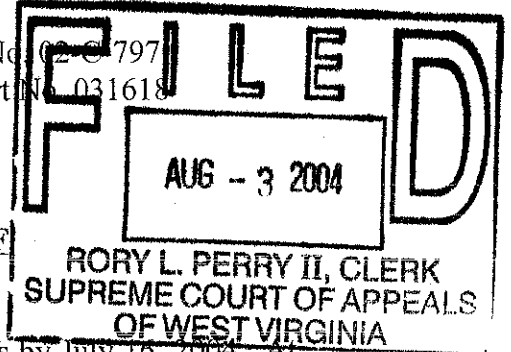


BEFORE THE SUPREME COURT OF APPEALS OF WEST VIRGINIA

RE: In Re: Flood Litigation

Civil Action No. 02-C-797
Supreme Court No. 031618



PLAINTIFFS' SUPPLEMENTAL BRIEF

The Court has invited parties to submit supplemental briefs by July 16, 2004. At

the outset, plaintiffs wish to make three points:

1. Many states including this West Virginia hold landowners strictly liable for nuisance. This is what *Hendricks* and *Priddy* and the *Restatement (Second)* require, no matter what defendants may say.¹
2. Many states, including West Virginia, explicitly hold that when an act of nature concurs with an act of man in causing nuisance, the human actor is responsible for the entirety of the harm. Related directly to this is a simple fact – a thimbleful of water is not unreasonable or abnormally dangerous and plaintiffs have never said so. A tidal wave of rocks and debris that wipes out entire communities is. The July 8, 2001 “flood” events -- and the “flood” events since -- were not comprised only of swift-flowing water escaping its bounds. Rather, these events were more a deadly flow of debris from the defendants’ mining and timbering activities cascading down mountains, damming up streams, clogging bridges and depositing tons of coal, rock, saw logs and other waste on the plaintiffs’ property, causing widespread injury, death and destruction. The Court’s inquiry during the June argument that the

¹ Plaintiffs/Petitioners have briefed the law on this case for 2 1/2 years. Plaintiffs’ legal arguments are contained in their Petition and designated brief and Reply. The first part of this shorthand brief will concentrate primarily on facts.

plaintiffs were trying to twist the law to hold defendants liable for adding a thimbleful of water to a "naturally" occurring flood is just not true. The evidence is that the make-up of this and other floods included the waste and aftermath of defendants' activities, all of which turned the "flood waters" into an "unnatural" broth of death and destruction. Here, the rain and the man-made circumstances on the ground combined to cause plaintiffs' losses. Plaintiffs must prove that these circumstances created by the defendants' activities were unreasonable, or abnormally dangerous, or both with regard to the risk of flooding. If we fail to do this, we lose.

3. Government studies have concluded that the disturbances of the topography by the defendants, in the areas studied, caused an increase in the rate of storm water discharge by as much as 59%. Historical flood event data show a direct correlation between an increase in the number of flood events and an increase in the number of tons of coal and an increase in the number of board feet of timber extracted. Rain fall during this historical period up to the present has remained constant and was in fact at a low ebb during the complained of events.

It is this Court's burden to decide the law. Defendants want this Court to create a special rule exempting extractive industry for harm they cause. This Court must decide if it wants to do that.

Consider the DEP flood study of June 14, 2002, which has been included in the record of exhibits submitted directly to the Court. DEP held public hearings on the July 8, 2001 flood in the fall and winter of 2001, which were written up in the report:

There were approximately eighty citizens at the Boone-Raleigh meeting and many shared their accounting of that July day. Many of the speakers spoke of a tidal wave-type wall of water with debris carried on top. Various residents spoke of living in their respective communities for twenty to thirty-plus years and never experiencing anything close to this magnitude of flooding. Additionally, numerous residents mentioned a diesel or gasoline odor and others just a strong stench to the waters. There was a mention of the water being yellow then turning gray.

One resident of Whitesville commented, "there's enough coal in my yard to heat the hollow for four years. I mean coal, lumps of coal, sludge and stuff in my yard." The same resident spoke of logging trucks running in and out of the hollow, all day and all night, without resting at all. This went on for three years. She states: "To me, that's what happened. They have logged and logged, and it's not just them." Many commenters spoke of seeing logs and boulders the size of cars washing off the hillsides.

Several residents from Round Bottom, in Sylvester, spoke about the "bridge" jamming up with rocks and debris. The debris backed up from the dam causing an overflow onto residents' property. The water could not get through and under the bridge, nor through the dam but overflowed onto the banks of the river and onto residents' property.

This is straight from DEP, at p. 55. Here's what DEP had to report about the hearing in Mullens, which was totally destroyed in the 7/8/01 flood.

A resident of Mullens stated, "I'm a lifelong resident of Mullens. I've lived there for sixty years. I've been through floods there. I've got brothers and sisters there. We've never been flooded like we have this time. I've never seen water come so quick, come so high. I do know that all the mountains around Mullens have been logged out and I went back in those mountains and it looked like a bomb went off back in there.

Another resident said that, "there were no warnings of an anticipated flood. We had four very hard rains in a six hour period but no harder than we had many times in the past." "I hearing something and looked, and it looked like a tidal wave coming. That thing was thirty feet high and looked like a surfer could be underneath it, an ocean wave."

This resident spoke of a chemical smell in the air and a sheen that could be seen in the water. The resident commented that she smelled this same chemical odor when they de-gassed the holes on her property and that it burned her throat and caused her difficulty with breathing.

DEP Flood Advisory Technical Taskforce, Runoff Analyses of Seng, Scrabble and Sycamore Creeks, June 14, 2002, p. 57, submitted directly to the Court.

This case is not about greedy trial lawyers or frivolous lawsuits. These people suffered real harm. In Plaintiffs' Reply, and in Plaintiffs' record designation Item 4, we have shown the enormous costs of the coal industry alone in unpaid workers' compensation premiums, super tax credits, destruction of roads, unfunded reclamation costs, all in the billions with a *B*. See, Plaintiffs' Reply beginning at 8, and Plaintiffs' Reply Brief to the Panel filed Jan. 13, 2003. These are hard facts from government studies, legislative findings and news reports. But even these facts do not complete the picture. Submitted below to the Panel and again here is a simple Economics 101 lesson from Dr. Thomas Johnson of the University of Missouri, which explains that the actual net benefit to society for extractive industry is reduced by "external" and "opportunity" costs that cannot be reduced to hard numbers. (Exhibit A attached) All this evidence shows that extractive industry like mining and logging has a real value to this state, but that its real costs are hardly factored into the equation – costs now borne by plaintiffs and the people at DEP's hearings.

This is a Rule 12 (c) proceeding, but the Court's questioning in June indicates the Court's interest in facts, both economic and hydrologic, so plaintiffs address it.

A. The rain event of July 8, 2001

We've already mentioned in prior briefing that the same DEP study concludes that mining and logging had significant affects on increased surface water discharge rates and hence increased flooding.

Generally, there are approximately 11 areas where major flood damage occurred:²

1. Seng Creek/Whitesville, Boone County.
2. Dorothy, Raleigh County.
3. Rhodell, Helen, Raleigh County
4. Gauley Bridge, Fayette County.
5. Mullens, Wyoming County.
6. Pineville, Wyoming County.
7. Oceana, Wyoming County.
8. Glenfork, Ravenscliff area, Wyoming County.
9. Welch, McDowell County.
10. Keystone, Northfork, Kimball, McDowell County.
11. Thorpe, Pageton, McDowell County.

This designation is not all inclusive, or exclusive. It does, however, illustrate the widespread nature of the flooding that occurred.

Plaintiffs retained Carpenter Environmental Associates, Inc., of Ramsey, New Jersey to prepare an analysis of the rainfall event of July 8, 2001. This analysis incorporated 11 National Weather Service rain gages in the flood area as well as NEXRAIN radar imagery every 15 minutes during the rainfall event. The results were then compared to interpolated, 24-hour, maximum return values at the center of the entire seven-county area using the *Rainfall Frequency Atlas of the United States*, Technical

² By bringing to the court's attention these eleven areas, the plaintiffs are in no way abandoning flooding that occurred in other locations within watersheds at issue.

