An Approach to Siting Solid Waste Disposal Facilities in Minnesota

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1 Introduction

The Minnesota Pollution Control Agency (MPCA) is in the process of writing a new rule to address solid waste disposal facility siting in response to a directive from the 2008 legislature. This paper offers an approach to siting that conforms to the legislative intent of protecting Minnesota's groundwater resources and satisfies a set of fundamental principles that are important to the environmental, social, economic, and political interests of Minnesotans.

2 Fundamental Principles

A new rule addressing the siting of new solid waste disposal facilities should adhere to the following fundamental principles.

1) A new siting rule should be consistent with existing law and rule. Significant legislation has already been enacted regarding solid waste management both in Minnesota and at the federal level. A new siting rule should readily fit within this existing legislation.
2) A new siting rule should include explicit, non-arbitrary requirements. Solid waste disposal facilities in Minnesota, whether operated by public or private entities, must be able to make rational planning decisions. In the case of siting a new solid waste disposal facility, these planning decisions must begin eight to ten years prior to the time that new disposal capacity is needed. To enable rational decision-making, rules governing solid waste disposal facility siting must be explicit and non-arbitrary, with a well-defined decision-making process and a reasonable timeline.
3) A new siting rule should acknowledge that science and technology play an important role in protecting human health and the environment. Technical aspects of solid waste disposal facilities, as with most other aspects of modern life, have made great advances in the past 20 years. This technical knowledge should be embraced by and incorporated into a new siting rule.
4) Since each site has unique characteristics, a new siting rule should acknowledge that citizens of Minnesota rely on the professionalism, expertise, and ethics of the MPCA in evaluating the associated complex technical site issues. MPCA staff and administrators are well-respected professionals with great expertise in solid waste management issues. In addition to their obligation to all citizens as regulators of activities that affect Minnesota's environment, MPCA technical staff are also bound by a code of ethics as Professional Engineers and Professional Geologists. A new siting rule should acknowledge the technical and administrative capabilities of the MPCA, and allow the MPCA to apply its expertise and judgment in directing and evaluating technical aspects of solid waste disposal facility siting.

3 Applicable Law and Rule

3.1 Existing Legislation

Existing legislation with which a new siting rule should be compatible includes:

- Groundwater Protection Act (MN Statute 103H)
- Solid Waste Management Act (MN Statute 115A)
- Solid Waste Rules (MN Rules Chapter 7035)
- Environmental Review Rules (MN Rules Chapter 4410)

- Environmental Health Rules (MN Rules Chapter 4717)
- RCRA Subtitle D (40 CFR Part 258)

3.2 Legislative Directive for Solid Waste Disposal Facility Siting Rule

In 2008, MN Statute 116.07 was enacted which placed a moratorium on permitting new solid waste disposal facilities in Minnesota (with certain exceptions), and directed the MPCA to make new rules that address siting issues. MN Statute 116.07 states:

> Subd. 4. **Rules and Standards.** … The rules for the disposal of solid waste shall include site-specific criteria to prohibit solid waste disposal based on the area's sensitivity to groundwater contamination, including site-specific testing. …Until the rules are modified to include site-specific criteria to prohibit areas from solid waste disposal due to groundwater contamination sensitivity, as required under this section, the agency shall not issue a permit for a new solid waste disposal facility…

4 Sensitivity Definition

The phrase "sensitivity to groundwater contamination" is a new term in the context of solid waste disposal facility siting. The term "sensitivity" can have different meanings depending on the particular field of study in which it is applied. The purpose of this section is to develop a definition for the term "sensitivity to groundwater contamination" that is useful in the context of the siting process and is supported by existing Minnesota law and rule.

4.1 Overview

MN Statute 116.07 does not define the term "sensitivity." However, the language of the statute puts clear emphasis on site-specific criteria–not general standards–when determining the sensitivity of a site to "groundwater contamination."

4.2 Definition in Existing Law

A search of Minnesota Rules Statutes and Laws (Minnesota Reviser of Statutes) does not provide any matches for the phrase "sensitivity to groundwater contamination." The most specific definition for sensitivity is found in the Groundwater Protection Act, MN Statute 103H.005, which offers the following:

> Subd. 13. **Sensitive Area.** "Sensitive area" means a geographic area defined by natural features where there is a significant risk of groundwater degradation from activities conducted at or near the land surface.

