

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BRIEFING DOCUMENT

Rule Title: Groundwater Protection Standards At Dominion Generation Steam Electric Generating Facility, Mt. Storm, West Virginia

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 lead) at Mount Storm's steam electric generating facility operated by Dominion Generation (Virginia Electric and Power Company) for the coal storage area.

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(l), "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 technologically feasible alternative available and 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 will be reviewed by the Advisory Council during its meeting on May 29, 2001. Recommendation of the Council and the Secretary's response to the Council's recommendation will be included in the June 6, 2001 filing with the Secretary of State's Office and the Legislative Rulemaking Review Committee.

APPENDIX B

FISCAL NOTE FOR PROPOSED RULES

Rule Title: Groundwater Protection Standards At Dominion Generation's Steam Electric Generating Facilities, Mt. Storm, West Virginia

Type of Rule: ☒ **Legislative** ☐ **Interpretive** ☐ **Procedural**

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

1. Effect of Proposed Rule:

	ANNUAL		FISCAL YEAR		
	INCREASE	DECREASE	CURRENT	NEXT	THEREAFTER
ESTIMATED TOTAL COST	\$0	\$0	\$0	\$0	\$0
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 Department of Environmental Protection as a result of this rule.

3. Objectives of These Rules:

To set groundwater protection standards for the coal storage area at Mount Storm's steam electric generating facility operated by Dominion Generation (Virginia Electric and Power Company). This activity by its 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 Dominion Generation's Steam Electric Generating Facility, Mt. Storm, West Virginia

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 were not to pass, the cost to implement corrective action measures at this facility are outlined in the economic factors listed below:

Economic Factors at Mt. Storm Power Plant	
Cost of Compliance (million \$)	Increase in Cost of Electrical Generation (%)
\$30.1 million	4.2%

C. Economic Impact on Citizens/Public at Large.

None

Date: May 21, 2001

Signature of Agency Head or Authorized Representative:



TITLE 47
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER RESOURCES
SERIES 57B
GROUNDWATER PROTECTION STANDARDS AT DOMINION GENERATION'S
MOUNT STORM ELECTRIC GENERATING FACILITY

2001 MAY 24 A 8:45

OFFICE WEST VIRGINIA
SECRETARY OF STATE

§47-57B-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 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.

1.1.a. A study was initiated by Virginia Electric and Power Company, doing business as Dominion Generation, and conducted by Resource International, Ltd., to ascertain the existing groundwater quality at the Mount Storm steam electric generating facility located at Mount Storm, Grant County, West Virginia. The study concluded that five (5) metals (beryllium, cadmium, chromium, lead, and nickel) were consistently exceeding groundwater quality standards at the coal storage area.

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 the variance applicable area, which is the coal storage site at the Mount Storm steam electric generating facility.

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

1.3. Filing Date. -

1.4. Effective Date. -

§47-57B-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. "Groundwater" means the water occurring in the zone of saturation beneath the seasonal high water table, or any perched water zones.

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

2.6. "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.

2.7. "ppb" - means parts per billion or $\mu\text{g/l}$ (micrograms per liter).

2.8. "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.

2.9. "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.

2.10. "Secretary" means the Secretary of the Department of Environmental Protection.

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 area" 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.

§47-57B-3. Variance Applicable Area.

3.1. Variance applicable area for the coal storage site at the Mt. Storm electric power generating facility is described by the following coordinates:

Southwest corner marker: 39°12'08.249", 79°16'05.256"

Northwest corner marker: 39°12'20.227", 79°16'10.457"

Northeast corner marker: 39°12'22.912", 79°16' 01.294"

Southeast corner marker: 39°12'08.366", 79°15'57.272"

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 Secretary as to which method is used to mark the variance applicable areas.

§47-57B-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 lead. (See Table 57B-4 at the end of this rule.)

4.2. The groundwater protection standards and preventative action limits are established for the coal storage site at the variance applicable area referenced in §47-57B-3. The variance shall not pertain to any 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 Secretary shall cause such action to be taken as specified in §47-57B-5, "Terms and Conditions" to assure that standards of purity and quality are not violated.

§47-57B-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 area and the receptor. If the Secretary reasonably believes the current number and location of compliance monitoring wells is no longer adequate to monitor the variance applicable area, the Secretary 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 other wells monitoring the variance applicable area.

