

## Chapter Thirteen

# COKE AND CANCER AT BHP\*

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**C**oke ovens can be killers—the medical evidence around the world is “overwhelming”. Workers at steelmaking plants live with the constant danger of cancer of the lungs, bladder and skin.

*But at BHP's steelmaking plant in Port Kembla it took a flexing of union muscle, screaming newspaper headlines, claims in parliament and government inquiries to get things moving.*

In addition to extensive oil and mineral investments, BHP monopolises the manufacture of steel in Australia. BHP's largest steelworks are at Port Kembla, run by its Australian Iron and Steel subsidiary (AIS). Carcinogenic emissions from coke ovens at Port Kembla were the subject of an extraordinary series of industrial disputes between 1979 and 1981. Local unions (the Federated Ironworkers and Amalgamated Metalworkers) accused BHP of putting profits ahead of the safety of 1,000 coke oven workers through intolerable levels of emissions of dangerous gases.

A crucial stage in steelmaking is the conversion of coal to coke for use in the blast furnaces. Coke is made by cooking coal in batteries of ovens arranged in rows. At Port Kembla there are four batteries, each with between 66 and 101 ovens. Many of the gases driven out of the coal by the cooking processes are captured and

\*This is a modified version of Chapter 7 of the authors' book *The Impact of Publicity on Corporate Offenders* (State University of New York Press, 1983) updated for the present volume.

sold as by-products. However, some of these gases also escape from the doors at the side of the huge ovens or from the lids on top.

The emissions are a complex mixture of small particles and vapour, in addition to gases. They include such gases as carbon monoxide, hydrogen sulphide, benzene, and hydrogen cyanide, as well as other carcinogens such as benzopyrene and coal tar.

There is voluminous evidence from North America, Europe and Japan indicating an association between the products from the carbonisation of coal and cancers of the skin, lungs, and bladder.<sup>1</sup> After reviewing this evidence, the US Occupational Safety and Health Administration (OSHA) described the support for the conclusion that coke oven emissions are carcinogenic as "overwhelming".<sup>2</sup> OSHA estimated that 100 US coke oven workers have been dying needlessly each year from job-related cancer.

In mid 1977, the unions representing Port Kembla workers became concerned about the health risks faced by their members working at the coke ovens. On 30 August 1977, the New South Wales Labor Council requested a conference with BHP to discuss the issue. Following that meeting, the company reported back to the Labor Council on 30 November 1977 with plans to improve the situation. But by 1978, it was the local Port Kembla branches of the unions that were running the campaign. After being sent OSHA material on coke ovens by the United Steelworkers of America and the International Metalworkers Federation, they wrote to BHP asking to be informed whether the company accepted the standards laid down in the OSHA regulations, and if it did not, the reason why not. A campaign began for the application to BHP of the OSHA prohibition against exposing workers not wearing protective equipment to coke oven emissions of benzene-soluble particulate in excess of 0.15 milligrams per cubic metre of air.

The company openly admitted emission levels that reach more than six times the OSHA maximum.<sup>3</sup> In fact, company records for 1980 revealed emission concentrations at the worst locations of over 100 times the OSHA standards.<sup>4</sup>

There is no New South Wales or national legislation setting a legal limit to coke oven emissions. The National Health and Medical Research Council promulgated a voluntary standard of 0.2 milligrams of benzene-soluble particulate per cubic metre. BHP's

Port Kembla ovens, in addition to its ovens at Newcastle and Whyalla, are routinely in excess of this voluntary standard. A central plank in the unions' campaign was to persuade the New South Wales government to enact legally enforceable limits on the emissions.

Many more specific reforms were also sought. These included:

- (a) Air-conditioning and air-filtration of the "cars" which travel up and down the ovens filling them with coal and pushing the coke out once it has been cooked.
- (b) Employment of additional lidsmen to work on top of the ovens. The lidsmen are responsible for sealing the lids with clay to cut down the escape of fumes. With more lidsmen, a better sealing job can be done, and it would be possible to give existing lidsmen more time in air-conditioned rest rooms to recuperate from the hellish heat and fumes.
- (c) Installation of the air-conditioned rest rooms and the introduction of the relief time mentioned in (b).
- (d) Annual medical examinations paid for by the company with the results to be made available in writing to the workers.
- (e) Provision by the company of lockers and laundering for workers' clothes so that there would be no need to take these home. There is evidence that such carcinogens carried home in workers' clothes pose a potential threat to their families.<sup>5</sup>
- (f) Washing time prior to breaks to allow workers to clean carcinogens from their hands before eating food.
- (g) Worker education and training on the dangers of coke oven emissions.