This definition provides that the area in question possesses a geographically distinct boundary defined not by municipal or regional jurisdiction but by natural features, and that "sensitivity" is directly related to a risk resulting from activities on the land surface. Thus the statute lays out a clear meaning that sensitivity is not an intrinsic function of the geology alone, but is also a function of the risk posed by an activity conducted on the land surface. Finally, it says that the risk must be "significant."

4.3 Discussion of "Significant Risk"

There is a commonly used and well-tested method for determining the significance of risk of an environmental effect (e.g. groundwater degradation) resulting from human activity. The test is found in Minnesota's environmental review rules (MN Rules 4410) that are often used to assess solid waste disposal facility projects prior to permitting in the EAW and EIS process. MN Rules

4410.1700 Subp. 6 and 7 offer the following standard and criteria for determining the significance of an environmental effect that may result from a project:

> Subp. 6. **Standard.** In deciding whether a project has the potential for significant environmental effects the RGU shall compare the impacts that may be reasonably expected to occur from the project with the criteria in this part.
>
> Subp. 7. **Criteria.** In deciding whether a project has the potential for significant environmental effects, the following factors shall be considered:
>
> A. type, extent, and reversibility of environmental effects;
> B. cumulative potential effects of related or anticipated future projects;
> C. the extent to which the environmental effects are subject to mitigation by ongoing public regulatory authority; and
> D. the extent to which environmental effects can be anticipated and controlled as a result of other available environmental studies undertaken by public agencies or the project proposer, including other EISs.

Criteria A and C are particularly relevant to solid waste disposal facility siting decisions. MN Rules 4410.1700 subp. 7.A requires consideration of three elements in determining whether the risk is significant:

1) T*ype* of effect—This element refers to the characteristics of the waste and the mobility of contaminants given the specific containment design for the facility
2) *Extent* of effect—This element could include both lateral extent and concentration of contaminants, if released to the environment, along with the ability to detect such a release and the timing of implementation of remedial actions in response to detection
3) *Reversibility*—refers to both the ability to detect a release of contaminants to the environment and the ability to remediate such a release (a measure of permanence of the effect)

This criterion thus requires evaluation of waste characteristics, engineered controls and monitoring systems, and the hydrogeologic setting. Likewise, MN Rules 4410.1700 subp. 7.C requires that the ability to mitigate potential environmental effects through regulation ("on-going public regulatory authority") also be considered in determining the significance of the effect. When applied to solid waste disposal facility siting, this criterion requires consideration of the ability of a regulatory authority to impose and enforce permit conditions on a project when determining the significance of a potential environmental effect. Such permit conditions would address engineered controls, operating requirements, monitoring locations, frequencies, and parameters, inspection and maintenance requirements, and contingency action planning that are suitable for the waste characteristics and the site-specific hydrogeologic setting of the proposed project.

MN Statute 103H.005 also recognizes that best management practices, when properly applied, are capable of preventing and minimizing groundwater degradation:

> Subd. 4. **Best management practices.** "Best management practices" means practicable voluntary practices that are capable of preventing and minimizing degradation of groundwater, considering economic factors, availability, technical feasibility, implementability, effectiveness, and environmental effects. Best management practices apply to schedules of activities; design and operation standards; restrictions of practices; maintenance procedures; management plans; practices to prevent site releases,

spillage, or leaks; application and use of chemicals; drainage from raw material storage; operating procedures; treatment requirements; and other activities causing groundwater degradation.

The MPCA's regulatory authority to incorporate best management practices through permitting serves as a basis for assessing the significance of a potential environmental effect.

