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September 30, 1986

Ms. Meredith Scheck
The Vinyl Institute
Wayne Interchange Plaza II
155 Route 46 West
Wayne, New Jersey 07470

Re: EPA RCRA Toxicity Proposal Comments

Dear Meredith:

Enclosed is a copy of the comments we filed on behalf of the Society of the Plastics Industry, Inc. (SPI) in response to the Environmental Protection Agency's (EPA) proposal to amend the toxicity characteristic under the Resource Conservation and Recovery Act (RCRA). As anticipated, the final comments incorporate those of SPI's Phenolic Division as well as the Vinyl Institute. I trust that you will make whatever distribution is appropriate.

If you have any comments or questions or if I can be of any assistance, please let me know.

Cordially yours,

Peter

Peter L. de la Cruz

Enclosure

cc: Joseph A. King
W. C. Holbrook
Robert Luss, Esq.
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Lewis R. Freeman, Jr. "
H. Patrick Toner "

SPI-12056

The Society of the
Plastics Industry, Inc.

SPI

1025 Connecticut Avenue
Washington, D.C. 20036
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September 26, 1986

EPA RCRA Docket (S-212)
U.S. Environmental Protection
Agency (WH-562)
401 M Street, S. W.
Washington, D. C. 20460

Re: Hazardous Waste Identification
and Toxicity Characteristic Revisions;
Docket No. F-86-TC-FFFFF

Dear Sir:

The Society of the Plastics Industry, Inc. (SPI), appreciates the opportunity to comment on proposed rules issued by the Environmental Protection Agency (EPA or Agency) under the Resource Conservation and Recovery Act (RCRA). 51 Fed. Reg. 21,648 (June 13, 1986). Members of SPI's Vinyl Institute and its Phenolic Division have a special interest in this proposal.

The Society of the Plastics Industry, Inc. is a trade organization of more than 1800 members representing all segments of the plastic industry in the United States. SPI's operating units and committees are composed of resin manufacturers, distributors, machinery manufacturers, plastic processors, moldmakers, and other industry-related companies and individuals. Founded in 1937, SPI serves as the "voice" of the plastics industry.

The Phenolic Division of the SPI is comprised of producers and processors of phenol-formaldehyde (thermosetting phenolic) resins. Members of the Vinyl Institute include Air Products and Chemicals, The BF Goodrich Company, Borden Chemical, CertainTeed, Dow Chemical U.S.A., Georgia Gulf, ICI Americas, Occidental Chemical, PPG Industries, Vista Chemical, and the Vinyl Council of Canada. Members of the Vinyl Institute account for approximately 82% of the domestic production of polyvinyl chloride.

The proposed rules would change the toxicity characteristic criteria for identifying wastes as hazardous under RCRA. As discussed below, finalization of the proposal in its present form would be unreasonable. SPI is submitting its views on the proposed rule concerning the listing of phenol and vinyl chloride, the regulatory level proposed, the dilution/attenuation factor and the Economic Impact Study.

I. SUMMARY OF COMMENTS

The Agency's proposed rules lack a firm basis in either statutory or scientific authority. We have particular concerns

with the Agency's mismanagement scenario, the impact on wastewater, and the specific levels established for vinyl chloride and phenol. Based on data regarding biodegradation and high RfD calculated using recent health data and groundwater transport modeling techniques, SPI requests that the Agency not list phenol under the toxicity characteristic leaching procedure hazardous waste identification system.

The groundwater migration/mismanagement scenario selected by the Agency as a basis for its analysis is unrealistic and highly improbable. Very little dilute liquid industrial waste is presently being placed in Subtitle D landfills. Almost all of these dilute liquid wastes would be effectively regulated under the Clean Water Act without further regulation. If the Agency is seriously concerned about the small amount of these wastes in Subtitle D landfills, an outright prohibition would be a more effective means of addressing the problem and more consistent with the RCRA framework.

The disposal and pollution scenario underlying the Agency's proposal incorporates a number of questionable "worst

case" assumptions that result in an unjustifiably conservative risk assessment. The Agency has already abandoned the use of a similar scenario in the Land Ban Proposal. EPA should follow its own lead by dispensing with the scenario here and providing general guidelines for a site-specific, case-by-case approach.

Despite the extraordinary impact these regulations would have on the industry, the Agency is providing a grossly inadequate amount of time for the regulated community to develop the extensive data necessary to make detailed comments on the proposal or for the industry to come into compliance once the proposal becomes final. Industry efforts in these two areas are made even more difficult by the great uncertainty created by the Agency's insistence on moving forward on this proposal without resolving the difficult practical problems now faced by the industry: the lack of test facilities to perform the toxicity characteristic leaching procedure (TCLP), the problems of imprecision and reproducibility inherent in the TCLP, and the dilemma of beginning the massive preparations for one regulatory standard despite the possibility that the final resolution of one of EPA's many "open" questions will result in a vastly revised standard.

Deficiencies caused by the Agency's haste are also reflected in its Regulatory Impact Analysis which completely ignores the impact of the proposal on the many facilities generating wastewater. As it now stands, the proposal will bring many wastewater stream and surface impoundments within the RCRA scheme, despite the fact that they are already adequately regulated under other laws.

In its present form, the proposal would require the retrofitting of surface impoundments containing wastewater above the TCLP threshold--virtually all the wastewater for the polyvinyl chloride (PVC) industry as well as others. Meanwhile, as the industry is being forced by these regulations to spend millions of dollars to comply with RCRA, discharges under the Clean Water Act would be subject to different regulatory limits.

To correct this anomaly, the EPA should: (1) allow each Generator to arrive at a long-term average for its facility to determine whether it exceeds the TCLP threshhold, (2) permit the contents of the impoundment to be used for testing rather than the influent, and (3) revise the

regulations to apply the aggressive biological treatment retrofit exemption of RCRA §3005(j)(3) to these surface impoundments.

The impact on surface impoundments would be even worse if the RCRA land disposal ban provisions are interpreted to ban all leaking wastewater surface impoundments within six months of the date the regulations become final. The Agency should make clear that these provisions would not operate in this manner or should exempt wastewater surface impoundments from their coverage.

Virtually all waste waters discharged in the PVC industry would become hazardous wastes, yet no discussion of this enormous impact is made in the RIA. In addition, EPA has failed to explain just how the proposal will generate any significant health benefit when no health-based need for the new regulations has yet been identified. EPA must also address in its RIA the impact of the rules on PVC producers and processors who will now face the additional task of managing dry resin wastes which are currently not covered by RCRA.

The Vinyl Institute is also particularly concerned with the method employed by the Agency in setting a regulatory level for vinyl chloride. The vinyl chloride level is primarily derived from an inappropriately conservative Agency policy of zero risk, technology-based maximum contaminant levels (MCLs) under the Safe Drinking Water Act, and the random availability of data from the Land Ban groundwater migration scenario, rather than from a scientifically-justified, health-based assessment of risk. We object to the continued use of MCLs and to the method used by EPA in establishing threshold levels. We recommend that vinyl chloride remain subject only to the extensive framework of existing vinyl chloride regulations which already provide adequate protection for human health and the environment.

The Agency's listing of phenol in these regulations is unjustified and unnecessary to protect human health and the environment. Phenol is biodegradable under both aerobic and anaerobic conditions, including those conditions associated with groundwater under the EPA scenario. Phenol does not merit inclusion in the proposed toxicity list under RCRA. The proposed listing of phenol is also based on a reference dose

level (RfD) which does not reflect currently available health data.

Bringing phenol under RCRA in this fashion will not have a health benefit in terms of protecting human health and the environment. But, it will place an unnecessary burden on industry and the public in general. EPA should delist phenol under the TCLP hazardous waste identification system.

Should the Agency continue to pursue this proposal, it should do so only after developing a strong scientific and technical foundation on which to rest its regulatory scheme. The best way to do this is to move cautiously, allowing for adequate Agency preparation and the full constructive input of those it seeks to regulate. At a minimum the comment period should be extended until 90 days after EPA: (1) issues definitive guidance on proper sampling, (2) has published a final Regulatory Impact Analysis, and (3) finalized the Safe Drinking Water Act proposals on which the threshold trigger levels are based. Phenol should be removed from the proposed list of substances.