Paper No. 40, 1961, by David Hershfield. These averages were as follows: 5-year storm -- 3.5 inches; 10-year storm -- 4 inches; 25-year storm -- 4.7 inches; 50-year storm -- 5.2 inches; 100-year storm -- 5.5 inches. These figures are averaged but closely match the storm return averages for each individual county.³

The 24-hour storm total figures indicate that most of the seven-county area received a 25-year return storm *or less*, and that within these lesser-affected areas most of the measured rainfall was less than the average five-year rain event. The heaviest rain fell in Wyoming County, where 23% of the county received a 10-25 year storm between 4 and 4.7 inches of rain; 15.61% percent of the county received a 25-50 year storm with rain between 4.7 and 5.2 inches; 5.49% of the county received a 50-100 year storm between 5.2 and 5.5 inches; and 10.13% of the county received a 100-year plus storm between 5.5 and roughly 7.2 inches (Exhibit B in dark blue). Pockets of other counties also saw significant rainfall, but with the exception of Wyoming County, most of the rain event was at the 25-year level, or less (Exhibit B in tan and brown).

B. Topography, Surface Disturbance and Surface Water Discharge

After the July 8, 2001 flood, Gov. Wise ordered the state Division of Environmental Protection to complete a study of the effects of surface mining and logging on flooding. The DEP Flood Advisory Technical Team study used computer modeling to calculate the effect on runoff and stream flows from surface disturbance in two disturbed drainage areas, and one 'control' area with little or no disturbance. While fully reclaimed mine sites actually seemed to decrease runoff rate, the DEP study concluded that mining and logging activity increased surface water discharge rates up to

³ See map and exhibit to Plaintiffs' Integrated Brief to the Panel, Record Designation Item 1, submitted again here as Exhibit B.

21%, depending on location within a drainage basin. (DEP flood study, June 14, 2002 -- Scrabble Creek, Node 5C, p. 66 and 70, submitted and designated below with Plaintiffs' Integrated Brief to the Panel, Record Designation Item 1) The DEP study is consistent with the findings of three U.S. Office of Surface Mining and Army Corps of Engineer studies in 2000, which also found that mountaintop removal mining increased the risk of flooding by increasing surface water discharge. (Samples Valley Fill No. 1, 25%-59% increase in discharge during mining operations; Samples Valley Fill No. 2, 3-1% increase in discharge after reclamation; Hobet Westridge, 42% increase in discharge after reclamation, all submitted directly to the Court in Record Designation Item 1 exhibits)

Further, the DEP study included a telling Appendix item, Table 3, p. 77, where the high-water marks from the July 8, 2001 flood for the Guyandotte and Tug rivers were listed. While Wyoming County experienced a 10-year to 100-year plus *storm*, the Guyandotte high-water marks revealed a *100-year to 500-year plus flood*. Similarly, while much of McDowell County experienced a five-year to 50-year storm, the Tug showed a 10-year to 500-year plus flood, depending on location.

Finally, the DEP and Army Corps findings are consistent with a prophetic state study of the flood of April 3-5, 1977, which affected much of the same area as the July 8, 2001 flood:

In the area where the flood occurred, the hillsides are extremely steep, the valleys are very narrow and steep, and flood plains are very poorly developed. Much of the housing, industry and highways are within the floodplain. With even a small amount of precipitation, the water runoff is great and rapid. Streams quickly rise and overflow their banks, carrying large amounts of silt and debris. Also, this area is naturally subject to land and mud slides. Even without the presence of man, natural erosion and weather conditions will cause landslides and floods, *but when man suddenly and substantially disturbs the topography, as has occurred in Southern West Virginia during this century, this natural erosion process is*

dramatically increased. Special care must be taken to make sure that the actions of man do not unnecessarily further disturb the topography and vegetation of this area. (Report to the Legislature of Citizens Committee on Flood Cause and Prevention, January 1978, p. 27-28, Included in Record Designation Item No. 1)

Quite so. All this has been previously briefed below. Yet defendants still maintain that mining and logging could not possibly be responsible for the July 8, 2001 flood, or for any of the floods that have occurred since. Perhaps the following will shed some light on the evolving correlation between the flooding that this state has experienced over the last decade and extractive industry.

Between 1978 and 2002 annual West Virginia coal production nearly doubled from roughly 84 million tons to 160 million tons. During this same period coal employment dropped from roughly 62,000 to 15,000.⁴ (See attached Ex. C) Meanwhile between 1989 and 2000, average annual timber harvest has nearly doubled to approximately 1 billion board feet.⁵ In 1993 there were six documented flood events in southern West Virginia; in 2001 there were 31; 2002 – 8; 2003 – 29. And between 1993 and 2002 average annual rainfall has remained roughly constant between 35 and 50 inches.⁶ (See Ex. C) True these are just numbers. But the spike in flood events between 1999 and the present hardly seems coincidental.

C. Many states apply strict liability for flooding

Few states have as much rainfall, as much extractive industry and as many people living downstream in harm's way.⁷ As we've seen these past few years, in the southern

⁴ WV Office of Miners' Health Safety & Training.

⁵ Northeastern Research Station, USDA Forest Service; *Forest Statistics for West Virginia 1989 and 2000*. News Bulletin, 12/5/03.

⁶ National Oceanic and Atmospheric Administration (NOAA)

⁷ As this Court well knows, southern West Virginia produces coal with an extremely high BTU content. Generally speaking, this is about the best coal in the world, although somewhat dirty with sulphur and other elements. Today the only way to mine it produces serious risk of flooding. Same goes with

West Virginia coalfields, *every* significant rainstorm is “the perfect storm.” It is undisputed that the floods of 7/08/01 devastated southern West Virginia. It is undisputed that the defendants’ activities have a very high social and economic value. And it cannot be disputed that the defendants’ activities present serious risk of flooding.⁸

So, to follow the defendants’ reasoning, it would be a surprise if many other states apply the law of nuisance to flooding and hold parties who cause flooding strictly liable. But they do. And they leave God out of it. And they treat all property owners the same, regardless whether they mine coal, log timber, build subdivisions, or dig drainage ditches. There is no special rule for extractive industry with regard to nuisance anywhere in the country, with the sole exception that such nuisance will be tolerated if the actor compensates injured property owner – the same rule of *Rylands vs. Fletcher*, the same rule for intentional unreasonable nuisance, and the same rule for unintentional abnormally dangerous nuisance.

Consider just a few cases involving virtually benign land use practices: In *Pendergrast vs. R.C. Aiken*, 236 S.E.2d 787 (N.C. 1977), property owner sued neighbor for flooding caused by inadequate culvert pipe.

timbering in certain areas of the state, which normally precedes mining. Consider, again: the Powder River Basin near Gillette, Wyoming is the nation’s leading coal producing region and receives an average 17.4 inches of precipitation annually. Pineville, WV receives an average 46.12 inches of precipitation annually. *Weather.Com*. See Plaintiffs Integrated Brief in Support of Theories of Liability Dated Oct. 22, 2002, p. 8, n. 10. Designated Record Item No. 1. Wyoming’s coal on federal land with 60-foot-plus seams, pales in comparison with West Virginia’s BTU content.

This is why mining and logging are valuable industries, even if it means blowing up a mountain. And that’s why these industries should ‘insure’ for flooding they cause. That’s the rule of strict liability, whether by §822(a) unreasonable nuisance or §822(b) abnormally dangerous nuisance.

⁸ Again, this case is before the Court on a Rule 12 (c) Judgment on the Pleadings proceeding with no facts in evidence. Normally, such a case would be confined to arguments over pure law. The Court will notice, however, that plaintiffs have introduced lots of evidence about rainfall, coal and timber extraction, flood events, and the costs and benefits of extractive industry outlined in Plaintiffs’ Reply beginning at p. 8. Some members of the Court and the Panel seemed interested in these facts, so we include them here.

Plaintiffs would point out that defendants have offered virtually no legal argument, with the exception of their economic devastation argument. With respect this is not law, but veiled extortion.

Analytically, a cause of action for unreasonable interference with the flow of surface water causing substantial damage is a private nuisance action, with liability arising where the conduct of the landowner making the alterations in the flow surface water is either (1) intentional and unreasonable or (2) negligent, reckless or in the course of an abnormally dangerous activity (citation to *Restatement (Second) of Torts*, §822), *Aiken* at 796-797.

This same case explicitly adopted the compensation test for intentional unreasonable nuisance in the *Restatement (Second)* §§826(b) and 829A briefed previously by plaintiffs.

“(E)ven should alteration of the water flow by defendant be ‘reasonable’ in the sense that the social utility arising from the alteration outweighs the harm to the plaintiff, defendant may nevertheless be liable for damages for a private nuisance ‘if the resulting interference with another’s use and enjoyment of land is greater than it is reasonable to require the other to bear under the circumstances without compensation.’” *Pendergrast* at 797.