4.4 Other Definitions are Less Applicable

The Minnesota Department of Natural Resources (MDNR) has developed guidelines ("Criteria and Guidelines for Assessing Geologic Sensitivity of Groundwater Resources in Minnesota," MDNR, June 1991) for assigning "geologic sensitivity" for its own use in preparing sensitivity maps in response to a directive in MN Statute 103H.101. Page 8 of the Criteria and Guidelines document provides a general definition of sensitivity:

> The term "sensitivity" is commonly used to describe the general potential for an aquifer to be contaminated. One aquifer is said to be more sensitive than another aquifer if it has a higher potential to be contaminated. However, this definition of sensitivity is unsatisfactory because "potential" is vague and difficult, if not impossible, to measure.
>
> Part of the difficulty is that the likelihood of contaminant release is poorly known, usually reflecting site-specific factors such as actual use, storage and handling and equipment maintenance. In addition, the physical and chemical characteristics of a contaminant, local and regional ground water flow patterns, geologic materials, land use patterns, seasonal changes, how and where the contaminant release occurs, and other factors complicate estimating the "potential" for contamination.
>
> Instead of trying to use an unmeasurable term such as "potential" to define relative sensitivity, this report uses the concept of "time of travel," the time required for a contaminant to move vertically from the land surface to an aquifer. This interpretation is preferred as being specific and measurable.

The MDNR expressly acknowledges the limitations of this definition and that the sensitivity mapping completed based upon this definition is necessarily broad (pages 16-17 of the Criteria and Guidelines document):

> These guidelines represent a qualitative approach to the assessment of geologic sensitivity of ground water resources. They are designed to use data that are already available, or can be obtained reasonably, in most parts of the state.
>
> However, they are not rigorously quantitative. The general criteria are based on time-of-travel estimates that are very broad and overlapping. This method is not intended to substitute for site-specific studies that establish more accurately the effects of factors that affect ground water sensitivity.
>
> In general, a study which takes more local physical, cultural and other factors into account takes precedence over a study which considers fewer factors. And a study which uses more exact and detailed information, including field measurements, supersedes a study which uses less or only estimates of local conditions.
>
> All needs will not be satisfied by the general criteria and/or the application method as presented. Since some assessment needs are site-specific or require assessment results this approach does not produce, such as the potential for ground water contamination from a specific contaminant, an alternate method should be used to address these needs. Examples of such needs would be or hazardous waste site evaluations, disposal basin leaching and mathematical modeling.

The MDNR's definition of sensitivity was tailored to its task of completing regional sensitivity mapping without incorporating site- and project-specific knowledge. Therefore, it defined sensitivity relative to vertical "time of travel" for the purpose of comparing larger scale geologic

terranes. That is, the faster the vertical movement of water from the ground surface to the groundwater table, the more sensitive the geologic setting.

This definition was functional for the MDNR's task of performing statewide groundwater sensitivity mapping at large scales. However, it was never intended for application to specific sites and lacks the specificity required by MN Statute 116.07. The problem with this definition for use in solid waste disposal facility siting is that it does not consider the nature of the activity at the ground surface, geologic alterations involved with implementing a project, hydraulic gradients that control movement of groundwater across a site, or the lateral and vertical effects of diffusion, dispersion, and retardation as contaminants move with groundwater.

The complexities that had to be overcome in order for the MDNR to complete its sensitivity mapping are in fact important site-specific variables that are required by statute and rule to be taken into consideration in determining a site's sensitivity to groundwater contamination and the significance of potential environmental effects that a project may pose.

5 Recommended Approach to Solid Waste Disposal Facility Siting

Based upon the foregoing discussion, it is suggested that a new rule governing the siting of solid waste disposal facilities include a four-step process:

1) Define the nature of the activity proposed at the ground surface
2) Evaluate the hydrogeologic setting in which the activity is proposed
3) Determine the significance of the risk of groundwater degradation posed by the activity
4) Assign a threshold of "significant risk" that, if crossed, results in prohibition of the activity

Steps 1 and 2 are currently performed under existing rules as part of solid waste disposal facility permitting. Step 3 is a critical link between steps 1 and 2 that is performed under existing rules to only a limited extent. The crucial *new* aspect of step 3 is reevaluating and adapting the "nature of the activity" defined in step 1 based upon the detailed understanding of the hydrogeologic setting developed in step 2. Step 4 constitutes the "go/no-go" decision regarding the suitability of a site based upon the interaction of the nature of the activity (waste type and facility design) and the hydrogeologic setting. Each of these items is discussed below.