5.4. Preventative action limits have been statistically calculated to establish a concentration for the specified constituent that is achievable with a 95% (percent) confidence level.

5.5. Any expansion of the existing coal storage area outside of its variance applicable area is prohibited; unless the expanded area employs 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 §47-57B-5, "Terms and Conditions" of this rule.

5.7. Compliance monitoring of the variance applicable area 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 Secretary 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 which may include groundwater modeling to determine the cause of such exceedences. The results of such an assessment shall be reported to the Secretary.

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 Secretary 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 Secretary 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 which may include groundwater modeling to determine the cause of such exceedence. The results of which shall be reported to the Secretary.

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.

§47-57B-6 Periodic Review.

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

TABLE 57B-4

Mount Storm Coal Storage Area			
Compliance Monitoring Stations: MW-14, MW-15, and MW-16.			
Variance Candidate	Existing Groundwater Quality Standard (GQS)	Proposed Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)
Beryllium (ppb)	4	125.88	100.7
Cadmium (ppb)	5	88.24	70.59
Chromium (ppb)	100	421.25	337
Lead (ppb)	15	185	148
Nickel (ppb)	100	3900	3120



Division of Water Resources
1201 Greenbrier St.
Charleston, WV 25311-1088
(304) 558-2108
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West Virginia Department of Environmental Protection

Bob Wise
Governor

Michael O. Callaghan
Secretary

MEMORANDUM

To: Secretary of States Office
Attn: Judy Cooper
Building 1, Suite 157K
Charleston, WV 25305-0770

From: Division of Water Resources
Chad Board *hbl*
1201 Greenbrier St.
Charleston, WV 25311-1088

Date: June 1, 2001

Re: **Request For Variance From Groundwater Standards By Dominion Generation Power Company-Proposed Rule 47CSR57B**

Enclosed is a copy of the *Request For Variance From Groundwater Standards By Dominion Generation And Power Company* and *The Secretary's Decision For Proposing The Variance*. Please attach these sections to the variance I sent you on May 25, 2001. I was informed two days ago that these sections need to accompany the variance. Please accept my apology for the delay in getting this information to you.

If you have any questions, please feel free to call me at (304) 558-2108.

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OFFICE WEST VIRGINIA
SECRETARY OF STATE

REQUEST FOR VARIANCE FROM GROUNDWATER STANDARDS BY VIRGINIA ELECTRIC AND POWER COMPANY

INTRODUCTION:

Petition for Groundwater Quality Variances (47CSR57)

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 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.

Virginia Electric and Power Company, doing business as Dominion Generation, requested a variance to grant relief from existing groundwater quality standards. The variance applicable area is the coal storage site at the Mount Storm steam electric generating facility.

Dominion Generation believes that operations at the Mount Storm power station cannot be conducted to provide compliance with existing groundwater quality standards. In support of this variance request, Dominion Generation initiated a study conducted by Resource International, Ltd., to ascertain the existing groundwater quality at the Mount Storm steam electric generating facility located at Mount Storm, Grant County, West Virginia. The study concluded that five (5) metals (beryllium, cadmium, chromium, lead, and nickel) were consistently exceeding groundwater quality standards at the coal storage area.

Technical Documentation

Dominion Generation provided technical documentation in support of this variance from existing groundwater quality standards. This included:

- ❖ Evaluation of local and regional hydrogeology, including an evaluation of regional groundwater quality and uses of other sources in the vicinity of the power station which may affect groundwater quality.
- ❖ Performing an exposure assessment to identify potential human and environmental receptors. This evaluation concluded that Mount Storm Lake is the sole receptor.
- ❖ Performing an evaluation of Dominion Generation's two year groundwater quality study involving quarterly groundwater monitoring from twenty monitoring wells, with

analysis for 44 chemical parameters (organic and inorganic). The study concluded that five (5) metals (beryllium, cadmium, chromium, lead, and nickel) were parameters of concern. The study identified the coal storage site at the Mount Storm steam electric generating facility as the source of these metals.