Steve Quinn, of the Amalgamated Metalworkers and Shipwrights Union, described the attitude of BHP management to the initial 1977 campaign as "intransigent".<sup>6</sup> The company response was said

to be "Don't get things emotional and the workers stirred up". The unions turned to their elected representatives for help. A government backbencher, George Petersen, castigated BHP in the New South Wales Parliament, and as a result the government sent a team from the Health Commission to report on conditions at Port Kembla.

An inspection led by Dr W Crawford of the Health Commission took place on 19 December 1979. The team concluded that emission levels "exceeded the National Health and Medical Research Council Standards in nearly all the assays undertaken by the company" and that "the employees are at considerable risk to health by the physically and chemically hostile environment in which they must work".

A variety of reforms was recommended, including the employment of additional lidsmen, the provisions of lockers and industrial laundering for the work clothes of oven employees, and the speeding up of engineering improvements to reduce the emissions.

Four months after the inspection, the contents of the report were revealed to the company. Between the receipt of the report in April 1980 and September of that year the company introduced no changes in response to the recommendations of the report. By September, the unions were wondering why they had heard nothing about the results of the Health Commission inspection. When they were told that the government had informed the company, but not the unions, of the contents of the report five months earlier, the 1,000 coke oven workers went on strike for four days.

The government responded by setting up another working party to determine the action necessary to implement the Crawford Report. This was an inter-departmental working party with officers from the Departments of Industrial Relations and of Health. An inspection took place on 15 and 16 September 1980. The resulting report adopted a softer line than the earlier report on the rate at which leaking oven doors would have to be replaced, although there were other respects in which tougher recommendations were made. The Minister for Industrial Relations requested the company to act on the recommendations.

The company, among other reforms, had already agreed to provide

lockers and industrial laundering for workers employed on the ovens, and these reforms were implemented. This did not satisfy the unions; they wanted the same benefits to apply to workers in the vicinity of the coke ovens—mainly in the coal washery (which washes the coal before it is fed into the ovens) and in the by-products plant (which processes the gases extracted from the ovens).

At the request of the unions, Dr Crawford was brought in for another inspection to ascertain whether his recommendations with respect to workers on the ovens should also apply to those around the ovens. In this report Dr Crawford exacerbated the dispute with the ambiguous conclusion that extending the same recommendations to the 320 by-products and associated workers would be “desirable” but not “essential”. Bitter dispute between management and employees as to whether these workers should get the same benefits as those on the ovens continued until the entire coke plant work force went on strike on 15 May 1981, and stayed out until 28 May.

On 26 November, the Industrial Commission of New South Wales decided in favour of the company that laundering and locker benefits not be extended beyond workers actually on the ovens.<sup>7</sup>

## MEDIA COVERAGE OF THE SCANDAL

Throughout the 1979–81 period, the coke ovens saga was reported many times on the front page of the Port Kembla newspaper, the *Illawarra Mercury*. The Sydney and national press devoted much more limited attention to the problem. Some of the headlines seemed to be damaging for BHP: e.g. “BHP MEN IN CANCER PERIL AFTER GOVT ERROR” (*Australian*, 11 September 1980); “CANCER KILLING COKE WORKERS” (*Illawarra Mercury*, 6 September 1980). One front-page story was headlined “AIS CANCER RISK COVER-UP CLAIM” (*Illawarra Mercury*, 12 October 1979). This article reported statements in the New South Wales Parliament by George Petersen that the company had settled two coke oven compensation cases out of court so that there would be no evidence on which to establish a precedent for future claims. BHP issued a press release denying that this was its motivation in settling the cases. But as happens so often with corporate scandals,

allegations of cover-up can draw stronger fire than the material concerning the offence itself. The worst publicity came in union journals. For example, one story was headed: "DEATH ON THE COKE OVENS—BHP STYLE: KEMBLA CHALKS UP 13 KNOWN CANCER DEATHS" (*The Metal Worker*, September 1980).