In *Crest Chevrolet-Oldsmobile vs. Willemsen*, 384 N.W.2d 692 (Wisc. 1986), a flooding dispute between a developer and an auto dealer, the Wisconsin Supreme Court specifically said that the reasonable use test for surface water is “substantially embodied” in Section 822(a) and (b) of the *Restatement (Second) of Torts*. *Crest*, too, adopted the compensation test for unreasonable nuisance. See also, *Hughes vs. Emerald Mines Corp.*, 450 A.2d 1 (Pa. Super. 1982).

In *Shearoon, etal. Vs. Tucker Corporation, etal.*, 2001 WL 1158897 (Tenn.Ct.App) 2001, plaintiffs sued developer of subdivision for a ditch that caused frequent flooding. Trial court finding that the developer had created a permanent nuisance by altering water course was affirmed. “It is well-settled law that if a property

owner changes the natural flow of water across his land in a manner that causes flooding on adjacent property, he is liable for creating a nuisance.”

In *BNT Company vs. Baker Precythe Development Company*, 564 S.E.2d 891 (N.C. 2002) property owner brought nuisance action for flooding caused by filling a drainage ditch. The Court said nuisance action was based on reasonable use, not negligence, and affirmed denial of a contributory negligence instruction.⁹

Arkansas even has a statute, a flood plain administrator and an administrative review process. “Every structure, building, fill or development placed or maintained within any flood-prone area in violation of measures enacted under the authority of this chapter is a public nuisance. The creation of any of these may be enjoined and the maintenance thereof may be abated by action or suit of any . . . citizen of this state, See, *Hurst, etal vs. Holland*, 61 S.W.3d 180 (Ark. 2001), *citing* §14-268-105.

In *Kerr, etal. Vs. Harris County*, 2003 WL 22053653 (Tex.App.-Hous 1st Dist), homeowners brought action for inverse condemnation and nuisance alleging flood control measures actually caused flood during tropical storm. The Court affirmed summary judgment for defendants on the condemnation issue but reversed summary judgment on nuisance claim. “Non-negligent or intentional nuisance is actionable.” *Kerr* at 5.

In *City of Portsmouth vs. Vernon M. Culpepper*, 64 S.E.2d 799 (Va. 1951) a farmer sued the city for flood damage to his crops when city altered a canal, causing it to overflow on one side. Jury verdict for the plaintiff was affirmed, with the following endorsement.

⁹ We have already seen that tests for unreasonable nuisance and nuisance caused by abnormally dangerous activity or conditions are virtually identical, and that both are rules of strict liability. See Plaintiffs Petition in Support of Docketing Certified Questions at 14-19, and Plaintiffs' Reply at 3,4.

Undoubtedly the record shows that the rainfall in question was extremely severe, but under the circumstances and facts in this case, it cannot be termed an 'Act of God.' It has been held in Virginia since 1849 that 'all human agency is to be excluded from creating or entering into the cause of mischief, in order that it may be deemed an Act of God. . .

The jury had a right to conclude that this canal had been obstructed by the city, that the city had permitted the nuisance to stand unabated, and that the city had also lowered the bank on the east side of the canal which would permit water to overflow. . . *City of Portsmouth* at 801-802.

In *Helton et al vs. Scioto County Board of Commissioners*, 703 N.E.2d 841 (Ohio App. 1997), driver and passengers sued county for car accident alleging failure to maintain drainage ditch, thereby causing road to flood creating a nuisance. The Court remanded summary judgment for the county, with this explanation. "An act of God . . . must be due directly and exclusively to such a natural cause without human intervention. If the injury is in part occasioned by the wrongful act or negligent act of any persons concurring therein and contributing thereto, such person will be liable. . ."

And we have this Court's own rulings on flood cases which were all cited in plaintiffs' designated Petition and brief at 23. All these cases stand for the same thing. A property owner who causes a flood compensates the injured party. The rule is really that simple, and it is embodied in the *Restatement (Second)* sections cited in plaintiffs' Petition and designated brief and in plaintiffs' Reply. Plaintiffs ask that this Court not create a special rule exempting extractive industry from this rule.

D. Issues before the Court; issues not before the Court

Plaintiffs *are not* asking this Court to rule that defendants' activities **are** unreasonable or abnormally dangerous nuisances. That is plaintiffs' burden to prove at trial. Plaintiffs do ask the Court to rule that **the law recognizes** two types of nuisance under the *Restatement (Second) of Torts*: §822(a) intentional and unreasonable nuisance

and §822(b) unintentional but otherwise actionable nuisance for negligent, reckless or abnormally dangerous activity or conditions, and that this rule covers flooding or any other invasion where man's activities are unreasonable, negligent, reckless or abnormally dangerous¹⁰. This is the law for any kind of nuisance. And as we've said before the legal test for intentional unreasonable nuisance is virtually identical to the legal test for unintentional abnormally dangerous nuisance, the first focusing on the nature of the harm invaded, the second focusing on the nature of the actor's conduct.

An abnormally dangerous enterprise is required to pay its way by compensating for the harm it causes, because of its special, abnormal and dangerous character. No particular purpose is served by determining whether the conduct should be characterized as unreasonable, even though a decision to that effect could be made by defining the conduct to include both the activity and the failure to pay for the harm it causes. Compare the similarity to intentional invasions, where it is sometimes held to be reasonable to carry on a socially useful enterprise if a payment is made for harm it causes but unreasonable to continue without paying. (See §826) *Restatement (Second) of Torts* §822, Comment on Clause (b), *k. Unintentional invasions – unreasonableness*.

If the Court recognizes that Sections 822(a) and (b) control, plaintiffs will then have to prove their case at trial with facts, at the end of which a jury instruction should encompass these two nuisance provisions. And what plaintiffs intend to prove is that these conditions were both unreasonable and abnormally dangerous. We fail to prove this, we lose. And again, plaintiffs are not talking about a thimbleful of water. As Prosser said:

The law does not concern itself with trifles, or seek to remedy all the petty annoyances and disturbances of everyday life in a civilized community even from conduct committed with knowledge that annoyance and inconvenience will result. . . The interference must be substantial and

¹⁰ See Plaintiffs' Petition and designated brief for proposed alternative certified questions at pp. 15 and 19.

unreasonable. *Prosser and Keeton on Torts (5th Edition)*, Nuisance, §88, p. 626.

Plaintiffs also ask the Court to recognize that there are two tests for intentional unreasonable nuisance, both the balance of utilities test and the compensation test (all briefed previously beginning at p. 12 of plaintiffs' Petition and designated brief). The compensation test is a keystone and underlying building block for nuisance law and has been adopted by at least eight states.¹¹ Indeed, if the Court does not recognize the compensation test then logically it cannot recognize *any* nuisance action -- intentional or unintentional -- where offending party's activity is deemed by society at large to have social or economic value. Every time, an injured property owner's interests would be subservient. Again to borrow from Prosser:

Substantial means a significant harm to the plaintiff and unreasonably means that it would not be reasonable to permit the defendant to cause such an amount of harm intentionally without compensating for it. It is not necessarily a justification on the issue of damages that the social value or utility of the defendant's conduct outweighs the gravity of the harm that is being done. *Prosser, supra*, at 626.

E. Taylor vs. Culloden PSC and WV American Water, 591 S.E.2d 197 (W.Va. 2003)

Just last November, this Court spoke loud and clear on the depth and breadth of nuisance law in a water pollution case, and indicated that West Virginia should recognize the compensation tests embodied in *Restatement (Second)* §§826(b) and 829A.

There is simply no common law doctrine that approaches nuisance in comprehensiveness or detail as a regulator of land use and of technological abuse. Nuisance actions have involved pollution of all physical media – air, water, land – by a wide variety of means. . . . Nuisance actions have challenged virtually every major industrial and municipal activity which is today the subject of comprehensive environmental regulation – the operation of landfills, incinerators, sewage

¹¹ See Plaintiffs' Reply at 4, Lewin, *Boomer and the American Law of Nuisance: Past, Present and Future*, 54 Alb.L.Rev. 189, 234, n. 239.

treatment facilities, activities at chemical plants, aluminum, lead and copper smelters, oil refineries, pulp mills, rendering plants, quarries and mines, textile mills and a host of other manufacturing activities. Were it not for the availability of nuisance actions as a remedy, it seems certain an inestimable number of business and private actions that have deleterious health and environmental results as a byproduct of their operation would have continued unabated. *Taylor vs. Culloden PSC and WVAWC*, 591 S.E.2d 197, 206 (W.Va. 2003), *citations omitted*.

