

capacity ranging from 16,000 to 20,000 gallons per tank. Constant temperatures of 120° F. for phenol and 110° F. for formaldehyde are maintained in the storage tanks. Pressure-vacuum relief valves (a device which opens on one ounce pressure or one-half ounce vacuum) were installed on five of the six raw material storage tanks about 5 years ago (R. 221). The remaining phenol storage tank was equipped with such a relief valve within the last 6 months (R. 223). Vapors in the storage tanks are displaced during loading and are released to the atmosphere through the relief valves (R. 224). Respondent receives and unloads three 4,000 gallon tank trucks of phenol every two days. Formaldehyde shipments are received daily.

Unspecified quantities of acetone and methanol are also used at the plant (R. 153) and apparently are stored in 7 underground storage tanks ranging in capacity from 6,000 to 12,000 gallons which vent to the atmosphere (R. 208).

Preparatory to the reaction process, raw materials are transferred to weigh tanks which are equipped with pressure-vacuum relief valves. The relief valves were installed on the weigh tanks about two years ago (R. 222) in such manner that any vapors passing through the valve are released to the atmosphere (R. 205). From the weigh tanks the reactants are transferred to hold tanks which are vented to the plant's cooling tower (R. 206). From the hold tanks, the reactants and catalysts are fed to one of the four reactors.

In the reflux reactors, vapors released from the boiling reactants are condensed in water cooled condensers and returned to the reactor. Uncondensed vapors from the condensers are channeled to a scrubber where the vapors are washed with water and then vented to the atmosphere (R. 203). The process in the heat exchanger reactors differs from the reflux process in that the temperature of the reactants remains below the boiling point as the liquid is pumped through a heat exchanger and back to the reactor. Vapors released from this process are vented directly to the atmosphere (R. 202).

The reaction process is completed in 4 to 8 hours. The intermediate product is then transferred to one of the eight dehydrators. Depending on whether the final product is to be in a liquid or flake form, it takes from 20 to 40 hours to dehydrate the intermediate product. Material removed during dehydration is condensed and collected in a receiver. Noncondensable vapors from the dehydrator condensers are pulled through a vacuum pump to the scrubber while the liquid collected in the receiver is drained to the sewer (R. 204, 205).

From the dehydrator the product is transferred in liquid form either to liquid product storage tanks or to flake hold tanks which were also equipped with pressure-vacuum relief valves about two years ago (R. 222). Feed from the flake hold tanks goes to a flaking machine where the product is solidified and placed in a hopper from which the product is bagged or boxed. The hopper and bagging station are equipped with a high efficiency cyclone for emission control (R. 284). Seven of the 16 liquid product storage tanks are equipped with relief valves and similar devices were ordered for the remaining 9 tanks during the latter part of April 1973 (R. 223).

Acme ships the liquid product to its consumers in drums and tank trucks. The liquid is transferred to the drums through pipes and enter the drum through a 2 1/2" diameter bung hole. The tank trucks are loaded through 16" diameter manholes located on top of the tank trucks. Product is transferred to the trucks through a hose 3" in diameter which rests on an indented screen used to filter the product. Respondent's chief engineer testified that he was not aware of the commercial availability of a "closed system" for loading tank trucks (R. 237) but that he thought the system used to unload raw materials might be adaptable to the loading of the finished product (R. 233). He stated "Given proper research and design, we may be able to design something..." (R. 237). Acme has not "searched or looked for an alternate method" for loading the tank trucks (R. 235).

