlorination to destroy the more toxic cyanide compounds to low levels by the existing regulations. Typically all that is left after alkaline chlorination is complexed (iron) cyanides. Most of the complexed iron cyanide after chlorination forms solids and becomes part of the F-006 waste (which the Agency regulates as well). However, some iron cyanide complexes are soluble [for example potassium ferrocyanide $KFe(Fe(CN)_{\epsilon})$] and do not readily settle out in a clarifier. These may be discharged in low concentrations to POTWs.

If the MP&M rule on cyanide is promulgated as proposed, the Agency will have little if any impact on the total amount of cyanide discharged to POTWs. At least 1.6 million lb (and probably much more) enters the environment from road salt alone, and in cities with combined sewer systems, the cyanide spread on the street is discharged to POTWs. MP&M will eliminate, at most, about 46,000 lb, based upon my data. The POTWs and the environment will see essentially no difference.

The Agency has promulgated regulations for centralized treatment facilities that would allow a total cyanide in the discharge from such a facility at **500 mg/L**, a level that is almost 4,000 times higher than would be allowed to be discharged by jobshop metal finishers under the proposed MP&M rule.

If the Agency creates such a large

difference between allowed cyanide in these discharges, then the Agency will create an incentive for the jobshop metal finishing industry to avoid treating its cyanide wastes altogether. Instead jobshops would send their cyanide wastes to such centralized facilities. The end result could be 800 times more cyanide being discharged to POTWs through centralized facilities than is discharged legally today. This would calculate to a maximum total cyanide discharged legally under MP&M of 37,500,000 lb annually through centralized treatment facilities!

The Agency will have placed itself in a position of sanctioning a cyanide assault on the POTWs and on the environment.

The Agency needs to reconsider its method of estimating the environmental benefits of the proposed MP&M Rule, as the amount of benefit that is apparent, does not justify the rule.

(b) The economics used by the Agency to justify the proposed rule utilize unrealistic assumptions.

The end result of the past cooperation between the Agency, the POTWs and the metal finishing industry is that today, administrative costs and environmental impacts on the POTWs have been significantly reduced and there is a high level of compliance, while at the same time, the metal finishing industry is able to survive financially in a business climate where its customers are repeatedly demanding reduced cost for their services.

While EPA believes that 90% of the total cost of compliance with MP&M can be covered with price increases, the reality is that the metal finishing industry in the U.S. must compete with metal finishers located across the north and south borders and overseas. The purchasers of metal finishing services are routinely demanding cost **decreases**, typically in the area of 15% over three years, and are threatening to take the work out of this country, if costs are not reduced.

One might conclude that price increases might be feasible, after MP&M is finalized, if a significant percentage of the industry goes out of business. Even if the Agency's low estimate of a 10% closure rate is correct, such a level of closure, or even double that level of closure, cannot be expected to allow for an increase for metal finishing services,

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when the competition a few hundred miles away can maintain existing prices or add capacity and lower them.

The companies served by the jobshop metal finishing industry are constantly looking to reduce costs, and are more frequently relocating their manufacturing in other countries to take advantage of lower wages and lower levels of environmental requirements. This makes the possibility of price increases covering the cost of an investment in equipment that the Agency believes will cost about \$500,000, highly unlikely.

The Agency estimates that the cost per pound of pollutant equivalent removed due to MP&M will be about \$39. This is because of the estimated removal from the environment of:

- 1. 1,113,405 lb of PE due to cyanide
- 2. 242,337 lb of PE due to tin
- 3. 148,476 lb of PE due to copper
- 4. 122,061 lb of PE due to sulfide
- 5. 44,719 lb of PE due to boron
- removal 6. 25,840 lb of PE due to nickel removal
- 7. 56,278 lb of PE due to lead, chromium, and other pollutant removals

The above totals 1,753,116 lb of PE removed by MP&M, according to the Agency's estimate.