- ❖ Performing fate and transport modeling to evaluate long term effects associated with the variance.
- ❖ Determining proposed alternate Groundwater Protection Standard (GWPS) and Preventive Action Limits (PAL) using the West Virginia Department of Environmental Protection statistical model.
- ❖ Evaluation of the environmental ramifications of the proposed alternate GWPS by calculating contaminant influx to Mount Storm Lake from the coal pile, then comparing the influx to the applicable published surface water standard to ensure that the influx did not represent environmental concern. This demonstrated that the proposed variance does not have adverse environmental ramifications with respect to the receptor identified in the exposure assessment.

The proposed variance GWPS and PALs derived from this exercise are summarized in the following table.

Metal	Published GWPS	Proposed GWPS	Proposed PAL
Beryllium	4 µg/L	125.88 µg/L	100.7 µg/L
Cadmium	5µg/L	88.24 µg/L	70.59 µg/L
Chromium	100 µg/L	421.25 µg/L	337 µg/L
Lead	15 µg/L	185 µg/L	148 µg/L
Nickel	100 µg/L	3900 µg/L	3120 µg/L

This technical demonstration has been prepared in accordance with generally accepted engineering and environmental practices. It is Dominion Generation's opinion that sufficient documentation has been provided to support the assertion that the proposed variance is both reasonable and prudent.

Groundwater Quality Study

Beginning in March 1998, Dominion Generation conducted a groundwater evaluation (variance study) at the Mount Storm Power Station in support of this variance request. The approach taken for the variance study consisted of collection and chemical analysis of groundwater samples from monitoring wells on a quarterly basis. Quarterly sampling continued through December 1999.

Monitoring Wells

A total of 20 groundwater monitoring wells were incorporated into this study. Monitoring wells MW-1 through MW-11 were pre-existing. Wells MW-12 through MW-20 were installed for the purpose of this study. Monitoring well MW-19 was located upgradient of the coal storage pile. All other monitoring wells were located downgradient of features/structures which could have a conceivable effect on groundwater quality.

Groundwater Quality Monitoring Program

Quarterly groundwater samples from each well were analyzed for an analyte list comprised of 44 organic and inorganic constituents, as follows:

Alkalinity	Chloride	Mercury	Temperature
Aluminum	Chromium as Cr	Molar Alkalinity	Thallium
Antimony	Chromium (Total)	Molybdenum	Toluene
Arsenic	Conductivity	Nickel	TDS
Barium	Copper	Nitrate/Nitrite	TOC
Benzene	Ethylbenzene	pH	Total Phosphorus
Beryllium	Fluoride	Potassium	Suspended Solids
Boron	Iron	Selenium	Xylenes
Cadmium	Lead	Silver	TOX
Calcium	Magnesium	Sodium	Vanadium
COD	Manganese	Sulfate	Zinc

Fate and Transport Modeling

The purpose of fate and transport modeling is to provide an analysis of potential release plume migration from the source areas at the Mount Storm Power Station. Analysis of plume migration pathways and velocity is accomplished using the MODFLOW and MT3D software codes.

General Model Overview

Modeling was performed using modules of the Groundwater Vistas (GV) software developed by Environmental Simulations, Inc. (ESI). These modules include:

MODFLOW a three dimensional groundwater flow model published originally by the United States Geological Survey.

MT3D a three dimensional containment transport model distributed by the US Environmental Protection Agency (EPA).

Conceptual Flow Model

The first step in creating a solute transport demonstration is to generate a reliable groundwater flow model which will accurately define the advection portion of the advection-dispersion equation. MODFLOW is used for this purpose.

The solution of the groundwater flow equation, and, hence, the establishment of the flow model, requires the specification of boundary conditions. There are several categories of boundary conditions:

Constant head boundaries, which are defined as areas where the head in the aquifer does not change with time. Examples include regional groundwater divides and surface water bodies (e.g., ponds, lakes). For this model, Mount Storm Lake represents a constant head boundary.

Constant flux boundaries, which are defined as areas where the rate of recharge or discharge can be specified (e.g., withdrawal wells, injection wells).

Mixed boundaries, which are defined as a combination of the above, and include rivers, drains, general-head boundaries, streams, and evapotranspiration.

The application of boundary conditions is site specific and is derived from hydrogeologic conditions. Based on the understanding of the geology of the Mount Storm Power Station, a conceptual flow model was constructed. The reliability of the conceptual flow model is dependent on how closely it compares to known field conditions.