Plaintiffs agree. And as this Court and other courts have said, if there's anything that can qualify as a nuisance it's a flood.

Taylor scolded the defendant for its extortionate economic argument. Here's what the Court said when WV-American Water Company argued that reversing summary judgment for defendants will drive them out of business:

We take a dim view of WVAWC's suggestion that a reversal of the lower court's ruling will effectively halt other companies from ever agreeing to assume operation of utilities which are experiencing difficulties. We similarly find offensive the suggestion that the social value of providing a wastewater treatment plant so outweighs the gravity of the harm experienced by the (plaintiffs) that there can be no recovery under nuisance law on the facts of this case. *Citation to Hendricks*. Operating a business or providing a service that has societal benefits does not give a corporate entity license to freely pollute the waters of this state or to negatively affect the use and enjoyment of privately owned property. *Taylor* at 207.

Again, plaintiffs agree. And plaintiffs have shown the Court how to fix this: adopt the compensation test for reasonableness to supplement the balance of utilities test in *Hendricks*. See plaintiffs' Petition and designated brief at 12-15.


Finally, here's what *Taylor* said about statutory compliance, when defendants tried to argue that DEP's action in filing a claim against wastewater plant precluded property owner's public nuisance claim. "In this Court's opinion, this case aptly demonstrates the need for common law remedies in addition to the (state water pollution

control) Act, especially where it is arguable that the government agency charged with protecting the public's interest may not be acting with sufficient alacrity to eradicate the alleged nuisance which may be presenting serious public health concerns or posing a potential environmental hazard. *Taylor* at 206.

Once again, plaintiffs agree.

Was *Taylor* wrong? Defendants seem to think so. Some on this Court seem to think so, too, but the decision was unanimous.

Plaintiffs by counsel

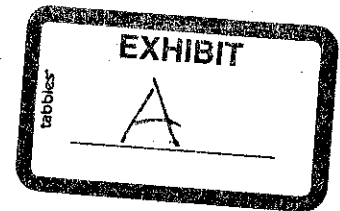


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APPENDIX

- A. Statement of Prof. Thomas Johnson.
- B. Rain intensity chart.
- C. Four charts depicting flood events, mining employment and tonnage rates, rain levels.



Declaration: Economic Impact Analysis Versus Benefit-Cost Analysis

Economic impact analysis is designed to answer the question, "what were, or will be, the economic consequences of a particular change in economic circumstances?" Economic impact analysis, while useful to both public and private sectors as a basis for planning, is quite different from benefit-cost analysis. Economic impact analysis measures or predicts the changes in market related indicators of economic activity—employment, income, Gross Domestic Product, and sectoral output. Economic activity is not a measure of economic benefits, and it certainly does not indicate all the costs of economic change.

Benefit-cost analysis is designed to answer the question, "how much better off will we (a firm, a community, a state, or some other entity, depending on the accounting stance) be if a particular change occurs?" Benefit-cost analysis measures the net values (benefits less costs) of changes. It includes in its calculation the changes indicated by economic impact analysis, but also many other consequences excluded from economic impact analysis. "If employment, income, Gross Domestic Product, and sectoral output changes as predicted by economic impact analysis, how much will 'we' benefit?" Benefit-cost includes many non-market costs and benefits (externalities) and it include the especially important 'opportunity costs.'

An economic activity may have significant economic impacts but generate a negative net benefit to society. The economic impact of a fire or local flood is to increase sales of building material and to increase employment. The multiplier effects of these direct impacts will amplify the positive impacts. But a benefit-cost analysis will point out that the repaired and replaced buildings will be marginally more valuable than the originals, and the cost of replacement very high, indicating negative net benefits as we would expect.

It is well established in the field of economics that there are two types of costs that are not factored into standard economic impact analysis, externalities and opportunity costs.

Externalities

Externalities are consequences of economic activities that are not included in the usual market transactions. Externalities include such things as changes in air quality, water quality, visual amenities, climate, and public safety. Externalities are the costs or benefits that are not borne by those that cause the changes, but by by-standers. An example of an externality associated with forestry, may be increased loadings of soil in waterways, silting of reservoirs, and loss of visual amenities to nearby residents.

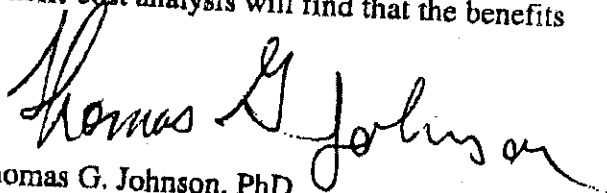
Benefit-cost analyses should incorporate measures of external costs and benefits as well as the usual market costs and benefits. But even this is not satisfactory—externalities are

best treated, if it is possible to do so at a reasonable cost. Externalities, if left untreated, lead to the over-production of external cost creating activities, and under-production of external benefit creating activities. Furthermore, they fail to encourage the development and adoption of alternative technologies that would reduce or eliminate the source of externalities.

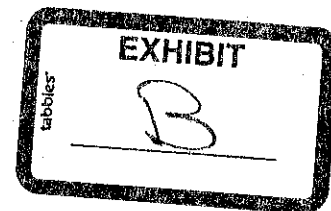
Opportunity Costs

Opportunity costs are potential benefits foregone because a particular strategy is taken, or event occurs. The opportunity cost of strip-mining, includes the forgone opportunity to develop a recreation sector, possibly. Economic impact analyses typically ignore all opportunity costs. They calculate the number of jobs associated directly and indirectly with a particular scenario or basic sector. They ignore the potential jobs that might have been created in some other activity, forgone by the particular scenario or basic sector.

An industry may have very large impacts on a state or nation yet preclude even larger impacts simply by its size or nature. If a sector is critical to an economy then a thorough benefit-cost analysis will find that the benefits



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THOMAS GORDON JOHNSON
FRANK MILLER PROFESSOR OF AGRICULTURAL ECONOMICS
UNIVERSITY OF MISSOURI - COLUMBIA

PERSONAL:

Born February 9, 1950
Moose Jaw, Saskatchewan, Canada
Canadian Citizen
Married, 2 children

ADDRESS:

Business: Department of Agricultural Economics
143A Mumford Hall
University of Missouri - Columbia
Columbia, MO 65211

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Rocheport, MO 65279-9493

Telephone: Office - 573-882-2157
Fax - 573-882-2504
Home - 573-446-8922

EDUCATION:

Ph.D. - Agricultural Economics - July 1979 - Oregon State University
M.Sc. - Agricultural Economics - March 1976 - University of Saskatchewan
B.S.A. (Honors) - Agricultural Economics - May 1973 - University of Saskatchewan

PREVIOUS EXPERIENCE

Visiting Professor - January 1995 to December 1995 - University of Missouri-Columbia
Assistant Professor, Associate Professor, and Professor - July 1982 to 1996 - Virginia Polytechnic
Institute and State University
Assistant Professor - July 1979 to June 1982 - University of Saskatchewan
Research Assistant Unclassified - May 1979 to July 1979 - Oregon State University
Research Associate - August 1978 - University of Saskatchewan
Graduate Research Assistant - September 1976 to April 1979 - Oregon State University
Research Assistant - July 1975 to September 1976 - Grain Handling and Transportation Commission,
Saskatoon, Saskatchewan
Teaching Fellow - September 1974 to December 1974 - University of Saskatchewan
Research Economist - May 1973 to August 1973 - Saskatchewan Department of Agriculture

HONORS

Frank Miller Professor of Agricultural Economics, University of Missouri, 1997
Advisor for Recipient of Regional Science Association International Outstanding Dissertation Award, 1992
(Rathin Basu)
Advisor for Recipient of Honorable Mention in the American Agricultural Economics Association

Outstanding Dissertation Competition, 1990 (Dr. David S. Kraybill)
 Advisor for first and third prize-winning students in the 1982 Undergraduate Essay Contest of the Canadian Agricultural Economics Society (Dale Sigurdson and Kevin O'Grady)
 Advisor for first prize winner of the 1981 Undergraduate Essay Contest of the Canadian Agricultural Economics Society (Margaret Thurmeier)
 Outstanding Professor in the College of Agriculture, University of Saskatchewan, 1981
 Robert E. Johnson Research Fellowship, Oregon State University, 1978-1979
 Robertson Memorial Scholarship, Oregon State University, 1976-1977 and 1977-1978
 University of Saskatchewan Graduate Teaching Fellowship, 1974-1975
 Hantleman Postgraduate Scholarship, University of Saskatchewan, 1973-1974