As has been demonstrated earlier, the cyanide removal due to MP&M is a seriously wrong estimate. Further, boron cannot be removed by chemical precipitation using the BAT identified by EPA (nor by any chemical precipitation method that I am aware of). Also, sulfide is not discharged by this industry. The highest credit that the Agency can therefore claim, based on these conditions, is about 524,000 lb per year. If the true amount of cyanide saved from the environment by MP&M is really 46,000 lb, then the cost per pound of PE removed increases to about \$131, if it is assumed that 90% of the cost of compliance cannot be covered by a price increase.

Of the remaining 524,000 lb of PE removed in the above scenario, almost half is due to tin, which the Agency has never regulated in the past and has not justified in any way beyond the metal being an "indicator" of good treatment practices. If tin is removed from the benefit calculation, the cost per pound PE removed escalates to \$243, assuming 90% of the cost can be covered by price increases. Further, the above argument has not included adjustments to the toxicity factors on cyanide, based upon the fact that the cyanide discharged is significantly lower in toxicity, than the factor assigned by the Agency.

The above arguments alone indicate that the Agency has no economic justification for this proposed rule. Any perceived benefit to the environment is far outstripped by the cost.

(c) The technology identified by the Agency as BAT cannot achieve the proposed discharge limits, even with the addition of the recommended P2.

The metal finishing industry currently is already regulated under 40CFR parts 433 and 413, and has been regulated by EPA for over 20 years. The existing regulations are based upon the same technology as the Agency proposes to be used for compliance with MP&M. The only apparent difference is the application of "P2" practices ahead of treatment, which is identified in the Federal Register as: "Flow reduction using flow restrictors, conductivity meters, and/or timed rinses, for all flowing rinses, plus countercurrent cascade rinsing for all flowing rinses," along

with centrifugation and recycling of paint water curtains and centrifugation/pasteurization of water soluble machining coolants.

The existing regulations (40 CFR parts 413/433) are based upon a database EPA generated after sampling 22 alkaline chlorination systems. While EPA correctly indicates that waste treatment technologies and metal finishing processes have improved significantly over the years, I wish to point out that our industry has already incorporated such changes and improvements and, as a result, is presently treating the generated wastewater significantly below the existing regulations, but significantly above the proposed regulations.

I have designed, modified, solved compliance problems with, and physically operated numerous cyanide destruct systems utilizing alkaline chlorination, notably two stage alkaline chlorination systems. It is my opinion that this technology, when operated under normally expected conditions at a metal finishing facility that is in the business of electroplating with cyanide solutions on steel substrates, using normal plating equipment including barrel plating, **cannot** meet the newly proposed standards, which are 600-700% higher than those proposed in 1995, but 400-500% lower than the regulations presently in force.

The Agency conducted a more thorough investigation into the ability of alkaline chlorination to treat metal finishing wastewaters when the Agency promulgated the discharge limits of 40 CFR parts 413/433. At that time, 22 cyanide treatment systems were evaluated. Since the mid 80s, this technology has NOT undergone any substantial or meaningful changes, as is borne out by the four facilities the Agency used in generating the MP&M cyanide data. There is no new treatment chemical (oxidizer) proposed, and the equipment is still a tank, mixer, pH, ORP controllers, and chemical feed pumps. Yet, somehow, the Agency now claims that the same technology, with P2 options such as counterflow and drag-out recovery rinsing, can achieve vast improvements in cyanide treatment.

Many of my clients have installed additional waste treatment equipment (beyond BAT), including the addition of polishing filtration after clarification and cationic exchange systems after polishing filtration. They have researched and found better waste treatment chemicals, and have significantly improved the operation of their waste treatment systems over the past 20 years. Yet these upgraded wastewater treatment systems cannot comply with the proposed MP&M discharge limits.

The only conclusion from this discrepancy is that the Agency's data must not match what BAT plus P2 can actually accomplish.

Since the Agency surveyed and sampled the industry, one might ask how the facilities sampled managed to meet the proposed standards. The answer is that the facilities sampled by the Agency did not adequately represent the type of jobshop metal finishing most commonly conducted, and the SER/SAPs generated show that the data-gathering effort was seriously flawed, and this was especially the case when the Agency gathered data on cyanide.