II. STATUTORY ISSUES

A. Legislative Framework

Through this rulemaking, EPA intends to reexamine the toxicity characteristic under RCRA and satisfy a Congressional directive in the Hazardous and Solid Waste Amendments of 1984. In particular, EPA is attempting to be responsive to Sections 3001(g) and (h) of RCRA. See 51 Fed. Reg. 21,648.

Under subsection (g), EPA is directed to:

> examine the deficiencies of the extraction procedure toxicity characteristic as a predictor of the leaching potential of wastes and make changes in the extraction procedure toxicity characteristic, including changes in the leaching media, as are necessary to insure that it accurately predicts the leaching potential of wastes which pose a threat to human health and the environment when mismanaged.

Subsection (h) requires that EPA promulgate regulations identifying additional characteristics of hazardous wastes, including measures or indicators of toxicity, by November 9, 1986.

The legislative history indicates that these provisions were derived from the Senate bill and adopted by the Conference Committee. H.R. Rep. No. 98-198, 98th Cong., 2d Sess. 105-106 (1984) (conference report) and S.757. The intent underlying these provisions is best described in a report by the Senate Committee on Environment and Public Works. S. Rep. 98-284, 98th Cong., 1st Sess. (1983). This report makes it clear that Congress was not attempting to direct EPA to expand the EP toxicity test under Section 3001(h). Rather, EPA was being asked to establish regulatory thresholds for hazardous organic constituents by expanding the number of hazardous waste characteristics to "bring under control those wastes which pose a carcinogenic, teratogenic, mutagenic, reproductive or neurotoxic hazard." S. Rep. 98-284 at 34. As Senator Chafee stated when discussing the provisions which would later become Section 3001(h), EPA has not expanded the set of characteristics defining wastes as hazardous. 129 Cong. Rec. S822 (daily edition of Feb. 1, 1983) (Statement of Senator Chafee).

The Committee's discussion on the deficiencies of the EP Toxicity Procedure are also instructive. In particular, the Committee was concerned with the adequacy of the EP Toxicity

Procedure used by EPA as a determinant for evaluating the hazard of wastes containing metals. For example, the Report states that EPA is required to revise the EP toxicity characteristic when necessary to "reflect more accurately the concentrations of toxic metals that will leach from wastes subject to more aggressive leaching media than those used in the present test." S. Rep. 98-284 at 35.

The Senate's comments on the need to amend the EP toxicity test are interesting because they appear at the end of a long discussion on EPA procedures for delisting wastes. Because the Senate did not consider the EPA EP toxicity procedure to be very effective for "evaluating the mobility of organic toxicants," it concluded that "any [EPA] decision to delist wastes containing these [organic] toxicants should be based on their concentration in the waste . . . ," rather than on the negative results obtained by applying the extraction procedure to the waste in question. Id. This provision was later dropped when the Agency adopted a policy reflecting the aims of the language in the Senate bill. See 129 Cong. Rec. S9178 (daily ed. July 25, 1983).

The legislative history leads to two conclusions. First, Section 3001(h) directs EPA to develop additional characteristics of hazardous waste and is basically irrelevant to the current proceedings. As for the EP toxicity characteristics addressed in Section 3001(g), that provision simply directs the Agency to refine the EP toxicity test for the specific and limited purpose of making the test more accurate in predicting the leaching potential of wastes. In particular, the Senate Committee's discussion concerning the adequacy of the EP toxicity test focused on the leaching of toxic metals from wastes. Therefore, the 1984 RCRA amendments provide little if any support for the Agency's undertaking here and certainly do not require compliance with the time limits imposed by those sections. The statutory deadlines in Sections 3001(g) and (h) clearly do not apply to the Agency's decision to expand the toxicity characteristic to include additional specific wastes.

B. The Mismanagement Concept

The hypothetical waste disposal scenario which the Agency uses here as a basis for its analysis is similar to that

used in the January 1986 rulemaking to prohibit the direct placement of any bulk or any non-containerized liquid hazardous waste in landfills. 51 Fed. Reg. 1,602 (Jan. 14, 1986). The Agency's central concern could be addressed more simply and effectively by prohibiting the placement of dilute liquid wastes into Subtitle D landfills or by subjecting individual landfills to a revised permitting system that takes into account the findings and conclusions of the TCLP research, rather than by attempting to regulate specific wastes. A statutory ban on all liquid hazardous wastes in RCRA facilities is already in operation. It is our impression that no substantial amount of dilute liquids containing Appendix VIII substances are being placed in Subtitle D landfills.

We do not see any realistic scenario under which generators of dilute liquid waste streams would employ the "mismanagement" scenario depicted in the EPA proposal. Rather, generators of liquid waste streams would be regulated under the Clean Water Act through the permitting system of the National Pollutant Discharge Elimination System (NPDES) or under the pre-treatment rules applicable to facilities discharging to publicly owned treatment works (POTWs). An EPA study conducted

in response to Section 3018(a) of the Hazardous and Solid Waste Amendments of 1984 indicates that the Clean Water Act's regulatory programs have made a substantial reduction in the discharge of hazardous pollutants to POTWs (approximately 95 percent of the metals and 50 percent of the organics) and that this regulatory plan can successfully address this environmental issue without the imposition of additional regulation under RCRA. EPA Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works at 2 (Feb. 1986) (EPA/530-SW-86-004) (hereinafter "EPA Report to Congress).

The fundamental objective of RCRA is to minimize the generation of hazardous waste and to assure that when hazardous waste is generated it is properly managed. RCRA §§ 1002 and 1003. Indeed, EPA's entire program is designed to identify those wastes which are potentially hazardous and to ensure that they are properly treated, stored, or disposed of. In the current proceeding, the Agency uses as an example of mismanagement the disposal in any Subtitle D sanitary landfill of dilute liquid wastes or solid wastes from which hazardous components might leach.

This conclusion of mismanagement would equally apply to waste generated from individual homes, small generators, and others who have disposed of waste previously deemed "nonhazardous" in compliance with Federal and local law. The proposal would make such disposal illegal without the development of an alternative means of disposal. It is also probable that leachate or other emissions from disposal sites would be hazardous under RCRA. This would disrupt the current land disposal program and potentially make all of them subject to listing on the national priorities list (NPL) as a cleanup site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). Given the statutory exclusion for hazardous waste generated by individual residences or small generators, it is likely that industry will bear the burden of this cleanup through direct administrative or judicial assessments or indirectly through increased taxation without regard to the actual contribution to the waste problem.

III. TIMING

In addition to its other concerns with these proposed rules, SPI objects to the relatively short time period EPA has allotted for the submitting of comments and for allowing only six months from promulgation to the effective date. For example, the Agency has solicited comments on a proposal which has set such an extremely low Toxicity Characteristic contaminant limit for vinyl chloride (VC), 50 parts per billion (ppb), that all PVC product resins, as well as wastes, must be evaluated under the proposed Toxicity Characteristic Leaching Procedure (TCLP); and now "wastes" are to include wastewaters.

The magnitude of this effort for PVC producers in investigating what is practically the universe of their operations is so great that there is simply not enough time prior to September 26 to obtain sufficient information to make informed comments. Additional time pressure is generated by the need for PVC producers to educate their customers since they may wish to make comments on those first-grade resins they use which, if discharged as wastes, will be Hazardous Wastes.

Comments, therefore, are being made based for the most part on spot samples sent to one or the other of the few commercial test facilities known to be able to perform analyses under the proposed TCLP. In addition to the problems of limited availability of test facilities are those associated with the increased cost and poor durability of the new equipment required for performance of the TCLP. In this regard, we incorporate by reference our earlier comments on the TCLP dated August 11, 1986. The outcome of all these difficulties has been to overload the test facilities, further aggravating the time constraint and providing limited data for cursory evaluations which fall far short of the comprehensive characterizations required.

Time is needed for a plant to begin to define the scope of applicability of the proposed regulations. More time is required to resolve such issues as representative sampling, reproducibility of lab results, correlation of results between different test facilities, and the inherent difficulties in the proposed TCLP.

The Agency states that a guidance document may be published on proper sampling late in 1986. Meanwhile, the regulated community must resolve for itself in the limited time remaining the matter of what constitutes representative sampling for wastewater streams which only rarely contain listed substances and in a random time sequence or where a large polymer chunk scraped from a reactor which in a landfill will leach out many times less material than the quantity extracted after size reduction in the proposed TCLP.

