

# **The State of Indiana's Experience in Regulating the Disposal of Coal Ash at Surface Coal Mines.**

**Paul J. Ehret<sup>1</sup>**

<sup>1</sup>Indiana Department of Natural Resources, 402 W. Washington St., Room W-256, Indianapolis, IN 46204

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## **BACKGROUND**

The state of Indiana, after Texas is the largest producer of coal combustion materials (coal ash) in the nation. The quantity of coal ash produced is directly related to the fact that 98 percent of all the state's electrical generation comes from the burning of coal. Indiana's dependence on coal fired utilities for electrical production is the highest in the nation. In an attempt to level the playing field for Indiana coal operators in competition with low sulfur Western coals caused by expanding clean air limitations, the Indiana General Assembly intervened to provide legislative relief. In a like manner Indiana utilities were seeking a cost effective alternative to current methods of coal ash disposal and storage as expanded use of clean coal technologies were causing a corresponding increase in the quantity of coal ash produced. With coal ash production in the state estimated at 6 to 7 million tons annually the question of how best to manage this issue has been no small task. Even as of this date, the issue of coal ash placement, disposal and utilization are subjects of a considerable public policy debate within the state.

The Indiana Department of Natural Resources – Division of Reclamation has been involved in the placement, i.e., disposal as well as use of coal ashes (CCW's, CCM's, CCB's, CCP's, CCBP's, CUB's FGD's, FBC's, fly ash, bottom ash, boiler slag, scrubber sludge, flue gas desulfurization materials, etc., etc., etc.) since 1988. In that year, in response to a recommendation from the Governor appointed Indiana Coal Commission, the Indiana General Assembly passed Public Law 103. A relatively uncomplicated piece of legislation, the new law simply exempted coal ash disposal from solid waste regulations administered by the Indiana Department of Environmental Management (IDEM) when disposal occurred at surface coal mines regulated by the Indiana Department of Natural Resources (IDNR) under the Surface Mining Control and Reclamation Act (SMCRA). The underlying rationale behind the switch in authority to regulate coal ash was that for a material that is generally non-hazardous, existing solid waste requirements associated with normal landfill regulations were viewed to be excessive. There was the view that disposal of coal ash in the volumes being generated was an unwise use of otherwise precious municipal landfill space. Additional arguments were also advanced that massive storage cells and holding ponds located in close proximity to the powerplants was also not necessarily the best location for

placement of this material. Moreover, neither was it considered a wise use of land as the expansion of these holding cells continued to take up ever increasing acreages of otherwise productive land. In Indiana characteristically many powerplants are located in floodplain areas immediately adjacent to rivers and lakes. These hydrologic environments can often be highly favorable to the conductance of pollutants through the ground water. To some it seemed logical to dispose of coal ash in a hydrologic environment already substantially disturbed by surface coal mining, represented typically by highly mineralized ground water. There also seemed to be a sort of symbiotic logic in returning these burned coal residues to their place of origin. As has been learned, to others this choice did not appear to be so logical or wise.

With the passage of Public Law 103-88 several attempts at administrative rule making were made by IDNR in the late 1980's and early 1990's. None of these attempts met with any measure of success. The Natural Resources Commission (NRC), which serves as IDNR's policymaking body overseeing the agency's programs, held hearings on proposed CCM disposal regulation. Unfortunately, the hearings proved to be highly contentious. Representatives from both the coal industry and the electrical utilities claimed that the early draft versions of the rules proposed by IDNR were far too stringent. Opponents to CCM disposal at surface coal mines claimed them to be not strict enough. A review of several of these early drafts revealed that they were based largely on the state's existing solid waste disposal regulations administered by the IDEM.

In effort to resolve the issue an attempt was made to get the various multi-interest stakeholders together to agree on an approach to regulate coal ash disposal. As a result, a group was created among the stakeholders that agreed to have the University of North Dakota (UND) conduct a study to characterize Indiana coal. The group also agreed on how the study was to be conducted and what parameters were to be examined. The UND report was to serve as basis for determining what level of risk CCM presented to the environment. It was hoped that corresponding regulations could be developed commensurate to the degree of risk.