Groundwater measurements taken from monitoring wells in June 1999 were entered as targets. The calibration of the steady state groundwater flow involves a trial and error process with respect to identification of realistic boundary conditions. These calibration results are considered acceptable for a model grid established for a surface area of several dozen acres.

Solute Transport Model

Once the conceptual flow model is created and calibrated, it is possible to conduct contaminant transport modeling. For the purposes of the variance request, the following simulation was performed:

- ❖ The source area was considered to be all the land underlying the coal stockpile. The variance study did not include the coal pile runoff pond and metals cleaning basin as sources.
- ❖ The release was considered to be steady-state as opposed to a one-time event.
- ❖ A contaminant value of 100 was used as the concentration at the release area. The purpose of this assumption was to allow model result interpretation on a percent basis, and thereby apply the results to all metals under consideration for variance.
- ❖ The model period was 100 years.
- ❖ No retardation or decay values were incorporated into the simulations. This means that the modeled contaminant transport will be as rapid as advection and dispersion will allow, rendering a worst case scenario. The purpose of such conservative modeling parameters is to accommodate protection of human health and the environment.
- ❖ Assuming constant flux emanating from the coal pile, a plume will extend to the shore of Mount Storm Lake. The concentration contours indicate that the highest concentration anticipated to reach the lake in 100 years would be 50% of the original value. The length of shoreline to be impacted is approximately 1500 feet, of which approximately 700 feet is at the 50% concentration and the remainder is at lower concentrations.

Summary

A fate and transport model was developed and applied to evaluate the potential long-term effects of steady state release over a period of 100 years. The model plume characteristics exhibit reasonable agreement with the metals plumes identified in the variance study, indicating that the model may be relied on as a reasonable predictor of long term effects. The model demonstrates that metals released to groundwater from the coal stockpile will interface with Mount Storm Lake, and that the maximum concentration to reach the lake over a 100 year period is modeled to be no more than 50% of the concentration at the source area.

The fate and transport model provides additional assurance that steady state conditions have been reached with respect to the influence of coal storage on groundwater. The model does not indicate that further degradation of groundwater quality downgradient of the coal pile is to be anticipated.

Determination of Alternate Groundwater Protection Standards

In order to develop proposed alternate GWPS for the facility, the anticipated impact to surface water (Mount Storm Lake) from groundwater influx was mathematically determined for each candidate metal. This determination was performed as follows.

The background data set (eight sample events) was statistically evaluated using procedures outlined in the WVDEP statistical model using a 95% confidence level. The WVDEP statistical model was applied because it outlines the standard statistical protocols used in the evaluation of groundwater monitoring programs for waste disposal sites in the state of West Virginia. Use of the model allowed for a defensible evaluation of the data collected during the Groundwater Quality Study.

Proposed alternate protective action limits (PAL) and alternate GWPS were developed based on the statistical comparison. The statistical evaluation identified an upper confidence based on the concentration for each candidate metal which is statistically predictable with 95% confidence based on the background data set. This value was selected as the PAL. Accordingly, GWPS were calculated from the PALs.

In order to evaluate whether the proposed GWPS represents a threat to Mount Storm Lake, the influx to the lake associated with the proposed alternate GWPS was mathematically derived.

The derived influx value was compared to the West Virginia Surface Water Quality Criteria to insure that the criteria were not exceeded.

The assumptions upon which the determinations were made are as follows:

- ❖ The coal pile is acting as a source. Based on the age of the coal pile, it is assumed that a steady state influx into groundwater has been reached (i.e., groundwater quality is not continuing to degrade). The variance study and the fate and transport model support this assumption.
- ❖ The proposed alternate concentrations apply to groundwater quality at the interface with Mount Storm Lake.
- ❖ The length of exposed shoreline is 1,500 feet, based on the variance study plumes and the fate and transport model. Although the model indicates maximum concentration (i.e., 50% of source) exists only along approximately 700 feet of this length of exposed shoreline, the variance demonstration assumes maximum concentration for the entire 1,500 feet. Again,

this is to overestimate rather than underestimate risk.

- ❖ The thickness of the aquifer exposed to the lake is 2 meters, based on site geology.
- ❖ The average depth of the lake is 4 meters, estimated from the USGS Mount Storm Lake topographic quadrangle.
- ❖ The groundwater flow rate is 0.137 meter/day, as derived from slug tests and the groundwater gradient between the coal pile and the lake.