Concerning reproducibility of test results and correlation between test facilities, the Agency admits that the precision of results from the TCLP are poor and that it is repeating its evaluations. If the Agency cannot even report the test precision in its proposal, it is obvious that both the Agency and the public need more time for this deficiency to be resolved. A company in Illinois has reported in the public hearing that it sent samples to three commercial test facilities and that these could not reproduce test results.

EPA has requested comments on the TCLP itself raising the probability that it may be revised in part. We note that

the Science Advisory Board has already recommended simplifying the procedure. The effect of significant revision could be that the time and money already spent would have been wasted and no time would be left for one to determine his status under the new procedure in order to make informed comments.

Of even greater concern to Vinyl Institute members is that the new rules are to become effective only six months from the date of promulgation. It is only on that date, the date of promulgation, that the necessary comprehensive waste stream evaluation and definitive planning for compliance can begin.

In that relatively short time span, overall site profiles must be developed to determine which product, waste, and wastewater streams are Hazardous Wastes. They will have to address all the questions raised previously about representative sampling, precision, and reproducibility of results, etc.; the economic choice of building the apparatus for testing in-house or contracting a commercial test facility will have to be investigated.

The many elements of compliance as a Generator will have to be made ready: training of a far greater body of the work force; expansion of Contingency Plans; physical additions and changes in plants for containment, temporary storage, labeling, or signs; arranging for financial liability coverage; etc.

At least a preliminary engineering study for some waste management will have to be made for a decision on whether to ship a waste off-site after the effective date or to accept the many requirements of becoming a Treating, Storage, or Disposal Facility operator.

Finally, Part A Permit applications must be filed and capital programs prepared for those plant additions and changes required for compliance with the final rules. Six months is simply too short a time period for industry members to make all of the evaluations, decisions, and operational changes necessary for full compliance with these extensive new regulations.

IV. COST CONSIDERATIONS AND BENEFITS

A. Additional Costs Not Considered

In Section VII of its notice, the Agency admits that its analysis does not directly provide an estimate of the impact of the proposed rules, but that the final Regulatory Impact Analysis (RIA) which will accompany promulgation of the regulations will analyze benefits and costs based on them. We find this delay to be in direct opposition to the intent of the RIA process and maintain that a completed RIA should be published in time for review and comment by the regulated community before promulgation of final rules.

Nevertheless, even in this premature RIA, EPA has made an elementary error in excluding from the estimated costs of compliance the many facilities, probably numbering in the thousands, discharging wastewaters which are apparently intended to be regulated in this proposal.

We again stress that these wastewater streams are already adequately regulated under NPDES and Pretreatment

Standards, or will be shortly under Pretreatment Standards already proposed, such as those for the Organic Chemicals and Plastics and Synthetic Fibers industries (OCPSF) limiting many of the same pollutants of concern here. Very little of this type waste finds its way into Subtitle D landfills primarily because of the economic disincentive.

However, if EPA proceeds to regulate dilute liquid wastes, it must correct the major deficiency of considering only the costs of compliance associated with landfilling and incinerating the "new" hazardous wastes by including those of the greatly increased RCRA universe of hazardous waste waste-waters.

The vastly increased scope and complexity of this newly regulated community will result in large part from a key aspect of the proposed TCLP, that wherein the wastewater, of low solids content, is the extract for analysis for the Toxicity Characteristic pollutants. Many Small Generators, not now regulated, will become large, regulated Generators. In-plant waste streams will have to be managed as hazardous wastes even though they may be later treated in approved ways. Water supplied from

outside a plant containing pollutants in compliance with other rules could become hazardous wastes after use for once-through, non-contact cooling inside a plant. The EPA will require substantially greater resources in order to process permit applications for these newly-regulated facilities in a proper and timely manner.

In the VC and PVC industries, the very low threshold limit for VC, 0.05 mg/l, practically guarantees that almost all wastewaters will become hazardous wastes; these industries are already very stringently regulated under OSHA, FDA, and NESHAPS regulations and will soon also be regulated by the OCPSF Pretreatment Standard already mentioned.

The recommended cost impact study must encompass the retrofitting, and clean-out in preparation for this revision, of many wastewater treating systems including surface impoundments. This, along with determining the many other cost aspects of preparing for, achieving and continuing in compliance, will require several months of effort by EPA, but must be undertaken for development of a credible RIA.

There is another cost impact that the Agency has overlooked, and this is probably an unforeseen consequence of its having set the extremely low regulatory limit of 0.05 mg/l for VC. This is the compliance costs for both PVC Producers and PVC Processors for management of dry resin first grade and off-grade saleable products when these are spilled and otherwise rendered unfit for sale and use in today's marketplace.

From the limited and unverified TCLP test results obtained in the relatively short time span of the comment period has emerged the realization that even some of these "pure" materials will come under the RCRA umbrella. Although we have no accurate estimate of the quantities of these wastes, we believe the costs of compliance will be significant and disproportionately high.

Such wastes are currently landfilled in Subtitle D landfills and will now have to go to Subtitle C landfills at considerably greater costs. Retrofitting a landfill for such disposal will be equally costly. In addition, of course, will accrue the many other increments of cost for compliance with the Generator requirements: training, inspection, storage, packaging, manifesting, financial liability coverage, etc.

Although the long-term future effects are not clear, PVC Producers cannot rule out the possibility that the market for their products may shrink when PVC Processors switch to other materials rather than be burdened with the costs and complexities of operating in the RCRA system.

The Agency should include in its final RIA the results of a comprehensive study of the costs for PVC Producers and PVC Processors to manage product wastes under the proposed rule.

We believe that when the Agency completes the additional studies suggested, and required for a credible RIA, the results will be of such significance that it cannot avoid a complete re-evaluation of its position on the cost impact of the proposed regulations.

B. Lack of Demonstrated Benefits

In this proposed rulemaking, EPA has adopted a concept of "mismanagement" of wastes which we believe is highly questionable and for which we can find no reference in the Statutes, specifically Section 3001(h).

EPA has then used a version of its risk assessment procedure, proposed in 1984 and just finalized in late August 1986, and added "worst case" assumptions for establishing regulatory pollutant concentration limits despite the prohibition in Executive Order 12498 against using worst case analysis as a basis for rulemaking.

Finally, EPA has chosen as the object of risk a lone well water user ingesting, over 70 years, 2 liters per day of water from the same well perceived by EPA to be contaminated from Subtitle D landfill leachate, infinitely, in this worst case analysis. Using this procedure rather than the usual study of hazard to a known, potentially-exposed population has resulted in EPA's proposing insupportably low toxicity characteristic threshold limits.

Even under its questionable definition of mismanagement, however, EPA has not shown a need for this rulemaking as required by Executive Orders 12291 and 12498. 40 Fed. Reg. 13,193 (Feb. 19, 1981) and 50 Fed. Reg. 1036 (Jan. 8, 1985). The benefits addressed in Section VII of the proposal are not reasonably based. EPA has not demonstrated the hazard of harm

to human health posed by its scenario of mismanagement of the 52 candidate characteristic pollutants. We maintain that some proof of harm at the regulatory thresholds must be shown for each substance.

Since there is no demonstrated health-based need for the proposed rules, there can be no health-based benefit. EPA should assess what health effects there may be from ground water contamination of the potentially-exposed population before deciding if and where its toxicity characteristic applies.

V. GROUNDWATER MIGRATION SCENARIO

The Agency assembled a collection of worst cases and absolute worst cases into an hypothesized scenario to depict the results of mismanagement of the wastes under consideration. EPA fails to consider the probability that any one individual assumption may be correct, or that the entire series could actually occur. Despite this, the Agency combines this result with the "upper plausible limit" risk assessment or some other health datum to back-calculate a threshold regulatory level for the candidate waste or constituent. This compound of conserva-

tisms is not accepted by the main stream of the scientific community and has been criticized frequently by EPA's own Science Advisory Board. A recent example is an SAB letter to the Administrator dated April 8, 1986 and designated as SAB-EHC-86-018, in which the Board again offered its assistance in improving the accuracy and credibility of the Agency's work product. It also again expressed its position that worst case analyses alone are not properly descriptive of the situation.

