WEST VIRGINIA

SECRETARY OF STATE

KEN HECHLER

ADMINISTRATIVE LAW DIVISION

Form #3

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OFFICE OF WEST VIRGINIA SECRETARY OF STATE

NOTICE OF AGENCY APPROVAL OF A PROPOSED RULE AND FILING WITH THE LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

AGENCY: Division of Environmental Protection Office of Water Resources TITLE NUMBER: 47

CITE AUTHORITY 22-12-5(I)

AMENDMENT TO AN EXISTING RULE: YES ___ NO X

IF YES, SERIES NUMBER OF RULE BEING AMENDED: ___

TITLE OF RULE BEING AMENDED: ___

IF NO, SERIES NUMBER OF NEW RULE BEING PROPOSED: 57A

TITLE OF RULE BEING PROPOSED: "Groundwater Protection Standards at Steam Generating Facilities"

THE ABOVE PROPOSED LEGISLATIVE RULE HAVING GONE TO A PUBLIC HEARING OR A PUBLIC COMMENT PERIOD IS HEREBY APPROVED BY THE PROMULGATING AGENCY FOR FILING WITH THE SECRETARY OF STATE AND THE LEGISLATIVE RULE MAKING REVIEW COMMITTEE FOR THEIR REVIEW.

Carrie J. Chambers

Authorized Signature

$14.70

Executive Office
#10 McJunkin Road
Nitro, WV 25143-2506
Telephone: (304) 759-0515
Fax: (304) 759-0526

West Virginia Bureau of Environment

Cecil H. Underwood
Governor

Michael P. Miano
Commissioner

July 27, 1999

Ms. Judy Cooper
Director, Administrative
Law Division
Secretary of State's Office
Capitol Complex
Charleston, WV 25305

RE: 47CSR57A - "Groundwater Protection Standards at Steam Electric Generating Facilities"

Dear Ms. Cooper:

This letter is to give my approval for filing of the above-referenced rule with your Office and the Legislative Rule-Making Review Committee as "Notice of an Agency-Approved Rule."

Your cooperation in this matter is very much appreciated. If you should have questions or need additional information, please call Carrie Chambers in my office at 759-0515.

Sincerely yours,

Michael P. Miano
Commissioner

MPM:cc

Attachment

cc: Barb Taylor
Dave Watkins
Carrie Chambers

QUESTIONNAIRE

(Please include a copy of this form with each filing of your rule: Notice of Public Hearing or Comment Period, Proposed Rule, and if needed, Emergency and Modified Rule.)

DATE: August 3, 1999

TO: LEGISLATIVE RULE-MAKING REVIEW COMMITTEE

FROM: (Agency Name, Address & Phone No.) Office of Water Resources

1201 Greenbrier Street

Charleston, WV 25311 Phone (304) 558- 2108

LEGISLATIVE RULE TITLE: "Groundwater Protection Standards at Steam Electric Generating Facilities"

1. Authorizing statute(s) citation 22-12-5(I)

2. a. Date filed in State Register with Notice of Hearing or Public Comment Period:

June 17, 1999

b. What other notice, including advertising, did you give of the hearing?

DEP's InDEPth Newsletter; DEP's Public Notice Bulletin, State wide News Releases

c. Date of Public Hearing(s) *or* Public Comment Period ended:

July 21, 1999

d. Attach list of persons who appeared at hearing, comments received, amendments, reasons for amendments.

Attached X No comments received

e. Date you filed in State Register the agency approved proposed Legislative Rule following public hearing: (be exact)

August 3, 1999

f. **Name, title, address and phone/fax/e-mail numbers** of agency person(s) to receive all *written correspondence* regarding this rule: (Please type)

Dave Watkins, Office of Water Resources, 1201 Greenbrier Street, Charleston, WV 25311; E-Mail dwatkins@mail.dep.state.wv.us Phone (304)558-2108; Fax (304)558-5905

Carrie Chambers, Director's Office, 10 McJunkin Road, Nitro, WV 25143

Phone (304) 759-0515; Fax (304) 759-0526; E-Mail cchambers@mail.dep.state.wv.us

g. ***IF DIFFERENT*** **FROM ITEM 'f', please give Name, title, address and phone number(s)** of agency person(s) who wrote and/or has responsibility for the contents of this rule: (Please type)

Same as (f)

3. If the statute under which you promulgated the submitted rules requires certain findings and determinations to be made as a condition precedent to their promulgation:

a. Give the date upon which you filed in the State Register a notice of the time and place of a

hearing for the taking of evidence and a general description of the issues to be decided.

N/A

b. Date of hearing or comment period:

N/A

c. On what date did you file in the State Register the findings and determinations required together with the reasons therefor?

N/A

d. Attach findings and determinations and reasons:

Attached N/A

BUREAU OF ENVIRONMENT
DIVISION OF ENVIRONMENTAL PROTECTION

BRIEFING DOCUMENT

Rule Title: Groundwater Protection Standards At Steam Electric Generating Facilities

A. AUTHORITY: **WVCode** §22-12-5(l)

B. SUMMARY OF RULE:

This rule authorizes a change in groundwater quality standards for five(5) metals (beryllium, cadmium, chromium, nickel and selenium) at steam electric generating facilities operated by Allegheny Power and American Electric Power for coal storage areas and ash disposal ponds.

C: STATEMENT OF CIRCUMSTANCES WHICH REQUIRE RULE:

Variances from existing groundwater quality standards may be granted by the legislature for a single source or class of sources which by their nature cannot be conducted in compliance with two requirements of WV Code§22-12-5, "Groundwater Protection Act". The benfits of granting the variance must outweigh the benefit of complying with existing groundwater quality standards and demonstrate that there is no technologically feasible alternative available. Also, the granting of the variance is more in the public interest than adherence to existing groundwater quality standards.

D: FEDERAL COUNTERPART REGULATIONS - INCORPORATION BY REFERENCE/DETERMINATION OF STRINGENCY:

There are no federal counterpart regulations.

E: CONSTITUTIONAL TAKINGS DETERMINATION:

This is not applicable to this rule.

F: CONSULTATION WITH THE ENVIRONMENTAL PROTECTION ADVISORY COUNCIL:

This proposed rule was reviewed and discussed at the DEP Advisory Council on June 10, 1999. There were no changes recommended by the Council. Minutes of that meeting are attached.

MINUTES

ENVIRONMENTAL PROTECTION ADVISORY COUNCIL

June 10, 1999, Director's Conference Room, Nitro

The sixteenth meeting of the DEP Advisory Council was held Thursday, June 10, 1999, in the Director's Conference Room located in Nitro. Chairman Mike Miano called the meeting to order at 10:00 a.m.

ATTENDING:

Advisory Council Members:

Mike Miano, Chairman
Jacqueline Hallinan
William Raney
Rick Roberts
William Samples

Environmental Protection:

Bill Adams
Andy Gallagher
Tony Grbac
Randy Huffman
Mike Johnson
Mike Lewis
Robert Keatley
Pam Nixon
Rocky Parsons
Cap Smith
Charlie Sturey
Barbara Taylor
Karen Watson
Mike Zeto

1) Review and Approval of March 22, 1999 Minutes. Chairman Miano called the meeting to order at 10:00 a.m. The first item on the agenda was approval of the minutes of the March 22 Advisory Council; they were approved as written.

2) Discussion of Proposed Rule Amendments - 2000 Legislative Session. In accordance with WV Code §22-1-1(c), and DEP's new rule-making procedure that was implemented by Director Miano in September 1998 to involve the Advisory Council in DEP's rule-making process as early as possible to enable the Council to review, comment, and make recommendations to the Director on DEP's proposed legislative rule changes before they are filed for public hearing, the following proposed rules were brought to the Council's attention.

Chairman Miano said he would like to begin by saying he hoped all Council members had received their draft rules by E-mail without any complications and they were able to review them before the meeting. He informed the Council that due to the large number of rules being proposed for the 2000 Legislative Session, DEP's program offices would review them with the

Council as thoroughly as possible, in the allotted time frame, and try to answer any questions or concerns the Council may have.

The following Office of Air Quality's proposed rule amendments were discussed by Karen Watson, OAQ, with assistance from Richard Keatley, also from the OAQ office:

- 45CSR1 - "TO PREVENT AND CONTROL AIR POLLUTION FROM COAL REFUSE DISPOSAL AREAS"
- 45CSR2 - "TO PREVENT AND CONTROL PARTICULATE AIR POLLUTION FROM COMBUSTION OF FUEL IN INDIRECT HEAT EXCHANGERS"
- 45CSR3 - "TO PREVENT AND CONTROL AIR POLLUTION FROM THE OPERATION OF HOT MIX ASPHALT PLANTS"
- 45CSR4 - "TO PREVENT AND CONTROL THE DISCHARGE OF AIR POLLUTANTS INTO THE OPEN AIR WHICH CAUSES OR CONTRIBUTES TO AN OBJECTIONABLE ODOR OR ODORS"
- 45CSR5 - "TO PREVENT AND CONTROL AIR POLLUTION FROM THE OPERATION OF COAL PREPARATION PLANTS, COAL HANDLING OPERATIONS AND COAL REFUSE DISPOSAL AREAS"
- 45CSR6 - "TO PREVENT AND CONTROL AIR POLLUTION FROM COMBUSTION OF REFUSE"
- 45CSR7 - "TO PREVENT AND CONTROL PARTICULATE MATTER AIR POLLUTION FROM MANUFACTURING PROCESSES AND ASSOCIATED OPERATIONS"
- 45CSR10 - "TO PREVENT AND CONTROL AIR POLLUTION FROM THE EMISSION OF SULFUR OXIDES"
- 45CSR12 - "AMBIENT AIR QUALITY STANDARD FOR NITROGEN DIOXIDE"
- 45CSR16 - "STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES PURSUANT TO 40 CFR PART 60"
- 45CSR17 - "TO PREVENT AND CONTROL PARTICULATE MATTER AIR POLLUTION FROM MATERIALS HANDLING, PREPARATION, STORAGE AND OTHER SOURCES OF FUGITIVE PARTICULATE MATTER"
- 45CSR18 - "TO PREVENT AND CONTROL PARTICULATE AIR POLLUTION FROM DIRECT MEAT-FIRING DEVICES"
- 45CSR23 - "TO PREVENT AND CONTROL EMISSIONS FROM MUNICIPAL SOLID WASTE LANDFILLS"
- 45CSR25 - "TO PREVENT AND CONTROL AIR POLLUTION FROM HAZARDOUS WASTE TREATMENT, STORAGE, OR DISPOSAL FACILITIES"
- 45CSR33 - "ACID RAIN PROVISIONS AND PERMITS"
- 45CSR34 - "EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS PURSUANT TO 40 CFR PART 63"

Karen began by bringing the Council up to date on the status of two OAQ rules that were filed during the last session (or late in the session). 45CSR8 revised the ambient air quality for sulfur oxides and particulate matter, and 45CSR9 pertained to ambient air quality standards for carbon monoxide and ozone. The DC Circuit Court of Appeals has ordered EPA to show how they arrived at the new standards - EPA may go back to the previous standards. Karen also apprised the Council on the N_{ox} State Implementation Plan. The Circuit Court stayed the implementation of that rule and there are no plans to develop any other amendments in the

immediate future. 45CSR28, which is the emissions trading rule that was filed late in the 1999 Session, was not taken up by the Legislature, but plans are to put the rule on the July agenda of the Interim Legislative Committee.

Karen explained the reason for the unusually large number of DEP rules that are being filed for the next Legislative Session. She informed the Council that several of the rules were outdated and were amended for consistency and streamlining, and are a result of months of on-going meetings with stakeholders -- involving both the regulated community and citizens. A particulate matter and sulfur oxide work group was also involved. Those rule amendments as a result of the stakeholders process include: 45CSR1 (which is being repealed and replaced with language in 45CSR5), 45CSR2, 3, 4, 5, 6, 7, 10, 12, 17, and 18 (which is being repealed since the rule is no longer deemed necessary). The amendments to the remainder of the rules, 45CSR16, 23, 25, 33, and 34 were necessary to adopt by reference definitions, clarifications, technical amendments, etc., recently adopted by US EPA.

After several minutes of discussion, the Advisory Council recommended to the Director that the following amendments be made to the OAQ rules:

Mr. Samples pointed out that 45CSR2 and 45CSR7 contain different definitions for the term "opacity." The agency responded that this discrepancy was inadvertent and the language should be as it is in 45CSR2. The agency agreed to revise 45CSR7, subsection 2.23, accordingly.

Mr. Larry Harris was unable to attend the meeting; however, he expressed the following comments on 45CSR10 and 45CSR33 by e-mail. He stated that the State's rules should be more stringent than the federal counterpart regulations, since the State's streams are being adversely impacted. The agency responded that, at this point in time, it does not possess sufficient evidence to make the written finding that is required by WV Code §22-2-3a before promulgating a rule which is more stringent than a counterpart federal regulation.

Cap Smith and Mike Zeto discussed the following Office of Waste Management proposed rule amendments:

- **33CSR2 - "Sewage Sludge Management Rule"**
- **33CSR20 - "Hazardous Waste Management Rule"**

Mike Zeto briefed the Council on the proposed amendments to 33CSR2. He stated that in 1996 the Legislature mandated DEP to perform a study on soil limitations for sewage sludge land application sites. These amendments (as a result of the study) were to be proposed by June 30, 1999. Other amendments to the rule include specifying the analytical method used for soil analysis, placing conditions on variances from the soil limits for land application sites, providing an incentive for municipalities to produce higher quality compost products, and adjusting the sewage sludge limits for four metals. Mr. Zeto told the Council these amendments are being proposed to update other related areas of the rule in an attempt to provide better management of sewage sludge within the state.

Cap Smith discussed 33CSR20 with the Council. He informed the Council that amendments are proposed in section 2 of the rule that will allow the Office of Waste Management to delist hazardous wastes, which has previously been handled by EPA. The other significant amendments that are being proposed by adoption of the Federal Register pertain to revision standards for owners and operators of closed and closing hazardous waste management facilities, post closure permit requirements, and the closure process. These amendments are referenced throughout the rule and will hopefully expedite site cleanup while maintaining environmental protection.

There were several minutes of discussion on OWM's proposed rule amendments; however, no recommendations were made to the Director concerning the amendments.

Mike Lewis, Office of Oil and Gas, discussed the following new proposed rule:

- **35CSR7 - "Well Operations - Within and Around Gas Storage Reservoirs"**

Mike informed the Council that 35CSR7 is a proposed "new" rule for the O&G Office. The rule is needed to provide protection of the environment, the public, and the state's natural gas resources. It is the intent of the proposed rule to accomplish this by addressing certain operating procedures that oil and gas and gas storage operators are to use when drilling into or through a gas storage reservoir or the gas storage reservoir protective area. In order to assure absence of leaking gas, the proposed rule requires gas storage operators to conduct monitoring and inspections of gas storage wells.

There were no questions or discussion by the Council on this proposed rule.

The following proposed rules were discussed by the Office of Mining and Reclamation:

- **38CSR2 - "Surface Mining and Reclamation Rule"**
- **38CSR2A - "Rules for Mining and Restoration for Sandstone, Limestone, and Sand"**
- **38CSR2B - "RULES FOR MINING AND RECLAMATION OF MINERALS OTHER THAN COAL"**

Ed Griffith, Office of Surface Mining, discussed the proposed amendments to the Surface Mining and Reclamation Rule. Ed told the Council that there are only minor amendments being proposed to this year's rule. The proposed definition of "woodlands" in subsection 2.136 relates to the utilization of commercial woodlands in Approximate Original Contour variance areas. This change is being proposed in order for the state to meet the federal policy that is expected to change in July 1999. The proposed amendment to change the bonding requirements of mining operations that request variances from contemporaneous reclamation to the maximum amount per acre bond ($5,000 per acre) is found in subdivision 14.15.f. All other amendments are being proposed in order to meet the requirements of the Office of Surface Mining's program amendments.

Rocky Parsons, OMR's Philippi Office, next addressed OMR's proposed rules 38CSR2A and 2B. Rocky explained to the Council members that 38CSR2B has been in place since 1983 and regulates all minerals other than coal. However, in accordance with the requirement that separate rules for limestone, sandstone, and sand are to be promulgated, DEP is proposing

38CSR2A which will regulate only those minerals - 38CSR2B will regulate all minerals other than limestone, sandstone, sand, and coal. Both proposed rules will regulate roads, blasting, drainage control, methods of operation, excess spoil disposal, revegetation, mapping, transfer of permits, permit renewals, revisions and incidental boundary revisions. 38CSR2A will provide provisions for restoration and 38CSR2B will include provisions for reclamation. Rocky gave the Council a brief history on the roadblocks the agency has encountered in the past several years in their attempt to amend the quarry statute. He said since the agency has been unsuccessful in that approach, it has become necessary to try to accomplish this through rule making. He informed the Council of a public meeting held the previous week to discuss the two proposed rules. He said the meeting was well attended and he believes the rules were well received by everyone in attendance.

The three OMR proposed rules were discussed by the Council members. Bill Raney said that although Rocky stated that the quarry rules have been well received by industry and the citizens, he is concerned about whether there has been enough time for the review of the proposed rules after they were drafted. He believes there would be a smoother transition into the rule making process, i.e., the public hearing/comment period, etc., if there had been more involvement from outside DEP during the drafting of the rules.

Mr. Larry Harris commented by e-mail 38CSR2A and 2B. His question is whether the siltation measures include silt fences where runoff might enter streams. He said it is not apparent what best management practices are for this situation, and he wonders if it needs to be spelled out. He knows of some operations in quarries where streams muddy after rainfalls, such as the Elkins and Waco quarries near Snowshoe, and he feels this is harming the streams. Do the new rules address this?

Rocky Parsons responded by saying that design criteria for drainage control structures is found in the technical handbook. Silt fences are not adequate for sediment control. The drainage system must be designed to hold .125 ac/ft of sediment for each acre of disturbed land. All runoff must pass through a drainage control structure. There is a provision for less sediment control (1/2 factor) for certain circumstances as approved by the Director. Effluent limits as established in the NPDES permit must be met.

Tony Grbac, Office of Surface Mining, addressed the following rule:

199CSR1 - "SURFACE MINING BLASTING RULE"

Tony began by briefing the Council on the history of the Surface Mining Blasting Rule. This rule is being proposed to comply with SB681 - passed during the last session. This bill created the Office of Explosives and Blasting and the Office of Coalfield Community Development, which is under the West Virginia Development Office. The proposed rule will regulate blasting laws and rules associated with all surface-mining operations. All duties currently performed by OMR related to blasting, and all rules which now regulate blasting (38CSR2C) will be transferred to this new office. Besides regulating blasting on all surface mining operations, it will also implement and oversee pre-blast survey processes; maintain and operate a system to receive and address questions, concerns and complaints relating to mining

operations; determine the qualifications for individuals and firms performing pre-blast surveys; establish the education, training, examination and certification of blasters; administer a claims process for property damage caused by blasting; and conduct a study of blasting and make recommendations regarding any appropriate rule or code changes.