In the cases of beryllium, cadmium, lead, and nickel, Dominion Generation's study has interpreted the presence of a plume emanating from the coal pile, and intercepted by wells MW-14, MW-15, and MW-16. For these metals, the statistical evaluations were performed using data from these wells only.

In the case of chromium, it is less conclusive whether the coal pile may act as a source. This is because chromium is prevalent in upgradient well MW-19, and in several other wells across the site. The natural background presence of chromium in groundwater therefore appears to be a factor. For this reason, the statistical evaluation of chromium was based on data from all wells in the program.

Statistical Determination of Alternate GWPS

The statistical evaluations of the variance candidate metals are discussed individually below.

Beryllium

The data downgradient wells were included in the evaluation. This data set includes 38 data points and is lognormally distributed. There are no outliers. Dominion Generation's study calculated the upper prediction limit (UPL) and upper tolerance limit (UTL) using log-transformed data. These limits are presented below, along with the highest detected background data point.

Beryllium

Limit	Log-transformed	Raw Data(µg/L)
UPL	4.526	92.37
UTL	4.614	95.69
Highest Background	4.612	100.70

Based on this evaluation, the highest statistically justified PAL would be the highest background

or 100.7 µg/L (0.1007 mg/L). The GWPS derived from this concentration is 125.88 µg/L (0.126 mg/L). The current GWPS for beryllium in West Virginia is 4 µg/L (0.004 mg/L).

Cadmium

The data from downgradient wells were included in the evaluation. This data set includes 38 data points and is lognormally distributed. There is one low outlier, which was excluded from the data set for the subsequent evaluations. Dominion Generation's study calculated the UPL and UTL using the log-transformed data. These limits are presented below, along with the highest detected background data point.

Limit	Log-transformed	Raw Data (µg/L)
UPL	4.196	66.40
UTL	4.257	70.59
Highest Background	4.194	66.30

Based on this evaluation, the highest statistically justified PAL would be the UTL, or 70.5 µg/L (0.0706 mg/L). The GWPS derived from this concentration is 88.24 µg/L (0.0882 mg/L). The current GWPS for cadmium in West Virginia is 5 µg/L (0.005 mg/L).

Chromium

The data from all wells was included in the evaluation . This data set includes 146 data points, of which 27 are non-detects (18.5% non-detects). The detects only data set is non-normally distributed, exhibiting severe left skew, indicating that parametric statistical methods are not appropriate. There are no outliers. The non-parametric UPL is the highest detected background value. The non-parametric UTL in this case is also the highest detected background value. The highest detected background value is 337 µg/L (0.337 mg/L). Based on this evaluation, the highest statistically justified PAL would be 337 µg/L. The GWPS derived from this concentration is 421.25 µg/L (0.421 mg/L). The current GWPS for chromium in West Virginia is 100 µg/L (0.1 mg/L).

Lead

The data from downgradient wells were included in the evaluation. This data set includes 38 data points, of which seven were non-detects (18.4%) non-detects. The detects only data set is lognormally distributed. There are no outliers. Dominion Generation's study calculated the UPL and UTL using the log-transformed data and Aitchison Adjusted mean and standard deviation. These limits are presented below, along with the highest detected background data point.

Limit	Log-transformed	Raw Data (µg/L)
UPL	4.729	113.19
UTL	4.862	129.27
Highest Background	4.997	148.00

Based on this evaluation, the highest statistically justified PAL would be the highest detected background concentration or 148 µg/L (0.148 mg/L). The GWPS derived from this concentration is 185 µg/L (0.185 mg/L). The current GWPS for lead in West Virginia is 15 µg/L (0.015 mg/L).

Nickel

The data from downgradient wells MW-9, MW-10, MW-15, MW-16, and MW-17 were included in the evaluation. This data set includes 37 data points and is normally distributed. There are no outliers. Dominion Generation's study calculated the UPL and UTL. These limits are presented below, along with the highest detected background data point.

Limit	Log-transformed	Raw Data (µg/L)
UPL		3012.3
UTL		3073.5
Highest Background		3120.0

Based on this evaluation, the highest statistically justified PAL would be the highest detected background concentration or 3120 µg/L (3.12 mg/L). The GWPS derived from this concentration is 3900 µg/L (3.9 mg/L). The current GWPS for nickel in West Virginia is 100 µg/L (0.1 mg/L).