Public hearings on the Agency Complaint were conducted on May 3 and 4, 1973. Testimony was received from 11 persons who live or formerly lived near Respondent's plant. While all of these witnesses thought the Acme plant was the source of various odors, four of the residents, two firemen and two policemen employed by the City of Forest Park, positively identified Acme as the source of odors from having been in the plant on official business. One of the firemen, Fred Knaack, testified that a west wind carried odors from Respondent's plant to his home located about 2 blocks east of the plant. He testified to having experienced the odor on "many occasions" and most recently at 8:45 a.m. on the morning of May 3, 1973 (R. 11). (However, we will not consider violations which might have occurred after the filing of the Complaint) Knaack also testified that the odors caused him to experience "a pinching of your nostrils, congestion in your sinuses and lungs" which caused him to "have a hell of a time breathing" (R. 15). According to Knaack, he had been forced to leave the area at times because of breathing difficulties brought on by the odors (R. 17). He specifically recalled strong odors on June 25, 1972 and again on July 5, 1972 when guests at his daughter's birthday party had to be taken "inside because the smell was too strong" (R. 18). Knaack began calling the Acme plant about 4 years ago to complain about the odors and has continued calling from time to time "wishfully thinking that possibly something could be corrected on it" (R. 22).

The other fireman, Arthur Licitra, who resides directly across the street from Respondent's plant, testified that he noticed an odor every day (R. 192). He had also detected a strong odor at 7:45 a.m. on May 3, 1973 (after the filing of the Complaint). Licitra found the odor "nauseating and eye watering... you can't stay outside the house" (R. 190). He testified that he began calling "the President, Mr. Polhemus" about 8 years ago concerning the odor but no longer calls because he felt the calls were not effective.

Michael Thompson, one of the police officers, testified that he had resided about 1/2 block east of the Acme plant until October 1, 1972 at which time he moved because of an odor like "decomposed flesh" which he detected every day (R. 88, 91). (Thompson, who now resides about 3/4 mile northeast of the Acme plant, also stated that he detected the odor at his present residence on April 29, 1973 (R. 90). He testified that he had detected the odor at other times while on duty and recalled detecting a strong concentration "last Tuesday" at 2:30 a.m. when he and his partner stopped to eat.) During cross examination, when Thompson was asked if he could have detected the odor at his former residence "if the wind was blowing at 25 m.p.h. the opposite direction", he answered "very possibly correct, sir" (R. 107). Prior to moving, Thompson considered purchasing the building in which he resided but decided against the purchase because of the odor (R. 92). He found the odor repugnant and sickening and testified that the odor had caused him to vomit on two different occasions in August 1972 (R. 92). Thompson stated that the odor varied in intensity but that when leaving his residence he and his wife would frequently have to run to his automobile holding their breath (R. 93). He sent four letters to Acme during the summer of 1972 complaining of the odor but failed to receive a reply (R. 97). He also had complained to the Environmental Protection Agency, Forest Park Village Officials, the "County Environmental Protection People" and the "Regional Environmental" (R. 98).

Richard Archambault, another Forest Park police officer, testified that he had experienced a "nauseating" and "very terrible odor" from Acme at his residence about 3/4 block from the plant (R. 114). The "terrible, horrible smell" caused his eyes to tear "especially at night when I'm home and trying to sleep" (R. 137). He testified that the odor keeps him from enjoying his patio on occasion (R. 138) and has caused discomfort to his family. Archambault added that the odor varies in intensity and is not present on certain days. While on duty, Archambault attempts to avoid working "that end of town" because of the odor (R. 137) and when he is the senior officer on duty he only goes into the area "when necessary" (R. 144).

Other witnesses testified to having experienced nausea, headaches and tearing eyes caused by the odors (R. 44, 64, 121, 159, 169, 182), to having been awakened during the night by the odor (R. 63), to the frequent occurrence of strong odor concentrations (R. 43, 120, 161, 182), and to the nuisance experienced by other members of their families (R. 79, 183). Two witnesses specifically recalled that strong odors had persisted for almost the entire day on Easter Sunday 1973 (R. 42, 119). Although one witness complained of "billows of smoke", the record indicates that this witness had mistakenly identified plant steam discharges as smoke (R. 169).