Tony explained that the revenue generated by the proposed fee in 199CSR1 (one-half cent times the number of pounds of explosive material used ruing the preceding month for any purpose on the surface mining operations) would fund both the offices, as required by SB681. After one year of collection, both offices are to report to the Legislature as to whether the revenue collected is sufficient to operate both offices.

After several minutes of discussion between DEP and the Council members, Bill Raney expressed his concern in filing the rule for public hearing in the specified time frame. Mr. Raney asked if anyone outside DEP has been involved in drafting the rule. OMR answered by saying the rule was drafted by several staff within OMR. Mr. Raney replied that he believes there will be serious concerns with this rule once industry has had an opportunity to review it. He believes the rule drafting process definitely needs input from firms and individuals outside DEP, and he thinks the process will go smoother once everyone has had the opportunity to address their concerns. Mr. Raney recommended that the Director withhold this rule from the list of rules DEP proposes to file for public hearing/comment period in the coming week to give all interested parties a chance to participate in drafting the rule.

After discussion of this recommendation, Chairman Miano said he believes the best approach would be to continue with the filing of the proposed rule for public hearing, start the rule in the normal process and time frame, and in the meantime he would commit to putting together a work group of interested parties to discuss the rule. If DEP feels that more time is needed once the group begins their work on the rule, he will consider the possibility of either extending the comment period or filing for another public hearing. He said he will also decide in the near future whether DEP will file the rule as an "Emergency Rule" since HB 681 will become effective on June 11.

Council members also pointed out a typographical error in subdivision 3.9.a.3. of the rule relating to cross-references that will be corrected by DEP.

Barb Taylor and Mike Johnson, Office of Water Resources, briefed Council on the following rules:

- **47CSR57A - "Groundwater Protection Standards at Steam Electric Generating Facilities"**
- **47CSR26 - "Water Pollution Control Permit Fee Schedule"**
- **47CSR31 - "State Water Pollution Control Revolving Fund Program Rule"**

Barb described the proposed "new" rule relating to Groundwater Protection Standards at Steam Electric Generating Facilities. She noted that the rule is a result of a Notice of Intent filed on October 24, 1994, by the West Virginia Steam Electric Generation Industry, with the Director of DEP, in accordance with 47CSR57 to apply for a class variance for all West Virginia power stations and associated disposal sites. At that time, DEP provided AEP and AP with the

opportunity to conduct a four-year study to gather the necessary data to support their variance request. The objectives were met by assembling and reviewing data, estimating potential impacts to receptors, and performing an economic assessment impact analysis to the industry, commercial enterprises, and citizens at large if compliance with the Groundwater Protection Act were required without benefit of the variances. After review of the four-year study, the Director determined that granting this request for a variance at these locations would not pose adverse effects to human health or the environment. There are no human or environmental sensitive receptors between the coal storage areas or as ponds; therefore, it is unlikely there will be adverse affects. Barb gave each member a copy of the four-year study on which the Director made his determination.

Chairman Miano told Council that DEP is definitely willing to look at such cases where extensive research and study have been done by the regulated community to back up their findings before granting such variances, and believes DEP will see more studies like this in the future.

Barb next apprised the members on the proposed amendments of the Water Pollution Control Permit Fee Schedule. She stated that amendments are being proposed as a result of HB 2684, passed March 11, 1999, and effective ninety days from passage. The Director is required to implement an emergency rule to implement the fee schedule authorized by the amendments by July 1, 1999. This rule was filed as an "Emergency Rule" on June 7, 1999.

Mike Johnson, Office of Water Resources' Construction Assistance Office, briefed the Council on 47CSR31 - the Water Pollution Control Revolving Fund Program rule. The amendments to this rule are being proposed to allow the State Revolving Fund low interest terms to be extended from 20 years to 30 years for communities that qualify as "disadvantaged." There is only one other state in the country to receive such approval from EPA. Mike informed the Council that he was only recently made aware of this extension by EPA to extend the low interest loans from 20 to 30 years while attending a meeting out of state. This rule was filed as an "Emergency Rule" on May 24, 1999.

Council members unanimously agreed that Mike Johnson should be commended for gathering this information and proposing the amendment to the rule that will enable disadvantaged communities to immediately take steps toward constructing watershed projects that will provide affordable monthly sewer rates.

Open Discussion:

Chairman Miano and Council members expressed their compliments to the program offices for all their hard work, especially with the stakeholders process -- it is obvious a lot of hard work has gone into the process in order to make their efforts more productive.

Bill Raney asked a question relating to the "More or Less" Stringency statement that appears on the front of some DEP rules, but not on others, and voiced his concern if DEP is paying close attention to this, or if the same statement is appearing with all proposed rules. Carrie Chambers from the Director's Office explained that statement was once required to be included in the "General" section of each rule; however, it is now placed in the briefing document that is attached to each rule, and required by the Secretary of State's Office and the

Legislative Rule-Making Review Committee, before it is filed. She went on to explain that with the rush to get draft copies of the rules to Council members as soon as possible, some of the Briefing Documents had not been completed, but would be attached to all DEP rules before they are filed for public hearing. Chairman Miano went on to say it is his belief that all program offices are carefully scrutinizing each rule before that decision is made.

Chairman Miano thanked Council for taking time from their busy schedules to review the extensive list of DEP's proposed rules. He informed the Council that the minutes would be left open for comment until Wednesday, June 16, at which time the minutes will be attached to the rules and filed with the Secretary of State's Office and the Legislative Rule-Making Review Committee for notice of public hearing/comment period.

Before adjourning the meeting, the Council informed Chairman Miano that they would prefer beginning future meetings at 10:00 a.m., instead of the usual time of 1:00 p.m. The meeting was then adjourned at 3:30 p.m.

APPENDIX B

FISCAL NOTE FOR PROPOSED RULES

Rule Title: Groundwater Protection Standards At Steam Electric Generating Facilities

Type of Rule: X **Legislative** ___ **Interpretive** ___ **Procedural**

Agency: WV Division of Environmental Protection
Office of Water Resources
1201 Greenbrier Street
Charleston, WV 25311

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1. Effect of Proposed Rule:

	ANNUAL		FISCAL YEAR		
	INCREASE	DECREASE	CURRENT	NEXT	THEREAFTER
ESTIMATED TOTAL COST	$	$	$	$	$
PERSONAL SERVICES	0	0	0	0	0
CURRENT EXPENSE	0	0	0	0	0
REPAIRS & ALTERNATIONS	0	0	0	0	0
EQUIPMENT	0	0	0	0	0
OTHER	0	0	0	0	0

2. Explanation of Above Estimates:

There will be no financial impact to State government or the WV Division of Environmental Protection as a result of this rule.

3. Objectives of These Rules:

To set groundwater protection standards for coal storage areas and ash disposal ponds at nine(9) steam electric generating facilities operated by Allegheny Power and American Electric Power within the State. These activities by their very nature cannot be conducted or operated in compliance with groundwater quality standards published in 46CSR12 "Requirements Governing Groundwater Quality Standards."

Rule Title: Groundwater Protection Standards At Steam Electric Generating Facilities

4. Explanation of Overall Economic Impact of Proposed Rule.

A. Economic Impact on State Government.

None

B. Economic Impact on Political Subdivisions; Specific Industries; Specific Groups of Citizens.

There is no economic impact on political subdivisions. If this rule where not to pass, the cost to implement corrective action measures at these facilities are outlined in the economic factors listed below:

Economic Factors		
Allegheny Power Facilities	**Cost of Compliance (million $)**	**Increase inCost of Electrical Generation (%)**
Plant		
Albright	$13.5	6.70%
Fort Martin	$38.9	4.70%
Harrison	$37.2	1.50%
Pleasants/Willow Island	$44	2.60%
Rivesville	$8.4	9.50%
Total	$142	
American Electric Facilities		
Kammer	$24.5	7%
Kanawha River	$21.1	6.20%
Sporn	$32	4.20%
Total	$78.6	

Cost Increase (per year)	Small Residential User	Large Commercial User	Large Industrial User
Allegheny Power Facilities	$7.00	$3,600.00	$278,400.00
American Electric Facilities	$5.00	$2,300.00	$145,000.00

C. Economic Impact on Citizens/Public at Large.

The economic impact on citizens and the public at large is also outlined in the table in Section B.

Date: 8/3/99

Signature of Agency Head or Authorized Representative: Carrie J. Chambers

TITLE 47
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES
SERIES 57A
GROUNDWATER PROTECTION STANDARDS AT STEAM ELECTRIC GENERATING FACILITIES

§47-57A-1. General.

1.1. Scope. ---Variances may be granted by the legislative to allow groundwater quality standards to be exceeded for a single source or a class of sources which by their nature cannot be conducted in compliance with the requirements of W.Va. Code §22-12-5, "Groundwater Protection Act". The benefits of granting the variance must out weigh the benefits of complying with existing groundwater quality standards and demonstrate that there is no reasonable and prudent alternative available, and that granting the variance is more in the public interest than adherence to existing groundwater quality standards.

1.1.a. A study was initiated by Allegheny Power (AP) and American Electric Power (AEP) and conducted by the Electric Power Research Institute (EPRI) to ascertain the existing ground water quality at nine(9) steam electric generating facilities throughout the state. The study concluded that four(4) metals (beryllium, cadmium, chromium and nickel) were consistently exceeding groundwater quality standards at coal storage areas, and two(2) metals (nickel and selenium) were consistently exceeding ground water quality standards at ash disposal areas.

1.1.b. The purpose of this legislative rule is to grant relief from existing groundwater quality standards by establishing groundwater protection standards (GWPS) for variance applicable areas for both the coal storage and ash disposal sites at nine(9) steam electric power generating facilities within the state.

1.2. Authority. - W.Va. Code §22-12-5(l).

1.3. Filing Date. -

1.4. Effective Date. -

§47-57A-2. Definitions

2.1. "Act" means the West Virginia Groundwater Protection Act, W.Va. Code §22-12-1 et seq.

2.2. "Class of sources" means a group of sources which engage in similar types of activities and release, or have the potential to release, similar types of pollutants to the groundwater.

2.3. "Constituent" means any chemical, or biological substance found in groundwater due to either natural or man-made conditions.

2.4. "Director" means the director of the Division of Environmental Protection of the Bureau of Environment.

2.5. "Groundwater" means the water occurring in the zone of saturation beneath the seasonal high water table, or any perched water zones.

2.6. "Groundwater Protection Standard" or "GWPS" means the concentration of a specified constituent, statistically calculated, which is achievable with a 95% (percent) confidence level.

2.7. "Groundwater Quality Standards" means the standards of purity and quality for groundwater of the state promulgated by the Environmental Quality Board pursuant to section 4 of the Act.

2.8. "ppb" - means parts per billion or μg/l.

2.9. "Preventative Action Limit" or "PAL" means a numeric value expressing the concentration of a substance in groundwater that, if exceeded, causes action to be taken to assure that standards of purity and quality of groundwater are not violated.

2.10 "Receptor" means a surface water body, a public or private drinking water supply and any off-site migration onto adjacent properties of groundwater for which the variance is granted.

2.11. "Source" means any facility or activity which has caused a release or is reasonably likely to cause a release.

2.12. "Variance" means a legislative rule modifying groundwater quality standards or preventative action limits, or both, for a source or class of sources, for one or more specific constituents.

2.13. "Variance applicable areas" means a geographic area for which the variance is allowed and is further delineated by geographic coordinates listed in section 3.0 of this rule.

§47-57A-3. Variance Applicable Areas.

3.1. Variance applicable areas for coal storage sites at steam electric power generating facilities with their coordinates are as follows:

3.1.a. Albright; Preston County; 39°29′09″,79°38′07″; 39°29′09″,79°38′11″; 39°29′13″,79°38′15″; 39°29′07″,79°38′11″:

3.1.b. Fort Martin; Monongalia County; 39°43′03″,79°55′14″; 39°42′43″, 79°55′29″; 39°43′04″,79°55′17″; 39°42′47″,79°55′35″:

3.1.c. Harrison; Harrison County; 39°23′15″,80°19′30″; 39°23′07″,80°19′25″; 39°23′14″,80°19′43″; 39°23′03″,80°19′41″:

3.1.d. Kammer; Marshall County; 39°51′01″,80°48′52″; 39°50′58″,80°48′49″; 39°50′50″,80°49′09″; 39°50′45″,80°49′02″:

3.1.e. Kanawha River; Kanawha County; 38°12′27″,81°25′23″; 38°12′24″,81°25′28″; 38°12′36″,81°25′29″; 38°12′35″,81°25′34″:

3.1.f. Pleasants/Willow Island; Pleasants County; 39°21′56″,81°17′43″; 39°21′51",81°17′49″; 39°22′10″,81°17′39″; 39°22′05″,81°18′00″:

3.1.g. Rivesville; Marion County; 39°31′54″,80°06′26″; 39°31′53″,80°06′28″; 39°31′55″,80°06′37″; 39°31′34″,80°06′36″ and:

3.1.h Sporn; Mason County; 38°58′19″,81°55′35″; 38°58′11″,81°55′26″; 38°58′15″,81°55′43″; 38°58′05″,81°55′35″.

3.2. Variance applicable areas for ash disposal sites at steam electric power generating facilities with their coordinates are as follows:

3.2.a. Kanawha River; Kanawha County; 38°12′20″,81°24′35″; 38°12′16″,81°24′34″; 38°12′18″, 81°25′02″; 38°12′13″,81°25′03″ and:

3.2.b. Sporn; Mason County; 38°57′58′,81°55′19″; 38°57′46″,81°55′11″; 38°57′51″,81°55′35″; 38°57′38″,81°55′26″.

3.3. Variance applicable areas shall be permanently marked by stationary monuments or other highly visible alternative methods. These monuments shall be protected from damage or removal as long as the variance is in effect.

3.4. The facility shall communicate to the Director as to which method is used to mark the variance applicable areas.

§47-57A-4. Groundwater Protection Standards and Preventative Action Limits.

4.1. Groundwater protection standards, preventative action limits and compliance monitoring stations are hereby established for the following sites and for the following individual constituents: beryllium, cadmium, chromium, nickel and selenium. (See tables 57A-4A through 57A-4F at the end of this rule.)

4.2. The groundwater protection standards and preventative action limits are established for coal storage and ash disposal ponds at variance applicable areas and shall not pertain to other activities or areas at the facility.

4.3. Compliance with preventative action limits shall also be determined at the same monitoring stations as the groundwater protection standards.

4.4. If any groundwater protection standard (GWPS) or preventative action limit (PAL) is exceeded, the Director shall cause such action to be taken as specified in section 5.0 of this rule to assure that standards of purity and quality are not violated.

§47-57A-5. Terms and Conditions.

5.1. Any constituent for which a variance is granted shall not cause a violation of water quality standards or groundwater quality standards at any receptor.

5.2. A sufficient number of monitoring wells of approved design and construction shall be installed and maintained between the variance applicable areas and the receptor. If the Director reasonably believes the current number and location of compliance monitoring wells is no longer adequate to monitor the variance applicable areas, the Director may order the installation of additional wells.

5.3. Groundwater protection standards and preventative action limits will be applied on intrawell comparisons; that is, each compliance monitoring well would stand alone, and not be collectively averaged with all wells monitoring the variance applicable areas.

5.4. Preventative action limits will be established at 80% (percent) of the groundwater protection standard or as otherwise determined by the Director.

5.5. Any expansion of existing coal storage areas or ash disposal ponds outside of its variance applicable areas is prohibited; unless these expanded areas employ all relevant mitigation practices in accordance with applicable rules promulgated pursuant to the Act.

5.6. Compliance monitoring shall begin on the effective date of this rule and shall continue in accordance with section 5.0 of this rule.

5.7. Compliance monitoring of the variance applicable areas shall be quarterly provided that three(3) successive preventative action limit (PAL) exceedences shall result in an increased monitoring frequency to monthly. Compliance monitoring will continue on a monthly basis until such time as the reason for the exceedences is resolved or the pattern of exceedences is broken by two(2) successive sampling events below the preventative action limits (PAL).

5.8. The Director upon determining that an exceedence of the preventative action limit (PAL) has occurred for any constituent shall notify the facility by certified mail that a verification sample shall be taken within thirty(30) days receipt of such notification to substantiate such exceedence. A verification sample which exceeds a preventative action limit (PAL) shall be deemed a second exceedence for purposes of establishing a pattern of exceedences.

5.9. If three(3) successive exceedences of the PAL should occur, the facility will initiate an assessment of the variance applicable area(s) which may include groundwater modeling to determine the cause of such exceedences. The results of such an assessment shall be reported to the Director.

5.10. If four(4) successive exceedences or five(5) exceedences of the PAL within a six(6) month period should occur, then the facility shall initiate a plan of mitigation to be approved by the Director in order to assure that groundwater protection standards are not violated.

5.11. If a groundwater protection standard is exceeded, sampling shall immediately be increased from quarterly to monthly. Compliance monitoring will continue on a monthly basis until such time as a reason for the exceedence is resolved, or until such time as there are two(2) successive sampling events below the preventative action limit (PAL).

5.12. The Director upon determining that an exceedence of the Groundwater Protection Standard (GWPS) has occurred for any constituent shall notify the facility by certified mail that a verification sample shall be taken within thirty(30) days receipt of such notification to substantiate such exceedence. A verification sample which exceeds a groundwater protection standard (GWPS) shall be deemed a second exceedence.

5.13. If a second successive exceedence of the groundwater protection standard (GWPS) should occur, the facility shall sample the receptor, and conduct an assessment of the variance applicable area(s) which may include groundwater modeling to determine the cause of such exceedence. The results of which shall be reported to the Director.

5.14. If a third successive exceedence of the groundwater protection standard (GWPS) should occur, or if there are four(4) exceedences of the Groundwater Protection Standard (GWPS) within a six(6) month period, the facility will initiate remedial action, including an evaluation of environmental and human health risks.

§47-57-A-6 Periodic Review.

6.1. No less frequently than every five(5) years the Director shall review all prior decisions granting these variances to determine their continual consistency with 47CSR57, "Groundwater Quality Standard Variances". Should the Director determine that any modification of such a decision is appropriate, the Director shall initiate rule making pursuant to W.Va. Code §29A-3.

TABLE 57-A-4A.

Beryllium (ppb)			
Coal Storage Areas	Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)	Compliance Monitoring Stations
Albright	24.0	19.2	MW 501, MW 502
Fort Martin	6.3	5.0	MW 608, MW610, MW 611
Kammer	52.0	41.6	MW 2, MW 3
Kanawha	109.0	87.2	MW-13, MW-14, MW-17
Pleasants/Willow Island	10.0	8.0	MW 903, MW 904, MW 906
Rivesville	9.1	7.3	MW 801, MW 802

TABLE 57-A-4B.

Cadmium (ppb)			
Coal Storage Areas	Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)	Compliance Monitoring Stations
Albright	58.0	46.4	MW 501, MW 502
Fort Martin	12.0	9.6	MW 608, MW 610, MW 611
Harrison	7.7	6.2	MW 701, MW 705, MW 706, MW 711
Kammer	182.0	145.6	MW 2, MW 3
Kanawha River	90.0	72.0	MW 13, MW 14, MW 17
Pleasants/Willow Island	8.6	6.9	MW 903, MW 904, MW 906
Rivesville	22.0	17.6	MW 801, MW 802
Sporn	6.4	5.1	MW 12, MW 13, MW 14

TABLE 57-A-4C.