The proposed alternate GWPS derived from the above statistical evaluations are summarized in Table 1 below. Table 2 summarizes influx evaluations affecting surface water.

TABLE 1.

Mount Storm Coal Storage Area			
Compliance Monitoring Stations: MW-14, MW-15, and MW-16.			
Variance Candidate	Existing Groundwater Quality Standard (GWPS)	Proposed Groundwater Protection Standard (GWPS)	Preventative Action Limit (PAL)
Beryllium	4 µg/L	125.88 µg/L	100.7 µg/L
Cadmium	5 µg/L	88.24 µg/L	70.59 µg/L
Chromium	100 µg/L	421.25 µg/L	337 µg/L
Lead	15 µg/L	185 µg/L	148 µg/L
Nickel	100 µg/L	3900 µg/L	3120 µg/L

TABLE 2

Summary of Surface Water Influx Evaluations			
Variance Candidate	Surface Water Quality Standard	Proposed Alternate Water Quality Standard Influx to Mt. Storm Lake	Order of Magnitude Difference
Beryllium	0.0077 µg/L	2.18×10^{-5} µg/L	2
Cadmium	1.5 µg/L	1.53×10^{-5} µg/L	5
Chromium	11 µg/L	7.29×10^{-5} µg/L	6
Lead	50 µg/L	3.2×10^{-5} µg/L	6
Nickel	510 µg/L	6.746×10^{-5} µg/L	6

In each case, the metals influx to surface water associated with the proposed variance is orders of magnitude below the applicable West Virginia Surface Water Standard. It can therefore be concluded that the proposed variance GWPS do not represent a threat to public health or the environment.

Significance of the PAL

The PAL (Preventive Action Limit) acts as a water quality protection value during future quarterly compliance monitoring. The PAL will not represent a violation threshold, but acts as a trigger concentration for the initiation of action.

Significance of the GWPS

The GWPS acts as a water quality permit level during future compliance monitoring.

SECRETARYS DECISION FOR PROPOSING THE VARIANCE

Basis for the Decision to Grant the Variances

The Division of Water Resources Groundwater Program believes that granting this request for a variance at this location 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 this location for the foreseeable future. There are no human or environmentally sensitive receptors between the coal storage area and groundwater receptors, which is adjacent to Mount Storm Lake.

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 Dominion Generation and found to be economically and operationally unfavorable. The coal storage area is 19.4 acres.

The Division of Water Resources Groundwater Program realizes that current methods of coal storage at large 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 WVDEP finds that no demonstrated benefit to the State and people of West Virginia would be gained by employing the alternatives.

Based on the foregoing, continuing with the proposed groundwater variance will still result in the:

- ❖ Absence of adverse environmental impact to the state of West Virginia.
- ❖ Absence of a quantified threat to human health.
- ❖ Continuation of efforts which enhance environmental quality throughout the region.
- ❖ Continued maintenance of Mount Storm Lake for habitat and recreational use.

In summary, the granting of the variance implies no adverse effect on environmental quality, whereas the alternatives imply potential adverse effects to Dominion Generation that can impact public interest. Under deregulation, electrical customers will be able to choose their electrical service provider in the future. Because of this, not obtaining the variance at Mount Storm Power Station will place Dominion Generation at a competitive economic disadvantage because it's power generation costs will be higher relative to other electric utilities in West Virginia who have already received this variance. The power station provides substantial economic benefits regionally to suppliers, contractors and vendors, as well as, providing over 29 million dollars in

local and state tax revenue in calendar year 2000. Possible alterations in operations could result in severe economic impact to the region. Economic factors of the cost of compliance with current groundwater protection standards are summarized in Table 3.