Unfortunately, the completion of the UND's report itself proved to be contentious. To a more or lesser extent the various parties used the study to declare that it had gone to prove their point for or against disposal at coal mines. With the breakdown of further progress toward a solution, IDNR acted unilaterally to get the program moving. Using the UND study to justify its initiative, IDNR approached the NRC with a suggested solution that would circumvent the need for drafting specific coal ash disposal regulations. It was IDNR's position that current SMCRA rules regulating surface mining were by themselves adequate to accommodate coal ash disposal and protect the environment. To that end IDNR drafted "Memorandum 92-1" as a policy guidance document instructing applicants for coal ash disposal what they must do to secure permit approval and comply with existing SMCRA law and regulations. After more than four years since the passage of Public Law 103-88 authorizing coal ash disposal at surface mines, and otherwise no end in sight to the debate, the NRC approved IDNR's

*Memo 92-1* as Indiana's coal ash disposal program.

## PROGRAM REQUIREMENTS

Among other requirements the highlights of *Memo 92-1* include; a characterization of the disposal sites hydrogeologic setting (pre and post-mining and disposal), a qualitative and quantitative analysis of the effects of coal ash placement within that setting, waste characterization determined through bulk analysis and both an 18 hour and 30 day neutral leachate analysis in compliance with ASTM standards. Coal ash is analyzed for 22 different constituents, including all 8 RCRA metals, plus pH, potential acidity, neutralization potential and net neutralization potential. *Memo 92-1* also carried with it the provision that any coal ash leachate result that exceeded 25 percent of the limit for any RCRA element would be rejected for disposal. All sources of coal ash proposed for disposal were required to undergo these tests as well as the requirement to representatively sample and analyze each active waste stream on a quarterly basis.

Other factors considered in IDNR's review included, proximity to public and private water supplies, maximum possible concentrations of constituents, site characteristics such as type and extent of aquifers, spoil characteristics, expected impacts of attenuation, dispersion and dilution, direction of ground water flow, volume proposed for disposal, baseline water quality and quantity data. Plans also are required to include provisions for handling and placement of coal ash during disposal, control of dust and plans for final reclamation and ground water monitoring both during and after the completion of disposal activities through final SMCRA bond release.

In July 1999 the department issued a second policy document, *Memo 99-2* specifically intended to provide guidance to coal operators that were intending to utilize coal ash on permitted coal mine sites, pursuant to the state's regulatory exemption at Indiana Code 13-19-3-3. While the use of coal ashes for certain functions has been lawfully exempted from regulation in Indiana, the department felt it was essential to provide guidance to coal operations in order to clearly differentiate between coal ashes on mine sites for purposes of utilization from coal ashes subject to disposal and regulatory jurisdiction. *Memo 99-2* closely mirrors the Indiana statute, but emphasizes communication between the coal operator and the department in order to avoid misunderstanding and potential enforcement.

## LITIGATION

Since the approval of *Memo 92-1* by the NRC in April 1992, the state of Indiana has received a total of 19 permit applications for coal ash disposal with the IDNR issuing its first permit for disposal in May 1994. Subsequently, of the 19 disposal applications received, 16 have been approved and three applications were withdrawn. Of the 16 approved permits, disposal has occurred at only 9 permitted sites. Currently, active coal ash disposal is occurring at only three mine sites and 6 have now officially terminated disposal. Seven of the 16 approved mine sites have never received any

coal ash disposal. The state currently has one pending coal ash disposal permit application under review and one recently issued permit is currently under administrative appeal.

Of the 16 issued permits issued only three have not undergone some form of legal challenge. A single environmental group, the Hoosier Environmental Council (HEC), has filed all but one of the legal challenges. Some of the challenges filed by HEC have included individually named adjacent landowners. Only two permits of all those which were challenged have completed the administrative appeal process. Both of these permits were subsequently appealed to the Indiana Circuit Courts for judicial review.