5.1 Nature of Activity

The "nature" of the activity (solid waste disposal) must be evaluated in terms of the type of contaminants that may be present and the potential for those contaminants to be released to the environment. The evaluation should include factors such as waste type, leachate characteristics, type of engineered containment and control systems, type of land alteration associated with development of the facility, and operating conditions.

A wide range of waste types are managed in solid waste disposal facilities in Minnesota. General waste categories include demolition waste, industrial waste, municipal solid waste (MSW), and MSW combustor ash waste. There are subsets of waste types within the demolition (Class 1-3) and industrial (monofill and merchant) categories. Each of these waste types present different potentials for producing contaminants in leachate.

There are a range of engineered containment options (liner, leachate collection, leak detection, interim and final cover) that may be applied at a specific solid waste disposal facility to minimize the potential for a release to the environment. There are minimum requirements for engineered containment in rule, guidance, and policy for the various waste categories. Different levels of containment may be proposed for a solid waste disposal facility that can significantly alter the "nature" of the activity by reducing the potential for release of contaminants.

Variations in the land alteration associated with development of a solid waste disposal facility also affect the nature of the activity with respect to the potential to contaminate groundwater. These variations include the depth below ground surface to the base of the facility, separation from groundwater, removal of it-situ geologic layers (excavation), and addition of new geologic layers (placement of engineered fill, such as buffer soils, clay liners, sand drainage layers, final cover layers, etc.).

Operating conditions that influence the nature of a solid waste disposal facility include the size of the open area, depth of waste within the facility, interim cover placement, timing of construction of new phases and closure of filled phases, control of leachate pressure on the base of the facility, and leachate recirculation for accelerated waste stabilization in the case of MSW disposal facilities.

The requirements for contents of a permit application for construction and operation of a solid waste disposal facility, specified in MN Rules 7035, provide the information required to evaluate the nature of the activity. The basic permit application requirements are summarized in Appendix A.

The outcome of the evaluation recommended in this section would be a quantification of a potential release of contaminants from the facility to groundwater. The characteristics of a potential contaminant release are a function of the leachate strength and flux, which in turn depend upon waste type, liner type, final cover type, operating plan, leachate collection efficiency, construction quality control, and control of leachate pressure on the liner. A conservative analysis should be used as part of the quantification to address uncertainties in the system variables. Such an analysis would assess the sensitivity of the contaminant types, concentrations, and release rates to changes in the performance of the engineered systems.

5.2 Hydrogeologic Setting

The hydrogeologic setting in which the solid waste disposal facility is proposed to be sited must be evaluated. Under current rules, the required scope of the evaluation varies according to the type of solid waste disposal facility (demolition, industrial, MSW). The requirements for a four-phase hydrogeologic evaluation for MSW and MSW combustor ash disposal facilities (and applied by policy to significant industrial waste disposal facilities) are specified in MN Rules 7035.2815, and provide the information required to evaluate the hydrogeologic setting, including requirements for site-specific testing and characterization. The basic evaluation requirements are summarized in Appendix B.

Site-specific testing includes measurement of the physical, chemical, and biological characteristics of the soils, geology, and groundwater at the site in accordance with MN Rules 7035.2815 and accepted ASTM Standards (e.g. ASTM C 5730-04). It also includes measurement of the groundwater flow including the presence and direction of hydraulic

gradients. Additional methods of investigation may be required for fractured rock and karst areas (e.g. ASTM D 5717).

The outcome of the evaluation recommended in this section should include developing a conceptual model of the hydrogeologic system, determining the rate and direction of groundwater flow, designing a monitoring system capable of detecting a release of contaminants from the facility, and preparing contingency plans for remediation. A conservative analysis should be used to address uncertainties in the conceptual hydrogeologic model, monitoring system, and contingency remediation plans. Such an analysis would assess the sensitivity of the predicted groundwater flow regime to changes in hydrogeologic characteristics.