MEMBERSHIP, OFFICES IN PROFESSIONAL ORGANIZATIONS

President, Southern Regional Science Association, 1992-1993
 Board of Directors, Southern Regional Science Association, 1987-1993
 Member, American Agricultural Economics Association
 Member, Regional Science Association
 Member, Southern Association of Agricultural Economics
 Member, Western Agricultural Economics Association
 Member, Southern Regional Science Association

PARTICIPATION ON NATIONAL, REGIONAL, OR STATE COMMITTEES, PANELS, COMMISSIONS

National - International

Member, USDA-Cooperative State Research, Education and Extension Service review team for the Department of Applied Economics, Purdue University, 1999
 Chair, Community Economics Section, American Agricultural Economics Association, 1998 - 1999
 Member, USDA-Cooperative State Research, Education and Extension Service review team for the Department of Applied Economics and Statistics, University of Nevada - Reno, 1997
 Associate Editor, American Journal of Agricultural Economics, 1997 - 2000
 Member, International Working Group on Social Aspects of Czech Agricultural Policy, 1995
 Chair, Community Policy Analysis Network, Rural Policy Research Institute, 1998 - 2000
 Member, Expert Panel on Rural Policy, Rural Policy Research Institute, 1995-1997
 Member, Expert Panel on Rural Health Economics, Rural Policy Research Institute, 1994-1995
 Member, Professional Activities Committee, American Agricultural Economics Association, 1993-1996
 Chair, Economic Analysis Committee, USDA-Extension Service, 1990-1992
 Member, Task Force on Persistent Rural Poverty, Rural Sociological Society, 1989-1992
 Member, USDA-Cooperative State Research Service review team for the Department of Agricultural Economics, University of Maine, 1989
 Member, IMPLAN Workshop Faculty, Fort Collins, CO, October 9-13, 1989
 Chair, American Agricultural Economics Association, Selected Paper Review Team, Community Economics Section, 1985, 1989
 Member, American Agricultural Economics Association, Selected Paper Review Team, 1988, 1990
 Chair, Community Economic Network of the American Agricultural Economics Association, 1988-1989
 Chair, Extension Committee on Organization and Policy (ECOP) IMPLAN Task Force, 1988-1989
 Member, North Central Rural Development Center, Input-Output Conference Planning Committee, 1988-1989
 Member, Advisory Committee, America Runs on Local Roads, 1986-1988
 External Reviewer for Promotion and Tenure Decisions, University of Maine, The Pennsylvania State University (3), Purdue University, University of Wisconsin, University of Illinois, University of Georgia, Louisiana State University, McGill University

Regional

Representative (for University of Missouri), North Central Extension Public Affairs Committee, 1998 - 2000
 Member, Northeast Regional Research Project, NE162, USDA-Cooperative State Research Service (CSRS), 1992-2000
 Member, Southern Extension and Research Activities -- Information Exchange Group 16, USDA-Cooperative State Research Extension and Education Service (CSREES), 1990-1997
 Member, Southern Rural Development Center Delegation to the Northeast Local Government Finance

Project Workshop, April 1990
 Representative (for Virginia Tech), Southern Extension Public Affairs Committee, 1989-1996
 Member, Economic and Fiscal Impact Technical Advisory Committee, New Jersey State Planning Commission, 1988
 Co-Chair, Southern Rural Development Center Infrastructure Financing Task Force, 1988-1992
 Member, Editorial Council of the Southern Journal of Agricultural Economics, 1987-1990
 Member, Manitoba Drought Sensitivity Advisory Committee, 1980-81

State

Member, Montgomery Regional Economic Development Commission, 1989-1996
 Chair, Montgomery Regional Economic Development Commission, 1996
 Member, Montgomery County-Radford, Route 177 Corridor Advisory Committee, 1992
 Member, Christiansburg-Montgomery County Joint Transportation Committee, 1990-1992
 Member, Economics Subcommittee of the Virginia Interagency Migrant Work Policy Committee, 1987-1989
 Principal Advisor, Transportation, Southwest Virginia Economic Development Commission, 1985-1987
 Member, Virginia Wholesale Farmer's Market Feasibility Study Finance Advisory Committee, 1985
 Member, Valley of Virginia Consortium for Higher Education Data Bank Advisory Committee, 1985
 Advisor, Rural Virginia Development Foundation, 1984-1990
 Advisor, Joint Subcommittee of the Virginia House of Delegates Agricultural Committee and the Senate of Virginia Agriculture and Natural Resources Committee, on the Rural Virginia Development Foundation, 1983
 Chairman, Saskatchewan Advisory Council on Socio-Economics, 1981-1982
 Treasurer, Canadian Agricultural Economics Society, Saskatchewan Section, 1980-1981

DEPARTMENTAL, INTERDISCIPLINARY, SCHOOL, COLLEGE, UNIVERSITY COMMITTEES OR ASSIGNMENTS1. *Departmental*

Chair, Search Committee for Regional Economist Position, 1999-2000
 Member, Search Committee for Community Informatics Position, Graduate School of Public Affairs, 1999-2000
 Member, Graduate Studies Committee, 1997-2000
 Member, Search Committee for Rural Sociology Position, 1997
 Chair, Search Committee for Rural Development Positions, 1985-1987, 1989-1990, 1994
 Member, Search Committee for Agricultural Economics Department Head, 1991-1992
 Chair, Departmental Ad Hoc Committee on Peer Review, 1983-1985
 Member, Department Advisory Committee, 1992-1994, Ph.D. Comprehensive Written Examination Committee, 1988-1994, Data Processing Lab Committee, 1988-1991, Department Awards Committee, 1982-1988
 Correspondent, American Agricultural Economics Association, Newsletter, 1983-1992
 Co-editor, Connection, the newsletter of the Department of Agricultural Economics, 1984-1986
 Faculty Advisor, Agricultural Economics Club, 1983-1986

2. *College*

Member, College of Agriculture, Food and Natural Resources Policy Committee, 1998-2000
 Member, Basic Sciences Experiment Station Project Review Committee, Virginia Agricultural Experiment Station, 1993-1995
 Member, Faculty Affairs Committee, 1993-1995
 Member, Executive Committee, College Faculty Association, 1992-1993
 Member, Diversity, Recruitment and Retention Committee, 1992-1994
 Member, College Facilities Committee, College Faculty Association, 1991-1992
 Member, Graduate Studies and Affairs Committee, 1989-1991
 Member, Extension Policy and Affairs Committee, 1988-1990
 Member, Strategic Planning (First Strategy) Steering Committee, 1989-1992
 Member, Future of Virginia Agriculture Think Tanks (5 committees)

3. *Cooperative Extension Service*

Member, Missouri Extension Leadership Development Team, 1997-1999
 Member, Supplemental Professional Development Grant Selection Committee, 1994

- Member, Organization and Staff Development Task Force, 1992-1993
- Member, Exploratory Committee on the Role of Cooperative Extension in Economic Development, 1989-1990
- Member, Economic Development Issue Core Team, 1989
- Member, Special Committee to Review the Rural Partnership Act, 1989
- Member, Future Transition Team, 1988

4. *University*

- Member, Program Committee, Missouri Institute for Public Policy, 1999 - 2000
- Member, Academic Cabinet, European Union Center of the University of Missouri—Columbia,
- Co-chair, Academic Cabinet, European Union Center of the University of Missouri—Columbia,
- Director, Community Policy Analysis Center, 1997-1998
- Member, Task Force on University Outreach, 1994-1995
- Chair, Settlement and Resource Systems Analysis (SARSA) Committee on Geographic Information Systems, 1990
- Member, Economic Development Assistance Center, Management Committee, 1989-1993
- Member, Powell River Project, Foundations and Environment Task Force, 1988-1990
- Member, Powell River Project, Steering Committee, 1985-1993