The SAB position is consistent with the instructions given to the Agency by Executive Order 12498, which directs the use of best estimates and requires that the proposed cure not only be a real cure for a real sympton, but also be better than the illness. The Agency has followed none of these instructions in this rulemaking.

The choice of disposal in a Subtitle D landfill for candidate-containing substances as the worst case mismanagement scenario is in error. Placing such substances in municipal landfills is legal and the public at large is directed to do so by Subtitle D of RCRA, as are all industrial generators of solid waste not captured by the hazardous waste provision of RCRA.

To put them elsewhere would be a violation of both federal and local laws.

The assumptions that certain specific leaching conditions will exist, that the leachate will enter a potable aquifer at an arbitrarily-determined strength, and exist undiminished in perpetuity is indefensible. Each of the steps (and the other conditions necessarily associated with these major named assumptions) has a very small chance of occurrence. All of them happening just as assumed has no reasonable probability of occurrence. Among other things, it is assumed that the Agency will be derelict under all of the applicable laws, will not detect the contamination of the aquifer or the sole source well, and will fail to provide either remedial action or alternative water supplies, and that the consumer will choose to drink this supply exclusively for an entire lifetime. There can be no rational expectation that such a series of events could occur.*/

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*/ The scenario is further distorted by overestimation of the hazardous potential of many wastes by the TCLP. The particle size reduction requirement of the TCLP will give rise to misleading results that exaggerate the leaching potential of monolithic type wastes. Such wastes tend to maintain their physical integrity and thus keep the surface area exposed to potential leachates to a minimum. As a result, these wastes

It is our understanding that the Agency has abandoned this scenario for the now-reconsidered January 1986 Land Ban Proposal. We trust that this same conclusion will be reached here. We agree with the written reports we have seen that the Agency has concluded that mismanagement is the failure to apply the most appropriate management for a particular waste. The best available technology (BAT) standard provides a very useful and suitable means of defining "mismanagement." There are many appropriate management scenarios provided under RCRA, including Subtitle D landfills. We urge the Agency to address the concept of case-by-case determination of adequate management, rather than a generalized hypothetical scenario of no reasonable probability.

(footnote continued)

have a lesser leaching potential than those wastes which are easily broken down into many pieces and which therefore have greater surface area exposed to leachates. The Structural Integrity Procedure (SIP) should be retained as an adequate indicator of the effects of heavy landfill equipment on the physical stability of the waste. If the Agency is concerned about "natural weathering forces", it must also consider that such forces operate over a long period of time. Requiring particle size reduction in the TCLP does not take that factor into account and, therefore, will not provide as proper a reflection of actual disposal conditions as the SIP.

The Agency apparently is unaware of the enormous amount of materials required to produce the postulated results. Just the concept of the infinite source (a source capable of producing a constant volume and concentration of leachate for at least 70 years) requires a waste source larger than any now existing in this nation.

Consider the scenario of a very large consumer of PVC. We do not believe that there is any single site facility which purchases as much as 100 million pounds per year. Of that, less than 1%, or 1 million pounds would be disposed of to the land. The current Plastic Pipe Institute/National Sanitation Foundation voluntary standard for potable water pipe is 2 ppm. Generally, manufacturers of PVC supply resin of that residual or less to avoid analysis of the finished product. Therefore, there would be a maximum of 2 lb/yr available for disposal to ground at this large facility. That is inadequate to supply an infinite source, even if all of it went directly to a single aquifer, which it would not.

Similarly, a large (10MM lb/yr) consumer of vinyl chloride-containing latex at the usual shipping residual of 5

ppm, would, if 1% were disposed of as waste, contribute a maximum of 0.5 lb/yr to the environment. That is not an infinite source, yet 5 ppm residual latex would be, under this proposal, a hazardous waste, and so would the washwater coming from the washout of the process equipment in which it was used.

A similar case can be made for the PVC plant which produced these products. Industry data shows that less than 2 lb. of wastewater is generated in the production of each pound of product, and that the combined wastewater stream to the water treatment system contains about 0.5 ppm VC, or a total of about 600 lb/yr from a world scale 300 MM lb/yr PVC plant. Agency data contained in Tables 4-5 and 4-7 of EPA Report to Congress (EPA/530-SW-86-004) state that an estimated 95% of this is removed in the wastewater treatment system and that no more than 5%, or 30 lb/yr is sent to the receiving stream. Although we have used a 95% figure for these calculations, actual removal rates at POTWs were 99.8% so the amount of vinyl chloride remaining after wastewater treatment is correspondingly less in the real world. See Table 4-2 of the EPA Report.

Thirty pounds a year in a river is not an infinite source, nor does it pose a significant risk to the users of that stream, who far outnumber the sole user of the contaminated well of the Agency scenario. Yet, this proposal would deem that wastewater stream hazardous, and along with it, the net resin solids and the sludge from the waste streams in that plant.

Such streams are not, in fact, hazardous to either the environment or human health, because they are being disposed of properly, including the use of Subtitle D landfills where appropriate. Bringing them under the control of RCRA by redefining this altogether proper management program as mismanagement will neither be a wise application of Agency or societal resources nor will it measurably benefit the environment or human health. The Agency has presented no data to support such a proposal. Its own data, as contained in the recent report to Congress referenced above, strongly supports not listing these wastes as hazardous.

VI. SURFACE IMPOUNDMENTS AND WASTEWATER

EPA has not adequately considered the regulatory impact of the TCLP on surface impoundments, especially wastewater treatment impoundments. No wastewater in the PVC/VCM industry contains less than the TCLP threshold of 0.050 mg/l vinyl chloride. As a result, every wastewater or stormwater impoundment in the industry will become subject to Subtitle C. The scenario is similar for refineries, and facilities producing organic chemicals, pesticides, and pharmaceuticals that use or produce compounds on the TCLP list.

The regulatory impact of TCLP on surface impoundments is not addressed in the preamble. EPA must estimate the number of impoundments affected by this rule and the cost of retrofit. At a cost of $1 million per impoundment (which we believe to be low), U.S. industry could spend billions of dollars cleaning, retrofitting and replacing impoundments that have a miniscule impact on the environment.

Ironically, the proposed TCLP will require facilities with surface impoundments to expend huge resources eliminating

leaks yet, the volume of water entering the environment from leaking surface impoundments is orders of magnitude less than from surface discharges. There is no logic to this. EPA must provide language that exempts surface impoundments from Subtitle C. The Vinyl Institute has three suggestions on how this could be accomplished.

First, since groundwater contamination from surface impoundments is a long-term phenomena, allow the regulated community to use an annual average for a particular facility to determine if a wastewater from that facility exceeds a TCLP threshold. This will also mitigate the wide analytical variability in TCLP results observed by EPA.

Second, revise the regulation such that the contents of a surface impoundment is what determines whether Subtitle C applies rather than what is entering the impoundment. This is logical since any leakage from the impoundment will be essentially the same as the average concentration in the impoundment. Unless this is allowed, EPA will be faced with the embarrassing situation of requiring expensive leak prevention measures to control a few gallons per day of leakage while

allowing what doesn't leak to be discharged to the environment under the NPDES exemption.

Third, revise the regulations so that the "aggressive biological treatment facility" retrofit exemption (HSWA, Section 3005(j)(3)) can be used for surface impoundments. HSWA currently requires that owners of surface impoundments wanting to apply for the exemption must apply to the Administrator by November 8, 1986. The TCLP regulations affecting surface impoundments will not be promulgated by that date. Section 3005(j)6A allows facilities time to upgrade their surface impoundments but does not provide for the "aggressive biological treatment facility" exemption. Certainly this was an oversight by Congress and a review of the legislative record would make it clear that biological systems becoming subject to Subtitle C after November 8, 1986 should be allowed to use this exemption. We suggest the affected industry be allowed a year after a waste is classified as hazardous under revised regulations to notify the Administrator of the company's intent to use the "aggressive biological treatment facility" exemption.

We also believe it was Congress' intent that facilities which qualify for the "aggressive biological treatment facility" exemption to be exempt from all of Subtitle C, including permitting requirements. EPA should make that intent explicit in its regulatory revisions.