5.3 Significance of Risk

Ultimately, the significance of the risk of groundwater contamination resulting from solid waste disposal activities is measured by quantifying potential contaminant concentrations in groundwater at the compliance boundary. The term "compliance boundary" is defined in MN Rules 7035.0300:

> Subp. 18. **Compliance Boundary.** "Compliance boundary" means the planar surface that circumscribes the permitted waste boundary, lies between the permitted waste boundary and the property boundary, extends vertically downward from the land surface, and constitutes the place at which compliance with agency groundwater quality standards is measured.

Clearly, this measure of risk is not a function of only the hydrogeologic setting, but also (and *just as importantly*) of the type of waste being disposed and the type of containment in which the waste is placed. The variables to be considered in this analysis therefore include:

1) Leachate constituents and concentration
2) Potential rate of release of contaminants from the containment system
3) Attenuation of contaminants en-route to the compliance boundary

It is important that this analysis be conducted as an explicit part of the permitting process because it is the permitting process itself that requires definition and evaluation of these three variables. Analyzing the interaction between these variables is a logical next step in the process.

Using this analysis, different types of containment systems would be evaluated iteratively for a given waste type and within a given hydrogeologic setting. The resulting information would be used to determine the significance of risk for varying combinations of the waste type/containment system/hydrogeologic setting triad. Just as differences in hydrogeologic settings are understood to have different effects on contaminant travel in an aquifer, so too is it understood that differences in containment technology and design result in different potential release rates and attenuation effects.

The outcome of this analysis may be that the minimum containment design prescribed by rules or guidelines results in an acceptable level of risk within the given hydrogeologic setting. On the other hand, the outcome may be that, given the details of a particular hydrogeologic setting, a higher level of containment (above and beyond the prescribed minimum) is required to produce an acceptable level of risk.

With the knowledge of the "nature of the activity" as described in Section 5.1, the hydrogeologic setting as described in Section 5.2, and analysis of the interaction between them as described in this Section 5.3, decisions can be made regarding the relative costs and benefits of constructing a higher level of containment versus seeking an alternate site with different hydrogelogic characteristics.

When determining the significance of risk, consideration should be given to:

1) The degree of certainty in the values calculated for the pertinent variables of waste types, engineering containment systems, and hydrogeologic characteristics
2) The ability of the monitoring system to detect a release
3) The effectiveness of a remediation plan
4) The proximity and nature of downgradient receptors

Consistent with the requirements of Minnesota's environmental review rules (MN Rules 4410.1700 subp. 6 and 7), the significance of the risk of potential environmental effects that may be reasonably expected to occur from the project should be based upon the type, extent, and reversibility of such effects, along with the extent to which the potential environmental effects are subject to mitigation by ongoing public regulatory authority. A summary of the environmental review process is provided as Appendix C.

It is recommended that the siting process described herein be conducted as an activity leading to development of a permit application rather than as an environmental review activity. Typically, submission of a permit application serves as the trigger for conducting environmental review. The more complete the application, the better the information that is available for environmental review. The environmental review process can then be used, as intended, to evaluate potential environmental effects of a well-defined project, including the siting aspects to be addressed by the new rule.

5.4 Threshold for Prohibition

The sensitivity to groundwater contamination of a site due to solid waste disposal at the ground surface should be measured by the interaction of the nature of the activity (waste type and facility design) and the hydrogeologic setting. The threshold for prohibiting the siting of a solid waste disposal facility due to sensitivity to groundwater contamination should be compliance with the permit-imposed intervention limits at the compliance boundary as determined from the evaluation described in Sections 5.1 through 5.3. The term "intervention limits" is defined in MN Rules 7035.0300:

> Subp. 50. **Intervention Limit.** "Intervention limit" means a concentration or measure of a substance which, if found to be exceeded in a sample of ground water, indicates possible ground water pollution from the facility.

The siting of a facility that is predicted to exceed the intervention limits at the compliance boundary, based upon the analysis described in Sections 5.1 through 5.3, would be prohibited. The intervention limits imposed through permitting are typically set at a fraction of the Department of Health's health risk limits (HRLs). HRLs are defined in MN Statute 103H.005:

> Subd. 3. **Health risk limits.** "Health risk limits" means a concentration of a substance or chemical adopted by rule of the commissioner of health that is a potential drinking water contaminant because of a systemic or carcinogenic toxicological result from consumption.