PUBLICATIONS

Refereed Journal Articles on Original Research

- Cox, Anna M., Jeffrey Alwang, and Thomas G. Johnson. 2000. "Local Preferences for Economic Development Outcomes: An Application of the Analytical Hierarchy Procedure." *Growth and Change*, forthcoming, Summer.
- Cox, Anna M., Thomas G. Johnson, and Morgan M. Mundell. 2000. "A Dynamic Simulation of TIF Impacts on Multiple Jurisdictions." *Municipal Finance Journal*, forthcoming.
- Scott, James K. and Thomas G. Johnson. 1998. "The Community Policy Analysis Network: A National Infrastructure for Community Policy Decision Support." *Journal of Regional Analysis and Policy*.
- Johnson, Thomas G. 1997. "Policy Conundrums in Rural North America: Discussion." *American Journal of Agricultural Economics* 79:5 (December): 1527-1529.
- Doeksen, Gerald A., Thomas G. Johnson, Diane Baird-Holmes, and Val Schott. 1997. "A 'Healthy' Health Sector is Crucial for Community Economic Development." *Journal of Rural Health* in press.
- Stallmann, Judith I., and Thomas G. Johnson. 1996. "Community Factors in Secondary Educational Achievement in Appalachia." *Youth and Society* 27 (June): 469-484.
- Basu, Rathin, and Thomas G. Johnson. 1996. "The Development of a Measure of Intersectoral Connectedness Using Structural Path Analysis." *Environment and Planning A* 28: 709-730.
- Siegel, Paul B., Jeffrey Alwang, and Thomas G. Johnson. 1995. "Decomposing Sources of Regional Growth With an Input-Output Model: A Framework for Policy Analysis." *International Regional Science Review* 18(3): 331-353.
- Siegel, Paul B., Thomas G. Johnson, and Jeffrey Alwang. 1995. "Regional Economic Diversity and Diversification: Seeking a Framework for Analysis." *Growth and Change* 26(2): 261-284.
- Siegel, Paul B., Jeffrey Alwang, and Thomas G. Johnson. 1995. "A Structural Decomposition of Regional Economic Instability: A Conceptual Framework." *Journal of Regional Science* 35 (August): 457.
- Johnson, Thomas G. "The Dimensions of Regional Economic Theory." 1994. *Review of Regional Studies* 24(2): 119-126.
- Johnson, Thomas G., and Judith I. Stallmann. 1994. "Human Capital Investment in Resource Economies." *Society and Natural Resources* 7(3): 221-233.
- Broomhall, David, and Thomas G. Johnson. 1994. "Economic Factors that Influence Educational Performance in

- Rural Schools." *American Journal of Agricultural Economics* 76(August): 557-567.
- Parsons, Robert L., and Thomas G. Johnson. 1994. "The Economic Impact of the Use of bST by the Virginia Dairy Industry." *Review of Agricultural Economics* 16(2): 175-186.
- Siegel, Paul B., Jeffrey Alwang, and Thomas G. Johnson. 1994. "Toward an Improved Portfolio Variance Measure of Regional Economic Stability." *Review of Regional Studies* 24(1): 71-86.
- Johnson, Thomas G. 1994. "Rural Development Policies Need Dose of Realism: Comment." *Forum* (Summer).
- Siegel, Paul B., Thomas G. Johnson, and Jeffrey Alwang. 1993. "Diversification of Production Agriculture Across Individual States: A Comment." *Journal of Production Agriculture* 6(3): 445-446.
- Stallmann, Judith I., Thomas G. Johnson, Ari Mwachofi, and Jan L. Flora. 1993. "Labor Market Incentives to Stay in School." *Journal of Agricultural and Applied Economics* (December): 82-94.
- Siegel, Paul B., and Thomas G. Johnson. 1993. "Conservation Reserve Program May Be Good for the Environment, Farms, and Rural Communities." *Rural Development Perspectives* 8(3): 25-31.
- Siegel, Paul B., and Thomas G. Johnson. 1993. "Measuring the Economic Impacts of Reducing Environmentally Damaging Production Activities." *The Review of Regional Studies* (Winter): 237-253.
- Zipper, Carl E., Howard Friedman, Thomas G. Johnson, and S. Murthy Kambhampaty. 1992. "The In-state Economic Impacts of Virginia Coal." *Virginia Coal and Energy Journal* Number 4, pp. 1-20.
- Pecsok, S. R., M. L. McGilliard, R. E. James, T. G. Johnson, and J. B. Holter. 1992. "Estimating Production Benefits Through Simulation of Grouping and Individual Feeding of Dairy Cows." *Journal of Dairy Science* 75: 1604-1615.
- Kraybill, David S., Thomas G. Johnson, and David R. Orden. 1992. "Macroeconomic Imbalances: A Multiregional General Equilibrium Analysis." *American Journal of Agricultural Economics* 74.3 (August): 726-736.
- Alwang, Jeffrey R., David M. Wooddall-Gainey, and Thomas G. Johnson. 1991. "Farm Labor Legislation: A Computer Program to Assist Growers." *American Journal of Agricultural Economics* 73:4 (November): 1027-1035.
- Siegel, Paul B., and Thomas G. Johnson. 1991. "Break-even Analysis of the Conservation Reserve Program: The Virginia Case." *Land Economics* 67(November): 447-461.
- Halstead, John M., F. Larry Leistritz, and Thomas G. Johnson. 1991. "The Role of Fiscal Impact Models in Impact Assessments." *Impact Assessment Bulletin* 9(Fall): 43-54.
- Bernat, Jr., Andrew G., and Thomas G. Johnson. 1991. "The Distributional Effects of Household Linkages." *American Journal of Agricultural Economics* 73(May): 326-333.
- Johnson, Thomas G., and Dennis U. Fisher. 1991. "Rural Entrepreneurship and Small Business Development: An Opportunity for Extension." *Journal of Extension* 29(Fall): 20-22.
- Broomhall, David, and Thomas G. Johnson. 1990. "Regional Impacts of the Conservation Reserve Program in the Southeast with Conversion to Trees: An Application of Input-Output Analysis." *Review of Regional Studies* 20 (Spring): 76-85.
- Johnson, Thomas G. 1989. "Rural Entrepreneurship: A Key to Rural Revitalization: Discussion." *American Journal of Agricultural Economics* 71:5 (December): 1324-1326.
- Johnson, Thomas G., David S. Kraybill, and Brady J. Deaton. 1989. "Improvements in Well-Being in Virginia's Coal Fields Hampered by Low and Unstable Income." *Rural Development Perspectives* 6:1(October): 37-41.
- Kraybill, David S., and Thomas G. Johnson. 1989. "Value-Added Activities as a Rural Development Strategy." *Southern Journal of Agricultural Economics* 21:1 (July): 27-36.

Johnson, Thomas G. "Fiscal Impact Models for Virginia Communities." 1988. *Government Finance Review* 4:1 (December): 36-38.

Johnson, Thomas G. 1988. "Fiscal Impact Software - New Strategies for Decision Makers." *Extension Review* 59:1 (Winter): 35.

Swallow, Brent, and Thomas G. Johnson. 1987. "A Fiscal Impact Model for Virginia Counties." *Review of Regional Studies* 17:1 (Spring): 67-74.

Halstead, John M., and Thomas G. Johnson. 1986. "Fiscal Impact Models for Local Economies." *Journal of Applied Business Research* 3(Spring): 90-101.

Johnson, Thomas G. 1986. "A Dynamic Input-Output Model for Small Regions." *Review of Regional Studies* 16:1 (Spring): 14-23.

Johnson, Thomas G., William J. Brown, and Kevin O'Grady. 1985. "A Multivariate Analysis of Farm Machinery Purchase Decisions." *Western Journal of Agricultural Economics* 10 (December): 294-306.

Johnson, Thomas G. 1985. "A Continuous Leontief Dynamic Input-Output Model." *Papers of the Regional Science Association* 56: 177-188.

Deaton, Brady J., and Thomas G. Johnson. 1984. "State Legislation for Rural Development: The Role of the University." *The Review of Regional Studies* 14:2 (Spring): 29-37.

Johnson, Thomas G., and Oral Capps, Jr. 1984. "Rural Area Consumer Demand and Regional Input-Output Analysis: Comment." *American Journal of Agricultural Economics* 66(May): 173-176.

Johnson, Thomas G. 1983. "Solving Dynamic Input/Output Models by Numerical Methods." *Simulation* 41:3 (September): 93-101.

Johnson, Thomas G. 1983. "Measuring the Cost of Time in Recreation Demand Analysis: Comment." *American Journal of Agricultural Economics* 65(February): 169-171.

Johnson, Thomas G., and Surendra N. Kulshreshtha. 1982. "Exogenizing Agriculture in an Input-Output Model to Estimate Relative Impacts of Different Farm Types." *Western Journal of Agricultural Economics* 7(December): 187-198.