This proposal could have a further, and even more devastating, impact on surface impoundments. It is conceivable that the land disposal ban provisions of RCRA could operate to ban, within six months of the promulgation of these regulations, all wastewater surface impoundments that leak in any way. The final sentence of §3004(g)(4) would require EPA to prohibit, within six months of the final rules, the land disposal of wastewater "identified" under the TCLP. "Land disposal" is defined to include "any placement of [a specified] hazardous waste in a ... surface impoundment".... §3004(k). Leaking wastewater from a surface impoundment would constitute "migration of hazardous constituents from the disposal unit"; thus, under §3004(g)(5), that method of land disposal could not be determined to be "protective of human health and the environment" and EPA would be required to ban wastewater in surface impoundments within six months. Congress clearly could

not have intended such a result and EPA apparently did not recognize this regulatory impact or it surely would have discussed it in the RIA. If wastewater surface impoundments are not exempted from Subtitle C, as recommended above, then EPA must, at a minimum, make clear that they will not be subject to the land disposal ban provisions of §3004.

VII. VINYL CHLORIDE LEVEL

The method by which the Agency arrived at the proposed regulatory level for vinyl chloride is inappropriate. The Agency proposed a Recommended Maximum Contaminant Level (RMCL) (a nonenforceable goal) for vinyl chloride of zero, based on the Agency policy of zero risk, a policy which both present and immediate past Administrators have stated repeatedly is unattainable, and, in fact, socially undesirable in the long run. See, for example, the article by W.D. Ruckelshaus entitled, "Risk, Science, and Democracy," which appeared in the spring 1985 issue of Issues In Science and Technology, and the comments made by Administrator Thomas at the National Conference on Risk Communication, January, 1986. The propriety of zero RMCLs is now being litigated.

Nevertheless, the Agency did set a zero RMCL at 40 C.F.R. Part 141. See 40 Fed. Reg. 46,880. It then proposed a Maximum Concentration Limit of 1 ppb. 50 Fed. Reg. 46,903. This is an enforceable limit on public drinking water supplies, and was set "as close to the RMCL as feasible." The current proposal then took that number, which is based on technology and includes a number of arbitrary safety factors adopted from a NAS report of several years ago, and multiplied it by an arbitrary groundwater dilution factor to arrive at a "health-based" allowable exposure of 14.4 ppb. The scientific justification for that conclusion is not presented. It then multiplied that number by a factor to make it quantifiable and enforceable, and arrived at the final proposed regulatory limit of 50 ppb. Nowhere are health considerations, science, or human experience factored into the procedure.

We, therefore, cannot support the use of MCLs in general, nor that for vinyl chloride, in particular, as a basis for a purportedly health-based rulemaking. If the Agency insists on using this discredited method, it should use a factor of at least 10, rather than five, to convert the detection limits to enforceable quantitation limits. This is

necessary to compensate for the wide difference between results obtained by EPA's labs working under ideal, controlled conditions and those that can be produced by commercial laboratories operating under "real world" conditions with actual wastes.

Despite predictions by the Agency of up to 20 cancer cases per year among those persons residing within a 5-mile radius of VC/PVC producing facilities (Anderson, Risk Analysis, 3 277 (1983)) and serious attempts by the Agency and the Centers for Disease Control to locate such victims (see the attached Vinyl Institute document, "Community Health Effects of Vinyl Chloride," 18 July 1986, for further details and references), there is no scientifically confirmed evidence that any person in the general population has been harmed by community exposure to ambient vinyl chloride in the more than 50 years of industrial use.

The "plausible upper limit risks" of the Agency no longer are plausible in the absence of some confirmation over a half century, and the use of such unsupportable assumptions in rulemaking cannot be defended on scientific grounds.

There is a statutory Reportable Quantity (RQ) of one pound for vinyl chloride under CERCLA. The Agency has not yet gotten around to the mandate under that 1980 statute to set considered levels for the RQs of various substances not covered by the Spill Provisions of the Clean Water Act, so the statutory one pound limits still stand.

The Agency did, however, produce a joint report in 1985 by the Cancer Assessment Group and the Office of Health and Environmental Assessment Group, EPA/600/D-85/040, in which it found vinyl chloride to be a weak carcinogen and recommended that the RQ be raised to 100 lbs. See also the Agency report EC AO-CIN-R245, August 1983, for more background data. The Agency has stated (50 Fed. Reg. 13456) that an RQ is not deemed a harmful quantity of a hazardous substance, but is the size of spill or release of which it wishes to be informed so that it might consider whether federal action might be required. Most of the RQ values are derived from local acute impact on the biota of receiving streams. The listing of wastes as hazardous automatically makes them subject to these CERCLA spill reporting limits.

Any vinyl chloride-contaminated wastewater which contains the regulatory threshold concentration of 50 ppb will, therefore, have to be reported to the National Response Center if a spill or nonpermitted release of greater than 2.37 million gallons occurs during any 24-hr. period. If PVC resin of 2 ppm residual monomer content is listed as a hazardous waste, then any spill of over 500,000 lb, or one thousand 50-lb. bags, or 20 25-thousand pound truckloads, or three jumbo railcars, are released to the environment and cannot be recovered. Similarly, a 5 ppm latex spill must be reported at only 24,000 gallons, 8 truckloads, or 470 50-gallon drums.

We do not expect to be required to report many waste releases of this magnitude. It is worthy of note, however, that it does require such a quantity of these streams before the Agency even wishes to be notified of the release under CERCLA. Of course, if the Agency proposal to raise the RQ to 100 lbs. is adopted, the relevant figures become 237 million gallons of wastewater, 50 million lbs. of resin, and 2.4 million gallons of latex. When looked at from this perspective it is difficult to consider the proposed regulatory levels as serious representations of significant health concerns.

Vinyl chloride is a very strictly regulated substance. Every facet of its manufacture, use, and disposal already is regulated on a federal level, with many states and municipalities having additional or more strict rules of their own. Aside from the general photochemical pollutant rules and other such nonspecific regulations, vinyl chloride is regulated by the following specific standards:

OSHA - Occupational Exposure Standard 29 C.F.R. § 1910.1017. Limits occupational exposure to 1 ppm regardless of the use of respirators. Requires very close control on emissions and waste streams to achieve this limit.

EPA - NESHAPS 40 C.F.R. § 61.60 et seq. Work practice, administrative, and engineering controls on manufacture of VC and PVC. Point sources, fugitives, and wastewater streams all are regulated.

CERCLA 40 C.F.R. § 302.4. Interim statutory reportable quantity of 1 lb.

SDWA 40 C.F.R. § 141. RMCL of zero, proposed MCL of 1 ppb.

CWA. Priority pollutant under Sec. 307(a), which calls for special considerations under permitting actions.

RCRA. Listed in Appendix VIII. Several wastes from the production process are listed wastes.

FDA - The Food and Drug Administration has proposed rules which will limit residual VC in food-contact applications to the 5-10 ppb range. 51 Fed. Reg. 4,173 (Feb. 3, 1986).

The only reason the Agency has given for including vinyl chloride in this list of candidates is that it had data available that allowed it to employ the (now abandoned) land ban groundwater migration scenario to calculate a regulatory threshold. It did not show any current health problems nor did it claim any health or environmental benefit from this proposal.

The only claim of societal benefit of any type is from reduction of cleanup costs of contaminated groundwater should such contamination occur and should it be cleaned up. It did not suggest that there would be any health benefits from that cleanup, nor any environmental improvement.

In view of the complete lack of any showing of current or future health or environmental problems, and no claim of future health benefits, as well as in view of the total absence of scientific justification for, or epidemiological support of the postulated health risks from environmental exposure to vinyl chloride, we believe that the present rules and standards are adequate to provide ample protection from potential releases of or exposure to vinyl chloride.

VIII. PHENOL

Phenol (CAS 108-95-2; NCI C50124) ranked 34 in production among U.S. chemicals in 1985 (Chemical & Engineering News, 1985) with annual production of 2.78 billion pounds. Approximately 40% of the phenol produced is used in the manufacture of thermosetting phenolic (phenol formaldehyde) resins. In

addition, over 50% is used in the production of caprolactam (15%), bisphenol A (25%), alkyl phenols (3%), and adipic acid (3%), which are also used in the production of a variety of engineering thermoplastics. The remaining percentage of phenol is used to produce an assortment of end products, including dyes, disinfectants, antiseptics, photographic chemicals, paints.