From a health-risk perspective, the threshold for health concerns related to consumption of drinking water-borne contaminants is the HRL itself. Use of intervention limits instead of HRLs as the threshold for siting decisions provides a high level of conservatism. Details on MPCA procedures for establishing intervention limits for a facility permit is provided in MN Rule 7035.2815 subp. 4.

6 Summary

The approach described herein to developing a new siting rule for solid waste disposal facilities accomplishes the following:

- Uses a science-based approach to evaluating the technical issue of a site's sensitivity to groundwater contamination, including site-specific testing and facility-specific waste type and design information
- Is consistent with the Minnesota Department of Health's rules regarding health risk limits for environmental contaminants, as enforced by the MPCA's permit-imposed intervention limits
- Fits within and enhances existing law and rule regarding hydrogeologic evaluation, environmental review, and solid waste facility permitting
- Considers the type of waste to be disposed as part of determining site suitability based upon the potential effects on groundwater
- Considers the type of engineered controls as part of determining site suitability, and recognizes the value of design enhancements in protecting groundwater resources
- Recognizes the importance of understanding the hydrogeologic setting in concert with the proposed activity when determining the potential effect on groundwater
- Adapts automatically to future changes to or establishment of new health risk limits for groundwater contaminants through use of the permit-imposed intervention limit approach to defining the significance of risk
- Allows for facility planning decisions to be made relative to trade-offs between the required level of engineered controls based upon the hydrogeologic setting for different sites

Appendix A
Summary of Solid Waste Facility Permit Application Requirements

An application to the MPCA for a permit to construct and operate a solid waste disposal facility includes the following components:

- Detailed design information and drawings of engineered controls (may include liner, leachate collection, lysimeter, gas collection, final cover, stormwater controls)
- Technical specifications defining the requirements for construction materials, methods, and performance of constructed systems
- Engineering report providing information on waste characteristics, detailed analysis of site geotechnical stability, site development phasing, liner/leachate collection/cap performance, gas management performance, stormwater control performance
- Construction Quality Assurance Plan specifying testing procedures, frequencies, required test results, responses to failed tests, documentation, and reporting
- Operations Plan addressing operating procedures, inspection and maintenance requirements, operating equipment, hours of operation, security, reporting, etc.
- Contingency Action Plan identifying possible contingencies, corresponding corrective actions, required equipment for implementing corrective actions, and cost estimates used for financial assurance
- Closure Plan addressing notification and filing requirements for final closure and cost estimates used for financial assurance
- Post-Closure Care Plan addressing inspection, maintenance, monitoring, and report requirement for the post-closure care period, and cost estimates used for financial assurance
- Emergency Response Plan identifying potential events that may require emergency response, responsible facility personnel, and required equipment for responding

Appendix B
Summary of Existing Hydrogeologic Evaluation Process

A hydrogeologic evaluation is required by rule, guidance, and policy for all solid waste disposal facility siting and expansion proposals. Hydrogeologic evaluations and groundwater monitoring requirements for industrial waste disposal facilities are specified in 7035.1800.B.2 and 7035.1700.S, respectively. In addition, the hydrogeologic requirements described below for MSW disposal facilities are currently applied by policy to industrial waste disposal facilities.

Hydrogeologic evaluations, groundwater performance standards, and groundwater monitoring requirements for MSW and MSW combustor ash disposal facilities are specified in 7035.2815 subp. 3, 4, and 10 respectively. Hydrogeologic evaluations and groundwater monitoring requirements for demolition waste disposal facilities are specified in 7035.2825 subp. 10 and subp. 12, respectively, and additional requirements are specified in "Demolition Guidance (MPCA Water/Waste #5.04, August 2005).