Contrary to complaints made to the authors by BHP management, not all the press coverage was negative. There were a number of articles giving the company's side of the story: e.g. "BHP DEFENDS HEALTH AND SAFETY PROGRAM" (*Sydney Morning Herald*, 13 October 1979); "COMPANY REFUTES CANCER CLAIMS: AI&S DEFENDS HEALTH POLICY" (*Illawarra Mercury*, 13 October 1979). The Health Minister was reported as saying that the coke oven workers were "being well looked after" by BHP in a story headed "BHP TREATS MEN WELL" (*Illawarra Mercury*, 13 October 1979). In addition, there was a variety of newspaper articles lauding safety improvements made to the coke ovens: e.g. "AI&S ACTS ON CANCER REPORT" (*Illawarra Mercury*, 23 September 1978); "AIS TELLS OF PLANT IMPROVEMENT" (*Illawarra Mercury*, 12 September 1978). However, none of these were front-page stories.

The industrial confrontation aspects of the problem generated much of the media coverage. For example, when Dr Crawford and his team inspected the ovens on 17 December 1979, the company was at first not agreeable to union representatives accompanying him on the inspection. In response, a stop-work meeting was held and a television crew from Channel 10 in Sydney arrived to film the action. The company backed down and gave permission for union representation during the inspection. However, Channel 10 was refused permission to enter the steelworks itself and was forced to film from outside the gates.

Adverse publicity over the occupational health problem led to a limited amount of snowballing into publicity over related issues. The main example was pollution from the ovens drifting into the suburbs of Port Kembla and Wollongong.

Steven Quinn, the union leader, believed that the company "likes to give the image that they are good for Wollongong".

When the ABC programme *Nationwide* took their cameras to the plant in the early hours of the morning to film the fumes emitted

at that time, the company was not pleased. Coke oven workers had long alleged that when the company fell behind with its production targets, it was the night and early morning shifts that were required to cook "green ovens"—coke which emits excessive green fumes because it had not been cooked for long enough. At 2 am there is less risk of billowing fumes alarming members of the public (or government inspectors). The company categorically denied these allegations and in its defence showed the authors a memorandum of 19 February 1979 from the General Superintendent to battery foremen instructing that:

1. No oven is to be pushed unless it is coked (no matter what the cooking time).
2. No oven is to be pushed under minimum coking time.

Another related risk—the subject of some adverse publicity in the *Illawarra Mercury*, and in a speech to the State Parliament by Petersen—was that "Escaping fumes from the vats of by-product liquid materials cause sleepiness and watering of the eyes of operators".<sup>8</sup>

BHP did not run a counter publicity campaign. It was averse to "feeding the hand that bit us" by paying for advertisements explaining its position in the press. However, when the authors visited Port Kembla, Mr M J Burns, the Manager, Coke and Sinter, could not meet them because he was taking a course at the head office in Melbourne on handling media appearances and public relations.

In the four years since the Industrial Commission decision, particularly as the steel industry went into deep recession in 1982, accompanied by massive retrenchments, the media, locally as well as nationally, had virtually ignored coke oven cancer as an issue. Once the issue returned to being simply one of slow, imperceptible killing of workers, when there was no longer an industrial dispute to report, media interest evaporated.

## IMPACTS ON THE COMPANY

The financial consequences of the emissions struggle for BHP were minor. Neither objectively nor subjectively in the minds of

management could the problem be viewed as having any impact whatsoever on BHP share prices. From late 1980 to mid 1981, when the struggle reached its climax with the plant-wide strike, BHP shares were trading at three times their 1978 prices. The period was one of a consistent climb in BHP share values.

Since BHP is a virtual monopolist in Australian steel, there was little chance of reduced production resulting in competitors seizing a slice of the market. It is doubtful if there was any diminution in ultimate steel production as a result of the strikes by the coke oven workers (cf. *Australian Financial Review*, 24 July 1981). Coke is stockpiled, and at no point was the stockpile expended. During the strikes, the ovens, run by the supervisory and management staff, continued to operate at about 70 per cent capacity. (Coke ovens cannot be shut down because their life will be reduced if their temperature is not kept at about 1,000°C). Undoubtedly, however, the disruptions to other working functions, by pulling people out of their normal responsibilities, had certain costs in inefficiency and aggravation of management problems.