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

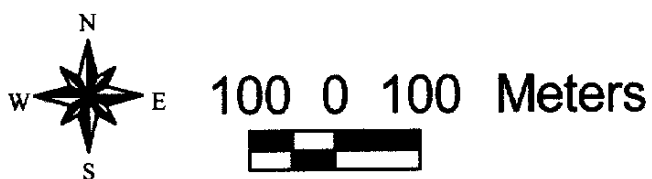
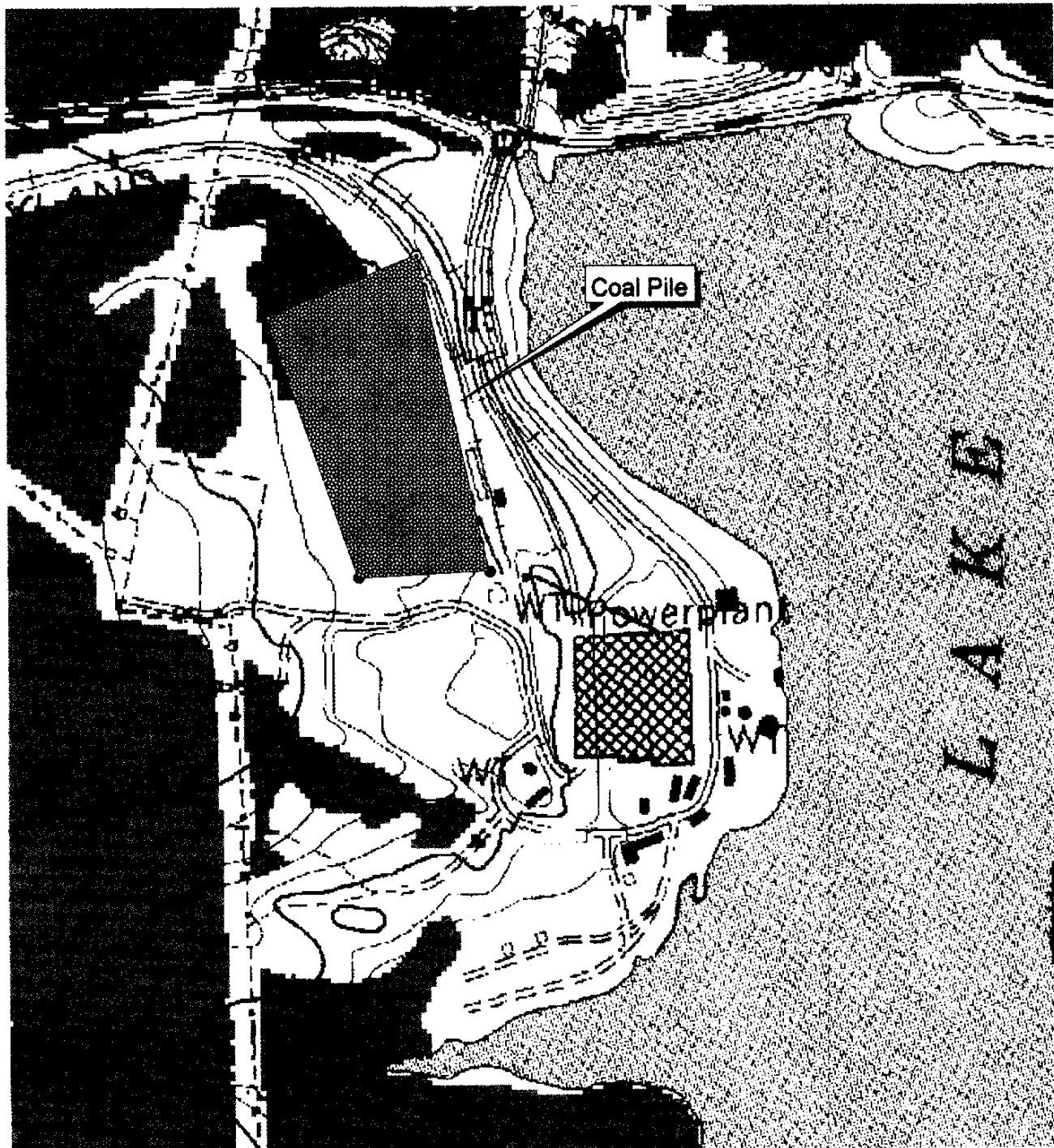
Table 3.