Chromium (ppb)			
Coal Storage Areas	Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)	Compliance Monitoring Stations
Albright	190.0	152.0	MW 501, MW 502
Fort Martin	440.0	352.0	MW 608, MW 610, MW 611
Kammer	669.0	535.2	MW 2, MW 3
Kanawha River	140.0	112.0	MW 13, MW 14, MW 17
Pleasants/Willow Island	300.0	240.0	MW 903, MW 904, MW 906
Rivesville	120.0	96.0	MW 801, MW 802

TABLE 57-A-4D.

Nickel (ppb)			
Coal Storage Areas	Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)	Compliance Monitoring Stations
Albright	970.0	776.0	MW 501, MW 502
Fort Martin	433.0	347.0	MW 608, MW 610, MW 611
Harrison	328.0	263.0	MW 701, MW 705, MW 706, MW 711
Kammer	844.0	675.2	MW 2, MW 3
Kanawha River	2900.0	2320.0	MW 13, MW 14, MW 17
Pleasants/Willow Island	744.0	595.2	MW 903, MW 904, MW 906
Rivesville	299.0	240.0	MW 801, MW 802
Sporn	490.0	441.0	MW 12, MW 13, MW 14

TABLE 57-A-4E.

Nickel (ppb)			
Ash Disposal Ponds	Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)	Compliance Monitoring Stations
Sporn	119.0	95.2	MW 10

TABLE 57-A-4F.

Selenium (ppb)			
Ash Disposal Ponds	Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)	Compliance Monitoring Stations
Kanawha River	120.0	96.0	MW 2, MW 3, MW 5

REQUEST FOR VARIANCE FROM GROUNDWATER STANDARDS BY ALLEGHENY POWER (AP) AND AMERICAN ELECTRIC POWER (AEP)

INTRODUCTION:

Petition for Groundwater Quality Variances (47CSR57)

A petition for groundwater variances was filed by Allegheny Power (AP) and American Electric Power (AEP), for sources, which by their nature cannot be conducted or operated in compliance with groundwater quality standards published in 46CSR12, "Requirements Governing Groundwater Quality Standards".

Variances may be granted by the legislature to allow groundwater quality standards to be exceeded for a single source or class of sources which by their nature cannot be conducted in compliance with the requirements of W. Va. Code 22-12-5 "Groundwater Protection Act". The benefits of granting the variance must outweigh the benefit of complying with existing groundwater quality standards and demonstrate that there is no reasonable and prudent alternative available. The request must also show that granting the variance is more in the public interest than adherence to existing groundwater quality standards.

An initial notice of intent (NOI) to request a West Virginia Steam Electric Generation Industry class variance was filed on October 25, 1994, with the Director of the West Virginia Division of Environmental Protection (WVDEP). The WVDEP responded by providing AP and AEP the opportunity to conduct a four-year study to gather the necessary data to support this variance request. The Electric Power Research Institute (EPRI), conducted the AP/AEP study.

The purpose of the West Virginia Power Plant Groundwater Quality Study was to develop information needed to prepare and submit a class variance request for all West Virginia power stations and associated disposal sites in the AEP and AP systems. The objectives were met by assembling and reviewing data, performing field data collection, modeling transport of dissolved chemicals in groundwater, and conducting statistical analysis of groundwater quality data, and estimating potential impacts to receptors. The study includes 12 power plants, six operated by each participating utility. This work was done in coordination with the West Virginia Division of Environmental Protection (WVDEP).

Separate reports containing results of the field investigations and analysis of the collected information were prepared for each power plant. These reports provide a summary and synthesis of all the results, statistical analysis of the data, transport modeling results, and assessment of potential impacts on receptors.

American Electric Power and Allegheny Power have submitted in accordance with 47CSR57 requests for a class variance for groundwater quality standards published in

47CSR 12 for four metals, (beryllium, cadmium, chromium, and nickel). These metals have been found to be leaching from the coal storage areas into the groundwater at nine power generating facilities in the State. These coal storage areas are located at the Albright Plant, Preston Co.; Fort Martin Plant, Monongalia Co.; Harrison Plant, Harrison Co.; Kammer Plant, Marshall Co. Kanawha River Plant, Kanawha Co.; Pleasants/Willow Island Plant (two adjoining facilities); Pleasants Co.; Rivesville Plant, Marion Co.; and the Sporn Plant, Mason Co. These requests also include a request for a single source variance from groundwater quality standards at two on-site inactive ash ponds at the Sporn Plant for the metal Nickel, and the Kanawha River Plant for the metal Selenium. None of the metals for which the variances were requested appear on the WV DEP 303 (d) list. Levels of the constituents for which the variance is being requested are detailed in Table 1. Requested levels of concentrations were obtained by statistical analysis using a statistical analysis method developed by the Electrical Power Research Institute (EPRI) for WV DEP and patterned after the federal Environmental Protection Agency guidance document "Statistical Analysis for RCRA and Solid Waste Facilities".

Where the calculated groundwater protection standard was less than the maximum observed concentration after making Atchinson's or Cohen's adjustment, the maximum observed value was used. The procedure for this statistical analysis is detailed in Figure 1.

OBJECTIVES

The overall objectives of this multi-site analysis were to:

1. Characterize potential sources of groundwater contamination and the hydrogeology at the power plants and associated off-site disposal facilities;

2. Establish existing groundwater quality at each site;

3. Identify constituents that currently exceed West Virginia groundwater quality standards and therefore may require a variance;

4. Derive alternative concentrations for those constituents that may require a variance; and

5. Evaluate the potential impacts on receptors associated with those alternative concentration levels.

CRITERIA

The following criteria were considered in the decision to support the request for variances:

1. The metals could not impact a receptor, nor could there be off-site migration onto adjacent properties. Receptors are defined as a surface water body and public or private drinking water supplies.

CRITERIA continued

2. The variance had to be specific to an existing activity on-site, and could not be extended to other activities on-site not listed in the variance application.

3. The concentration for which the variance was requested had to be achievable with a 95% confidence level using WV DEP's statistical model.

4. Preventative Action Limits (PALs) would be established at 80% of the variance concentration requested or as otherwise determined by WV DEP. The PAL would not be considered a violation of the variance standard, but would cause some action to be taken. The WV DEP would monitor the situation to determine a pattern in the concentration of the constituents towards exceeding the variance concentrations. Should three successive exceedences of the PAL occur, requirements stated in the Terms and Conditions of the rule would be mandated.

5. Quarterly monitoring would be established by the rule. A pattern of three(3) successive exceedences of the PAL would result in an increased monitoring frequency to monthly until such time as the reason for the exceedences is resolved or the pattern of exceedences is broken by two(2) successive sampling events below the PAL.

6. PALs and variance concentrations would be applied on an intra-well comparison; that is, each monitoring well would stand alone, and not be collectively averaged with all wells monitoring site activity. The PAL's and Groundwater Protection Standards (GWPS) would be established at specified compliance wells.

7. The variance applies to only those existing sites/activities listed in the variance application; and does not apply to the expansion of the sites/activities. All expansions must employ preventative groundwater protection practices established by 47CSR58, or other relevant rules and statutes.

8. A minimum of six (6) sampling events are necessary to statistically validate the concentration of the parameters for the variance request.

Table 1.	Existing Groundwater Quality							
Coal Storage Areas	Beryllium (µg/L)[3] GW Standard 4 µg/L				Cadmium (µg/L)[3] GW Standard 5 µg/L			
	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)
Albright	24	24	20	19.2	58	58	53	46.4
Fort Martin	6.3	6.3	2.3	5.04	9.8	12	7	9.6
Harrison	below existing standards	existing standards	n/a[1]	n/a[1]	7.7	7.7	2.7	6.16
Kammer	34	52	48	41.6	140	182	177	145.6
Kanawha River	80	109	105	87.2	81	90	85	72
Pleasants/ Willow Island	19	10	6	8	30	8.6	3.6	6.88
Rivesville	9.1	9.1	5.1	7.28	22	22	17	17.6
Sporn	below existing standards	existing standards	n/a[1]	n/a[1]	96	6.4	1.4	5.12
Coal Storage Areas	Chromium (µg/L)[3] GW Standard 100 µg/L				Nickel (µg/L)[3] GW Standard 100 µg/L			
	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)
Albright	190	190	90	152	960	970	870	776
Fort Martin	440	440	340	352	410	433	333	346
Harrison	below existing standards	existing standards	n/a[1]	n/a[1]	220	328	128	262
Kammer	480	669	569	535.2	844	844	744	675.2
Kanawha River	140	140	40	112	2900	2900	2800	2320
Pleasants/ Willow Island	300	300	200	240	1800	744	644	595.2
Rivesville	120	120	20	96	260	299	199	239
Sporn	below existing standards	existing standards	n/a[1]	n/a[1]	1300	490	390	475
Ash Pond Areas	Nickel (µg/L)[3] GW Standard 100 µg/L				Selenium (µg/L)[3] GW Standard 50 µg/L			
	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)	maximum observed[6]	GWPS[4] (µg/L)	Increase[2] (µg/L)	PAL[5] µg/L)
Kanawha River	below existing standards	existing standards	n/a[1]	n/a[1]	120	120	70	96
Sporn	110	119	19	95.2	below existing standards	existing standards	n/a[1]	n/a[1]

Explanation:

1. "n/a" means not applicable because the constituent meets existing groundwater quality standards.
2. "increase" means the difference between the existing groundwater quality standard and the proposed groundwater quality standard.
3. "µg/L" means micrograms per liter.
4. "GWPS" means Groundwater Protection Standards requested pursuant to 47CSR57 "Groundwater Quality Standard Variances".
5. "PAL" means Preventive Action Limits which is a numeric value expressing the concentration of a substance in groundwater that, if exceeded, causes action to be taken to assure the standards of purity and quality of groundwater are not violated.
6. "maximum observed" includes monitoring well and direct-push sample data

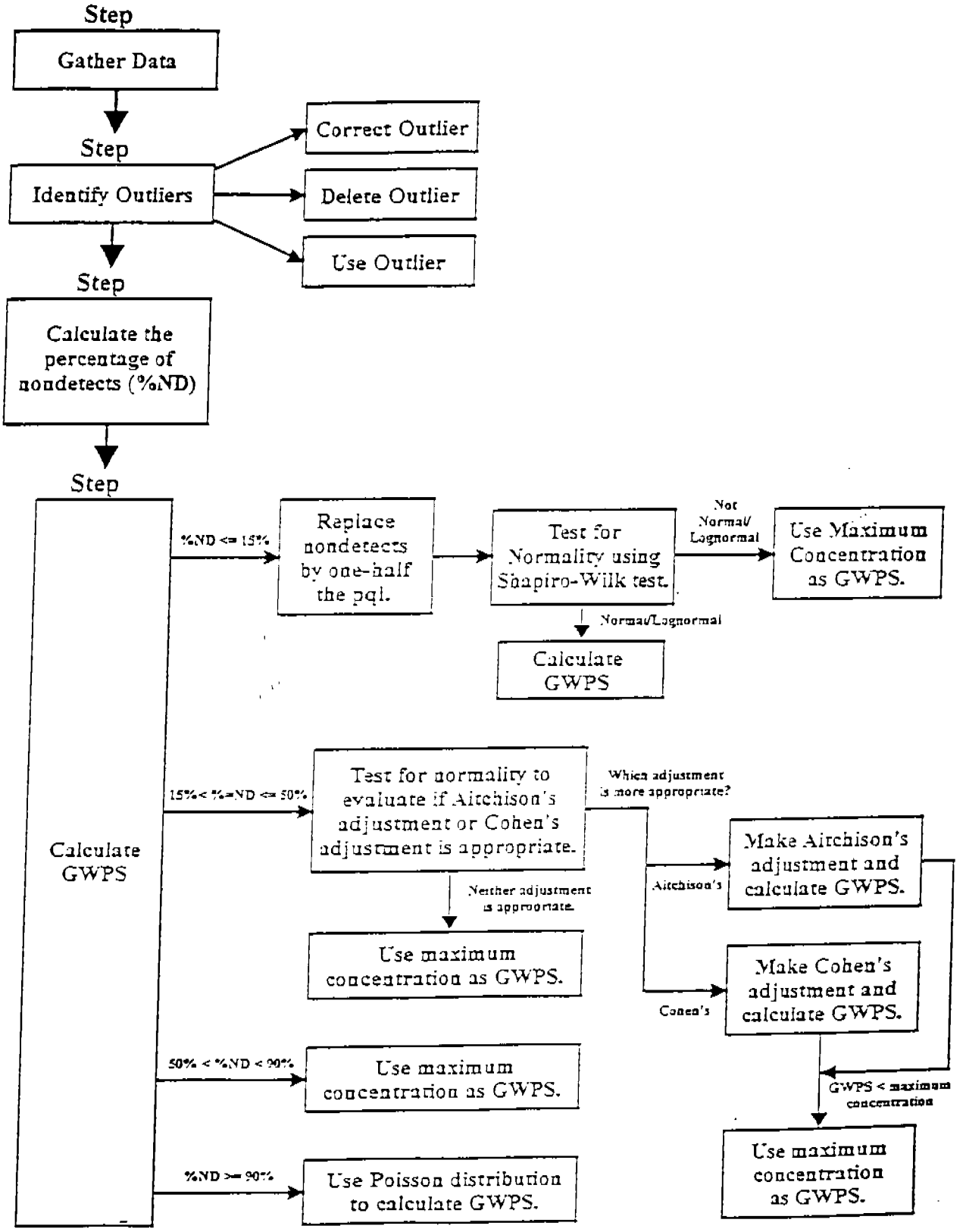

Figure 1. Statistical procedure Used to Calculate Groundwater Protection Standard Values

TECHNICAL APPROACH

From 1995 through 1998, extensive field studies were performed to broadly characterize groundwater quality at all of the power plants and associated off-site combustion by-product disposal facilities. The approach taken for the field studies consisted of collection and chemical analysis of groundwater samples using direct-push drive-point methods, installation of new monitoring wells, collection and chemical analysis of groundwater samples from both new and pre-existing monitoring wells, and special sampling to characterize soil porewater and groundwater quality directly below coal storage areas at each power plant.

A total of 80 wells were installed specifically for this study for geologic characterization, hydraulic testing, and groundwater quality characterization. Wells were intentionally located in areas with the highest groundwater concentrations based on results of initial direct-push groundwater sampling. More than 750 groundwater samples, including direct-push samples, were collected and analyzed for an analyte list that included up to 40 inorganic and organic constituents. An additional 134 samples were collected and analyzed to characterize surface water and leachate in potential source areas, such as coal pile runoff ponds, wastewater lagoons, and disposal impoundments. The number of samples collected at plant sites requesting a variance is shown in Table 2. The four-year study developed a comprehensive database for characterizing hydrogeology and groundwater quality at power plants and combustion by-product disposal facilities in West Virginia.

Table 2. Number of Samples Collected at Plant Sites

			Number of Groundwater Samples	
	Number of on-site Pond Water Samples [1]	Number of Monitoring Wells	Direct Push Samples	Monitoring Well Samples
Albright	6	5	7	25
Fort Martin	9	7	13	30
Harrison	6	10	0	23
Kammer	8	3	19	10
Kanawha River	9	16	4	46
Pleasants/Willow Island	12	8	32	24
Rivesville	5	3	3	10
Sporn	8	10	25	28
Total	63	62	103	196

[1] Wastewater lagoons, coal pile runoff sumps, etc.

Variance candidates were identified for each site based on the field investigation results. A variance candidate was defined as any constituent that exceeded the West Virginia Groundwater Standards (WVGS) Title 46 CSR 12 due to a specific power plant activity. Statistical analysis using a method previously approved by the WVDEP was performed for each variance candidate to derive its maximum concentration near the source. The statistical procedure used is detailed in Figure 1. An analytical solute transport model

was then used to estimate the maximum groundwater concentration at the nearest potential receptor, usually a river, within a 100 year time period. The modeled concentration at the river was used with the estimated groundwater discharge rate to project the maximum potential mass loading rate to the river.

RESULTS

Results are presented separately for the power plant sites and the off-site disposal facilities.

Power Plant Sites

The plants cover a broad range of ages and sizes. Generating capacities range from 140 to 2900 megawatts (MW), plant areas range from 19 to 850 acres, and plant ages ranges from 19 to 76 years. The Rivesville Plant is the oldest, smallest, and has the lowest generating capacity. Coal storage piles at the plant sites range from 2 to 20 acres in total area. Other potential sources of groundwater contamination include wastewater lagoons, on-site ash ponds, underground and aboveground storage tanks, materials handling and storage areas, and maintenance facilities. Information for the plant sites requesting a variance is summarized in Table 3.

Table 3. Summary of Plant Site Information

Plant	County	Plant Size (acres)	Generating Capacity (MW)[1]	Plant Age (years)	Coal Pile Area (acres)
Albright	Preston	45	300	46	5
Fort Martin	Monongalia	71	1100	30	17
Harrison	Harrison	130	1920	26	16
Kammer	Marshall	145	630	40	15
Kanawha River	Kanawha	130	400	45	8
Pleasants/ Willow Island	Pleasants	168	1250/250	19/49	20
Rivesville	Marion	19	140	76	2
Sporn	Mason	230	1050	48	15

[1]Megawatts

The plant sites have similar hydrogeologic characteristics. These characteristics are shown in Table 4. All of the plants are located adjacent to major rivers, and unconsolidated alluvium is the primary groundwater aquifer. The rivers are regional groundwater divides that intercept groundwater discharge from alluvium and shallow bedrock units, and therefore are the primary receptors of any constituents released to groundwater at the power plants.

Table 4.	Summary of Hydrogeologic Characteristics of the Plant Sites				
Plant	**River**	**Alluvium Thickness (ft.)**	**Depth to Water Table (ft.)**	**Saturated Hydraulic Conductivity (ft/day)**	**Primary Water-Bearing Unit**
Albright	Cheat	30 to 40	6 to 18	0.5 - 104	sand/gravel/cobbles
Fort Martin	Monongahela	30 to 40	7 to 14	0.1 - 8.8	sand & clay
Harrison	West Fork	5 to 45	7 to 66	0.2 - 3.5	bedrock
Kammer	Ohio	50 to 70	19 to 21	300	clayey-gravelly sand
Kanawha River	Kanawha	30 to 90	4 to 60	0.2 - 6.2	silty-clayey sand/gravel
Pleasants/ Willow Island	Ohio	70 to 80	33 to 38	79 - 1900	sand & gravel
Rivesville	Monongahela	15 to 45	9 to 16	0.9 - 7.8	silty clay
Sporn	Ohio	50 to 100	22 to 60	0.02 - 333	silty sand/sandy gravel

Five chemicals were identified as variance candidates at the power plant sites - beryllium, cadmium, chromium, and nickel near coal storage areas at nine plants; and selenium and nickel near on-site ash ponds at two plants. The maximum observed groundwater concentrations and the statistically estimated groundwater protections standards for each constituent are summarized in Table 1.