Johnson, Thomas G., John Spriggs, and G. C. Van Kooten. 1982. "Social Costs of Supply-Restricting Marketing Boards: A Comment." *Canadian Journal of Agricultural Economics* 30(November): 369-372.

Abstracts in Refereed Journals

Liu, Binzhang, George W. Norton, Shukla Kshirsagar, Thomas G. Johnson, and Craig Thatcher. 1999. "Evaluating the Economic Impacts of Veterinary Research and Education." Forthcoming, *American Journal of Agricultural Economics* 81(5): Dec.

Broomhall, David, and Thomas G. Johnson. 1992. "The Valuation of Education in Rural Communities." *American Journal of Agricultural Economics* 74 (December): 1302.

Parsons, Robert L., and Thomas G. Johnson. 1992. "The Impact of the Use of bST by the Virginia Dairy Industry: Impact Analysis." *American Journal of Agricultural Economics* 74 (December): 1274.

Siegel, Paul B., Thomas G. Johnson, and Jeffrey Alwang. 1992. "Modelling the Growth, Stability, and Distributional Impacts of Alternative Development Strategies." *American Journal of Agricultural Economics* 74 (December): 1302.

Siegel, Paul B., and Thomas G. Johnson. 1990. "Economic Impacts of the Conservation Reserve Program in Virginia: A Break-even Analysis Using the IMPLAN Input-Output Model." *American Journal of Agricultural Economics* 72:5 (December).

Broomhall, David E., and Thomas G. Johnson. 1990. "The Impact of the Conservation Reserve Program on a

Region in Rural Eastern Georgia." *American Journal of Agricultural Economics* 72:5 (December).

Johnson, Thomas G. 1989. "The Emerging Federal Policy on Rural Development: Current Perspectives and Future Direction." *Southern Journal of Agricultural Economics* 21(1): 198.

Halstead, J. M., and Thomas G. Johnson. 1986. "Fiscal Impact Models in the United States and Canada: Review and Discussion." *American Journal of Agricultural Economics* 68-5(December).

Johnson, Thomas G., and John R. Keeling. 1985. "An Econometrics Based Microcomputer Fiscal Impact Model." *American Journal of Agricultural Economics* 67:5 (December).

Bernat, G. Andrew Jr., and Thomas G. Johnson. 1985. "An Input-Output Model with Endogenous Unemployment Benefits." *American Journal of Agricultural Economics* 67:5 (December).

Kriesel, Warren P., Brady J. Deaton, and Thomas G. Johnson. 1984. "Industrial Development as a Community Investment Decision." *American Journal of Agricultural Economics* 66(5): 899.

Johnson, Thomas G., Brent M. Swallow, and Brady J. Deaton. 1984. "Does Crime Prevention Pay: An Analysis of Local Government Crime Prevention Expenditures." *American Journal of Agricultural Economics* 66(5): 912.

Johnson, Thomas G. 1983. "On the Standardization of Input-Output Multipliers." *American Journal of Agricultural Economics* 65(5): 1183.

Johnson, Thomas G., and F. W. Obermiller. 1979. "An Operational Extension of the Leontief Dynamic Input-Output Model." *American Journal of Agricultural Economics* 61(5): 1144.

Refereed Proceedings on Original Research

Ma, Jian C., James K. Scott and Thomas G. Johnson. 1996. "Soy Diesel Processing in Buchanan County, Missouri: Potential Impacts." In *Liquid Fuels and Industrial Products from Renewable Resources: Proceedings of the Third Liquid Fuel Conference*, Nashville, Tennessee, September 15-17. The Society for engineering in agricultural, food, and biological systems.

Halstead, John M., F. Larry Leistritz, and Thomas G. Johnson. 1990. "The Role of Fiscal Impact Models in Impact Assessment." *Proceedings of the Second European Conference of the International Association for Impact Assessment*, Lausanne, Switzerland, June 27-30.

Johnson, Thomas G. 1987. "Shifts and Needed Economic Strategies," pp. 108-117. In *Ushering in the Twenty-First Century: Emphasis on the Rural South*, Thomas T. Williams, ed. Tuskegee University: Tuskegee, AL.

Halstead, J. M., and Thomas G. Johnson. 1986. "Fiscal Impact Models for Extension," pp. 446-451. In *Proceedings of the International Conference on Computers in Agricultural Extension Programs*, University of Florida, Gainesville, FL.

Johnson, Thomas G. 1986. "Virginia Impact Projection (VIP) Modeling Series: An Extension Tool," pp. 380-385. In *Proceedings of the International Conference on Computers in Agricultural Extension Programs*, University of Florida, Gainesville, FL.

Johnson, Thomas G. 1985. "Off-Farm Employment of Small-Farm Operators: A Strategy for Survival," pp. 105-118. In *Proceedings of the Forty-Second Annual Professional Agricultural Workers Conference*, Tuskegee Institute, Tuskegee, AL.

Kulshreshtha, S. N., D. D. Tewari, and Thomas G. Johnson. 1983. "Impact of Rising Energy Cost Upon Agricultural Production and Regional Economy: A Case Study of Saskatchewan." In *Rural Development: Growth and Equity*, Bruce L. Greenshields and Margot A. Bellamy, eds. International Association of Agricultural Economics Occasional Paper No. 3: 235-239.

Books Edited

Otto, Daniel M., and Thomas G. Johnson, eds. *Microcomputer-based Input-Output Modeling: Applications to Economic Development*. Westview Press, 1993. 228 pp.

Johnson, Thomas G., Brady J. Deaton, and Eduardo Segarra, eds. 1988. *Local Infrastructure Investment Decisions in Rural America*. Boulder, CO: Westview Press. 295 pp.

Reviewed Proceedings

Johnson, Thomas G., and James K. Scott. 1997. "The Changing Nature of Rural Communities." In *Increasing Understanding of Public Problems and Policies*. Farm Foundation, January. 177-188.

Johnson, Thomas G., James K. Scott and Jian Ma. 1997. "An Introduction to the Community Policy Analysis System, COMPAS." In *Rural Infrastructure as a Cause and Consequence of Rural Economic Development and Quality of Life*, 89-98. SRDC Publication No. 207, SRIEG-16 No. 5, Southern Rural Development Center, July.

Johnson, Thomas G. 1993. "Education and Rural Economic Development." In *Education, Off-farm Employment and Rural Economic Development: Perspectives from States in the Southeast*, 1-3. SRDC Publication #165, Southern Rural Development Center, June.

Johnson, Thomas G., and David E. Broomhall. 1993. "Education and Economic Development in Rural Appalachia." In *Education, Off-farm Employment and Rural Economic Development: Perspectives from States in the Southeast*, 20-29. SRDC Publication #165, Southern Rural Development Center, June.

Johnson, Thomas G. 1993. "Discussion of Municipal Solid Waste Landfill Costs Under Subtitle 'D' Regulations." In *Rural Infrastructure and Economic Development Issues*, 23-24. SRIEG-53 Publication No. 3, SRDC Publication Number 172, Southern Rural Development Center, June.

Henry, Mark, and Thomas G. Johnson. 1993. "The Contribution of Transportation to Rural Economic Development." In *Rural Infrastructure Issues*, 35-46. SRDC Publication No. 171, Southern Rural Development Center, June.

Broomhall, David, and Thomas G. Johnson. 1992. "Creation of A Central Appalachian Regional Database for Social, Economic, and Natural Resource Information." *Powell River Symposium and Progress Reports*, 100-105. Virginia Polytechnic Institute and State University, Blacksburg, September.

Johnson, Thomas G., and David E. Broomhall. 1991. "Perceived Employment Opportunities and Educational Performance in Virginia's Coal Counties." In *Powell River Symposium and Progress Reports*, 11-20. Virginia Polytechnic Institute and State University.

Johnson, Thomas G. 1991. "The Developmental Impacts of Transportation Investments." In *Rural Infrastructure and Economic Development Issues: Information Systems, Transportation, and Education*, SRDC 146, 25-34. Southern Rural Development Center.

Johnson, Thomas G. 1991. "Successful Community Development Strategies." In *Proceedings of the Role of Education in Rural Community Development Conference*, 41-48. Southeastern Educational Improvement Laboratory.