A. PHENOLIC RESINS

Phenolic resins are used in a number of applications affecting our everyday life. Attached are the figures for domestic consumption by end use and the distribution by major market of phenolic resin.

Phenolic resins are a class of thermosetting resins. Thermosetting plastics or resins are compounds which in their final state as finished articles are substantially infusible and insoluble. Thermosetting resins are often liquids at some stage in their manufacture or processing, which are cured by heat, catalysis or other chemical means. After being fully cured, thermosets cannot be resoftened by heat.

PHENOLIC
DOMESTIC CONSUMPTION BY END-USE**

(In millions of pounds)

End-use	1980	1981	1982	1983	1984
Molding Compounds	246	249	192	232	238
Bonding & adhesive resins for:					
Laminating	97	134	127	166	149
Coated & bonded abrasives	34	37	25	28	23
Friction materials	35	29	25	32	35
Insulation materials	271	362	347	355	307
Foundry & shell molding	80	82	56	70	81
Plywood	445	1,110	1,012	1,309	1,319
Fibrous & granulated wood	88	201	146	179	184
Resins sold to Rubber Industry	28	24	23	27	30
All other	74	59	51	59	62
Protective coatings	24	26	18	19	22
All other uses	72	42	23	30	38
Total	1,494	2,355	2,045	2,506	2,488

**Gross weight basis of reporting begun in 1981.
Source: Monthly Statistical Report, SPI Committee on Resin Statistics, as compiled by Ernst & Whinney.

DISTRIBUTION BY MAJOR MARKET**

(In millions of pounds)

MAJOR MARKET	1980	1981	1982	1983	1984
Transportation	135	167	129	156	150
Packaging	10	*	*	*	*
Building/Construction	858	1,672	1,543	1,936	1,921
Electrical/Electronic	181	209	170	176	162
Furniture/Furnishings	11	25	26	*	*
Consumer & Institutional	33	*	*	44	*
Industrial/Machinery	21	27	*	11	9
Adhesives, Inks & Coatings	186	166	73	70	80
All Other	59	89	104	113	166
Exports	23	20	15	23	22
Total	1,517	2,375	2,060	2,529	2,510

**Gross weight basis of reporting begun in 1981
*Included in all other
Source: SPI Committee on Resin Statistics Annual Major Markets Survey.

Phenol-formaldehyde prepolymers termed novolacs are produced by keeping the ratio of formaldehyde to phenol below 1. The prepolymer is cooled, crushed, blended with a curing agent and sold to the fabricator.

When the novolak prepolymer is heated, curing occurs rapidly. Crosslinking takes place primarily through methylene bridging with the simultaneous formation of ammonia as a by-product. There are also appreciable amounts of benzylamine crosslinking bridges.

Thermoset molding compounds are processed differently from thermoplastic compounds. Thermoplastic compounds are similar to a candle; when heat is applied, the candle softens and melts. When heat is removed, the candle solidifies. Thermoplatics melt when heat is applied and solidify when heat is removed.

Thermoset compounds are similar to a boiled egg: a raw egg is placed in boiling water and is transformed into a hard boiled egg. There is no way to reverse the process. Thermoset compounds first soften upon the introduction of heat and then

cure into final form through a chemical reaction. Once cured, thermoset compounds cannot be softened by the application of heat.

Testing has shown that in the unmolded (uncured) state, phenolic molding compounds exceed the TCLP limit proposed: when cured, phenolic molding compounds do not exceed the TCLP limit for phenol.

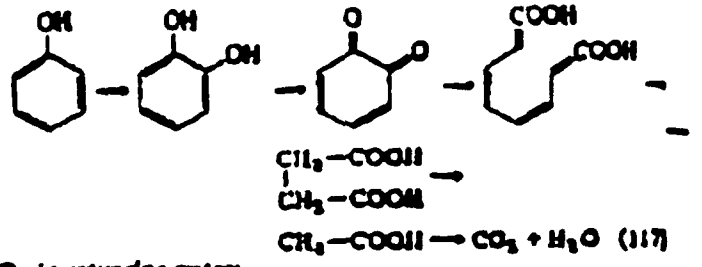
During the normal molding of phenolic molding compounds, it is common to generate waste in the uncured state. Typical sources are due to housekeeping requirements and start-up/shut down process scrap. The proposed TCLP limits for phenol would require molders to dispose of process scrap and housekeeping scrap as a hazardous waste.

B. PHENOL IS BIODEGRADABLE AND POSES NO ENVIRONMENTAL THREAT TO GROUND WATER

1. Aerobic Biodegradation

Phenol is known to be biodegradable and utilizes the following pathway to decompose into ubiquitous by-products, namely carbon dioxide and water.

pathway of breakdown:



- Biodegradation to CO_2 in estuarine water:

The full range of biotransforming activity is displayed under aerobic conditions. The characteristic end products of aerobic metabolism (respiration) are carbon dioxide, water and other simple inorganic compounds such as ammonia and phosphate.

The decomposition rate of phenol in soil suspension is two days and it is decomposed by soil microflora in one day. (See, Handbook of Environmental Data on Organic Chemicals.) The phenol completely disappears from the environment when it

decomposes and therefore it presents no threat to health or the environment at that point.

Phenol is subject to microbial action. Microbial activity is likely to exist in most subsurface regions where ground water is important. (McNabb or Dunlop, 1975). Bacteria levels, typically around 10^6 organisms/ml, have been found for several shallow water table aquifers which have been investigated (Wilson et al - 1983 B). The potential for biodegradation of a variety of compounds in the subsurface has been extensively studied. Litchfield and Clark (1973) analyzed ground water samples from aquifers throughout the United States that were contaminated with hydrocarbons and found hydrocarbon utilizing bacteria in all samples at levels up to 10^6 organisms/ml. Aerobic biodegradation of hydrocarbons compounds leads to formation of carbon dioxide, water and new cell biomass. (Vanlocke et al 1975).

A study undertaken to determine the biodegradability of 114 organic priority pollutants included in the U.S. EPA consent decree list to ascertain the extent of microbial degradation and to determine the acclimation period was published in

October 1981 in the Journal of the Water Pollution Control Federation Volume 53, No. 10. The priority pollutants were subjected to a specific set of controlled experimental conditions and culture enrichment techniques within the framework of a static culture flask biodegradability screening test.

The biodegradability test method used in the studies was the static-culture flask-screening procedure of Bunch and Chambers, utilizing biochemical oxygen demand (BOD) dilution water containing 5 mg of yeast extract per litre, as the synthetic medium; 5- and 10-mg/l concentrations of the test compound, a 7-day static incubation of 25 degrees C in the dark, followed by three weekly subcultures (totaling 28 days of incubation), and incorporation settled domestic wastewater as microbial inoculum. Phenol was used as the biodegradable control compound in each biodegradability evaluation series to ensure viability of the wastewater inoculum.

The biodegradability data from the static-culture-flask-biodegradation-screening test studies, based on GC analysis and TOC and DOC determinations, have demonstrated that phenol and the chlorinated, as well as the nitrated, phenols,

with the exception of 4,4-dinitro-o-cresol, were significantly biodegraded, with either rapid or gradual adaption periods necessary to achieve optimum biodegradation rates.

The biodegradability data are expressed in Table 1 (Attached), which summarizes the average percentage of biodegradation for each compound and for each subculture. Phenol biodegraded from 60% to 100% after the first week of incubation. Pentachlorophenol was shown to be significantly bio-oxidized but with a gradual adaption process over a 2-week period to achieve 100% biodegradation in 5-mg/l substrate cultures and over a 4-week period to achieve 98 to 100% loss in 10-mg/l pentachlorophenol cultures.

2. Microorganism

The highest microbial population is likely to be in the area of greatest contamination (up to 10^7 organism/ml have been reported); a map of the bacterial counts following a gasoline spill in Ambler, Pennsylvania, resembled the contours of gasoline contamination (Raymond, Jamison and Herdson 1975). During the course of the biostimulation program at this site,

Table 1—Biodegradability of phenolic compounds evaluated by the static-flask-screening method.