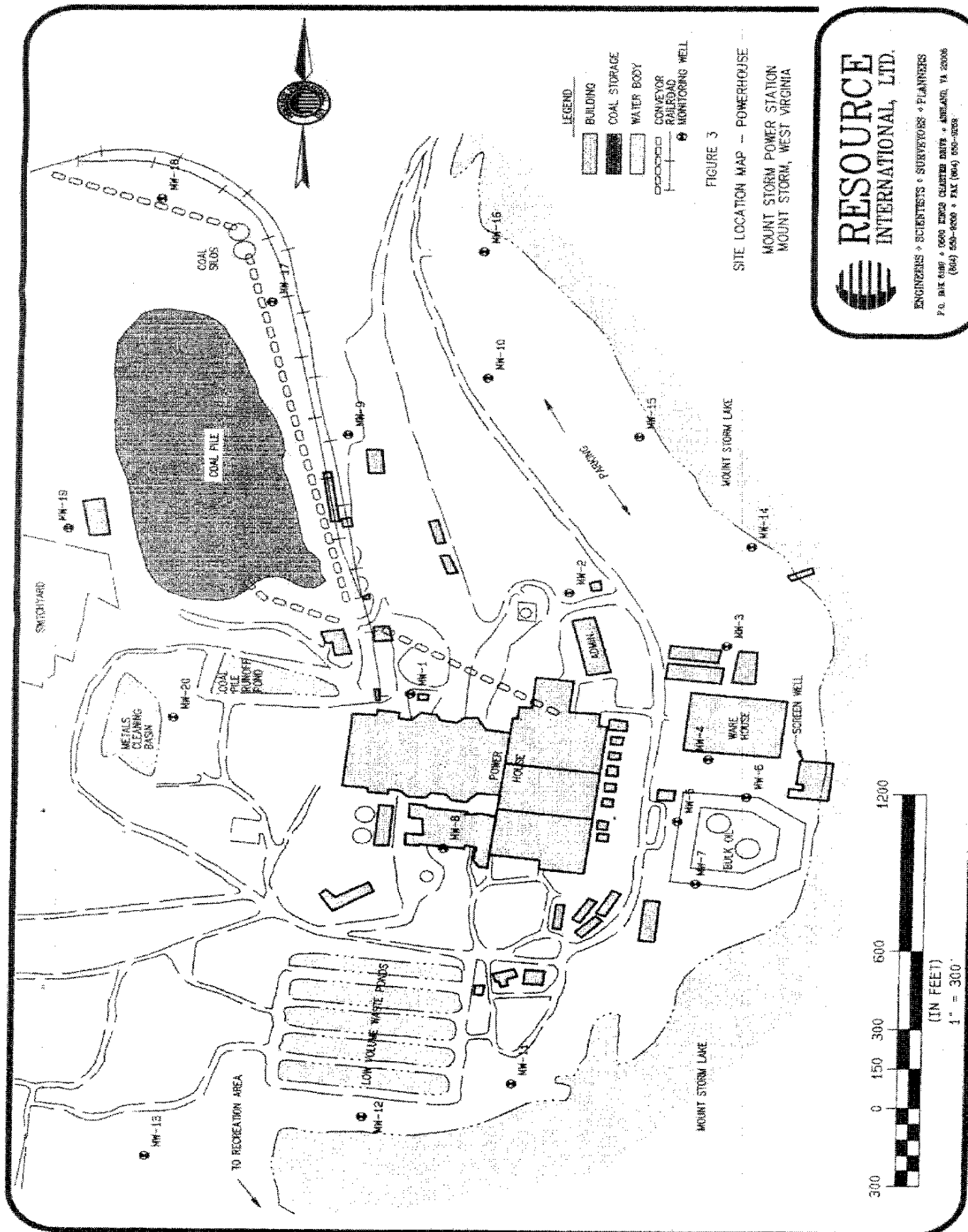
Economic Factors at Mt. Storm Power Plant	
Cost of Compliance (million \$)	Increase on Cost of Electrical Generation (%)
40.3	5.0

The following list of acronyms/abbreviations are used in the attached report:

µg/L	micrograms/Liter
mg/L	milligram/Liter
MW	Monitoring Well
GQS	Groundwater Quality Standard
GWPS	Groundwater Protection Standards
PAL	Preventive Action Limits
pH	A measure of the acidity/alkalinity of a solution
ppb	parts per billion
COD	Chemical Oxygen Demand
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TOX	Total Organic Halogen
UPL	Upper Prediction Limit
UTL	Upper Tolerance Limit
Be	Beryllium
Cd	Cadmium
Cr	Chromium
Ni	Nickel
Pb	Lead

Mt. Storm Coal Pile Variance Area





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