Respondent's case in rebuttal primarily rested on the testimony of an Acme employee, an EPA investigator, and an attack on the credibility of Agency witnesses. The Acme employee, Bruce Kimball, testified that, at the request of Respondent's attorney, he had initiated an odor survey of the area on February 8, 1973 (again after the filing of the Complaint). Kimball stated that his experience in odor evaluation consisted of "in-house training by CPC employees" and "an outside firm". The methods used for the survey were of his own choice (R. 367) and he personally made the survey on all but one occasion (R. 370).

The Kimball survey consisted of walking from the plant to specified locations in the area once or twice a day from Monday through Friday and sniffing the air (R. 319). Using an odor rating system of one (1) for no odor, two (2) for slight odor, three (3) for moderate odor, four (4) for moderately heavy odor, and five (5) for heavy odor, Kimball's survey initially checked three locations east of the plant but was later expanded to five locations on March 13, 1973. Survey records show that Kimball never detected an odor above his rating of two (2) and that out of 275 separate tests only six achieved a rating of two (2). Those occasions when he detected slight odor were on February 8 and 23, March 7 and April 6, 1973.

After each odor detection during the survey, Kimball returned to the plant and investigated possible sources of the odor. He attributed the February 8 odor to a leak in one of the formaldehyde storage tanks. The tank was drained and repaired (R. 333). The February 23 odor was attributed to a malfunction in the scrubber which was corrected by unplugging the water distribution nozzles (R. 334). On March 7 Kimball found the source of the formaldehyde odor to be an overflow caused by a faulty scale at a formaldehyde weigh tank. The problem was corrected by emergency scale repair service (R. 335). An excessive addition of formaldehyde to one of the reactors caused excessive venting to the scrubber on April 6. Kimball stated that the problem was solved immediately by a

reduction in the formaldehyde addition rate to the reactor and that dampers were subsequently placed on the reactor vent system "in order to stop over-fume pickup because of velocities involved in the duct work" (R. 336).

Mr. Kimball's use of the "sniff test" was similar to the method used by residents in the area. We do not credit his method as a scientific survey. It is generally accepted that the minimum number for service on an odor panel is six persons. Journal of the Air Pollution Control Association Vol. 13, Number 10, Oct. 1963. An odor survey panel of one falls far short of this requirement. Indeed, Kimball testified that Acme's parent organization, CPC International, uses 15 individuals for its odor panel (R. 383).

Also, it seems that some of the tests may have been conducted when Mr. Kimball was experiencing olfactory fatigue. Although most odor experts agree that the subjective nature of human olfactory responses surpasses the sensitivity of most analytical instruments, evidence has also shown that the sense of smell is fatigued with prolonged exposure to an odor. Kimball acknowledged that his time limit before experiencing olfactory fatigue was just "an hour or two" of the phenol or formaldehyde odor (R. 394). The record fails to show if Kimball, after leaving a plant allegedly containing fumes and odors (R. 12, 88, 135, 190, 306), allowed sufficient time for recovery from any olfactory fatigue he may have experienced. Many of Kimball's readings, however, were taken early in the day and would not have been subject to error from olfactory fatigue.

Residents said strong odors have occurred at night and on weekends, but Kimball did not test for odors after 6 p.m. or before 8 a.m. or on any Saturday or Sunday. No testing occurred between July 1, 1970 and January 26, 1973, the period of alleged violations of the Statute.

Agency investigator Martin Sheahan, who resides in the vicinity of the Acme plant, testified to having "been up and down Harlem Avenue in the vicinity of Acme's plant" (an estimated distance of about 3 city blocks) "at least 500 times" without experiencing any odor which he associated with the Acme plant (R. 401). Sheahan acknowledged having been on Circle Avenue near the Acme plant at least 20 times and said 8 of the trips directly related to his investigation of odor complaints. On several of these visits Sheahan failed to detect an odor even though the wind was blowing across the plant towards the residential area.