Test compound	Concentration of test compound (mg/ml)	Performance summary	Average of 3 test flasks (biodegradation of compound in 7 days %)		
			Original culture	First subculture	Second subculture
Phenol	5	D	96	100	100
	10	D	97	100	100
2-Chloro phenol	5	D	86	100	100
	10	D	83	100	100
2,4-Dichloro phenol	5	D	100	99	98
	10	D	98	99	100
2,4,6-Trichloro phenol	5	D	100	100	100
	10	D	100	100	100
Pentachloro phenol	5	A	19	68	100
	10	A	16	0	0
2,4 Dimethyl phenol	5	D	100	100	100
	10	D	99	100	100
p-Chloro-*m*-cresol	5	D	78	100	100
	10	D	76	100	100
2-Nitro phenol	5	D	100	100	100
	10	D	100	100	100
4-Nitro phenol	5	D	100	100	100
	10	D	100	100	100
2,4-Dinitro phenol	5	D	80	100	100
	10	D	68	100	100
4,6-Dinitro-*o*-cresol	5	N	52	58	56
	10	N	0	5	11

D—Significant degradation, rapid adaptation
A—Significant degradation, gradual adaptation
N—Not significantly degraded under the conditions of test method.

32 cultures thought to be the predominant gasoline utilizing bacteria were isolated from the ground water. These cultures included 10 cultures assigned to Norcadia, two Micrococcus, four cultures of Actinetobacter, eight Pseudomonas Flavorbacterium devorars and seven unidentified cultures. Norcadia cultures were probably responsible for the major paraffinic hydrocarbon degradation and the Psuedomonas were responsible for much of the aromatic degradation. (Johnson, Raymond and Hudson).

Similar results from microbiological studies were found during the biostimulation program at Mellville, New Jersey.

Pseudomonas microorganisms attack the aromatic ring structure of phenol. At a concentration of 500 mg/l at 30 degrees C, parent strain of pseudomonas yielded 100% ring disruption in 25 hours and 100% ring disruption by the mutant strain in 8 hours. (Handbook of Environmental Data on Organic Chemicals).

and within an underlying porous rock formation. This study, "The Dynamics of Anaerobic Phenol Biodegradation in Lower Greensand" by Rees & King, established the rates of anaerobic phenol degradation in a porus rock formation and identified the inhibitory concentrations of phenol and other factors affecting those rates.

The pathway of anaerobic decomposition of phenol aromatic compound is well established. The kinetics of phenol degradation were determined by measuring zero order and first order rate constants. The zero order rate constant was given by $r_0=D(C_1-C_0)$ and the first order rate constant by rl=D ln (natual log) C_1/C_0; where D is the dilution rate (flow rate divided by column void volume); C_1 the phenol input concentration; $C_0$the steady state effluent phenol concentration.

4. Results

Zero order kinetics tend to apply above 1500 mg/liter of phenol as the concentration is increased, where as at input concentration of 200 - 1500 mg/liter first order kinetics tend to operate. These data agree with those of Blahely and Knox

(WLR Technical Note No. 63 Reportment of the Environment, London 1978) who observed increasing rates of anaerobic decomposition up to a concentration of 1000 mg/liter when phenol aliquots were added to leachate from a domestic refuse landfill.

The Table below exhibits the calculated times required for a phenol concentration of 1000 mg/liter to be reduced to 1, 0.1 or 0.01 mg/liter, in a Lower Greensand formation beneath a landfill site, at a flow rate of 0.3 meters/year based on kinetic data. The distance travelled by the pollution plume assumes no adsorption of the phenol.

Initial phenol concentration mg/liter	Final phenol concentration mg/liter	Time required (years)	Distance travelled (meters)
1000	1.0	1.7	1.5
1000	0.1	2.1	1.9
1000	0.01	2.6	2.4

Phenol, under anaerobic conditions biodegrades to form carbon dioxide and methane. It should be noted that the degradation rates reported here would be further stimulated in the presence of an active methoanogenic population.

5. Anaerobic Degradation Pathway of Phenol

Ring clevage or opening is the rate limiting step in the biodegradation of phenol. (Attached are the rate constants derived from this experiment.)

A Study of the Degradation of Phenol Contaminants in Ground Water by Anaerobic Bacteria in St. Louis Park, Minnesota, (Ground Water Magazine, Vol. 20, No. 6 Nov. - Dec. 1982) attests that anaerobic degradation of phenolic compounds is primarily responsible for the observed attenuation of phenol. The drift acts as a treatment zone for the removal of phenolic compounds that have penetrated the aquifier from wetlands adjacent to the manufacturing facility. This treatment zone can be characterized as a continuous flow bioreactor consisting of a fixed film microbral population fed by a multiple nutrient stream as envisioned by Whitman.

Table 1. Steady state phenol concentrations in effluents from columns of Lower Greensand fed with a simulated landfill leachate containing various concentrations of phenol at various flow rates. The columns had void volumes of 235 cm^3. The r_0 and r_1 values are shown where: $r_0 = D(r_1 - f_0)$ and $r_1 = D \ln (r_1/f_0)$

Column number	Phenol concentration ($mg\ dm^{-3}$) Input r_1	Output f_0	Column flowrate ($cm^3\ h^{-1}$)	Rate constants r_0	$r_1 \times 10^{-6}$
1	200	55	0.5	0.29	26
1	625	455	0.75	0.31	9.5
1	1500	1000	0.5	1.0	8.1
1	2900	2380	0.5	1.04	3.9
1	4200	3800	0.7	0.8	3.0
1	8200	7800	0.5	0.8	1.0
2	200	20	0.25	0.18	23
2	625	265	0.25	0.36	8.6
2	1200	600	0.25	0.6	6.9
2	2100	1600	0.25	0.5	2.1
2	3150	2500	0.25	0.65	2.3
2	6250	5800	0.25	0.45	0.75
3	200	35	0.2	0.13	15
3	625	225	0.25	0.40	10
3	1400	750	0.2	0.59	5.6
3	2600	1900	0.2	0.61	2.8
3	3800	3200	0.2	0.54	2.4
3	7200	6400	0.2	0.54	0.8

Phenolic compounds are biodegraded as they follow the direction of groundwater flow. The ultimate products of anaerobic metabolism are usually methane (CH_4), carbon dioxide and other simple inorganic compounds such as ammonia (NH_3) and phosphate. Various low molecular weight organic acids, alcohols and amines are produced as intermediate products.

An SPI member company who had disposed of 8-10 million pounds of solid phenolic resin waste with 6-10% free phenol content from 1964-1984 in a recently closed landfill performed ground water monitoring at the request of EPA. The results of this monitoring reveals that no phenol was present in the monitoring wells. This attests to the fact that aerobic and anaerobic biodegradation of phenol does occur.

Another member corporation disposed of 100,000 gallons of liquid phenolic resin with a free phenol content of 5% at a municipal landfill between 1970-1974. At the request of a government agency, this corporation contracted a laboratory to perform ground water monitoring of the landfill. Phenol was not detected.

Biological treatment for the destruction of phenolic waste is applicable over a wide range of phenol levels. Effective treatment has been reported for influent levels as low as 7 to 10 mg/l to several thousand mg/liter. Under properly controlled conditions microorganisms can be developed that are suitable for treating phenolic waste. Many plants report final effluents in the range of 0.1 mg/l from raw waste loads of 1,000 ppm. The biological treatment most frequently used is the activated sludge system. Other processes applicable to low strsngth waste include aerated lagoon, oxidation ponds, oxidation towers and trickling filters. Typical detention times in aeration basins for treatment plants now in operation are in the range of 15 to 24 hours.

Microorganisms obtained from a phenol waste or sewage sludge plants usually are used to seed a new phenol waste plant. In a landfill these microorganisms are plentiful and provide a means to biodegradation of phenolic waste. To list a waste that will biodegrade into harmless ubiquitous products under normal disposal conditions should preclude any regulatory action that would burden industry with additional cost when nature can take care of itself.