As examples, the Agency should consider that:

- (a) None of the facilities sampled for evaluation of alkaline chlorination generated significant amounts of cyanide complexed with iron, as would be the case for any jobshop metal finisher that plated with cyanide on steel parts. In the absence of iron cyanide complexes, significantly lower levels of residual cyanide after alkaline chlorination can be achieved, but this is not representative of how plating with cyanide is conducted in the industry.
- (b) None of the facilities sampled conducted any significant amount of barrel plating. Barrel plating is well known to cause much higher levels of drag-out, resulting in much higher in-flow concentrations to the cyanide destruct system, when compared to rack plating. Instead, the facilities sampled conducted plating via "racks," and one facility (according to a verbal discussion with one of the Agency's contractors) conducted cyanide plating via reelto-reel technology, which is well known to have one of the lowest levels of drag-out per square foot plated of all plating technologies. The higher the drag-out rate, the higher the concentration of the cyanide in the incoming stream to the treatment system, and the higher the treatment efficiency needs to be to achieve a wastewa-

ter in compliance with the discharge limits, as I will later demonstrate.

(c) The facilities sampled for cyanide data appeared to conduct only cyanide copper plating, over nonferrous substrates. This type of cyanide is known to be treatable to low residual levels via alkaline chlorination. The reality, however, is that even these facilities sampled by the Agency had plating lines using cyanide that were not operated, or were operated at very low production rates during the sampling episodes. As a result, the data gathered reflects unrealistically low residual concentrations entering and leaving the treatment system.

2. The pollution prevention option needs to supplant the proposed numerical standards.

The Agency is to be commended for considering an alternative nonnumerical standard for compliance with MP&M. Such "best management practices," support the spirit of the Strategic Goals Initiative agreement signed by the Administrator and the industry.

Cheaper, Smarter, and Better are mere words unless the Agency recognizes the impact these proposed regulations will have on the industry, the lower level of environmental benefit, and the significantly higher cost of compliance, when the P2 option assures better results at significantly lower costs for both the metal finishing industry and the POTWs.

3. The limitations on cyanide and cyanide amenable to chlorination are unreasonable and not justified by the data generated by the Agency's contractors.

The Agency has reproposed cyanide limits that are about six times higher than what was proposed in 1995, but 400-500% lower than current discharge standards.

These revised discharge limits were based upon substantial additional sampling and intense study of four jobshop electroplating facilities.

Unfortunately, the data from these four facilities are seriously flawed and do not reflect the level of treatment that the jobshop metal finishers can achieve through alkaline chlorination (plus P2), which the Agency has identified as BAT. I believe that the reason the Agency has proposed cyanide limits that are 400-500% lower than what the technology can achieve is because:

- (a) The four facilities that the standards are based upon were treating simple-to-treat raw cyanide wastewater that does not reflect what is normally treated at these very same facilities.
- (b) The data gathered at these four facilities is seriously flawed and indicates a higher level of treatment, because the samples gathered at the sites were improperly taken and preserved prior to analysis, yielding lower test results than would have been obtained had proper preservation and sampling procedures been followed.
- (c) One or more of the four facilities was not treating cyanide using BAT, and one of the four had essentially no cyanide to treat.

It is my opinion that the "new" data generated by the Agency cannot and should not be utilized to set cyanide limitations upon the metal finishing industry.

I arrived at the above opinion(s) after a review of the Sampling Episode Reports (SER) and the Sampling Analysis Plans (SAP) generated by the Agency's subcontractors at the four facilities that I understand were used to set the cyanide limitations under MP&M.

The EPA requires the metal finishing industry to practice "Best Available Technology" (BAT) in treating its wastes. It is only right that industry requires EPA to employ the best available sampling and analytical methodology to arrive at discharge standards. This clearly was not the case in the four sampling efforts.

The data generated at these facilities are so questionable and flawed that EPA cannot and should not utilize it.

EPA should retain the existing cyanide limitations, as detailed in 40 CFR parts 413 and 433.

4. The Agency needs to produce a reliable cyanide-ATC procedure, or an alternate method of verifying proper cyanide destruction

It is my opinion that the cyanide amenable to chlorination test is unsuitable for compliance monitoring purposes at many jobshop metal finishing facilities, and the CN-ATC procedure should be replaced with a test method of suitable precision (if there is one).