Of the two permits that completed the administrative appeal process, the first completed the process with no changes to the permit. Active coal ash disposal is currently taking place at this mine. The second permit, however, did not pass through the process unscathed and was subjected to additional conditions imposed by the Administrative Law Judge (ALJ). As conditioned, the ALJ reduced the amount of coal ash disposal that had been approved by IDNR in the permit by 75 percent. The initial permit approved the disposal of approximately 7.0 million tons of coal ash over the permit term. The IDNR approved plan also called for the mining of approximately an equivalent amount of coal to a ratio of 1:1 between tons of coal mined and coal ash disposed. In limiting coal ash disposal by 75 percent, or one quarter of the amount of coal removed, the ALJ found that this ratio represented approximately the amount of coal ash produced by the amount of coal mined under the permit. The ALJ further stated the 25 percent figure represented approximately the same amount of RCRA elements being returned to the mine site as originally present in the coal.

The permit was further conditioned by the ALJ to require a disclosure affidavit be filed in the County Recorder's office providing a legal description of land parcels where coal ash disposal occurred. Additional requirements were also imposed requiring the full recharge of ground water, as determined by monitoring wells, prior to the release of final SMCRA bond. Highly controversial, all parties appealed the ALJ's decision to the NRC, including IDNR. In administrative appeals the NRC serves as the final arbiter in permit dispute cases. As a result of the appeal, the NRC modified the ALJ's decision by revising the disposal limit upward to 50 percent of the amount of coal mined by the permittee. This increased amount, however, represented a reduction of 50 percent from the original amount approved by IDNR. The NRC otherwise maintained all other ALJ imposed conditions on the permit.

Subsequent to the NRC's final administrative determination both the coal operator and the Hoosier Environmental Council (HEC) filed for judicial review. The coal operator requested a full restoration of the department's initially issued permit and HEC argued that the NRC was in error for not denying the issuance of the disposal permit in total. As a party to the suit, but not appealing the NRC decision, the state filed a proposed "Findings of Fact and Conclusions of Law." document with the court. In a decision based virtually identical to the suggested "findings" document submitted by the state,

the Circuit Court ruling upheld the NRC decision in total and in support of the viability of the state disposal permit. No appeals were filed by any of the parties.

In a very recent development a state ALJ eliminated all pending permit challenges, citing a lack of prosecution by litigants. Currently only one permit appeal involving coal ash disposal at coal mines in Indiana is pending, as is an issue of legal fees involving an earlier case before the Court of Appeals. The “relative” quiet of the coal ash disposal at coal mines, cannot be said for the issue of coal ash utilization at non-mine sites where the Hoosier Environmental Council has very recently challenged a floodway construction permit. This “floodway permit” issued to Indianapolis Power and Light intends to utilize coal ashes as a structural fill. Although the use of coal ash is not regulated, the placement of fill in a stream floodway is and has been subjected to legal challenge.

The obvious fallout from the legal challenges filed on most of Indiana’s coal ash permits has been to complicate an already complex and lengthy permitting process. As of the last quarter of 2004, a total of approximately 7.2 million of coal ash has been disposed of at Indiana surface coal mines since 1989, with 1.64 million tons the most disposed at any single mine site. In contrast, since that same year, the state of Indiana has generated an estimated almost 100.0 million tons coal ash with about 7.0 percent of what has been produced disposed at coal mines.

While no projections have ever been done to estimate the tonnage expected to be returned to mines, the amount would undoubtedly be higher without the concern over litigation. Regardless of the litigation, however, more practical economic factors, such as transportation costs related to haulage distance and handling expenses, increasingly viable and profitable recycling initiatives and other disposal options, serve to inhibit coal ash disposal at mines. Realistically, it is unlikely that an amount greater than two to three million tons per year would be placed at Indiana surface coal mines due to these economic limitations. To date, most coal ash disposed of in Indiana coal mines in a single year has been slightly more than 1.0 million tons in 2003 and again in 2004. Litigation and the continued lingering controversy involving the seemingly perpetual review by the U.S. EPA and now the National Academy of Sciences, deserved or otherwise, also served as an effective constraint to disposal as well as utilization well below levels otherwise anticipated.

## OPPOSITION

The arguments brought forward by the opponents of coal ash disposal have been numerous and varied. One of the underlying philosophies is that coal ash which is otherwise classified as a solid waste is best left to the regulation of the agency responsible for solid waste disposal in the state, the Indiana Department of Environmental Management. It has been argued that based on legal precept of “equal protection under the law”, that it is not equal to have coal ash disposed of in a non-mining location subject to one set of rules, while disposal at coal mines are subject to a

different set, argued to be less protective. This “double standard” is asserted to be less protective of citizens living in the coalfields than those living near landfills.