Sheahan inspected the plant on three different dates. While inspecting the plant on January 4, 1972, Sheahan detected a strong phenol odor coming from a cooling tower located on the roof of the plant. He found the odor objectionable for the short period of time he remained exposed to it (R. 406). Sheahan informed Acme

officials that he considered the cooling tower to be the plant's main source of odor primarily due to the discharge from the vacuum pumps to the cooling tower.

Company records indicate that five firms were promptly contacted concerning the odor problem and that by March 17, 1972 at least one equipment quotation had been received (Respondent Exhibit No. 11). Acme subsequently decided on a Purification Industries packed tower scrubber with a guaranteed phenol removal efficiency of 99.5%. An order for the unit was placed on September 8, 1972 with a scheduled delivery date of December 1, 1972 (Respondent Exhibit #19). Problems with equipment shipments delayed the actual scrubber installation until February 12, 1973 (R. 212). After finally placing the equipment on line, Acme discovered that the scrubber pump was not of sufficient capacity, liquid distribution nozzles plugged frequently and excessive wear was occurring on the drive-belts to the scrubber fan. These problems were solved and the scrubber unit placed back in operation on April 26, 1973 (R. 340).

Investigator Sheahan inspected the roof area of the plant again in March 1973 and noted a "significant improvement of the odor condition" since the scrubber installation (R. 415). This is consistent with Mr. Kimball's observations during this time period. Sheahan collected a sample of the cooling tower water with his hand and was unable to detect any odor in the sample (R. 418). He recalled detecting a "moderate" odor of phenol in the Licitra's living room, but also admitted that his only detection of a "strong" odor off the Acme premises occurred on April 17, 1973, after the filing of the Complaint and prior to repairs on the scrubber (R. 418)

Acme claims that the Agency witnesses "greatly exaggerated the episodes of phenolic odor" and that we should consider the Kimball survey "superior to those of citizen witnesses because Kimball had had training in odor detection and his observations were correlated to official weather records". The record partially supports the charge of exaggeration but not to the degree claimed by Respondent. One witness thought she saw "great billows of smoke" when in reality it was probably water vapor. We also have reservations about the ability of one witness to possibly detect an odor even when the wind was blowing 25 m.p.h. in the opposite direction. But the conclusion that all Agency witnesses greatly exaggerated is simply not supported. Most Agency witnesses agreed that the intensity of the odors varied and that odors were not present on certain days. But these same witnesses were also in agreement that, when present, the odors unduly interfered with their enjoyment of life and property.

As we have noted many times in previous cases involving odor, neither party chose to provide the Board with the results of any objective test. The record contains vague testimony alluding to tests that were conducted on the "exit gasses". These tests, which Respondent claims were conducted in March or April 1973, allegedly

showed Respondent's emissions of an undefined contaminant to be "over a half a part per million", "less than five parts per million", and "on occasion less than ten parts per million" (R. 364, 365). Such confusing testimony adds nothing to the proceedings when not accompanied by the test report.

Respondent argues that, should the Board consider the Agency evidence sufficient to prove Acme odors interfered with the enjoyment of life and property, the Board is nevertheless prevented from finding that this interference was "unreasonable", since the Agency failed to prove that there was an economically feasible means of limiting the odor emissions. The Agency, on the other hand, contends that Acme's pre-trial conduct removed economic reasonableness as an issue.

The record shows that the Agency's Interrogatory No. 13 called for financial information relating to Respondent's volume of business and profits. Acme claimed that this financial information was "irrelevant and immaterial" and would be provided only if Acme decided "to make a hardship defense". The Statute provides that "the burden shall be on the Respondent to show that compliance with the Board's Regulations would impose an arbitrary or unreasonable hardship". EPA Sec. 31(c) The hearing officer then issued this order:

"If said Interrogatory is not answered, no testimony or other evidence will be allowed at the hearing upon which the Respondents may base a hardship defense."

Acme refused to divulge the information knowing full well that the Agency would need it in order to make a responsible evaluation of the economic impact of Respondent's control program. If the record of economic impact is inadequate, the failure is that of the Respondent.