The total capital costs of improvements, from new oven doors to lockers for workers' clothes, could reach a total of \$5 million. However, as noted below, many of these monies might eventually have been spent without the extra impetus of the union campaign.<sup>9</sup> Another cost was in the double handling of coal during the strikes. Instead of coal being dropped straight into bins on railway tracks at the pit-head ready to be transported to the ovens, it had to be trucked elsewhere and picked up after the strike. Finally, it is possible that the publicity and antagonism aroused by the campaign may well provoke some victims of coke oven emissions into damages litigation against the company. According to the unions, by 1981 BHP had settled 13 cases out of court for payments running up to \$25,000 to the families of deceased coke oven workers.

Whatever the total costs, they will not loom large when compared with BHP's \$6 billion a year sales. Moreover, BHP in the past has usually managed to employ its monopoly status to pass on to consumers whatever extraordinary costs it incurs in its steel operations, although in recent times Australian protectionism has not been sufficient, given the world steel glut, to shield BHP from growing import competition.



The adverse publicity to which the company had been subjected was certainly cause for considerable objection and concern over loss of corporate prestige among the ten executives with whom the authors spoke during the course of their research. Because of some hostile coverage, primarily in the *Illawarra Mercury*, the company's repute in Port Kembla and Wollongong undoubtedly suffered as a result of the affair. However, individual executives were not singled out as villains in this press coverage. Consequently, our senior informants did not report loss of personal prestige to match the damage to corporate prestige.

Employee morale was also reported as having suffered. One executive expressed concern that wives who had been washing their husband's work clothes for years were now being told that by doing this they had been putting their families at risk of cancer. Hence, there was a belief that the morale of the work force was also being debilitated through family involvement in the issue.

Another adverse consequence of the affair for the company was a deterioration of already poor industrial relations. On 13 May 1981, when the workers started work late because of a gate meeting to consider the company's replies to a number of claims on cancer and emissions, they were forbidden their normal morning tea break, docked an hour's pay, and, according to the unions (although denied by the company), told to handle the same number of ovens they would push in a full eight-hour shift. It was this kind of event which badly soured industrial relations at the plant.

Avoidance of publicity was a consideration in many important management decisions. For example, after being told that the National Health and Medical Research Council standard for coke ovens was unrealistic, we asked why management had not complained to the Council with a view to setting a "realistic" standard. We were told that appeals against medical judgments on the grounds of "practical considerations" would only result in public attacks on the company for putting dollars ahead of lives.

## REFORMS

Numerous technological and other emission-control measures have been introduced since 1977. Machine-operated door and frame

cleaners have replaced manual cleaning on all batteries, thereby eliminating one of the jobs with the highest exposures. Fifty additional workers have been engaged as door adjusters and for sealing the lids on top of the ovens. Water seals have been introduced on the standpipes which take gases to the by-products section. There has been extensive machining of oven lids to improve their seal.

Stage one of the programme, which involved the installation of air-conditioning and air-filtration equipment on charger cars (which move up and down the battery dropping coal into ovens) and establishment of air-conditioned and air-filtered oven-top rest cabins, was completed in mid 1979. However, the government inspection of 15-16 September 1980 found that the air-filtering systems on two of the charger cars were not functioning properly. A videotape was made to explain the dangers of coke ovens and means of minimising risk to employees. Workers are now given five minutes' washing time before tea and meal breaks.

The most expensive engineering improvement has been the replacement of leaking doors on three of the four ovens with a new Japanese spring-loaded self-adjusting model.

The unions' view is that the reforms have not gone far enough fast enough. However, considerable amounts of money have been expended on a variety of measures. There have been a number of technological repairs and other changes mentioned above. When they are all catalogued in the company's public relations handout, they appear to be an impressive list of improvements. They are not trivial reforms. However, the question remains whether emissions levels have measurably improved.

We have been able to obtain only three sets of figures for emissions, one for 1978-79, another for September 1980, and the third for the 12 months to August 1983. The first two sets of figures were the subject of some discussion before the Industrial Commission of New South Wales on 4 June 1981. As J Bauer pointed out at the hearing, the two sets of figures indicated that, if anything, emission levels had worsened.<sup>10</sup> There was certainly no evidence of an improvement up to September 1980. When we visited the company in 1981, we asked whether it had any data suggesting an improvement since 1978. We were informed that it did not. We were then told that if one looked at the whole decade to take in

the total programme of upgrading, improvement would definitely be evident.<sup>11</sup> When we asked for evidence from systematic recording of emission levels throughout the period to substantiate this, we were informed that no such data existed.