Beryllium, cadmium, chromium, and nickel each equaled or exceeded the WVGS in more than five percent of all monitoring well samples at the plant sites. Nickel exceedences were most frequent, occurring in 25 percent of all monitoring well samples, and at 8 of the 11 plant sites. Beryllium and cadmium exceeded the WVGS in just over 12 percent of all monitoring well samples. A summary of monitoring well groundwater quality data for the plant sites is shown in Table 5. Chromium exceedences were least common, occurring at 6 of the 11 plant sites in just 6 percent of the samples. The number of samples exceeding WV DEP standards is shown in Table 6. A comparison of maximum calculated in-stream concentrations to river water quality criteria for each variance request location is shown in Table 7.

Elevated concentrations of these four constituents were generally associated with coal storage areas. Groundwater near coal storage areas was also characterized by high sulfate and iron concentrations and low pH, suggesting pyrite oxidation. The low pH conditions likely facilitate solubilization and migration of the heavy metals. Coal pile runoff samples and porewater samples confirmed that the coal piles are sources of the four constituents. Highest groundwater concentrations were measured near coal pile runoff ponds, ditches, and sumps at several of these sites. These areas may be the primary sources of the metals to groundwater.

Selenium was above the WVGS in four samples collected near an inactive ash pond at the Kanawha River Plant. All four selenium exceedences occurred in two wells downgradient of the ash pond. The maximum observed concentration was 120 ug/L, a

little more than two times the WVGS of 50ug/L. Selenium is often present in coal ash leachate, and other ash leachate constituents (sulfate and boron) were also found in groundwater around the pond. Nickel was above the WVGS in one well downgradient of a closed on-site ash disposal pond at the Sporn Plant. Nickel exceeded the standard in one of eight samples collected from the well. The maximum concentration was 110 ug/L, slightly above the WVGS of 100 ug/L, sulfate and boron were not elevated in the well.

Four other inorganic constituents - fluoride, antimony, lead, and thallium - also exceeded the WVGS in at least one groundwater sample at one or more plant site. Of these, lead exceedences were most frequent, occurring in 3.1 percent of the monitoring well samples. However, these exceedences were sporadic and isolated, and did not appear to be associated with power plant activities. Therefore, these constituents were not identified as variance candidates. No other organic constituents exceeded a WVGS in any groundwater sample.

Groundwater transport modeling was performed for all the variance candidates to estimate maximum groundwater concentrations at the receptor for a 100-year simulation period. For all variance candidates except DCE at the Mitchell Plant, the maximum predicted concentration at the river was used with the estimated groundwater discharge rate and 25 percent of the 7Q10 river flow to estimate maximum in-stream concentrations over the 100-year period. In all cases, the potential maximum in-stream concentrations were below applicable water quality criteria, often by several orders of magnitude. Groundwater and river discharge data for all plant sites is shown in Table 8. River water quality criteria at the plant sites is shown in Table 9.

Maps of the plant sites are shown in Figures 2 through 9 on the following pages.