Johnson, Thomas G. 1990. "The Creation of Family Wage Jobs as the Primary Objectives of Rural Economic Development Policy and Programs." In *Rural Policy. The Oregon Debate, 1990, Debate #3*, Legislative Discussion Series, Debate #3, 7-13. Oregon State University.

Johnson, Thomas G. 1990. "Potential Regional Economic Impacts of Yellow Poplar Development." In *Proceedings of a Symposium on Yellow-Poplar Construction Lumber. An Economic Development Opportunity for Southwest Virginia*, 58-67. Virginia Polytechnic Institute and State University.

Johnson, Thomas G. 1990. "Innovation." In *Community Strategies for Tomorrow's Local Infrastructure*, SRDC No. 135, 63-65. Southern Rural Development Center.

Johnson, Thomas G. 1990. "Strategies in Transportation Financing." In *Community Strategies for Tomorrow's Local Infrastructure*, SRDC No. 135, 63-65. Southern Rural Development Center.

Johnson, Thomas G., Judith I. Stallmann, and David Broomhall. 1990. "Perceived Returns to Investment in Education in Southwest Virginia." In *Powell River Symposium and Progress Reports*, 88-90. Virginia Polytechnic Institute and State University.

Johnson, Thomas G., and Dennis U. Fisher. 1990. "Rural Business Development and Entrepreneurship Challenges: Is Extension Able and/or Willing?" In *Revitalizing the Rural South*, SRDC No. 130, 37-42. Southern Rural Development Center.

Johnson, Thomas G. 1989. "Value-added Agriculture and Rural Development Foundation." In *Strategies for Success in Rural Economic Development*, 7-8. Center for Agriculture and Rural Development, The Council of State Governments.

Johnson, Thomas G. 1989. "Rural Development in Saskatchewan: Conceptual Basis and Policy Agenda." In *Proceedings of the Symposium on Economic Development and Diversification in Rural Saskatchewan*, 35-55. Department of Agricultural Economics, University of Saskatchewan.

Johnson, Thomas G., David Broomhall, and Raymond Wilson. 1989. "Industrial Targeting Strategies for Virginia's Coal Fields." In *Powell River Project Symposium and Progress Reports*, 103-107. Virginia Polytechnic Institute and State University.

Johnson, Thomas G. 1989. "The Role of Entrepreneurship in Rural Economic Development." In *Towards Rural Development Policy for the 1990s: Enhancing Income and Employment Opportunities*, 156-161. Joint Economic Committee, Congress of the United States.

Johnson, Thomas G., and S. Murthy Kambhampaty. 1988. "The Economic and Fiscal Impacts of Alternative Mined-Land Uses." In *Powell River Project Symposium and Progress Reports*, 30-35. Virginia Polytechnic Institute and State University.

Johnson, Thomas G., and Sandra S. Batie. 1987. "Policy Options Related to the Adjustment of Farm Family Labor to Off-farm and Non-farm Employment." In *The Status of Agriculture and Agricultural Policy in the United States and in Virginia*, M.B. 345, ed. J. Paxton Marshall, 35-44. Virginia Polytechnic Institute and State University.

Johnson, Thomas G. 1987. "Fiscal Impacts of Economic Development." Responding to the *Crisis in the Rural South. Highlights of Selected Public and Private Sector Initiatives*, SRDC 103, 47-52. Southern Rural Development Center, Mississippi State.

Johnson, Thomas G., G. Andrew Bernat, and Brady J. Deaton. 1987. "The Economic Structure of Virginia's Coal Region." In *Powell River Project Symposium and Progress Reports*, 53-62. Virginia Polytechnic Institute and State University.

Johnson, Thomas G. 1987. "Success Stories in Rural Development." *Agriculture and Rural Development Issues in the South*, 65-72. Southern Natural Resource Economics Committee.

Kraybill, David S., Thomas G. Johnson, and Brady J. Deaton. 1986. "Quality of Life in the Southwest Virginia Coal Fields." In *Powell River Project Symposium and Progress Reports*, 14-24. Virginia Polytechnic Institute and State University.

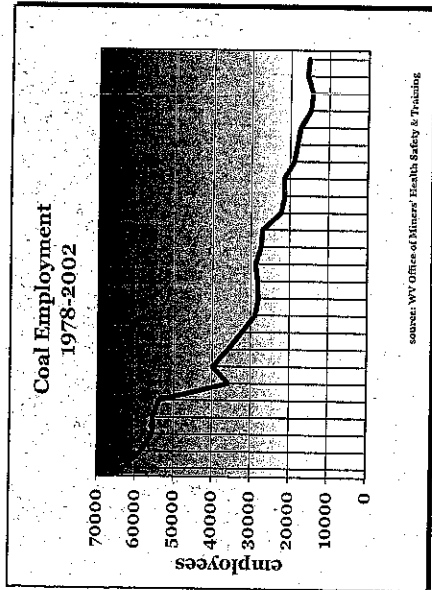
Agricultural Experiment Station Bulletins

Kraybill, David S., Thomas G. Johnson, and Brady J. Deaton. 1987. *Income Uncertainty and the Quality of Life: A Socio-Economic Study of Virginia's Coal Counties*. Bulletin 87-4, Virginia Agricultural Experiment Station, Virginia Polytechnic Institute and State University, Blacksburg. September. 87 pp. (To be reprinted in 1991.)

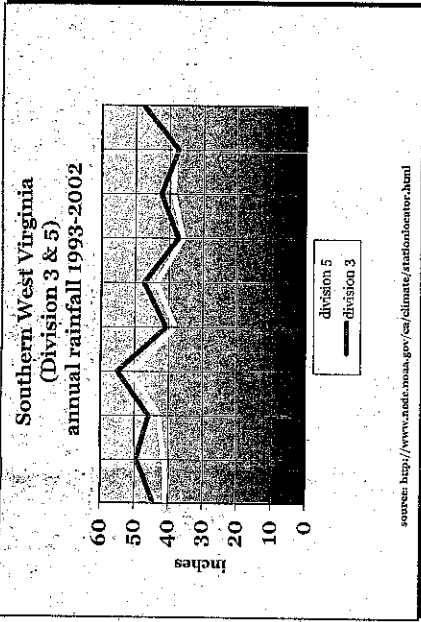
Johnson, Thomas G. 1982. *The Environmental and Economic Effects of Weather Modification in Saskatchewan*. Research Bulletin 82-02, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, March. 253 pp.

Johnson, Thomas G., and S. N. Kulshreshtha. 1981. *The Nature of Intersectoral Relations of Saskatchewan Agriculture. An Input-Output Analysis*. Research Bulletin 81-06, Department of Agricultural Economics, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, November. 89 pp.

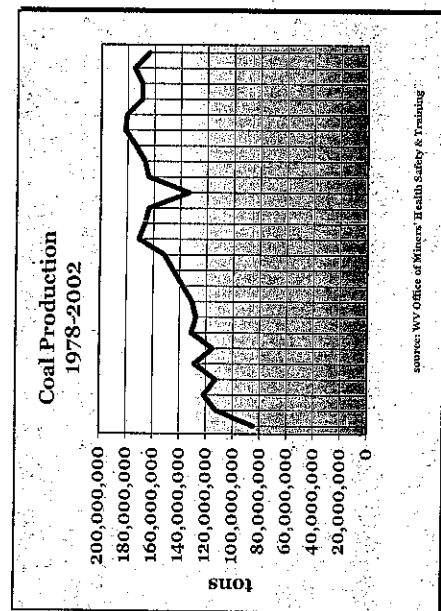
employees
62982
58565
55502
55411
53941
35831
39950
35913
32329
28885
28100
28323
28676
27479
27065
22386
21414
21602
18939
18165
17382
14845
14281
15729
15377



Year	div. 5	div. 3
1993	40.78	44.36
1994	41.49	49.68
1995	42.82	45.9
1996	51.21	55.1
1997	38.14	40.81
1998	43.71	47.43
1999	35.95	37.42
2000	38.88	42.56
2001	38.33	37.47
2002	47.03	47.86



annual tonnage
84,697,048
112,380,883
121,583,762
112,813,972
128,778,076
115,135,454
131,040,566
127,867,375
130,787,233
137,672,276
144,917,788
151,834,721
171,155,053
166,715,271
163,797,710
133,700,856
164,200,572
167,096,211
174,008,217
181,914,000
180,794,012
169,206,834
169,370,602
176,052,857
163,896,890



year	events
1993	6
1994	3
1995	4
1996	14
1997	11
1998	7
1999	0
2000	12
2001	31
2002	8
2003	29