Equipment exists for the control of odors from phenol and formaldehyde. The record contains a number of quotations from firms eager to sell such equipment to Acme. It was economically feasible for Respondent to install control equipment in 1973 and thereby at least reduce odors in the community. We believe it would have been just as feasible to install the equipment at an earlier date. The best evidence that control was economically feasible is the fact that the Company in fact installed equipment which accomplished some result.

Unanswered during these proceedings was the question whether or not the newly installed equipment will sufficiently abate the odor problems experienced by Acme's neighbors. The parties have filed a "Joint Motion With Respect to Relief" requesting that this Board direct the EPA and Acme to conduct a testing program for a

period of 150 days to determine whether actions taken by Acme have corrected the periodic phenolic odor problem. The testing program will involve both scientific and subjective measurement of odor at mutually agreeable ground level locations in a manner mutually acceptable to the parties. A procedure whereby nearby residents will be encouraged to immediately notify Acme of any odor complaints will be implemented. Acme agrees to make every effort to determine the source of the odor. The parties will attempt to develop a procedure whereby scientific tests will measure ground level concentrations of phenol at the time and place of any complaint.

Within 60 days after the conclusion of the test, the parties are to file a report summarizing the results. In addition, this report will contain a mutually agreeable program for further abatement procedures, if the test results show additional procedures are necessary.

In view of the fact that scrubber operating problems appear to have been solved and other control equipment has been recently installed the Board finds the proposed testing program acceptable and desirable. The simultaneous objective and subjective testing should provide the parties with a correlation that could determine the level of phenol deemed objectionable by Acme's neighbors.

We note, however, that the proposed testing program speaks only of the phenol odors. Evidence indicates that formaldehyde may also be responsible for complaints of the residents. We believe the program should include testing for formaldehyde and shall require the program be modified to include such testing.

The Joint Motion makes no recommendation regarding monetary penalty, beyond stating that this is for Board determination from the evidence presented at the hearings. In its Brief, Respondent requests that no penalty be imposed because "Acme has acted in good faith in its efforts to control odor". While Acme did react promptly to the Agency investigator's recommendation, the record clearly proves that a number of years passed with little action on complaint letters and phone calls from nearby residents. We believe Acme is now acting in good faith, but we do not believe the record fully supports the claim of "good faith" prior to January 1972. On the other hand, the Agency comparison of Acme to Respondent in EPA vs. Lloyd A. Fry Roofing Company, PCB 71-33, is likewise unjustified by the record.

We are convinced from the record that Acme did cause air pollution and an odor nuisance in the community on a number of occasions between July 1, 1970 and January 26, 1973. For these violations a monetary penalty of \$2,000 seems appropriate.

We shall approve the testing program in the hope that it may lead to further understanding of the odor problems which have concerned Acme and its neighbors and a further control of odor if that is necessary.

ORDER

It is the Order of the Board that:

1. Acme Resin Company shall pay to the State of Illinois by November 15, 1973 the sum of \$2,000 as a penalty for the violations found in this proceeding. Penalty payment by certified check or money order payable to the State of Illinois shall be made to: Fiscal Services Division, Illinois EPA, 2200 Churchill Road, Springfield, Illinois 62706.
2. Acme Resin Company and the Environmental Protection Agency shall conduct an odor testing program, as described in the Joint Motion With Respect to Relief, for a period of 150 days beginning no later than November 1, 1973.
3. Within 60 days after the conclusion of the test period, Acme Resin and the Agency shall submit to this Board a summary report on the results of the testing program. The report shall include a mutually agreed upon program by which Acme shall take any further action the parties deem necessary to reduce odorous emissions.
4. In addition to the proposed testing for phenol-phenolic odors, the parties shall incorporate into the test and control program, objective and subjective tests for formaldehyde odors.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order was adopted this 12th day of October, 1973 by a vote of 5 to 0.

Christan L. Moffett