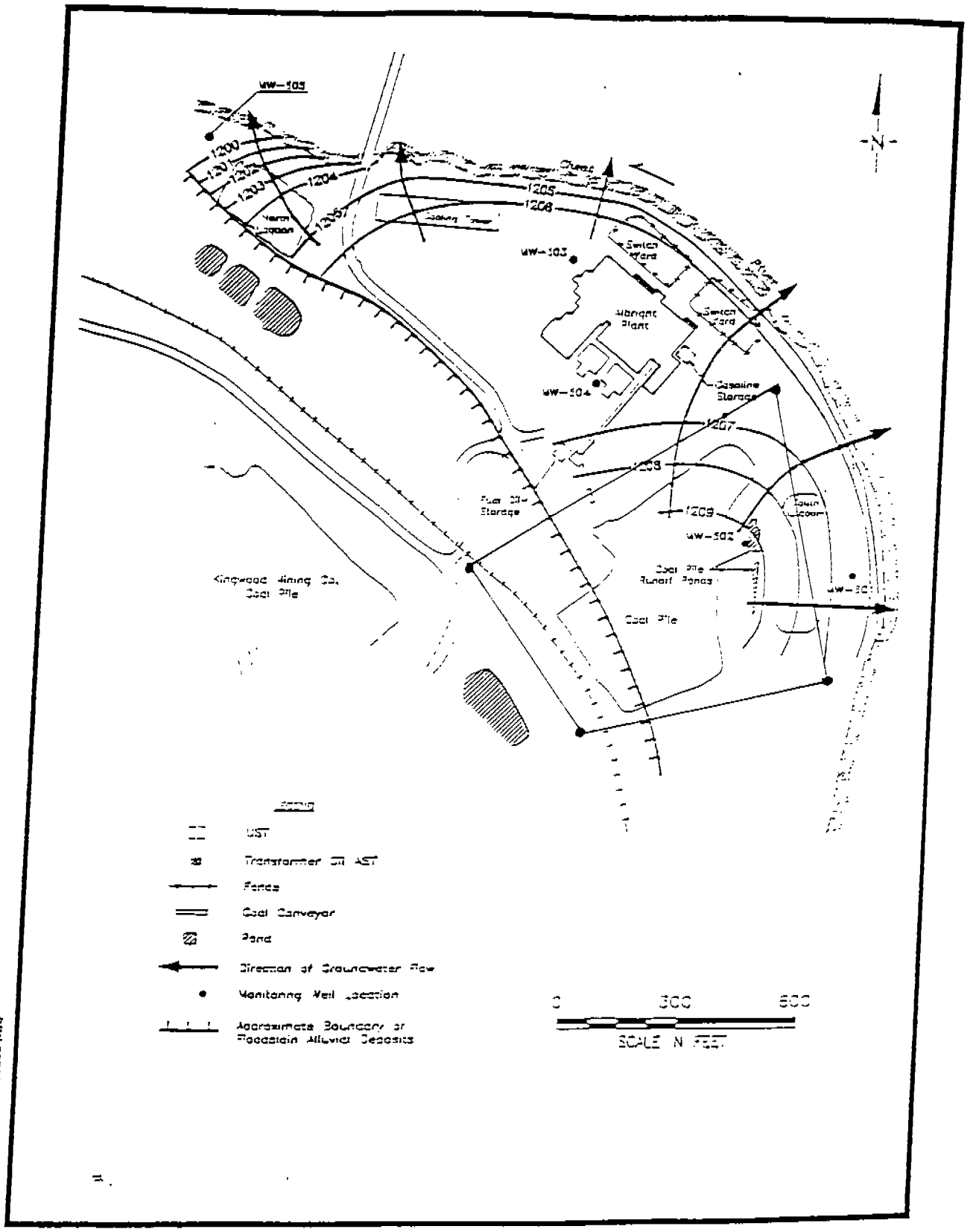

Figure 2. Albright Plant

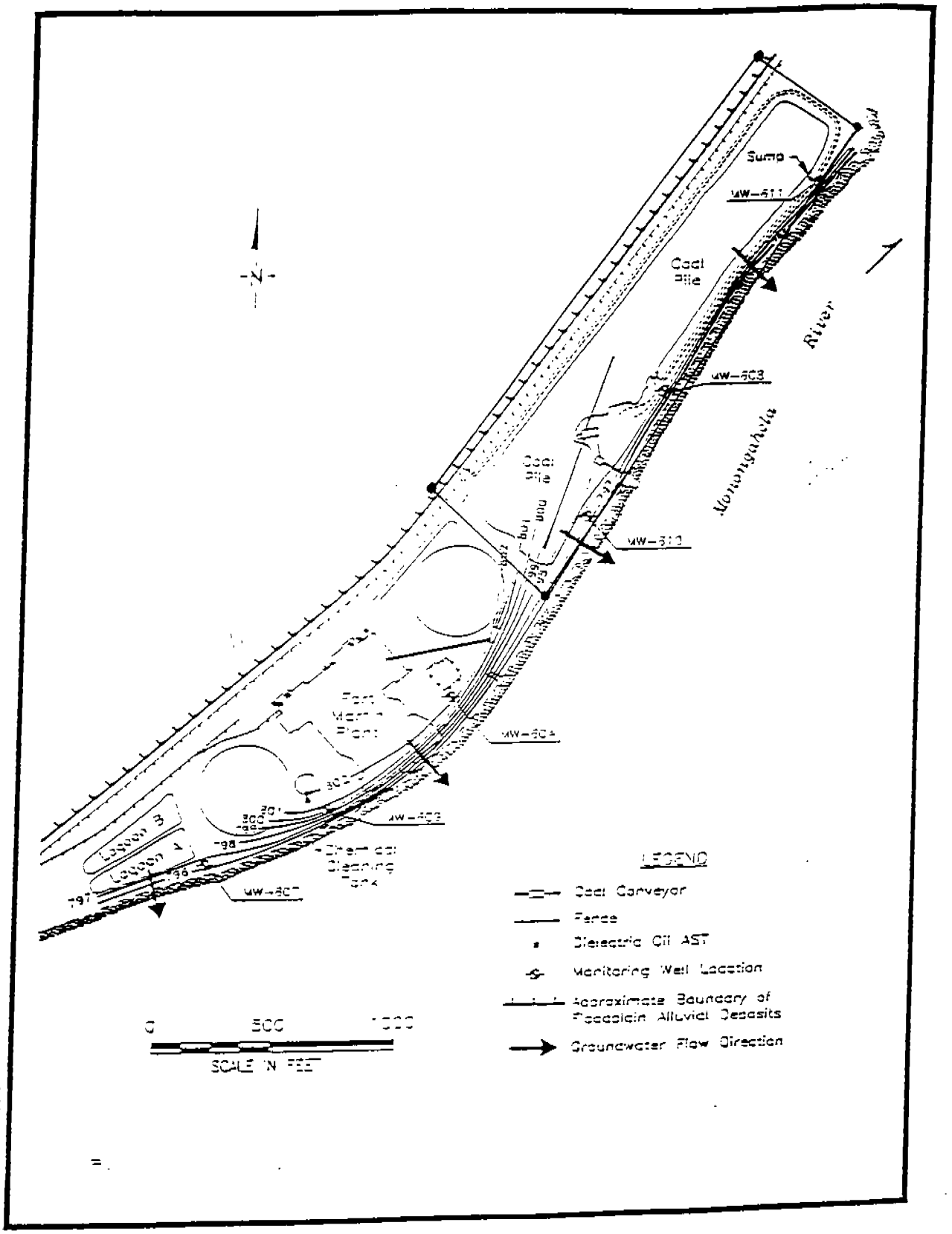

Figure 3. Fort Martin Plant

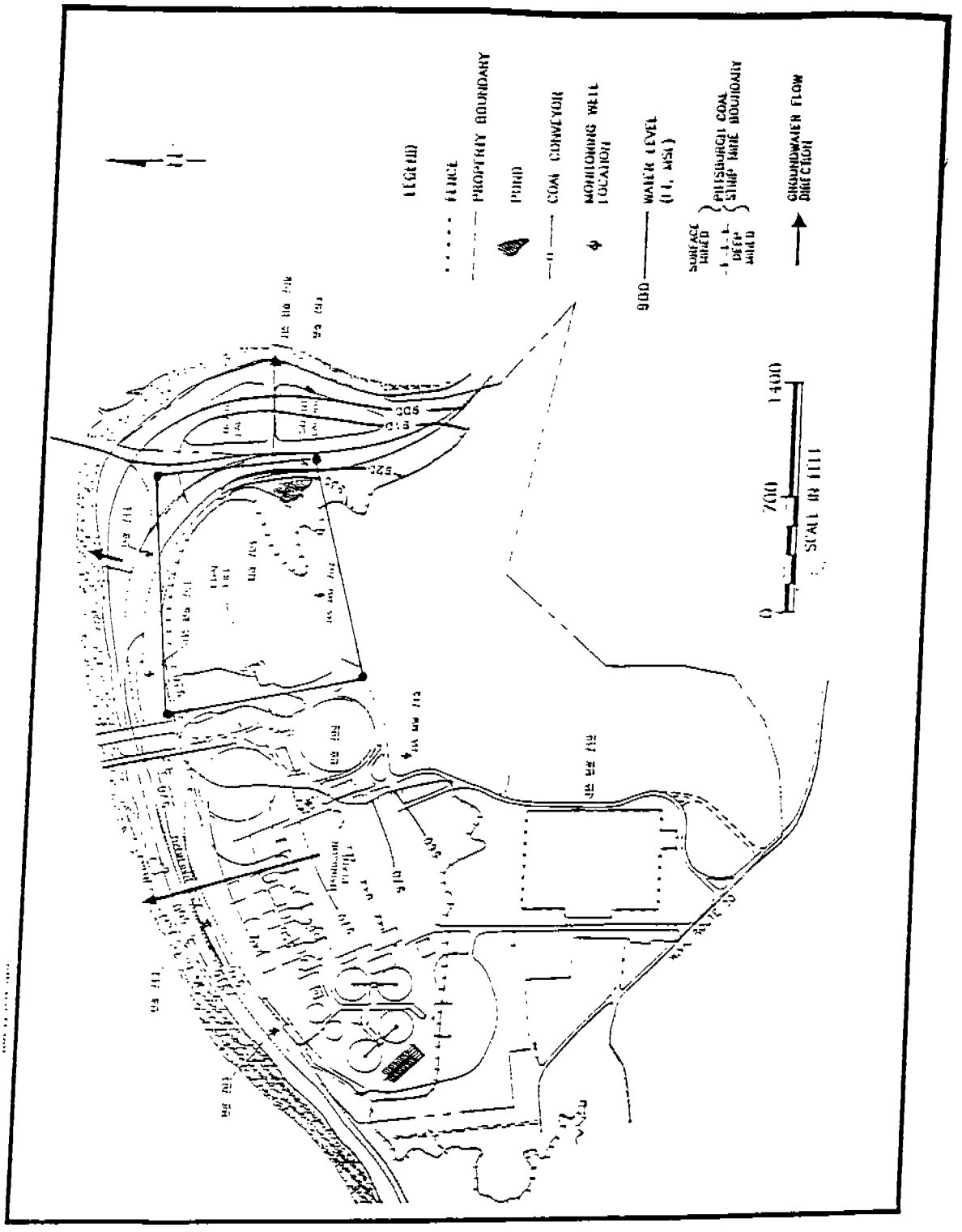

Figure 4. Harrison Plant

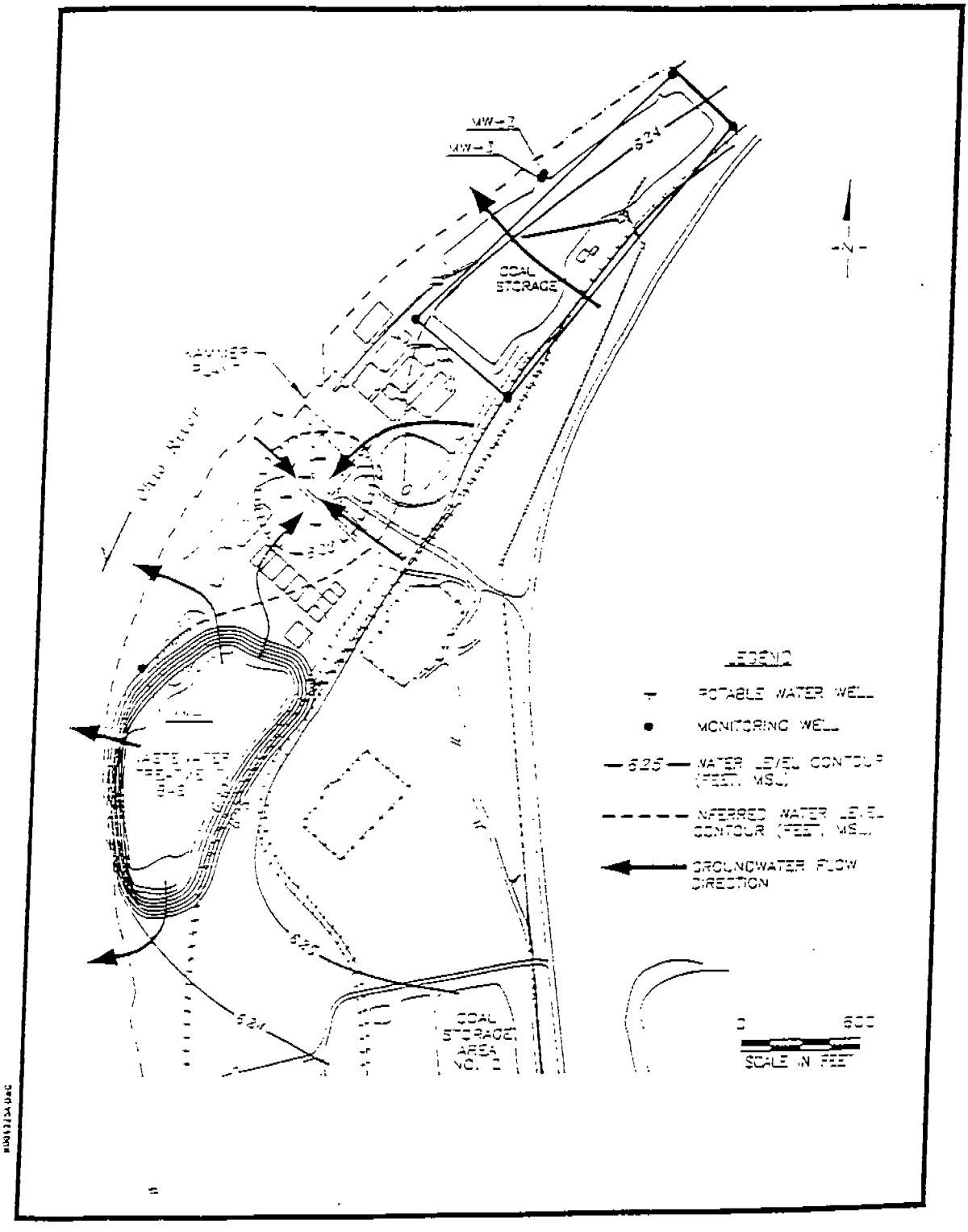

Figure 5. Kammer Plant

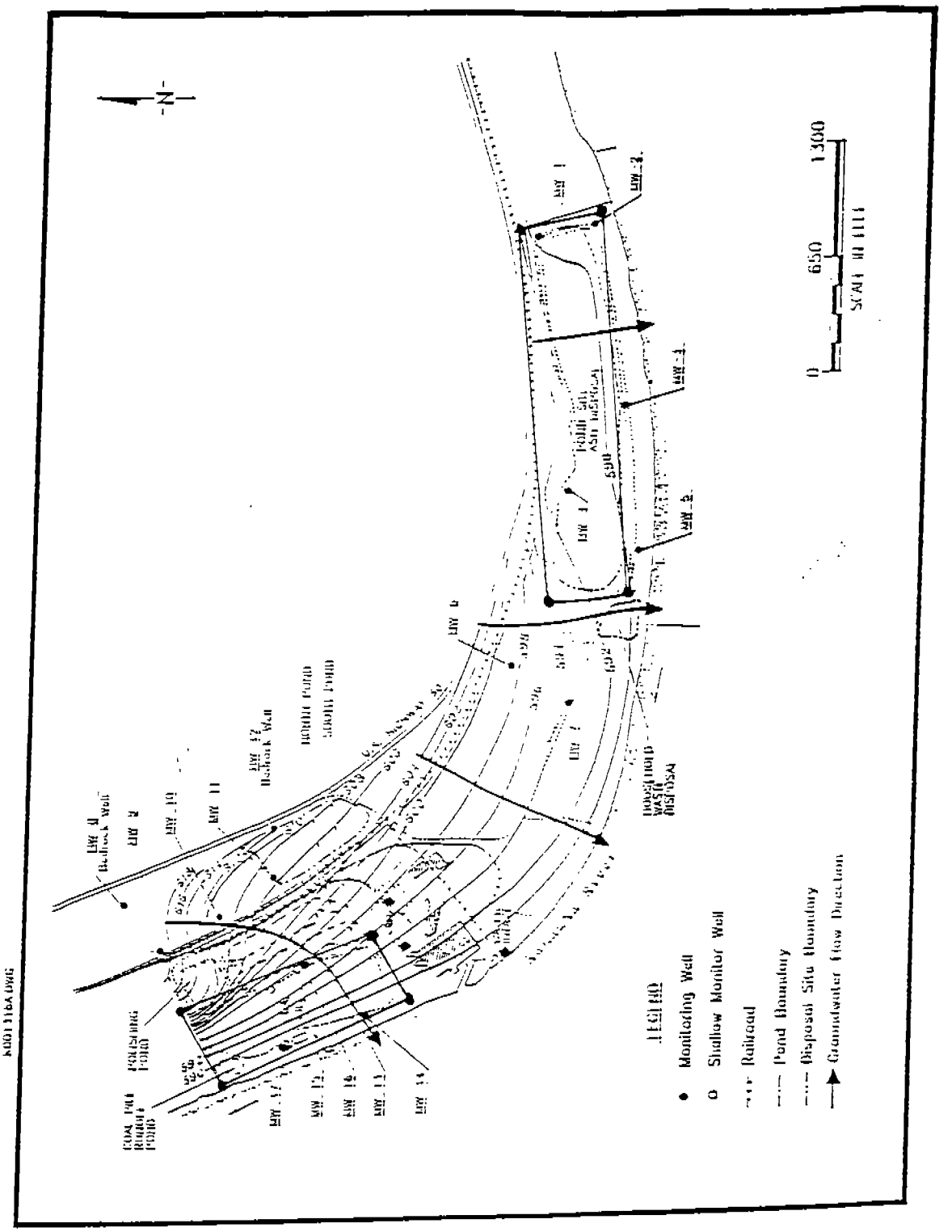

Figure 6. Kanawha River Plant

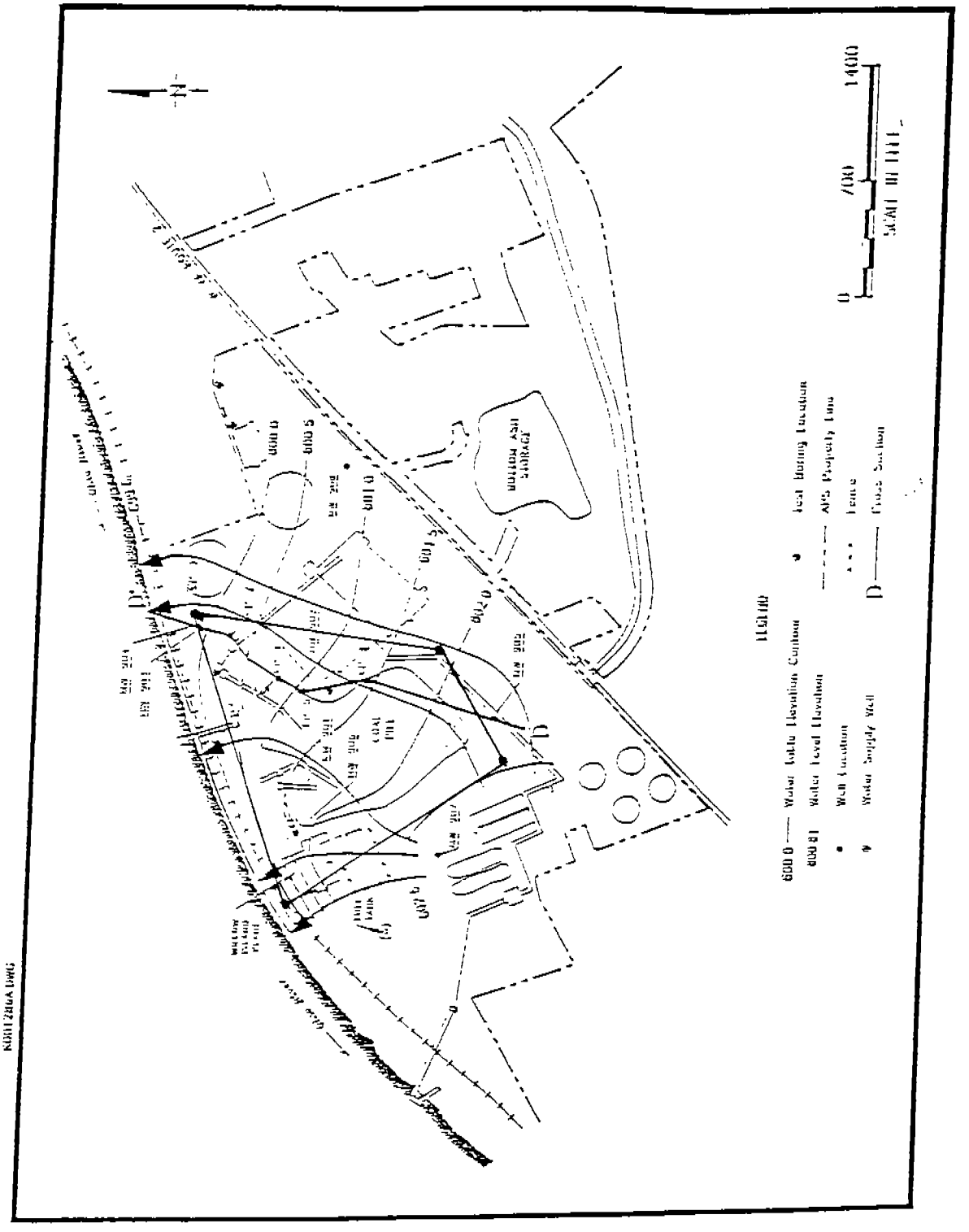

Figure 7. Pleasants/Willow Island Plant

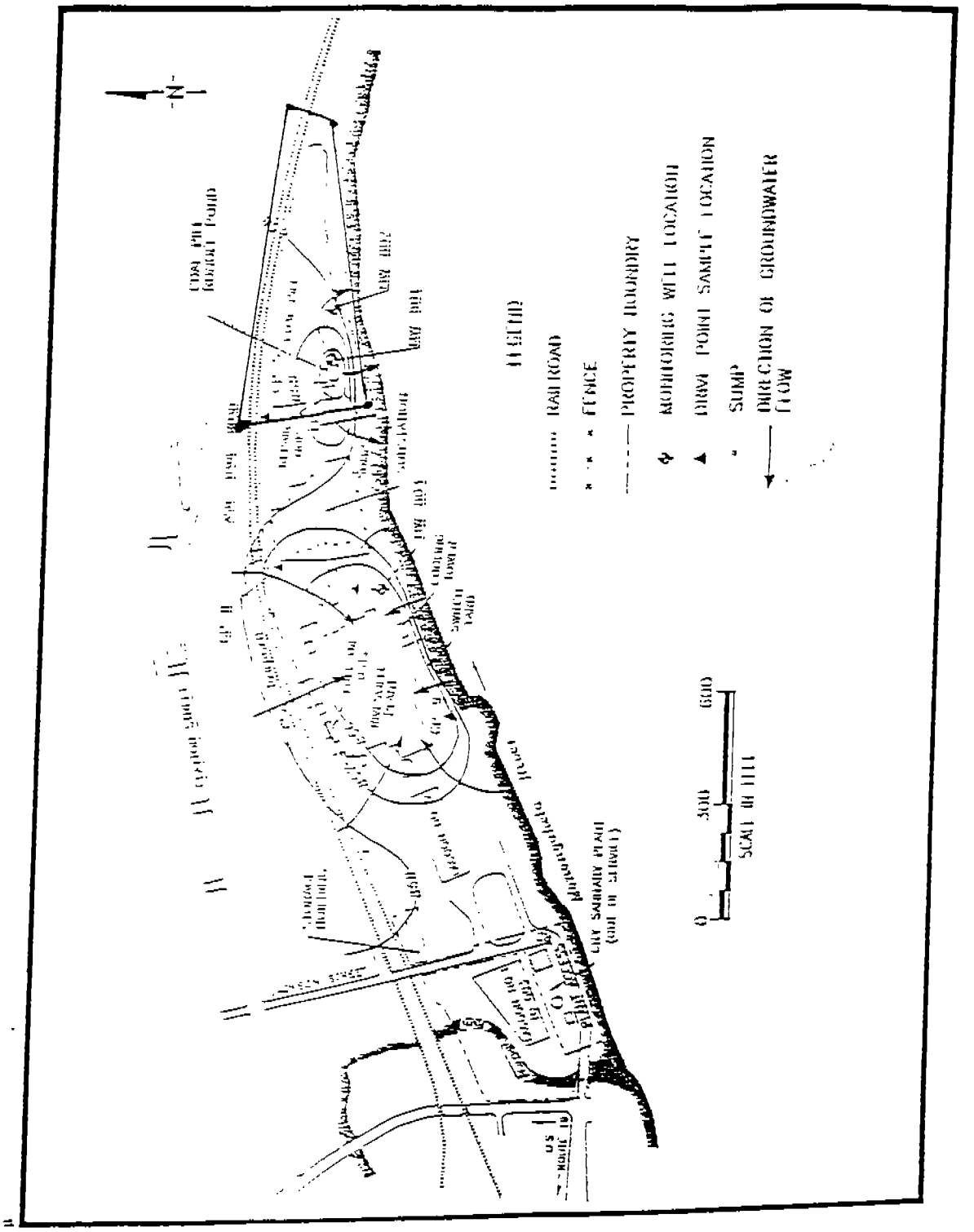

Figure 8. Rivesville Plant

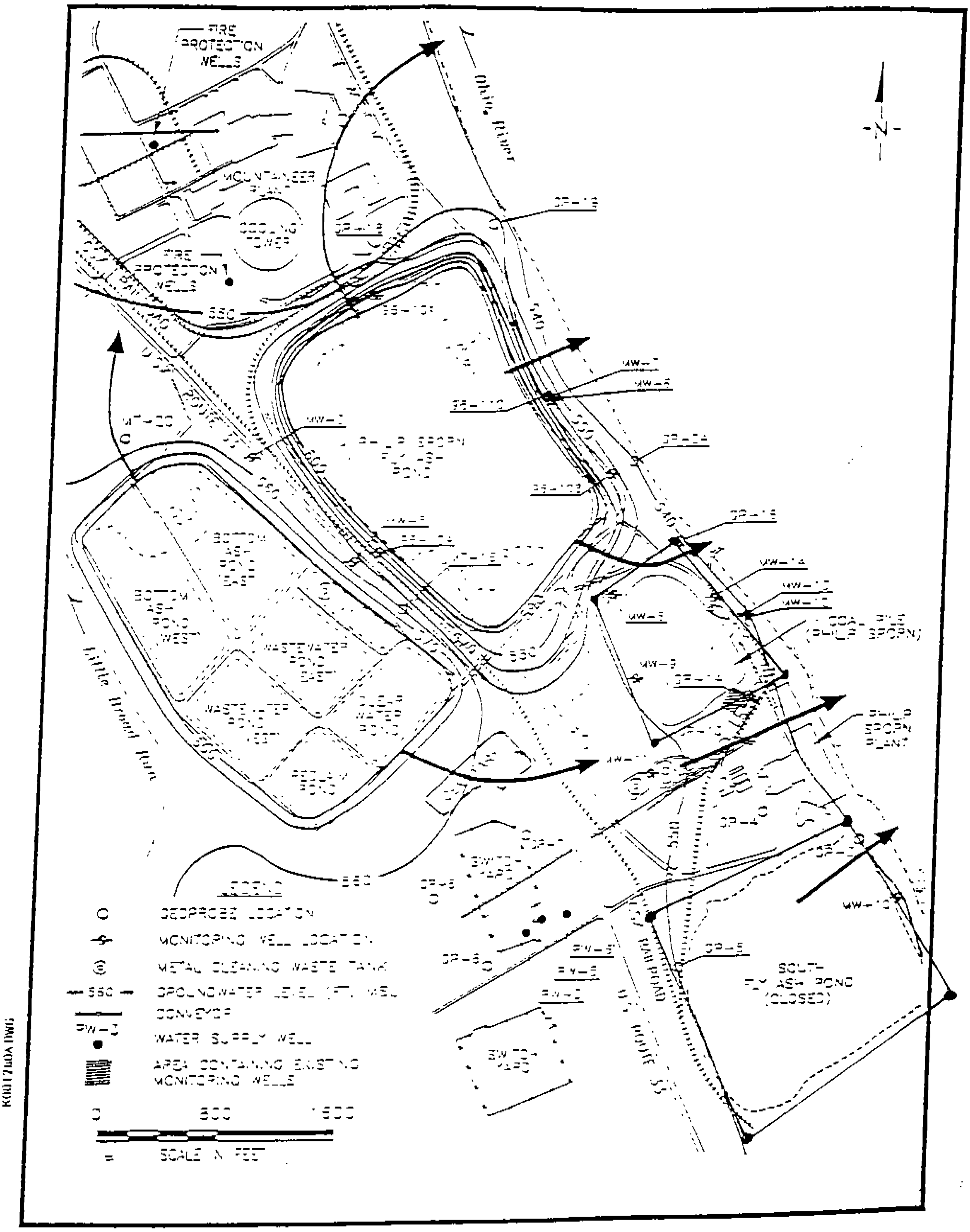

Figure 9. Sporn Plant

Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

Analyte	Units	ALBRIGHT			AMOS			FORT MARTIN		
		Count	Minimum	Maximum	Count	Minimum	Maximum	Count	Minimum	Maximum
pH	su	25	2.36	5.95	29	5.85	6.56	30	5.05	7.39
Spec. Cond.	(umhos/cm)	25	450	3900	30	160	820	30	210	3300
TDS	mg/L	25	310	3500	30	98	500	30	130	4300
Major Constituents										
Alkalinity	mg/L	25	bdl	300	20	8.0	180	30	bdl	220
Calcium	mg/L	25	31	340	28	12	98	30	2*	590
Chloride	mg/L	25	2.0	68	30	4.0	37	30	4.0	38
Fluoride	mg/L	25	bdl	4.4	30	bdl	0.2	30	0.1	0.6
Magnesium	mg/L	25	19	64	20	2.4	30	30	3.8	110
Nitrate-N	mg/L	25	bdl	1.4	30	bdl	0.9	30	bdl	0.1
Nitrite-N	mg/L	25	bdl	0.2	30	bdl	0.1	30	bdl	0.1
Nitrate/Nitrite-N	mg/L	25	bdl	0.5	30	bdl	0.3	30	bdl	5.0
Potassium	mg/L	25	bdl	17	30	bdl	2.4	26	bdl	6.3
Sodium	mg/L	25	bdl	22	30	bdl	40	30	bdl	120
Sulfate	mg/L	25	190	4000	30	17	330	30	4.0	2900
Minor/Trace Constituents										
Antimony	ug/L	25	bdl	bdl	30	bdl	bdl	30	bdl	bdl
Arsenic	ug/L	25	bdl	75	30	bdl	24	30	bdl	52
Barium	ug/L	25	bdl	1000	30	bdl	160	30	bdl	890
Beryllium	ug/L	25	bdl	24	30	bdl	bdl	30	bdl	6.3
Boron	ug/L	25	bdl	820	30	bdl	bdl	30	bdl	bdl
Cadmium	ug/L	25	bdl	58	30	bdl	bdl	30	bdl	10
Chromium	ug/L	25	bdl	190	30	bdl	24	30	bdl	440
Iron	ug/L	25	910	740000	30	bdl	60000	30	bdl	990000
Lead	ug/L	25	bdl	180	30	bdl	bdl	30	bdl	80
Mercury	ug/L	25	bdl	bdl	30	bdl	bdl	30	bdl	bdl
Molybdenum	ug/L	25	bdl	15000	30	bdl	bdl	30	bdl	5.3
Nickel	ug/L	25	bdl	960	26	bdl	13	30	bdl	410
Selenium	ug/L	25	bdl	14	30	bdl	bdl	30	bdl	35
Thallium	ug/L	23	bdl	bdl	30	bdl	2.0	29	bdl	bdl
Organics:										
Benzene	ug/L	15	bdl	2.4	17	bdl	bdl	19	bdl	bdl
Toluene	ug/L	15	bdl	2.3	17	bdl	bdl	19	bdl	1.9
Ethylbenzene	ug/L	15	bdl	bdl	17	bdl	bdl	19	bdl	bdl
Total Xylenes	ug/L	15	bdl	1.3	17	bdl	bdl	19	bdl	bdl
Carbon tetrachloride	ug/L	15	bdl	bdl	17	bdl	bdl	19	bdl	bdl
1,1-Dichloroethene	ug/L	15	bdl	bdl	17	bdl	30	19	bdl	bdl
1,1,1-Trichloroethane	ug/L	15	bdl	16	17	bdl	130	19	bdl	2.8
Trichloroethene	ug/L	15	bdl	bdl	17	bdl	8.9	19	bdl	bdl