Arguments have also been made that the requirements of the program itself as expressed in *Memo 92-1*, as a “non-rule policy” are not enforceable and are therefore not protective. Criticism was made that coal ashes were also not being properly characterized. Critics stated that the leachate medium of distilled water, pursuant to ASTM standards was improper. Testimony given at the administrative hearings by experts representing the opponents of coal ash disposal advocated that TCLP was the only correct method to properly determine the degree a waste might be a danger to the environment. The coal ash disposal opponents also wanted the list of constituents tested to include a quantification of radionuclides and polyaromatic hydrocarbons (PAH) as possible mutagens and carcinogens. An article written by a member of the U.S. Department of Energy’s Oak Ridge National Laboratory alleging that coal ashes could be used to extract sufficient quantities of weapons grade plutonium was touted as proof of the nuclear danger. Informational bulletins distributed by coal ash disposal opponents, containing such quotes from this article as; “significant quantities of fissionable material...” and “potentially employable as weapon fuel by any organization so inclined.” At public hearings held on coal ash disposal citizen’s stated that they did not wish to live adjacent to, “a weapons grade nuclear facility”. Others expressed fear over the potential for radioactive coal ash’s from some “hot” Colorado coals finding their way into Indiana for disposal.

The Indiana program has also been attacked under the allegation that its regulation of coal ash disposal was far weaker in comparison to its neighboring states of Illinois, Kentucky and Ohio. This allegation fed a corollary allegation that because Indiana’s program was lax, it would inundate the state with as much as 200 millions tons coal ash’s, most coming from “out-of-state”, over the next five years. The argument played upon recent emotional battles fought within the state over the import of out-of-state garbage into Indiana landfills. This concern has been continually raised despite the fact *Memo 92-1* strictly limits the disposal of out-of-state coal ash’s to materials generated from the burning of Indiana coal. Pursuant to *Memorandum 92-1*, coal ash from out-of-state sources may equal an amount no more than the tonnage of coal ash generated from exported Indiana coal. As the state exports only about four million tons annually, the return of coal ash’s for those same out-of-state sources would not in all probability exceed one million tons at most. These facts, however, were not sufficient to quell the specter of out-of-state coal ash as a basis to criticize the agency. As the reality has proven, the dire 200 million tons of coal ash in 5 years prediction has in fact turned out be only 7.2 million tons in the fifteen years.

Opponents of the Indiana disposal program frequently use the fact that program tests run on these materials produce a leachate that exceeds U.S.EPA’s primary drinking water standards for a variety of one or more test constituents as proof that coal ash is dangerous. Information is also distributed to the public with descriptions of how the various constituents such as lead, mercury arsenic, cadmium and others can impact

human health. U.S.EPA's February 1988 "Report to Congress" is also frequently referenced as evidence of the pervasive nature of ground water contamination from improper coal ash disposal. Together these issues are used to justify strict regulation of disposal at surface coal mines and arguments for the need for synthetic liners and leachate collection and treatment systems.

One of the observations that can be made by watching this process is that the primary entities involved, not surprisingly, view the issue from very different conceptual perspectives. The paradigm for some in the Indiana environmental community has been developed as a result of dealing with issues like coal ash from purely a "landfill" perspective. This is not surprising considering the extensive history of these individuals in working with solid waste laws in comparison to their understanding of SMCRA and the environment found at a "typical" surface coal mine. In their view coal ash is a solid waste and as such it must be disposed of in a typical solid waste landfill. Correlating with this viewpoint is the opinion that waste materials must be maintained completely separate from the groundwater. Conversely, IDNR mine regulators view the coal ash problem through their SMCRA paradigm. Knowing the post-mining ground water environment, the nature of mine spoils, and how materials such as coal processing wastes are successfully disposed under SMCRA, the addition of coal ashes have always been considered a manageable problem by IDNR. Placing coal ash in direct contact with the ground water did not present the agency with any undo concern in many situations. The effects of attenuation, dispersion, dilution, chemical interaction and the beneficial impacts of coal ash mineralization within the surface mine ground water environment, plus many of its physical characteristics did not appear to warrant the additional costs associated with total isolation as characteristic of a landfill approach. Moreover, given Indiana's nearly century of surface mining and the history of non-use of mine ground water (spoil water) for domestic or irrigation purposes, the department has an extremely high confidence level that potential receptors of "spoil water", much less "ash water" would continue to be virtually nonexistent. To the agency charged with administering SMCRA, a certain symbiotic/logical relationship exists between coal originating from a mine and the return of coal ash. In a differing analogy, the opponents to disposal have described coal as differing from coal ash as does the food you eat from the wastes you produce and a direct threat to domestic and agricultural sources of useable ground water.