C. REGULATORY LEVEL PROPOSED FOR PHENOL

In 1865, Lister established the use of 5% to 10% aqueous phenol as an antiseptic (Gleason et al., 1969); today phenol is used as a disinfectant on medical instruments (AMA Department of Drugs, 1977) and is occasionally used therapeutically as a chemical cauterizer (Baker and Gordon, 1971; DuPont et al., 1972) as well as to relieve severe chronic pain (Mark et al., 1962). In dentistry, liquified phenol (80% phenol in water) has been used as an analgesic for sensitive dentine, and 5% solutions of phenol have been used to devitalize deciduous tooth pulp (Blacow, 1972). Some over-the-counter products such as antiseptics, lip balms, throat lozenges, poison ivy lotions, and mouthwashes contain varying concentrations (0.1%-1.0%) of phenol as an antipruritic, anaesthetic, or antibacterial agent (Rosenthal, 1972; Harvey, 1975; AMA Department of Drugs, 1977; Physician's Desk Reference, 1978).

EPA has already considered whether or not phenol should be regulated under the Clean Air Act. The agency (EPA) has concluded that the health data base for phenol is insufficient both in terms of carcinogenic and noncarcinogenic effects, and

based on this current lack of information, EPA does not plan to initiate rule making under the Clean Air Act at this time. (EPA Press Advisory June 16, 1986 C. Rice.) Phenol was assigned for testing by the NCI Carcinogenesis Testing Program because of its large annual production, significant industrial and consumer exposure, and tumor-promoting effects identified in previous studies.

The National Cancer Institute's bioassay of phenol to test for possible carcinogenicity was conducted by providing this substance in drinking water to F344 rats and B6C3F1 mice. Groups of 50 rats and 50 mice of each sex were given drinking water containing 2,500 or 5,000 ppm phenol for 103 weeks. As matched controls, groups of 50 rats and 50 mice of each sex received tap water. Phenol was not carcinogenic for rats or mice of either sex.

The regulatory level proposed for phenol in Table 1(51 Fed. Reg. 21685) is 14.4 mg/L. The proposed regulatory level specifies a Reference Dose Level (RfD for non carcinogens) of 4 and an apportionment of 40% which yields a 1.6 mg/L apportioned reference level as listed in Table A-7 and not the apportioned

reference level of 1.0 mg/L listed in Table C-3 (51 FR 21674). This would yield a proposed regulatory level of 23 mg/L rather than the 14.4mg/L proposed if the dilution/attenuation factor of 14.4 is applied.

The health data on phenol published by EPA, the National Cancer Institute and the Food and Drug Administration reveal that the regulatory level proposed by EPA does not reflect the results of these studies. Instead the Agency based its RfD on a 1944 unpublished Gavage Study by Dow Chemical. SPI does not believe the Agency should base its RfD level on an unpublished study that is not open to peer review. The Gavage route of administration used in the Dow study is not relevant. SPI considers the NCI study to be more relevant because the route of administration simulates drinking water usage.

SPI supports the Chemical Manufacturers Association comments on phenol and the changes derived for the RfD based on the NCI study. In addition, SPI supports the CMA derivation of the dilution/attenuation factor study using the Monte Carlo statistical technique and believes the regulatory level of 2,045 ppm proposed by CMA reflects the available health and transport modeling data.

The Food and Drug Administration (47 Fed. Reg. 22,814 and 22,815) concludes that phenol is safe and effective as an over-the-counter (OTC) anesthetic/analgesic active ingredient for topical use on the mucous membranes of the mouth and throat when used within the dosage limit set forth below.

DOSAGE; Adults and children 3 years of age and older: use a 0.5-1.5% concentration of phenol in aqueous solution in the form of a rinse, mouthwash, gargle or spray not more than three to four times daily. Use a lozenge containing 10 to 50 mg of phenol every 2 hours if necessary. For chilren 3 years of age or under there is no recommended dosage except under the advice or supervision of a dentist or physician.

The dosage level would be 600 mg in a 24 hour day. If we assume that an individual consumes two liters of water per day then the Reference Dose Level should be 600mg/2 liter or 300 mg/L as opposed to the 4mg/L proposed by EPA. Utilizing 300 mg/L as the RfD with an apportionment of 40% and a dilution/attentuation factor of 14.4 would yield a regulatory level of 1,728 mg/ml.

D. ECONOMIC RAMIFICATIONS OF PROPOSED REGULATION ON PHENOLIC RESIN MANUFACTURERS AND PRODUCERS

2.5 billon lbs. of phenolic resin are produced each year by approximately 26 manufacturers. In addition, there are 3,000 compression and transfer molding processors who may fabricate phenolic resin into products. The phenolic manufacturing segment's waste average is 1% of production. Because phenolic resins are thermosets, the phenolic processing segment has a waste average of 10%. Therefore, the combined total of the resin manufacturers and processors yields 272 million lbs. of waste. A 55 gallon drum weighs approximately 250 lbs., therefore, 272 million pounds of waste would fill approximately 1 million drums. The cost of disposal of one drum is $200.00. The phenolic resin industry will incur a total cost of $217.6 million for the disposal of its scrap material if it were classified as hazardous.

The analytical cost for the TCLP for phenol as proposed is $1200 as quoted by a large and well known testing laboratory. The phenolic resin manufacturing segment through economy of scale probably will analyze a sample from 20 tons of material

at a time due to the homogeneity. The waste value, as illustrated above, will result in the performance of 600 tests for a total cost of $0.72 million. The phenolic resin processing segments, who produce the majority of the waste and fall into the category of small quantity generators who generate less than 1,000 kg/month will most likely sample a waste load which results in the performance of 123,500 tests resulting in a total expenditure of $148 million. This is based on the assumption that a small quantity generator will perform the TCLP test procedure on each ton of waste generated.

These calculations represent a worst case scenario for complete compliance for the determination of a waste as hazardous. The $148.7 million analytical expenditure plus the $217.6 million cost of disposal yields a $366.3 million cost for compliance. The Agency should realize that manufacturers and processors who act in good faith and in accordance with good manufacturing practices and the laws will perform the analysis and dispose of the material as required which results in the $366.3 million expenditure mentioned above. It should be noted that administrative and transportation costs associated with the disposal of this waste has not been included.

In surveying the industry, it was noted by one manufacturer, that his waste disposal cost would increase from $25,000/year to $250,000 to $1,000,000 if his waste were classified as hazardous. Another manufacturer alluded to the fact that the cost of disposal for scrap molding compound would be very costly. An approximate price of $200.00 per 55 gallon drum of waste was the estimate given from a local company that handles hazardous waste. This calculates into more than an 8% increase in overhead cost per year.

Another manufacturer revealed that the transportation cost for 82 drums (1 truckload) to a RCRA permitted disposal site is $10 a drum within a 200 miles radius. If the waste must be delivered outside this radius, transporation cost increases dramatically.

It makes sense to regulate wastes that are truly hazardous, however, to regulate waste that biodegrades is not necessary. Disposal of phenolic resin waste in a RCRA permitted hazardous waste landfill will inundate the hazardous waste control system as less space becomes available. In addition, incineration of these materials as hazardous waste will

also overwhelm the hazardous waste industry if they have to increase their capacity by an additional 272 million lbs.

E. SMALL BUSINESS EFFECT

EPA arbitrarily designates a small business as having 50 employees or less. 51 Fed. Reg. at 21,664. The Small Business Asociation (SBA) defines a small business as having less than 500 employees. By changing the definition, EPA has skewed the regulatory impact analysis. If the SBA generally accepted definition is used as the small business designation, the number of affected companies would increase dramatically over the number of plastic companies cited by EPA. 51 Fed. Reg. at 21,661. Thus, if finalized, the proposal will affect many small business entities based solely on phenolic resin uses referred to previously.

The proposed regulation would accelerate the contraction of the foundry, industry friction materials, molding materials, and other industries based on phenolic resins.

The cost of domestic processing of phenolic would increase due to the cost of compliance. This would make domestic production less competitive in world markets and make offshore production more attractive. This would lead to further contraction of the aforementioned industries. This action would have an unfavorable impact on our national trade deficit.

SPI requests, based on data regarding biodegradation and high RfD, that the Agency delist phenol under the toxicity characteristic leaching procedure hazardous waste identification system.

IX. CONCLUSION

For the reasons discussed above, phenol should not be listed and the proposal should be substantially revised after the completion of a thorough regulatory impact analysis and an opportunity for interested parties to comment. We sincerely

appreciate your consideration of our comments concerning this matter and will submit corroborative data within two weeks.

Sincerely,

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