Data for the 12 months to August 1983 showed that emissions from the batteries with the new Japanese doors had improved compared to the battery on which the doors were not replaced, though not dramatically so. It remained the case that over 80 per cent of workers sampled were exposed to average emissions in excess of the OSHA standard.

"Valve men" on one of the ovens were exposed to *average* readings of six times the permissible US level. BHP has stopped short of the drastic action which would be needed to create a low-risk environment at the Port Kembla coke ovens. The oldest and least productively efficient battery, No. 1, was closed down in 1982. However, the unions argued that it is the second oldest battery, No. 3, which should have been shut down because its design results in excessive emissions. The structural defects of No. 3, it was claimed, caused it to emit more dangerous fumes than No. 1. But management opted for closing the least efficient battery rather than the most dangerous one. Consequently, notwithstanding the new doors on the other ovens, workers on them are not protected from emissions above the OSHA standards because of spillover from No. 3. A year later part of No. 3 (3B) was closed, but 3A remained in production. The unions expressed the hope that the company would totally replace battery No. 3 in 1987 or 1988. However, they were not confident of this; allegedly, the company had consistently refused to hold talks with them about closing the killer No. 3 battery. One company spokesperson told the authors that the new battery was to provide for expansion rather than the replacement of No. 3. Battery 3A remains in production as this is written.

Little of the credit for the reforms which have been introduced by BHP can be given to the New South Wales government. Witness the fact that no new initiatives were introduced between the communication of Dr Crawford's report to the company in April 1980 and its discovery by the union in September. Things started to happen when the unions flexed their industrial and political muscle.

For the same reason, not much of the credit for the reform can be attributed to adverse publicity. While the publicity undoubtedly helped the workers in their cause, no change in the pace of reform was primarily attributable to industrial agitation. Two managers with whom the authors spoke, while adamant about the unions not forcing them to do anything they would not eventually have done of their own initiative, expressed the view that the industrial threats, backed by adverse publicity, had quickened the progress of reform. In responding to the authors' draft, however, the company rejected any interpretation that it had been forced into more rapid reform by the use or threatened use of the strike weapon. Its position was that reform should be interpreted in terms of a self-motivated corporate desire to improve health on the job.

In this case, in summary, adverse publicity played a relatively minor role in ushering in relatively minor reforms of company practices. Perhaps more significant was the part that adverse publicity played in jolting governmental authorities into action. In 1979, Dr Crawford of the Health Commission was quoted as saying that the Port Kembla coke ovens had a good pollution monitoring and filtering system (*Sydney Morning Herald*, 17 October 1979). By 4 June 1981, in giving evidence before the Industrial Commission, Dr Crawford could be heard to describe emissions from the same ovens as "dangerously high" and "frightful".<sup>12</sup> In fact, J Bauer in his Industrial Commission judgment, found that a previously lax approach of the government to monitoring coke oven emissions, had been replaced by a new, appropriate level of concern:

Whilst it might reasonably be said that there was a long delay in the commencement of detailed inspections and formation of recommendations after the responsible departments had been or ought to have been seised [*sic*] of the seriousness of the problems of industrial exposure to coke oven emissions and other industrial substances, the present position appears to be that the problems are being treated by these departments in a manner commensurate with the risks.

Furthermore, while disquiet might also reasonably be expressed at the delay in implementing the overall programme,

the commendable vigilance of the unions will no doubt ensure that the departments continue their supervision of the amelioration of the problem . . .<sup>13</sup>

Notwithstanding this improvement, the New South Wales Department of Industrial Relations has pointed out that its staff resources are still insufficient to conduct a comprehensive survey of emission levels at the Port Kembla ovens.

In 1982, the House of Representatives Standing Committee on Environment and Conservation strongly criticised both BHP and the health authorities for the tardiness of their responses to the coke and cancer problem at Port Kembla.<sup>14</sup> Unless the scandal is more vehemently pursued through renewed industrial agitation and concomitant media focus, however, this admonition will also continue to fall upon deaf ears.