Groundwater monitoring requirements imposed by the program were criticized. The number of wells were considered to be too few to characterize the mines hydrologic environment and determine flow direction, and to far removed from the disposal areas to detect any potential contamination. Again, in the paradigm of the landfill with numerous closely sited monitoring wells, no justification for anything less was acceptable. The water monitoring issue led to criticism that the program did not contain groundwater standards and neither specific requirements nor remediation plans should the groundwater become contaminated. However, with the recent adoption of statewide groundwater standards by the Indiana Department of Environmental Management (IDEM), which includes waters impacted by mining and coal ash disposal

at mines along with implementation of these standards through surface mining regulations, overall criticism has been less.

## STATE RESPONSE

On behalf of the state's position, IDNR has attempted to respond to what it viewed as inaccurate or misrepresentative information or to just provide the public an explanation of how the program worked whenever and wherever possible. As an example of some specifically debated points, such as the use of distilled water instead of TCLP to test coal ash, the agency responded that TCLP was designed for landfill environments and not at all representative of a mining environment. While IDNR recognized that distilled water also did not necessarily represent a mining environment either, it is considered by the agency to be a closer representation of coal ash characterization and in-situ leachability than TCLP. However, it would appear that the debate over TCLP has lessened with both sides agreeing that the test is not appropriate for the circumstance of coal ash placement at coal mines. Unfortunately however, there has been no corresponding agreement on what is the best test medium or method of testing.

Concerning the issue of radionuclides, IDNR pointed to substantial mainstream scientific literature that indicated that radioactivity from coal ashes were well within background radiation levels for many commonly occurring earth materials. That the possibilities of hot coals or coal ashes from Colorado coming to Indiana was not realistic. Moreover, IDNR has indicated that it was unaware of the federal government or any state, regardless of its disposal program, that tested for either radioactivity or PAH's.

In responding to attacks on *Memo 92-1* as "non-enforceable", IDNR responded that while the memo itself may not be enforceable, the SMCRA regulations protective of the environment and the specific conditions placed on the permits were. The agency also responded that *Memo 92-1* was never intended to do anything more than to provide guidance to operators as to what specifically must be done to comply with the SMCRA regulations when disposing of coal ash's and secure permit approval.

In defending the program, very often the sources of information and documents used to "prove" the soundness of the state's coal ash approach were the same sources of information and documents used by the coal ash opponents to "prove" the program's inadequacies. Not surprisingly, in the public opinion arena IDNR's attempts to scientifically respond to often-emotional arguments have not always played well. However, despite this fact the individual numbers of concerned citizens have been relatively small, given the length of time and the intensity of the effort by coal ash opponents to raise public consciousness. Media coverage has been generally light and most press coverage has been overall fair and balanced, with only a few isolated exceptions. For the most part, the intensity of concern expressed by the public appears to be directly proportional to the individual's proximity to the mine.

## CONCLUSION

In conclusion, after nearly seventeen years of controversy the issue of coal ash disposal may hopefully be drawing to a conclusion with the on-going review by the National Academy of Sciences (NAS) requested by Congress and the current review by the U.S. EPA, which will certainly draw guidance from the NAS study. Whether this process will finally put an end to future litigation or the practice of mine placement remains to be seen. Whether the final regulations will be within industry's means to "live" with economically, and coal ash opponent's demand for environmental protection, is uncertain. Whatever the final "product" is, it is the "process" that in today's reality must be gone through to get there. There must be ownership of the process. There hopefully will be ownership of the product as well.