bdl - below detection limit
Shaded values equal/exceed WVGS

Table 5. Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

Analyte	Units	HARRISON			KAMMER			KANAWHA RIVER		
		Count	Minimum	Maximum	Count	Minimum	Maximum	Count	Minimum	Maximum
pH	su	23	6.02	10.54	10	3.49	6.12	46	3.56	7.59
Spec. Cond.	(umhos/cm)	23	610	2900	10	570	5100	46	150	4000
TDS	mg/L	23	360	3100	10	370	7500	46	90	5400
Major Constituents										
Alkalinity	mg/L	23	bdl	510	10	bdl	200	31	bdl	220
Calcium	mg/L	23	62	780	10	40	520	46	bdl	580
Chloride	mg/L	23	5.0	76	10	45	120	46	bdl	53
Fluoride	mg/L	23	bdl	0.4	10	0.1	2.5	46	bdl	0.5
Magnesium	mg/L	23	7.1	110	10	7.3	99	46	bdl	280
Nitrate-N	mg/L	23	bdl	0.5	10	bdl	0.1	46	bdl	2.1
Nitrite-N	mg/L	23	bdl	0.2	10	bdl	0.1	46	bdl	bdl
Nitrate/Nitrite-N	mg/L	23	bdl	5.1	10	bdl	bdl	46	bdl	2.0
Potassium	mg/L	23	1.3	17.0	9	bdl	2.7	46	bdl	19.0
Sodium	mg/L	23	8.0	150	10	4*	310	46	bdl	120
Sulfate	mg/L	23	51	2000	10	150	6300	46	5.0	3600
Minor/Trace Constituents										
Antimony	ug/L	23	bdl	5.2	10	bdl	bdl	46	bdl	bdl
Arsenic	ug/L	23	bdl	100	10	bdl	bdl	46	bdl	20
Barium	ug/L	23	9.*	520	10	bdl	110	46	bdl	670
Beryllium	ug/L	23	bdl	1.6	10	bdl	24	46	bdl	180
Boron	ug/L	23	bdl	1900	10	bdl	360	46	bdl	11000
Cadmium	ug/L	23	bdl	3	10	bdl	140	46	bdl	33
Chromium	ug/L	23	bdl	69	10	bdl	130	46	bdl	140
Iron	ug/L	23	bdl	200000	10	2900	1000000	46	bdl	37000
Lead	ug/L	23	bdl	24	10	bdl	22	46	bdl	bdl
Mercury	ug/L	23	bdl	1.2	10	bdl	bdl	46	bdl	bdl
Molybdenum	ug/L	23	bdl	9.7	10	bdl	bdl	46	bdl	70
Nickel	ug/L	23	bdl	100	10	34	860	46	bdl	2900
Selenium	ug/L	23	bdl	22	10	bdl	14	46	bdl	120
Thallium	ug/L	23	bdl	bdl	8	bdl	bdl	46	bdl	3.7
Organics:										
Benzene	ug/L	20	bdl	1.7	6	bdl	bdl	15	bdl	bdl
Toluene	ug/L	20	bdl	bdl	6	bdl	bdl	15	bdl	1.0
Ethylbenzene	ug/L	20	bdl	bdl	6	bdl	bdl	15	bdl	bdl
Total Xylenes	ug/L	20	bdl	1.5	6	bdl	bdl	15	bdl	bdl
Carbon tetrachloride	ug/L	20	bdl	bdl	6	bdl	bdl	15	bdl	bdl
1,1-Dichloroethene	ug/L	20	bdl	bdl	6	bdl	bdl	15	bdl	bdl
1,1,1-Trichloroethane	ug/L	20	bdl	bdl	6	bdl	bdl	15	bdl	bdl
Trichloroethene	ug/L	20	bdl	bdl	6	bdl	bdl	15	bdl	bdl

bdl - below detection limit
Shaded values equal/exceed WVGS

Table 5. continued Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

		MITCHELL			MOUNTAINEER			PLEASANTS		
Analyte	Units	Count	Minimum	Maximum	Count	Minimum	Maximum	Count	Minimum	Maximum
pH	su	18	6.69	7.83	15	6.20	7.92	24	4.69	7.58
Spec. Cond.	(umhos/cm)	18	450	3000	15	420	1000	24	350	4400
TDS	mg/L	18	280	3400	15	280	620	24	220	5100
Major Constituents										
Alkalinity	mg/L	18	160	420	15	57	400	16	bdl	220
Calcium	mg/L	17	80	820	15	51	100	11	24	1200
Chloride	mg/L	18	25	540	15	15	35	24	bdl	840
Fluoride	mg/L	18	0.1	0.2	15	0.1	0.3	24	0.1	2.3
Magnesium	mg/L	18	8.0	110	15	8.3	16	11	6.3	180
Nitrate-N	mg/L	18	bdl	3.8	15	0.1	1.1	24	bdl	1.6
Nitrite-N	mg/L	18	bdl	bdl	15	bdl	bdl	24	bdl	0.1
Nitrate/Nitrite-N	mg/L	18	bdl	3.8	15	bdl	1.1	24	bdl	1.6
Potassium	mg/L	10	bdl	0.8	15	1.2	4.9	16	0.2	6.6
Sodium	mg/L	18	24	300	15	15	40	17	bdl	78
Sulfate	mg/L	18	41	1900	15	71	220	24	36	2400
Minor/Trace Constituents										
Antimony	ug/L	18	bdl	15	15	bdl	6.2	24	bdl	bdl
Arsenic	ug/L	18	bdl	5.5	15	bdl	bdl	23	bdl	13
Barium	ug/L	18	bdl	84	15	35	190	24	bdl	170
Beryllium	ug/L	18	bdl	bdl	15	bdl	bdl	24	bdl	10
Boron	ug/L	18	bdl	760	15	bdl	1000	24	bdl	1100
Cadmium	ug/L	18	bdl	bdl	15	bdl	bdl	22	bdl	17.0
Chromium	ug/L	18	bdl	bdl	15	bdl	bdl	24	bdl	300
Iron	ug/L	18	bdl	990	15	bdl	13000	24	bdl	40000
Lead	ug/L	18	bdl	bdl	15	bdl	bdl	24	bdl	bdl
Mercury	ug/L	18	bdl	bdl	15	bdl	bdl	24	bdl	bdl
Molybdenum	ug/L	18	bdl	bdl	15	bdl	110	24	bdl	8.2
Nickel	ug/L	18	bdl	20	15	bdl	83	21	bdl	600
Selenium	ug/L	18	bdl	bdl	15	bdl	12	23	bdl	12
Thallium	ug/L	18	bdl	bdl	8	bdl	bdl	24	bdl	bdl
Organics:										
Benzene	ug/L	23	bdl	bdl	15	bdl	bdl	16	bdl	bdl
Toluene	ug/L	23	bdl	bdl	15	bdl	bdl	16	bdl	bdl
Ethylbenzene	ug/L	23	bdl	bdl	15	bdl	bdl	16	bdl	bdl
Total Xylenes	ug/L	23	bdl	bdl	15	bdl	bdl	16	bdl	bdl
Carbon tetrachloride	ug/L	23	bdl	bdl	15	bdl	bdl	16	bdl	bdl
1,1-Dichloroethene	ug/L	23	bdl	17	15	bdl	bdl	16	bdl	bdl
1,1,1-Trichloroethane	ug/L	23	bdl	94	15	bdl	bdl	16	bdl	bdl
Trichloroethene	ug/L	23	bdl	bdl	15	bdl	bdl	16	bdl	47

bdl - below detection limit
Shaded values equal/exceed WVGS

Table 5. continued Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

Analyte	Units	RIVESVILLE Count	RIVESVILLE Minimum	RIVESVILLE Maximum	SPORN Count	SPORN Minimum	SPORN Maximum
pH	su	10	3.41	6.39	28	3.28	7.31
Spec. Cond.	(umhos/cm)	10	1300	3700	28	480	2700
TDS	mg/L	10	1300	4700	28	380	3000
Major Constituents							
Alkalinity	mg/L	10	bdl	220	28	bdl	690
Calcium	mg/L	10	160	570	28	32	430
Chloride	mg/L	10	7.0	21	28	12	53
Fluoride	mg/L	10	bdl	0.4	28	0.1	1.0
Magnesium	mg/L	10	27	120	28	7.5	120
Nitrate-N	mg/L	10	bdl	0.1	28	bdl	0.5
Nitrite-N	mg/L	10	0.1	0.2	28	bdl	0.1
Nitrate/Nitrite-N	mg/L	10	bdl	1.3	28	bdl	0.5
Potassium	mg/L	10	3.5	11	28	0.5	12
Sodium	mg/L	10	bdl	87	28	5.5	58
Sulfate	mg/L	10	730	3000	28	5.0	1800
Minor/Trace Constituents							
Antimony	ug/L	10	bdl	bdl	28	bdl	bdl
Arsenic	ug/L	10	bdl	99	28	bdl	45
Barium	ug/L	10	bdl	460	28	bdl	1100
Beryllium	ug/L	10	bdl	9	28	bdl	22
Boron	ug/L	10	bdl	bdl	28	bdl	1300
Cadmium	ug/L	10	bdl	22	28	bdl	14
Chromium	ug/L	10	bdl	120	28	bdl	15
Iron	ug/L	10	74000	710000	28	bdl	330000
Lead	ug/L	10	bdl	140	28	bdl	14
Mercury	ug/L	10	bdl	bdl	28	bdl	bdl
Molybdenum	ug/L	10	bdl	3.0	28	bdl	150
Nickel	ug/L	10	bdl	260	28	bdl	490
Selenium	ug/L	10	bdl	bdl	28	bdl	9.0
Thallium	ug/L	10	bdl	bdl	19	bdl	bdl
Organics:							
Benzene	ug/L	6	bdl	bdl	19	bdl	bdl
Toluene	ug/L	6	bdl	bdl	19	bdl	bdl
Ethylbenzene	ug/L	6	bdl	bdl	19	bdl	bdl
Total Xylenes	ug/L	6	bdl	bdl	19	bdl	bdl
Carbon tetrachloride	ug/L	6	bdl	bdl	19	bdl	bdl
1,1-Dichloroethene	ug/L	6	bdl	bdl	19	bdl	bdl
1,1,1-Trichloroethane	ug/L	6	bdl	1.3	19	bdl	bdl
Trichloroethene	ug/L	6	bdl	bdl	19	bdl	bdl

bdl - below detection limit
Shaded values equal/exceed WVGS

Table 5. continued Summary of Monitoring Well Groundwater Quality Data for the Plant Sites

Number of Samples Exceeding a West Virginia Groundwater Standard in Monitoring Well Samples at Each Plant Site

	F	NO3	NO2	NO3/ NO2	Sb	Ba	Be	Cd	Cr	Pb	Hg	Ni	Se	Tl	Benz	Tol.	Ethyl	Xyl	C Tet	DCE	TCA	TCE
Albright	1						16	7	1	1		17										
Amos														1						8		6
Fort Martin							1	2	2	3		8										
Harrison								1		2		2										
Kanawha River							4	5	4	1		8										
Mitchell					2		5	5	1			5	4	1						7		
Mountaineer					1																	
Pleasants/Wt							3	4	6			8										3
Rivesville							3	5	1	1		5										
Sporn							1	2				11		1								
Total # of exceedances	1	0	0	0	3	0	31	31	15	8	0	64	4	3	0	0	0	0	0	15	0	9
Total # of well samples	259	259	259	259	259	259	259	257	259	259	259	252	258	238	171	171	171	171	171	171	171	171
Percent exceedances	0.4	0.0	0.0	0.0	1.2	0.0	12.7	12.1	5.8	3.1	0.0	25.4	1.6	1.3	0.0	0.0	0.0	0.0	0.0	8.8	0.0	5.3

Table 6. Number of Samplings Exceeding West Virginia Groundwater Standards in Monitoring Well Samples at Each Plant Site

Table 7. Comparison of Maximum Calculated In-Stream Concentrations to River Water Quality Criteria						
Albright Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Be	24	24	0.14	0.00012	0.0077	0.0032
Cd	58	58	0.33	0.00029	0.4	0.0076
Cr	190	190	40	0.036	11	0.92
Ni	960	970	204	0.18	57	4.7
Fort Martin Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Be	6.3	6.3	0	0	0.0077	-
Cd	9.8	12	0	0	1.5	-
Cr	440	440	0.0019	1.8 e -08	11	3.8 e -06
Ni	410	433	0.0019	1.8 e -08	210	3.8 e -06
Harrison Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Cd	7.7	7.7	0	0	1.3	-
Ni	220	328	0	0	184	-
Kammer Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Be	34	52	51	0.0032	0.0077	11
Cd	140	182	180	0.011	1.3	41
Cr	480	669	669	0.04	11	151
Ni	840	844	844	0.05	184	190
Kanawha River Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Be	80	109	29	0.00020	0.0077	0.23
Cd	81	90	24	0.00017	0.6	0.19
Cr	140	140	120	0.0008	11	1.0
Ni	2900	2900	2400	0.017	74	19

Table 7. Comparison of Maximum Calculated In-Stream Concentrations to River Water Quality Criteria						
Kanawha River Ash Pond	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Se	120	120	120	0.0039	5	4.6
Pleasants/ Willow Island Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Be	19	10	19	0.0050	0.0077	19
Cd	30	8.6	30	0.008	1.3	31
Cr	300	300	300	0.08	11	305
Ni	1800	744	1800	0.47	184	1832
Rivesville Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Be	9.1	9.1	1.1	0.00013	0.0077	0.028
Cd	22	22	2.7	0.00032	1.5	0.068
Cr	120	120	81	0.010	11	2.0
Ni	260	299	202	0.024	210	5.1
Sporn Coal Storage Area	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Be	35	not calculated	24	0.0015	0.0077	6.1
Cd	96	6.4	66	0.0040	1.4	17
Ni	1300	490	1260	0.077	197	320
Sporn Ash Pond	Maximum Observed Groundwater Concentrations[1] (µg/L)	Calculated GWPS[4,5] Concentrations (µg/L)	Maximum Modeled Groundwater Concentrations at River (µg/L)	Maximum Calculated In-Stream Concentrations[2] (µg/L)	Surface Water Quality Criteria[3] (µg/L)	Maximum Discharge Rate[4] (µg/L)
Ni	110	119	117	0.011	197	45

1. Includes monitoring well and direct-push sample data
2. Based on groundwater discharge rate in Table 4-1, modeled maximum concentration at river, and 25% of 7Q10 flow; assumes negligible background concentration in river.
3. From Table 4-2
4. Based on modeled maximum concentration at the river and groundwater discharge rate in Table 4-1
5. "GWPS" means Groundwater Protection Standard

Table 8. Groundwater and River Discharge Data for all Plant Sites

Groundwater and River Discharge Data for All Plant Sites

Plant	Source	Groundwater Velocity (m/y)	Effective Porosity	Source Width (m)	Plume Penetration Depth[1] (m)	Groundwater Discharge (L/day)	River 7Q10 Discharge Rate (L/day)
Albright	coal pile	50	0.3	152	3.7	23,000	103,000,000
Amos	groundwater	55	0.3	5	13	3,000	4,781,000,000
Fort Martin	coal pile	2.9	0.3	240	4.0	2,000	844,000,000
Harrison	coal pile	15	0.3	170	3.0	6,000	49,000,000
Kammer	coal pile	100	0.3	180	15	225,000	14,147,000,000
Kanawha River	coal pile	25	0.3	130	3.0	8,000	4,623,000,000
Kanawha River	inactive ash pond	25	0.3	600	3.0	38,000	4,623,000,000
Mitchell	groundwater	225	0.3	30	15	NA	NA
Pleasants	coal pile	450	0.3	215	13	1,018,000	15,474,000,000
Rivesville	coal pile	20	0.3	200	7.6	25,000	832,000,000
Sporn	coal pile	95	0.3	305	11	254,000	16,585,000,000
Sporn	closed ash pond	95	0.3	460	11	383,000	16,585,000,000

1. Saturated thickness of the alluvium, except at the Kanawha River site.

River Water Quality Criteria at the West Virginia Plant Sites

Plant	River	Hardness (mg/L)	Beryllium[1,2] (ug/L)	Cadmium[1,3,6] (ug/L)	Chromium[1,3,5] (ug/L)	Nickel[1,3,5] (ug/L)	Selenium[1,3] (ug/L)	DCE[2] (ug/L)	TCE[2] (ug/L)
Albright	Cheat	32	0.0077	0.5	11	60	5	0.03	2.7
Amos	Kanawha	64	0.0077	0.8	11	108	5	0.03	2.7
Fort Martin	Monongahela	140	0.0077	1.5	11	210	5	0.03	2.7
Harrlslon	West Fork	120	0.0077	1.3	11	184	5	0.03	2.7
Kammer	Ohio	120	0.0077	1.3	11	184	5	0.03	2.7
Kanawha River	Kanawha	41	0.0077	0.6	11	74	5	0.03	2.7
Mitchell	Ohio	120	0.0077	1.3	11	184	5	0.03	2.7
Pleasants[6]	Ohio	120	0.0077	1.3	11	184	5	0.03	2.7
Rivesville	Monongahela	140	0.0077	1.5	11	210	5	0.03	2.7
Sporn	Ohio	130	0.0077	1.4	11	197	5	0.03	2.7

1 Criteria is for total recoverable concentration.
2 Human health criteria for public water supply.
3 Aquatic chronic criteria for non-trout waters.
4 Criterion for hexavalent chromium; no criterion for total chromium.
5 Cd criteria = e**(0.7852*[ln(hardness)]-3.490); Ni criteria = e**(0.846*[ln(hardness)]+1.1645).
6 Includes Willow Island Plant.

Off-Site Disposal Facilities

The off-site disposal facilities range in size from 30 to 380 acres, and disposal capacities range from 2 to 65 million cubic yards. The sites have been operating for between 13 and 38 years. All of the disposal sites were developed to dispose of high-volume coal combustion by-products (CCBs), primarily fly ash and bottom ash. The McElroys Run impoundment also receives flue gas desulfurization material. The characteristics of off-site disposal facilities is show in Table 10.

Most of the off-site disposal facilities were developed in steep-sided tributary stream valleys within one or two miles of the main power plant. Landfills were developed as valley fills; CCBs are trucked to the landfills and placed and compacted in dry form. Impoundments were developed by damming tributary valleys; CCBs are wet-sluiced via pipeline to the impoundments. Half of the sites are unlined, the other half are at least primarily lined. Several of the sites contain an underdrain system to control subsurface water. In some cases, the underdrains intercept leachate percolating from the fill area and rout it to a collection basin; in others, the underdrains are designed to intercept and divert natural springs and groundwater prior to entering the fill area.

Hydrogeology at the disposal sites is more complex than at the plant sites. The sites are generally characterized by groundwater flow in folded and fractured sedimentary bedrock. Nine of the ten sites are underlain by Pennsylvanian-or-Permian-age sequences of sandstones, limestones, shales, claystones, and coal. The potential for groundwater flow is expected to be greatest in the valley areas due to stress-relief induced fracturing. Several of the sites are located above or near underground coal mines, surface-mined areas, and/or mine refuse and spoil. One of the ten sites (R. Paul Smith) is located in northeastern West Virginia and is underlain by the thick, Ordovician-age Martinsburg Shale. The shale is highly folded, and is overlain by Tertiary-age unconsolidated deposits.

Only inorganic constituents were monitored at the disposal facilities. Although 12 of the 14 constituents - fluoride, nitrate, nitrate-nitrite, antimony, barium, beryllium, cadmium, chromium, lead, mercury, nickel, and thallium - equaled or exceeded the WVGS in at least one sample, no variance candidates were identified. The number of samples taken at the off-site disposal facilities is shown in Table 11.

Antimony equaled or exceeded the WVGS in 14 samples, or 4.9 percent of all the samples. Twelve of the exceedances occurred at one site, the Little Broad Run Landfill. Concentrations at the Little Broad Run Landfill ranged up to 11 ug/L, slightly less than two times the WVGS of 6 ug/L. The exceedances occurred around the fill area, in both upgradient and downgradient locations, and did not appear to be related to landfill operation. Elevated antimony concentrations were not associated with any of the more common and mobile ash leachate indicators such as sulfate and boron. The remaining 11 constituents equaled or exceeded the WVGS in 0.7 percent to 2.5 percent of the samples (1 to 7 samples). Of these, lead exceedances were most frequent. However, similar to the plant sites, the exceedances were generally isolated occurrences and usually were

observed in only one of the sampling rounds. The exceedance patterns did not suggest a consistent or pervasive pattern spatially or temporally. The exceedences for these 11 constituents may reflect natural variability, analytical variability, or contribution from unidentified sources. Monitoring well groundwater quality data for the off-site disposal facilities is shown in Table 12.