It is understood, in this industry, that the CN-ATC procedure (Method 335.1 along with other variations in Standard Methods and ASTM) is not designed for monitoring wastewater at the point of treatment, when such treatment involves high concentrations of iron cyanide and other cyanide compounds that do not lend themselves to chlorination. This procedure was developed at a time when end-of-the pipe monitoring resulted in concentrations of total cyanide in the neighborhood of 1 mg/L. Yet, when complexed iron cyanides are generated in a metal finishing facility (by the simple act of plating with cyanide on a ferrous substrate) and are treated by alkaline chlorination, then total cyanide readings can reach 30 mg/L or more.

The Agency had this procedure studied (Development and Evaluation of Procedures for the Analysis of Simple Cyanides, Total Cyanide, and Thiocyanate in Water and Wastewater, EPA-600/4-83-054, October, 1983), and the conclusion of this study was that, under the best circumstances, the CN-ATC procedure could be reproduced within 10%. Ten percent of 30 is 3, meaning that the laboratory could produce a CN-ATC of 3 or -3 mg/L, because of the imprecision in the procedure, when the Agency requires compliance at 0.07 mg/L. My own laboratory, along with other certified laboratories, has encountered such wastewater samples on several occasions. I am deeply troubled by the proposed MP&M regulations creating the need to reproduce high total cyanide readings with precision levels that would require detection of 0.07 mg/L and less of amenable cyanide on treated wastewaters, containing mixed iron cyanide complexes with total cyanide readings far above 1.0 mg/L.

The proposed MP&M standards would reduce the allowable CN-ATC sixfold, making the analytical job an impossibility. The metal finisher cannot comply with the total cyanide at the point of treatment, since iron cyanides can't be treated. Compliance with the CN-ATC is impossible, because the laboratory cannot analyze it with adequate precision.

The Agency owes the industry analytical procedures that have precision levels better than the regulated limits on cyanide wastes of this type. The most recent effort the Agency has made in this regard falls short of the need, because nickel cyanide complexes, which are also resistant to alkaline chlorination and are commonly found in cyanide waste streams, even when good segregation is practiced, are detected by this procedure.

One possibility the Agency might investigate would be to allow for filtration of the outflow from the cyanide destruct system prior to analysis for total and amenable cyanide. This would remove insoluble iron cyanides from the analyte (which contribute to the erratic total and CN-ATC readings that are sometimes obtained), and may dramatically improve the precision of the procedure.

5. Tin should not be included in the discharge standards.

To date, the only justification for adding tin to the list of regulated metals that I have heard from the agency, is that it (along with molybdenum and manganese) is an "indicator" of a well-operated treatment system. When these metals are low, the Agency found that, in general, all other regulated parameters were at low concentrations, indicating a welloperated treatment system.

The only other justification is the estimate by the Agency that about 200,000 pollutant equivalents per year could be eliminated from POTW inflows by the proposed MP&M standards.

The first justification given by the Agency is unwarranted, when each discharger is required to monitor and operate their treatment system below regulated discharge limits anyway. Since the operation of a treatment system requires frequent monitoring of control parameters and frequent analysis of the effluent, there is no need for "indicators," and the Agency has not demonstrated a need for indicators.

The PE eliminated from POTW inflows by the proposed MP&M rule on tin was not considered by the Agency throughout the MP&M process up until the final rule. At no hearing during the year 2000 did the Agency indicate that tin needed to be added to the list of metals to be monitored and treated. The Agency does not provide data or information that the discharge of tin to POTWs is harmful or poses a hazard to the sludges generated by POTWs. This appears to be regulation for the purpose of fortifying the "justification" for this rule, and little more.

6. Molybdenum and boron cannot be removed by BAT/BPT Options 2, 4.

It is my experience that neither molybdenum nor boron can be removed by the technologies prescribed for BAT/BPT under the proposed MP&M rule. Neither element produces an insoluble compound by pH adjustment and sedimentation/clarification (or microfiltration). As such, the Agency should not have added the removal of these elements to the total of approximately 1.7 million lb of total PE claimed by EPA to be saved from discharges to POTWs by the proposed MP&M rule. *Pass*F