In general, a hydrogeologic evaluation includes:

- Explicit four-phase process for hydrogeologic evaluation defined in Rule for MSW s, applied by policy to significant industrial s
- Phased process allows evaluation to be steered toward most critical areas
- Similar requirements applied by guidance to construction and demolition s
- Process is phased to constitute an observational approach where successive steps build upon the data collected in the previous phases
- Includes site-specific testing to determine hydrogeologic characteristics
- Requirements include a prescriptive number of boring/sample locations per acre of area
- Recognizes unique site-specific conditions may require additional methods such as tracer studies, geophysical investigations, and groundwater modeling be applied depending upon site characterization needs and geologic principles
- Process used to evaluate ability to monitor and remediate site
- Includes detailed monitoring system design, locations, and water sampling requirements
- The extent to which characteristics of the hydrogeologic setting influences the design of engineered systems, under current practice, depends upon the type of (demolition, industrial, MSW), site-specific Physical, biochemical, and hydrogeologic factors
- Under current practice, the hydrogeologic setting directly influences the configuration and depth of the (separation from groundwater), and in the case of demolition s, the required engineered controls

Appendix C
Summary of Environmental Review Process

(exerpted from "2008 Guide to Minnesota Environmental Review Rules," EQB, September 2008)

The function of the Minnesota Environmental Review Program is to avoid and minimize damage to Minnesota's environmental resources caused by public and private actions. The program accomplishes this by requiring certain proposed projects to undergo special review procedures prior to obtaining approvals and permits otherwise needed.

The program assigns a unit of government—the Responsible Governmental Unit—to conduct the review using a standardized public process designed to disclose information about environmental effects and ways to minimize and avoid them. Some people are disappointed to learn that the RGU is most often the governmental unit with greatest responsibility to approve or carry out the project, not an impartial unit as might be desired. The program does not give any unit authority over decisions of others, nor does it impart approval or disapproval of a proposed action. The Environmental Review program is not an approval process. It is an information gathering process to help governmental units with permitting authority over a project make better-informed decisions.

Local, state and federal regulatory agencies carry out the protection measures identified in environmental review. The program has no authority to enforce measures, regardless of how significant the environmental impact. In short, the review is a source of information that must be integrated with other permitting and approval processes to protect the environment.

Two basic review documents are used in this program: the Environmental Impact Statement (EIS) and the Environmental Assessment Worksheet (EAW). The EIS is a thorough study of the project's environmental impacts and a comparative analysis of its economic and sociological effects. It considers reasonable alternatives, including the "no-build" alternative. When completed, the review gives governmental units information to determine whether the project is environmentally acceptable and what mitigation measures are needed. The EIS is reserved for projects with "the potential for significant environmental effects."

The other, and much more common, level of review is the EAW. This review procedure uses a worksheet with a standardized list of questions to screen projects that may have the potential for significant environmental effects. The EAW is subject to a 30-day public review period before the RGU makes a decision about whether the project also needs an EIS.

Environmental review can apply to any action or project that meets three conditions:

- The action or project must involve the physical manipulation of the environment, directly or indirectly (see definition of project at part 4410.0200, subpart 65).
- The action or project must involve at least one governmental approval or one form of governmental financial assistance or be conducted by a government unit (defined at part 4410.0200, subpart 34). For types of approvals and financial assistance that qualify, including those by federal agencies, see definition of permit at part 4410.0200, subpart 58.
- Action or project approval and construction must take place in the future; that is, projects constructed or those with all required governmental approvals are not subject to further review, unless an expansion is proposed.

A moratorium is automatically placed on action or project approval and construction whenever environmental review is required or requested by citizen petition (Minnesota Statutes, section 116D.04, subdivision 2b and 4410.3100, subpart 1). Minnesota law requires that when environmental review is being conducted, a project may not proceed and permits authorizing the project may not be issued. Once all review is complete, governmental units with permitting authority or other authority over the project may proceed to make final decisions on the project. This moratorium concept is covered in detail in Chapter 2.

General responsibilities of those involved in environmental review are described at part 4410.0400 and can be summarized as follows:

- Project proposers provide for an EAW any information needed to which they have "reasonable access." They also pay reasonable costs to prepare an EIS (required by part 4410.6000).
- Responsible Governmental Unit prepares an EAW or EIS (or other environmental review document) when required by the rules, verifies its accuracy and complies with rule procedures and time frames.
- Environmental Quality Board adopts program rules, monitors their effectiveness and revises, as appropriate. EQB also provides technical assistance to interpret and apply rules.