Table 10. Summary of Off-Site Disposal Facility Characteristics

Summary of Off-Site Disposal Facility Characteristics

Disposal Site	Plant Served	Year Operations Began	Area (acres)	Disposal Capacity (cu yd)	Liner	Bedrock Geology
Albright Landfill	Albright	1960	200	8,000,000	clay[a] (partial)	Pennsylvanian Pottsville Group
Amos Impoundment	Amos	1973	142	11,000,000	none	Pennsylvanian Conemaugh Group
Quarrier Landfill	Amos	1985	178	8,800,000	2-foot clay-soil	Pennsylvanian Monongahela Group
Fort Martin Landfill	Fort Martin	1982	44	10,000,000	none	Pennsylvanian Conemaugh Group
Pigott's Run Landfill	Harrison	1979	120	65,000,000	clay/plastic[b]	Pennsylvanian Monongahela Group
Conner Run Impoundment	Kammer & Mitchell	1969	124	16,000,000	none	Permian Dunkard Group
McElroy's Run Landfill/Impoundment	Pleasants & Willow Island	1979	380	20,000,000 (LF) 35,000,000 (IM)	none	Pennsylvanian Conemaugh Group
R. Paul Smith Landfill	R. Paul Smith	1978	60	4,000,000	clay[a] (partial)	Ordovician Martinsburg Shale
Rivesville Landfill	Rivesville	1981	20	2,000,000	none	Pennsylvanian Monongahela Group
Little Broad Run Landfill	Sporn & Mountaineer	1980	325	16,000,000	2-foot clay-soil	Pennsylvanian Monongahela Group

a. Recent phase lined; most of the site is unlined
b. Older phase is unlined

Number of Samples Collected at the Off-Site Disposal Facilities

	Number of Surface Water Samples[1]	Number of Monitoring Wells[2]	Number of Monitoring Well Samples[1]	Number of Leachate Samples[1]
Albright Landfill	0	7	19	3
Amos Impoundment	1	7	19	0
Quarrier Landfill	0	9	26	2
Fort Martin Landfill	3	11	32	0
Pigott's Run Landfill	1	9	18	6
Conner Run Impoundment	2	5	8	0
McElroy's Run Landfill/Impoundment	8	17	49	10
R. Paul Smith Landfill	0	13	39	3
Rivesville Landfill	4	4	6	0
Little Broad Run Landfill	0	24	68	0
TOTAL	**19**	**106**	**284**	**24**

1. Samples collected specifically for this study
2. Includes pre-existing wells sampled for this study

Table 11. Number of Samples Collected at the Off-Site Disposal Facilities

Monitoring Well Groundwater Quality Data for the Off-Site Disposal Facilities

Analyte	Units	ALBRIGHT LF			AMOS IMP			QUARRIER LF			FORT MARTIN LF		
		Count	Minimum	Maximum	Count	Minimum	Maximum	Count	Minimum	Maximum	Count	Minimum	Maximum
pH	su	19	3.89	6 04	17	6 48	8.81	26	6.98	9.24	32	5.47	7.71
Spec. Cond.	(umhos/cm)	19	30	770	17	570	13000	26	398	1119	32	310	950
TDS	mg/L	19	12	580	16	180	8200	26	223	950	32	160	620
Major Constituents													
Alkalinity	mg/L	19	bdl	42	12	170	580	26	170	557	32	140	400
Calcium	mg/L	19	bdl	72	17	bdl	140	26	0 6	102	32	18	120
Chloride	mg/L	19	bdl	5 0	16	7.0	4100	26	1 0	55	32	1.0	17
Fluoride	mg/L	19	bdl	0 2	17	0 2	3 5	26	0 1	3 6	32	0.1	0 9
Magnesium	mg/L	19	1.1	35	16	bdl	30	26	bdl	29	32	3.9	33
Nitrate-N	mg/L	19	bdl	0 6	16	bdl	3 6	0			32	bdl	1.3
Nitrite-N	mg/L	19	bdl	0.1	16	bdl	0.1	0			32	bdl	bdl
Nitrate/Nitrite-N	mg/L	19	bdl	2 6	17	bdl	12	26	bdl	0 9	32	bdl	1.9
Potassium	mg/L	19	bdl	14	19	bdl	4 9	0			22	bdl	4.2
Sodium	mg/L	19	bdl	15	19	47	2400	26	5.1	272	32	1.6	66
Sulfate	mg/L	19	5.0	350	16	bdl	510	26	7.0	65	32	21	190
Minor/Trace Constituents													
Antimony	ug/L	19	bdl	bdl	19	bdl	bdl	26	bdl	bdl	32	bdl	12
Arsenic	ug/L	19	bdl	bdl	19	bdl	58	26	bdl	43	32	bdl	16
Barium	ug/L	19	bdl	63	19	bdl	1600	26	17	1010	32	13	280
Beryllium	ug/L	19	bdl	bdl	19	bdl	bdl	26	bdl	bdl	32	bdl	1.5
Boron	ug/L	19	bdl	1000	19	bdl	7700	26	bdl	2150	32	bdl	390
Cadmium	ug/L	19	bdl	bdl	19	bdl	1.9	26	bdl	0 6	32	bdl	bdl
Chromium	ug/L	19	bdl	200	19	bdl	bdl	26	bdl	3 0	32	bdl	630
Iron	ug/l	19	120	97000	19	bdl	15000	26	bdl	770	32	bdl	12000
Lead	ug/L	19	bdl	25	19	bdl	650	26	bdl	2 0	32	bdl	bdl
Mercury	ug/L	19	bdl	bdl	19	bdl	2.5	26	bdl	bdl	32	bdl	bdl
Molybdenum	ug/L	19	bdl	bdl	19	bdl	120	26	bdl	18	32	bdl	36
Nickel	ug/L	19	bdl	1900	16	bdl	85	26	bdl	4 0	32	bdl	310
Selenium	ug/L	19	bdl	bdl	19	bdl	13	26	bdl	bdl	32	bdl	bdl
Thallium	ug/L	16	bdl	5	19	bdl	bdl	26	bdl	bdl	32	bdl	bdl

bdl - below detection limit
Shaded values equal/exceed WVGS

Table 12. Monitoring Well Groundwater Quality Data for the Off-Site Disposal Facilities

Monitoring Well Groundwater Quality Data for the Off-Site Disposal Facilities

Analyte	Units	PIGOTTS RUN LF			CONNER RUN IMP			MCELROYS RUN			R. PAUL SMITH LF		
		Count	Minimum	Maximum	Count	Minimum	Maximum	Count	Minimum	Maximum	Count	Minimum	Maximum
pH	su	18	6.06	8.98	8	7.15	8.71	48	6.39	9.02	39	5.13	7.16
Spec. Cond.	(umhos/cm)	18	700	5000	8	530	1800	48	200	9600	39	83	560
TDS	mg/L	18	400	3100	8	310	1200	48	140	6200	39	50	420
Major Constituents													
Alkalinity	mg/L	13	34	1200	8	230	600	31	bdl	1500	39	9.0	94
Calcium	mg/L	18	2.3	480	8	15	130	37	bdl	310	39	1.8	51
Chloride	mg/L	18	bdl	1100	8	bdl	42	48	bdl	4600	39	bdl	43
Fluoride	mg/L	18	0.2	5.3	8	0.2	0.7	48	0.1	9.8	39	bdl	0.2
Magnesium	mg/L	18	0.8	49	6	5.6	36	37	bdl	100	26	3.2	37
Nitrate-N	mg/L	18	bdl	2.0	8	bdl	0.6	48	bdl	15	39	bdl	4.7
Nitrite-N	mg/L	18	bdl	bdl	8	bdl	bdl	48	bdl	0.5	39	bdl	bdl
Nitrate/Nitrite-N	mg/L	18	bdl	4.0	8	bdl	0.2	49	bdl	14	39	bdl	5.2
Potassium	mg/L	18	bdl	73.0	8	bdl	0.1	47	bdl	9.6	38	bdl	2.8
Sodium	mg/L	18	12	1500	8	44	390	45	bdl	2000	39	5.1	28
Sulfate	mg/L	18	70	1500	8	54	460	48	bdl	960	39	3.0	210
Minor/Trace Constituents													
Antimony	ug/L	18	bdl	5.0	8	bdl	bdl	49	bdl	bdl	39	bdl	30
Arsenic	ug/L	18	bdl	12	8	bdl	7.8	47	bdl	110	39	bdl	29
Barium	ug/L	18	bdl	130	8	51	120	49	bdl	15000	39	bdl	330
Beryllium	ug/L	18	bdl	bdl	8	bdl	bdl	49	bdl	bdl	39	bdl	26
Boron	ug/L	18	bdl	33000	8	bdl	7300	49	bdl	710	39	bdl	1200
Cadmium	ug/L	18	bdl	13	8	bdl	bdl	49	bdl	3.6	39	bdl	29
Chromium	ug/L	18	bdl	13	8	bdl	bdl	49	bdl	87	39	bdl	38
Iron	ug/L	18	bdl	2200	8	bdl	2800	49	bdl	38000	39	bdl	5900
Lead	ug/L	18	bdl	39	8	bdl	bdl	49	bdl	15	39	bdl	44
Mercury	ug/L	18	bdl	bdl	8	bdl	bdl	49	bdl	bdl	39	bdl	bdl
Molybdenum	ug/L	18	bdl	1100	8	bdl	20	49	bdl	170	39	bdl	28
Nickel	ug/L	18	bdl	45	8	bdl	12	49	bdl	48	39	bdl	120
Selenium	ug/L	18	bdl	11	8	bdl	bdl	49	bdl	bdl	39	bdl	28
Thallium	ug/L	18	bdl	10	8	bdl	bdl	49	bdl	bdl	39	bdl	bdl

bdl - below detection limit
Shaded values equal/exceed WVGS

Table 12. continued Monitoring Well Groundwater Quality Data for the Off-Site Disposal Facilities

Monitoring Well Groundwater Quality Data for the Off-Site Disposal Facilities

Analyte	Units	RIVESVILLE LF Count	Minimum	Maximum	LITTLE BROAD RUN LF Count	Minimum	Maximum
pH	su	6	6 95	7.26	68	6 51	8 94
Spec. Cond.	(umhos/cm)	6	1200	2100	68	6.1	6095
TDS	mg/L	6	1000	2300	68	315	5544
Major Constituents							
Alkalinity	mg/L	6	220	500	68	247	836
Calcium	mg/L	6	140	320	68	0 9	311
Chloride	mg/L	6	4 0	18	68	3 0	926
Fluoride	mg/L	6	0.1	0.2	68	bdl	3.8
Magnesium	mg/L	6	39	99	68	0.2	151
Nitrate-N	mg/L	6	0.1	0.6	0		
Nitrite-N	mg/L	6	bdl	bdl	0		
Nitrate/Nitrite-N	mg/L	6	0.1	4.7	68	bdl	0 6
Potassium	mg/L	6	3.4	18	0		
Sodium	mg/L	6	8.1	220	68	41	1230
Sulfate	mg/L	6	320	1000	67	bdl	3350
Minor/Trace Constituents							
Antimony	ug/L	6	bdl	5.3	68	bdl	[illegible]
Arsenic	ug/L	6	bdl	bdl	68	bdl	97
Barium	ug/L	6	24	170	68	9.0	1310
Beryllium	ug/L	6	bdl	bdl	68	bdl	0 2
Boron	ug/L	6	450	5600	68	bdl	11000
Cadmium	ug/L	6	bdl	bdl	68	bdl	2 0
Chromium	ug/L	6	bdl	7.7	68	bdl	7.0
Iron	ug/L	6	bdl	8300	68	bdl	102000
Lead	ug/L	6	bdl	12	68	bdl	11
Mercury	ug/L	6	bdl	bdl	68	bdl	1 0
Molybdenum	ug/L	6	bdl	80	68	bdl	1400
Nickel	ug/L	6	bdl	16	68	bdl	12
Selenium	ug/L	6	bdl	bdl	68	bdl	bdl
Thallium	ug/L	6	bdl	bdl	68	bdl	1.0

bdl - below detection limit
Shaded values equal/exceed WVGS

Table 12. continued Monitoring Well Groundwater Quality Data for the Off-Site Disposal Facilities

DIRECTORS FINDINGS
Basis for the Decision to Grant the Variances

The Office of Water Resources Groundwater Program believes that granting this request for a variance at these locations would pose no adverse effects to human health or the environment. The impact to potential receptors in the area affected by the variance is unlikely, as continued electrical generation is the only anticipated human activity at these locations for the foreseeable future. There are no human or environmentally sensitive receptors between the coal storage areas or ash ponds and groundwater receptors, which are the adjacent rivers.

When coal piles are exposed to ambient atmospheric conditions, geochemical processes initiate the leaching of metals from the coal storage pile. To prevent these geochemical reactions from reaching and affecting groundwater, a suitable liner would have to be installed under the coal storage area. Installation of suitable synthetic liners was investigated by AEP and AP and found to be economically and operationally unfavorable. The coal storage areas range in size from two acres to twenty acres.

Cost estimates were prepared for capping the inactive ash ponds with synthetic liners. The costs of the synthetic liners were also found to be prohibitively expensive.

The Office of Water Resources Groundwater Program realizes that current methods of coal storage at large and medium sized power generating facilities are conducive to metal leaching by its very nature, and agrees that the above mentioned alternatives to be neither technologically nor economically feasible. At these sites, the metals pose no threat to potential receptors or to human health, the WV DEP finds that no demonstrated benefit to the State and people of West Virginia would be gained by employing the alternatives.

If the alternative measures were to be mandated, the cost of employing these solutions would by necessity be passed on to residential, commercial, and industrial consumers. Commercial and industrial users would in turn pass along the increased cost of electrical power to the public. This would have a negative impact on the present and potential future economic well being of the affected communities. The benefits of economic development achieved by maintaining low cost energy outweigh the benefit of reducing the concentrations of these metals in groundwater where the environmental benefit would be insignificant. Economic factors of the cost of compliance with current groundwater protection standards are summarized in Table 13.

As the improvement in environmental quality would be insignificant, the Director deems it reasonable and prudent to support the request for a variance from groundwater quality standards at these locations.

Table 13	Economic Factors	
Allegheny Power Facilities	**Cost of Compliance (million $)**	**Increase in Cost of Electrical Generation(%)**
Plant		
Albright	$13.5	6.70%
Fort Martin	$38.9	4.70%
Harrison	$37.2	1.50%
Pleasants/Willow Island	$44	2.60%
Rivesville	$8.4	9.50%
Total	$142	
American Electric Facilities		
Kammer	$25.5	7%
Kanawha River	$21.1	6.20%
Sporn	$32	4.20%
Total	**$78.6**	

Cost Increases (per year)	Small Residential User	Large Commercial User	Large Industrial User
Allegheny Power Facilities	$7.00	$3,600.00	$278,400.00
American Electric Facilities	$5.00	$2,300.00	$145,000.00

PUBLIC HEARINGS
47CSR26, 47CSR57A, 47CSR31
DIVISION ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES
JULY 21, 1999

Good evening. I am Jessica Welsh of the Division of Environmental Protection's Public Information Office, and I will be facilitating tonight's public hearings for the Office of Water Resources' proposed legislative rules. We will have three hearings in succession tonight. I will start off each one by reading a synopsis of the proposed rule and then asking for comments. If you would like to make oral comments on the proposal, you can step up to the tape recorder and record your statement. For your information, tonight's hearings are being audio recorded so that we have a formal record of the hearings.

I'll start with the proposed rule for the Water Pollution Control Permit Fee Schedule, followed by the proposal for Groundwater Protection Standards at Steam Electric Generating Facilities, and finally the proposal for the Water Pollution Control Revolving Fund Program.

I'll now start the hearing for the permit fee schedule. The first proposed rule is 47CSR26, the Water Pollution Control Permit Fee Schedule. The proposed amendments to this rule are being proposed as a result of the passage of House Bill 2684, passed on March 11, 1999 and effective 90 days from passage. That bill requires the director to promulgate an emergency rule by July 1, 1999, to implement the fee schedule authorized by the amendments. This effective date is critical to enable the agency to assess and collect the required permit fees in order to maintain current resources in our Office of Water Resources for issuing permits. Furthermore, initiating modified fees on the first day of the state's new fiscal year greatly assists our effort in the ability to handle fee collections electronically. This rule was filed as an emergency rule on June 7, 1999.

Is there anyone who would like to comment on this proposed rule? If not, I will close the formal record of this hearing.

The next proposal is for 47CSR57A, Groundwater Protection Standards at Steam Electric Generating Facilities. A petition for groundwater variances was filed by Allegheny Power and American Electric Power for sources which by their nature cannot be conducted or operated in compliance with groundwater quality standards filed in 46CSR12, "Requirements Governing Groundwater Quality Standards". On October 24, 1994, the West Virginia Steam Electric Generation Industry filed a Notice of Intent with the Director of DEP in accordance with 47CSR57 to apply for a class variance for all West Virginia power stations and associated disposal sites. The DEP responded by providing American Electric Power and Allegheny Power the opportunity to conduct a four-year study to gather the necessary data to support their variance request. The purpose of the study was necessitated by the requirements established in 47CSR57 for applying for a variance from groundwater quality standards. The objectives were met by assembling and reviewing data, performing field data collection, modeling transport of dissolved chemicals in groundwater, and conducting statistical analysis of groundwater quality data, estimating potential impacts to receptors, and performing an economic assessment impact analysis to the industry, commercial enterprises, and citizens at large if compliance with the Groundwater Protection Act were required without benefit of the variances. As a result of the four-year study, the Director believes that granting this request for a variance at these locations would pose no adverse effects to human health or the environment.

The impact to potential receptors in the area affected by granting the variance is unlikely because there are no human or environmental sensitive receptors between the coal storage areas or ash ponds. As the improvement in environmental quality would be insignificant, the Director deems it reasonable and prudent to support the request for a variance from groundwater quality standards at these locations.

Is there anyone who would like to comment on this proposal? I will remind you that the comment period remains open on this proposal for 10 additional days. You may send written comments to my attention or to Dave Watkins at 1201 Greenbrier Street, Charleston, WV 25311. *(One written comment was submitted to Dave Watkins at the hearing).*

The final hearing is for 47CSR31, Water Pollution Control Revolving Fund Program. This proposed rule amends the recently-passed revised legislative rule effective May 4, 1999. The purpose of this rule is to allow SRF low interest loan terms to be extended from the current 20 years to 30 years for certain disadvantaged communities. The federal EPA gave the approval for this Extended Bond Purchase Program on April 11, 1999. West Virginia is now the second state in the country to receive such approval. The rule is needed immediately so adverse public health situations and the abatement of pollution can be alleviated in many communities. The rule will allow these disadvantaged communities to immediately take steps toward constructing proposed wastewater projects by providing affordable monthly sewer rates to their customers. This rule was filed as an emergency on May 24, 1999.

Is there anyone who would like to comment on this proposal? If not, I will close the formal record of the hearing. I'd like to thank you for coming tonight. That ends tonight's hearings.