### PROSPECTS FOR REAL REFORM

BHP is a company with an unimpressive record on occupational health and safety.<sup>15</sup> While the recession of the early eighties brought pleas that investment in occupational health and safety could only be purchased at the price of jobs, the Australian record profits of recent years make BHP the last company which can credibly advance such claims.

Unfortunately, BHP is one of those companies which in the past has often had to be prodded into action on occupational health by aggressive government or union action. The New South Wales Department of Industrial Relations is a notoriously weak enforcer of occupational health laws. Overcoming its inertia would seem to be every bit as great a challenge as shifting BHP itself. Since progressive change has been stimulated by union activism in the past, this remains the hope for the future. However, it is a matter of considerable disappointment that when the Hawke government, in one of its early economic achievements, revitalised the industry with the Steel Industry Plan, the unions did not insist on commitments to invest in improved occupational health and safety as part of the plan.

The current stand-off on the coke ovens is devastating. BHP

claims to have done its bit by investing in the Japanese doors and the other new technology it has in place. The fact that this money has been spent without getting emissions down to levels internationally recognised as an acceptable health risk leaves everyone perplexed as to where to go now. Government inspectors do not have the expertise in coke oven technology to tell BHP that the engineering judgments of the past have not been good enough and to specify the kind of technology which should be purchased in future. The government feels reluctant to introduce a standard which is unattainable at present without more massive investments in new technology. What is the point of fining the company every day for non-compliance with a standard which was written in the full knowledge that the company had no prospect of compliance for a number of years? To do so would bring the law into disrepute. Yet to persist in doing nothing continues to bring the government into disrepute with workers and others who are aware of the problem. If the law enactment and law enforcement route would be a farce, then there is one alternative which would place a recalcitrant company under real financial pressure for reform. This is to impose emission charges on BHP's coke ovens. For every .01 milligram per cubic metre of air by which coke oven emissions exceed the OSHA standard of 0.15, BHP could be required to pay \$1,000 per exposed worker per year into a special fund to support workers' health clinics at Port Kembla (and Newcastle).

Equally, for every .01 milligram per cubic metre of air by which emissions are *below* the OSHA standard, BHP could be given a rebate against the emission charge owed. This would give BHP, the Big Australian which takes pride in "the pursuit of excellence", an incentive to pursue innovative, cost-effective solutions to the problem.

The use of emission charges is a regulatory approach which has a great number of problems when applied on a wide scale.<sup>16</sup> However, in a situation of regulatory standoff where any other enforcement solution seems impracticable, and where an enforcement solution is needed to deal with an affluent company with little willingness to make further large investments to render the workplace safe, then a short-term solution which gives the company a financial incentive to invest in the expertise and technology to solve the

problem is perhaps the only road to take. Union mobilisation with maximum building of community support through the media, directed at the New South Wales government as well as BHP, is the only hope for moving down that road.

## Notes

1. Henry, S A (1946), "Cancer of the Scrotum in Relation to Occupation", *Oxford Medical Publications*, 1946, 40-48; Kawai, M and Harada, K (1967), "Epidemiologic Study of Occupational Lung Cancer", *Archives of Environmental Health*, 14, 859-864; Lloyd, W J (1971), "Long Term Mortality Study of Steelworkers, Part V: Respiratory Cancer in Coke Plant Workers", *Journal of Occupational Medicine*, 13, 53-68; Sakabe, Hiroyuki, Tsuchiya Kenzaburo, Takebura Noburu, Nomura Shigeru et al (1975), "Lung Cancer Among Coke Oven Workers: A Report to Labour Standard Bureau, Minister of Labour, Japan", *Industrial Health*, 13, 57-69; Dole, R, Fisher, R E W, Gammon, E J, Gunn, W et al (1965), "Mortality of Gas Workers with Special Reference to Cancers of the Lung and Bladder, Chronic Bronchitis and Pneumoconiosis", *British Journal of Industrial Medicine*, 22, 1-12.
2. U.S. Occupational Health and Safety Administration (1976) "Exposure to Coke Oven Emissions: Occupational Safety and Health Standards", *Federal Register*, 41 (206) 22 October; See also *American Iron and Steel Institute v OSHA*, 577 F 2d 825 (1978) where the OSHA coke oven emissions standard of 0.15 mg of benzene-soluble particulate was upheld by the Court of Appeals, Third Circuit.
3. The company made the following comment in response to a draft of this work which we sent to it:

There are very few US batteries with water-sealed standpipe caps. Moreover, there are batteries in the US which today still involve manual removal of charging lids. Many US batteries, even some of their newest batteries, do not have mechanical door cleaners on machines and yet the inference is that, compared to the US situation, Australia (BHP) is behind and deficient in this area because we choose not to agree with some USA decisions and regulations. This view ignores the areas where we have adopted other remedies.
4. The company's response to this sentence in the draft we sent them for comment was as follows:

This is a true statement but again gives no perspective. We do not deny that there are instances where such very high figures have been recorded. However, they are the infrequent exception rather than the rule. As is the case with the American and other overseas coke ovens, an emission level of 0.15mg/m<sup>3</sup> is routinely not met in many areas but it is rare indeed

for an exposure level to be 100 times the level. Moreover, in many cases where very high values have been reported we have doubts as to the validity of the result in that unrepresentative readings can be easily generated by holding a sample filter over an emission source. There have been numerous occasions when this practice has been detected.

Legally enforceable limits in America have not, at this point in time, resulted in compliance by American batteries, as is the simplistic inference implicit in the text. The nature of the problem and the stringency of the standard, notwithstanding the engineering and work practice controls specified by the OSHA regulations, have meant that the standard is currently unattainable in a number of areas on all batteries throughout the world for which we are privy to information.

5. Masek, V, Zdenek, J and Kandas, J (1972), "Content of 3, 4 Benzo(a) pyrene in the Working Clothes and Underwear of Workers at a Pitch Coking Plant", *Journal of Occupational Medicine*, 14, 548-551.
6. The company denies that its attitude was "intransigent":  
That there were claims by the unions for changes, which the company did not accept, is not disputed. Whether any fairminded person examining what was claimed, what was agreed to, and what effects might reasonably be expected from not agreeing to all the unions' claims, would conclude that the company's attitude was intransigent is debatable! Certainly J Bauer, in his recent judgment, effectively concluded that some of the unions' claims were not reasonable.
7. Steel Works (Broken Hill Proprietary Company Ltd) Award and Another Award, Industrial Commission of New South Wales 355 (26 November 1981).
8. NSW Legislative Assembly, *Hansard* 23 October, 1980, 2087.
9. The expenditure on new doors is the major new capital investment, which the company points out was beginning to take shape before the industrial campaign:  
The decision to install new doors had nothing to do with an industrial campaign. The trials with Ikio doors were begun in 1976. It was the company's intention all along to employ these doors subject only to the doors proving suitable. The initial design did not.
10. Notification under section 25A by Australian Iron and Steel Pty Limited of a Dispute with the Amalgamated Metalworkers and Shipwrights Union and Ors Re Claim for Two Lockers for Each Employee and Other Claims—Coke Ovens Department, Compulsory Conference 281, Industrial Commission of New South Wales, 4 June 1981.
11. BHP offered this response:  
In many cases, e.g. water-sealed standpipe caps, the engineering reforms were completed prior to the commencement of significant data collection. We have no doubt that these steps have "measurably improved" the situation but because statistics were not kept during the period prior to the steps being taken we cannot statistically evidence our conclusion.
12. Compulsory Conference 281, transcript.
13. Steel Works Award, p. 86.



14. House of Representatives Standing Committee on Environment and Conservation, (1982), *Hazardous Chemicals: Second Report on the Enquiry into Hazardous Chemicals*, Australian Government Publishing Service, Canberra, 120-123.
15. Kriegler, R (1980), *Working for the Company*, Oxford University Press, Melbourne; Hopkins, A (1981), "Crime Without Punishment: The Appin Mine Disaster", *Australian Quarterly*, Summer, 455-466; Lewis, S and Matters, P (1985), "In the Belly of the Monster", *Australian Left Review*, 91, 17-21.
16. Braithwaite, J (1982), "The Limits of Economism in Controlling Harmful Corporate Conduct", *Law and Society Review*, 16, 481-504; Stewart, R B (1981), "Regulation, Innovation, and Administrative Law: A Conceptual Framework", *California Law Review*, 69, 1256-377.