DEP

Division of Environmental Protection
West Virginia

Sign-In

Legislative Rules Hearing
July 21, 1999
Groundwater(47CSR57A)

NAME	ADDRESS	ORGANIZATION	E-MAIL	Comment? Y/N
Randy Cain	800 Cabin Hill Dr. Greensburg, PA 15601	Allegheny Power	rcainz@alleghenypower.com	N
Richard Herd	800 Cabin Hill Dr. Greensburg, PA 15601	Allegheny Power	rherd@alleghenypower.com	N
Jim Pappas	1 Riverside Plaza Columbus, OH 43215	American Electric Power	Jpappas@aep.com	Y
Tim Mallan	501 Virginia St. E Charleston, WV 25301	AEP-WV	EPMallan@aep.com	N

Allegheny Power
SUPPLY BUSINESS
Generation Division
800 Cabin Hill Drive
Greensburg, PA 15601-1689
(724) 837-3000

EXPRESS OVERNIGHT MAIL

July 27, 1999

Mr. David P. Watkins
Ground Water Program Leader
West Virginia Division of Environmental Protection
Office of Water Resources
Program Management / Technical Support
1201 Greenbrier Street
Charleston, WV 25311-1088

RE: Ground Water Protection Standards
At Steam Electric Generating Facilities
(47 CSR 57-A)
Comments by Allegheny Power

Dr. Mr. Watkins:

Attached please find comments by Allegheny Power to the proposed rule 47 CSR 57-A.

Sincerely,

Randy Cain

Randy Cain

Attachment

Comments by Allegheny Power on
West Virginia Division of Environmental Protection Proposed Rule
47 CSR 57-A
Ground Water Protection Standards At Steam Electric Generating Facilities

Allegheny Power fully supports the rule proposed in 47 CSR 57-A and commends the West Virginia Division of Environmental Protection and in particular Mr. David Watkins, Ground Water Program Leader, for its development. The rule represents a reasonable and practical interpretation of the ground water variance regulations for the long established and existing operations of the power stations within the state, and the electric utility industry's efforts to bring these facilities into compliance with the West Virginia Ground Water Quality Regulations.

This proposed rule should also serve as an example of how industry and the Division can cooperatively and constructively work together to produce practical and reasonable regulatory requirements while at the same time protecting the public interest and the environment. To gather the technical and socio-economic data needed to support this rule the Division authorized Allegheny Power to undertake a four-year, multi-million dollar study along with American Electric Power and the Electric Power Research Institute. The study, which specifically defined the existing quality of ground water at each of the twelve power stations owned by the companies, was conducted under the direct purview and guidance of the West Virginia Division of Environmental Protection. The resulting rule – Ground Water Protection Standards At Steam Electric Generating Facilities (47 CSR 57-A) – blends reasonable and practical requirements with protection of the public interest and demonstrates Allegheny Power's corporate commitment to protecting the waters of the state for this and future generations.

American Electric Power
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Columbus, OH 43215 2373
614 223 1000

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Mr. David P. Watkins
Ground Water Program Manager
West Virginia Division of Environmental Protection
Office of Water Resources
1201 Greenbrier Street
Charleston, West Virginia 25311-1088

July 21, 1999

Dear Mr. Watkins:

Re: Groundwater Protection Standards at
Steam Electric Generating Facilities
Comments on Proposed Rule 47 CSR 57-A

Please find enclosed American Electric Power's comments on proposed rule 47 CSR 57-A Groundwater Protection Standards at Steam Electric Generating Facilities. We appreciate the opportunity to comment on the proposed rule.

If you should have any questions regarding the enclosed comments, please do not hesitate to contact me at (614) 223-1246 or Jim Pappas of my staff at (614) 223-1257.

Sincerely,

Thomas R Zelina

Thomas R. Zelina
Manager, Waste Management
Environmental Services

Enclosure

American Electric Power's Comments on
West Virginia Division of Environmental Protection's Draft Rule
47 CSR 57-A
GROUNDWATER PROTECTION STANDARDS AT
STEAM ELECTRIC GENERATING FACILITIES

47-57-A-1. General

The second sentence of Section 1.1 contains language that is more restrictive than that which is contained in 47 CSR 57-6.7. It is suggested that the second sentence of Section 1.1 be restated as "The benefits of granting the variance must outweigh the benefits of complying with existing groundwater quality standards and demonstrate that there is no ~~technologically feasible~~ reasonable and prudent alternative available, and that granting the variance is more in the public interest than adherence to existing groundwater quality standards."

47-57-A-3. Variance Applicable Areas

Many of the coordinates listed in Sections 3.1 and 3.2 are incorrect. In some cases the coordinates are off by several hundred feet. The coordinates will need to be corrected to accurately describe the variance areas.

In addition, the draft rule defines each variance area as a quadrilateral having four coordinates. The proposed variance areas cannot be defined as quadrilaterals, since each variance area is located along a river and rivers do not follow straight lines. If a straight line is used to connect the two coordinates closest to the river, the resulting boundary line will exclude a portion of the variance area that is adjacent to the river. The following sentence should be added to Sections 3.1 and 3.2 to more accurately describe the proposed variance areas. "The river shall be the boundary line that connects the two coordinates that are located closest to the river."

47-57-A-5. Terms and Conditions

Section 5 requires quarterly monitoring for compliance with preventative action limits (PAL) and groundwater protection standards (GWPS). Quarterly sampling is not necessary for these facilities. The Company believes a groundwater sampling frequency of twice per year would be sufficient. Likewise, if an exceedance of the GWPS should occur or three successive exceedances of the PAL should occur, the proposed rule requires that the monitoring frequency be increased to monthly. The company believes that the sampling frequency should be increased to quarterly in these cases.

As stated above, only one observation that is greater than the GWPS will result in an increased monitoring frequency. The company believes that exceedances of the GWPS will occur on a routine basis, due to variability in the groundwater database. To reduce the false positive rate to a more acceptable level, the draft rule should be revised to state

that an increased monitoring frequency would be triggered whenever two successive exceedances of the GWPS have occurred.

REQUEST FOR VARIANCE FROM GROUNDWATER STANDARDS BY ALLEGHENY POWER (AP) AND AMERICAN ELECTRIC POWER (AEP)

Page 1, INTRODUCTION

For reasons stated above, the second sentence of the second full paragraph should be revised to read: "The benefits of granting the variance must outweigh the benefits of complying with existing groundwater quality standards and demonstrate that there is no ~~technologically feasible~~ reasonable and prudent alternative available, and that granting the variance is more in the public interest than adherence to existing groundwater quality standards."

Page 4, Table 1

Since drive point data was used in the 'maximum observed' column, a footnote should be added to Table 1 to indicate that the maximum observed value "includes monitoring well and direct-push sample data".

Pages 10 through 17, Figures 2-9

Figures 2-9 show each variance area as a quadrilateral having four coordinates. For reasons stated previously in these comments, Figures 2-9 should be revised to show the river as the boundary line that connects the two coordinates that are located closest to the river.

Page 35, Table 13

The heading at the bottom of the first column in Table 13 should be revised to read: "Cost Increases (per ~~month~~ year)". This error was also made in the Fiscal Note for Proposed Rules.

Response to Comments Regarding
West Virginia Division of Environmental Protection's Rule
47 CSR 57A

GROUNDWATER PROTECTION STANDARDS AT STEAM ELECTRIC GENERATING FACILITIES

A public hearing regarding the West Virginia Division of Environmental Protection's Rule 47 CSR 57-A, "GROUNDWATER PROTECTION STANDARDS AT STEAM ELECTRIC GENERATING FACILITIES" was held on July 21, 1999 at the West Virginia Division of Environmental Protection's Office of Water Resources in Charleston, West Virginia. No oral comments were received. Written comments were received at this time from American Electric Power (AEP).

The West Virginia Division of Environmental Protection received seven written comments from American Electric Power. The following sections contain those comments and WV DEP's responses:

1. AEP comments that the second sentence of Section 1.1 contains language that is slightly less reflective than that which is contained in 47 CSR 57-6.7. It is suggested that the second sentence of Section 1.1 be restated as "The benefits of granting the variance must outweigh the benefits of complying with existing groundwater quality standards and demonstrate that there is no technologically feasible reasonable and prudent alternative available, and that granting the variance is more in the public interest than adherence to existing groundwater quality standards."

The West Virginia Division of Environmental Protection agrees with American Electric Power's contention that the language is more restrictive than that which is contained in 47 CSR 57-6.7. Therefore, DEP will amend this section to read as follows: "The benefits of granting the variance must outweigh the benefits of complying with existing groundwater quality standards and demonstrate that there is no reasonable and prudent alternative available, and that granting the variance is more in the public interest than adherence to existing groundwater quality standards."

2. AEP commented that many of the coordinates listed in Section 3.1 and 3.2 are incorrect. In some cases the coordinates are off by several hundred feet. The coordinates will need to be corrected to accurately describe the variance areas.

In addition, the draft rule defines the [that] each variance area as a quadrilateral having four coordinates. The proposed variance areas cannot be defined as quadrilaterals, since each variance area is located along a river and rivers do not follow straight lines. If a straight line is used to connect the two coordinates closest to the river, the resulting

boundary line will exclude a portion of the variance area that is adjacent to the river. The following sentence should be added to Sections 3.1 and 3.2 to more accurately describe the proposed variance areas. "The river shall be the boundary line that connects the two coordinates that are located closest to the river."

The DEP disagrees with American Electric Power's assertion that the "proposed variance areas cannot be defined as quadrilaterals since each variance area is located along a river and rivers do not flow in straight lines". The coordinates that define the areas applicable to the variance request are based entirely on those existing coal piles and ash ponds specified in the Notice of Intent filed by American Electric Power and Allegheny Power on October 25, 1994. This variance rule applies to these areas only, and not to those contiguous areas surrounding the coal piles and ash ponds including those areas between the coal piles/ ash ponds and the river. The intent of the Groundwater Protection Act and the Groundwater Quality Standard Variances Rule, 47 CSR 57 is to offer a mechanism for relief from groundwater protection standards for those activities at facilities that were in existence upon passage of the Groundwater Protection Act. The coordinates delineating these quadrilaterals are intended to accurately and adequately delineate those areas covered by this rule. The variance applicable areas were further delineated to include an adequate buffer around the coal piles to allow for coal storage at maximum capacity at the existing coal storage sites. The variance applies solely to those areas within the staked boundaries. All other areas and activities at these plants not specified in this rule must comply with groundwater protection rules per 47 CSR 58. This includes any addition to or expansions of the variance applicable areas.

The DEP stipulates that the criteria used in determining whether a variance for these sites was warranted is based upon the premise that there would be no impact to a receptor. A receptor is defined as a surface water body, a public or private drinking water supply, or offsite migration of contaminated groundwater. The study revealed that there were no public or private drinking water supplies in the vicinity of the power plant that would be affected, and through monitoring and modeling it was determined that there was no offsite migration of contaminated groundwater. Therefore, the only receptor that requires protection is the adjacent surface water body to these power plants. Compliance monitoring station were established by the AEP contractor as a result of the four year study to monitor potential impacts to the receptor from the variance applicable areas. DEP has agreed to these compliance monitoring locations and has so specified in Table 57-A-4 A through F. It is therefore the contention of DEP that although the variance applicable areas are in the proximity of the river boundary line, they do not extend into the river, nor was it ever the intent that the variance applicable would extend into the river. Therefore, DEP will not amend these sections to reflect AEP's comments other than verification of the coordinates for the variance applicable areas.

The DEP disagrees with the commentator's assertion that the coordinates for the variance applicable areas are incorrect. In fact, the DEP has verified these readings

at several of those facilities covered by this rule. It has also received verification from one of the power utilities that there survey crews have verified these coordinates and reported that the coordinates are within ten feet of the mark wich is within the variability criteria of three (3) meters of the Global Positioning System unit when differentially corrected. Upon receiving these comments, DEP personnel returned to those sites specified in AEP's comments to verify those readings and to and re-evaluate the Sporn and Kanawha River ash disposal sites. It was discovered that the sites had fully delineated during the initial site visits. DEP will amend section 47- 57-A-3 with new coordinates for the variance applicable areas at these facilities to fully represent those areas specified in the variance application and notice of intent.

With the variance applicable areas now fully delineated at the Sporn and Kanawha River facilities, this does not change, alter, or diminish DEP's previous response to AEP's comments that the Variance applicable areas should extend to follow the river boundary. The alteration of the variance applicable areas at the Sporn and Kanawha River plants were in delineations parallel to and away from the adjacent rivers.

3. Section 5 requires quarterly monitoring for compliance with preventative action limits (PAL) and groundwater protection standards (GWPS). Quarterly sampling is not necessary for these facilities. The Company believes a groundwater sampling frequency of twice per year would be sufficient. Likewise, if an exceedance of the GWPS should occur, or three successive exceedances of the PAL should occur, the proposed rule requires that the monitoring frequency be increased to monthly. The Company believes that the sampling frequency should be increased to quarterly in these cases.

As stated above, only one observation that is greater than the GWPS will result in an increased monitoring frequency. The Company believes that exceedances of the GWPS will occur on a routine basis, due to variability in the groundwater database. To reduce the false positive rate to a more acceptable level, the draft rule should be revised to state that an increased monitoring frequency would be triggered whenever two consecutive exceedances of the GWPS have occurred.

Representatives from the American Electric Power, Allegheny Power, and the DEP met on May 13, 1999 to negotiate the terms and conditions as specified in section 5 of this rule. At the conclusion of this meeting all parties were in agreement upon the sampling frequency. The DEP further contends that quarterly monitoring for compliance is standard operating procedure and is commonplace in the majority of permits issued from this agency. Furthermore, the DEP believes that the variance rule allows for exceedances over and above standards that are protective of human health and believes it prudent and wise to monitor for patterns of exceedances prior to violations of this rule. The purpose of increased monitoring frequency from quarterly to monthly is to verify sampling and analytical results as well as alerting the company to a potential violation of the rule long before enforcement action is

initiated. In this manner the company may take steps to avoid any enforcement action.

DEP realizes that there is variability in sampling and analytical results, and possibly in the groundwater database. Confirmation of these results lends credence to the verification sampling and the relevant groundwater data submitted by AEP's contractor in support of the variance request and as stipulated in this rule. For this reason, DEP has offered these companies the opportunity to dispel a pattern of exceedances without penalty. The purpose behind establishing a pattern is to demonstrate a trend in increasing concentrations of the proposed variance parameters. The DEP believes, as was agreed upon, that the terms and conditions cited in section 5 of this rule are fair and equitable. Therefore, DEP does not agree to American Electric Power's comments and will not amend this section of the rule.

4. Since drive point data was used in the 'maximum observed' column, a footnote should be added to Table 1 to indicate that the maximum observed value "includes monitoring well and direct-push sample data".

The DEP agrees to amend Table 1 of the rule by incorporating a footnote (6) to the maximum observed column to read: "maximum observed includes monitoring well and direct-push sample data". Table 1 will read as follows:

Table 1.	Existing Groundwater Quality							
Coal Storage Areas	Beryllium (µg/L)[3] GW Standard 4 µg/L				Cadmium (µg/L)[3] GW Standard 5 µg/L			
	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)
Albright	24	24	20	19.2	58	58	53	46.4
Fort Martin	6.3	6.3	2.3	5.04	9.8	12	7	9.6
Harrison	below existing standards	existing standards	n/a[1]	n/a[1]	7.7	7.7	2.7	6.16
Kammer	34	52	48	41.6	140	182	177	145.6
Kanawha River	80	109	105	87.2	81	90	85	72
Pleasants/ Willow Island	19	10	6	8	30	8.6	3.6	6.88
Rivesville	9.1	9.1	5.1	7.28	22	22	17	17.6
Sporn	below existing standards	existing standards	n/a[1]	n/a[1]	96	6.4	1.4	5.12
Coal Storage Areas	Chromium (µg/L)[3] GW Standard 100 µg/L				Nickel (µg/L)[3] GW Standard 100 µg/L			
	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)	maximum observed[6]	GWPS[4] (µg/L)	increase[2] (µg/L)	PAL[5] (µg/L)
Albright	190	190	90	152	960	970	870	776
Fort Martin	440	440	340	352	410	433	333	346
Harrison	below existing standards	existing standards	n/a[1]	n/a[1]	220	328	128	262
Kammer	480	669	569	535.2	844	844	744	675.2
Kanawha River	140	140	40	112	2900	2900	2800	2320

Pleasants/ Willow Island	300	300	200	240	1800	744	644	595.2
Rivesville	120	120	20	96	260	299	199	239
Sporn	below existing standards	existing standards	n/a[1]	n/a[1]	1300	490	390	475
Ash Pond Areas	**Nickel (µg/L)[3] GW Standard 100 µg/L**				**Selenium (µg/L)[3] GW Standard 50 µg/L**			
	maximum observed[6]	**GWPS[4] (µg/L)**	**increase[2] (µg/L)**	**PAL[5] (µg/L)**	**maximum observed[6]**	**GWPS[4] (µg/L)**	**Increase[2] (µg/L)**	**PAL[5] µg/L)**
Kanawha River	below existing standards	existing standards	n/a[1]	n/a[1]	120	120	70	96
Sporn	110	119	19	95.2	below existing standards	existing standards	n/a[1]	n/a[1]

Explanation:

1. "n/a" means not applicable because the constituent meets existing groundwater quality standards.
2. "increase" means the difference between the existing groundwater quality standard and the proposed groundwater quality standard.
3. "µg/L" means micrograms per liter.
4. "GWPS" means Groundwater Protection Standards requested pursuant to 47CSR57 "Groundwater Quality Standard Variances".
5. "PAL" means Preventive Action Limits which is a numeric value expressing the concentration of a substance in groundwater that, if exceeded, causes action to be taken to assure the standards of purity and quality of groundwater are not violated.
6. "maximum observed" includes monitoring well and direct-push sample data

5. Figures 2-9 show each variance area as a quadrilateral having four coordinates. For reasons stated previously in these comments, Figures 2-9 should be revised to show the river as a boundary line that connects the two coordinates that are located closest to the river.

The DEP does not agree to revise Figures 2 through 9 for reasons specified in our reply to comment #2

6. The heading at the bottom of the first column in Table 13 should be revised to read: "Cost Increases (per month year)". This error was also made in the Fiscal Note for Proposed Rule.

It is agreed that the heading at the bottom of the first column in Table 13 should be amended to read: Cost Increases (per year) and will amend the fiscal note to reflect this change. Table 13 will read as follows:

Table 13	**Economic Factors**	
Allegheny Power Facilities	Cost of Compliance (million $)	Increase in Cost of Electrical Generation(%)
Plant		
Albright	**$13.5**	**6.70%**
Fort Martin	**$38.9**	**4.70%**
Harrison	**$37.2**	**1.50%**

Pleasants/Willow Island	**$44**	**2.60%**
Rivesville	**$8.4**	**9.50%**
Total	**$142**	
American Electric Facilities		
Kammer	**$25.5**	**7%**
Kanawha River	**$21.1**	**6.20%**
Sporn	**$32**	**4.20%**
Total	$78.6	

Cost Increases (per year)	Small Residential User	Large Commercial User	Large Industrial User
Allegheny Power Facilities	**$7.00**	**$3,600.00**	**$278,400.00**
American Electric Facilities	**$5.00**	**$2,300.00**	**$145,000.00**