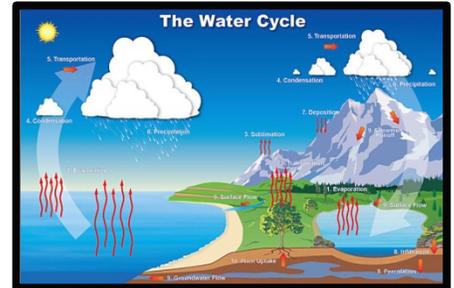


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# Groundwater Permit and Protection Program



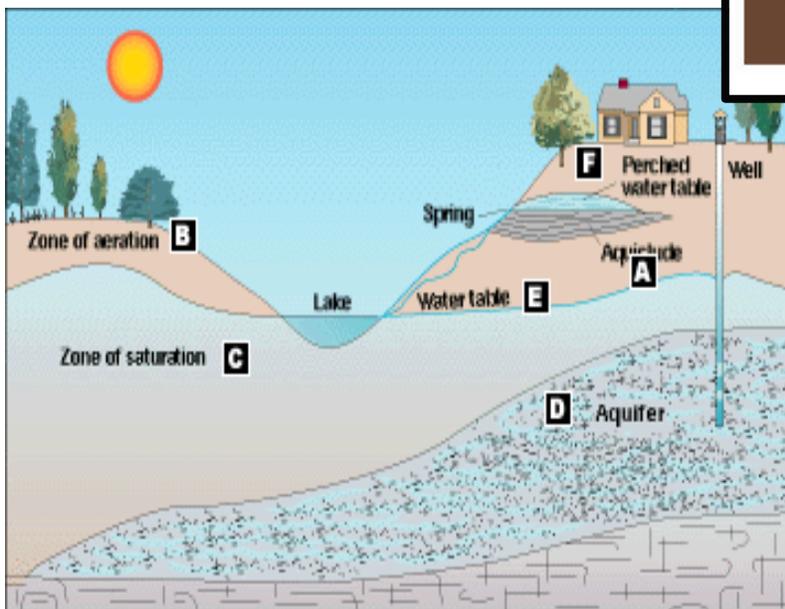
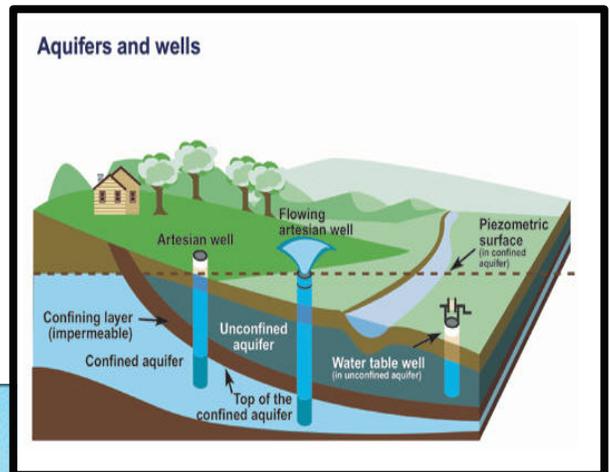
## Groundwater Protection Program

- Waterworks and Sewerage Systems
- Act 98, P.A. 1913, Promulgated August 15, 1913

The State has a formal program, which, if certain conditions are met, allows the discharge of treated wastewater to the ground, and hence to the groundwater.

Groundwater = water located beneath the earth's surface in soil pore spaces and in the fractures of rock formations

- Groundwater fills the spaces between sand grains (intergranular), in rock crevices (as in igneous rocks), and in solution openings (as in limestone)
- A deposit is called an aquifer when it can yield a usable quantity of water. The depth at which soil pore spaces or fractures and voids in rock become completely saturated with water is called the water table

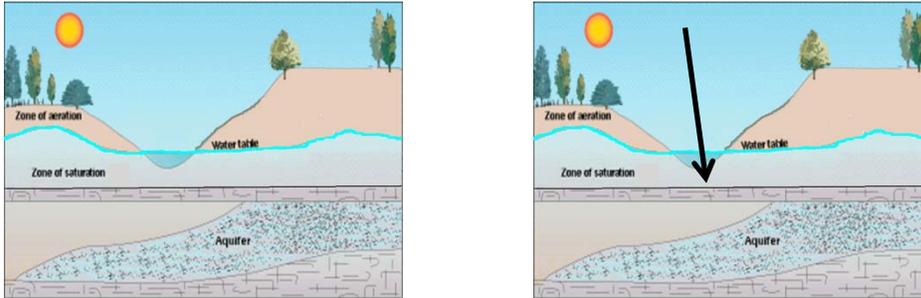


- Usually within 100 meters of the surface.
- Much of the earth's fresh water is found in these spaces.
- At greater depths, because of the weight of overlying rock, these openings are much smaller, and therefore hold considerably smaller quantities of water.
- Groundwater flows slowly through water-bearing formations (aquifers) at different rates.

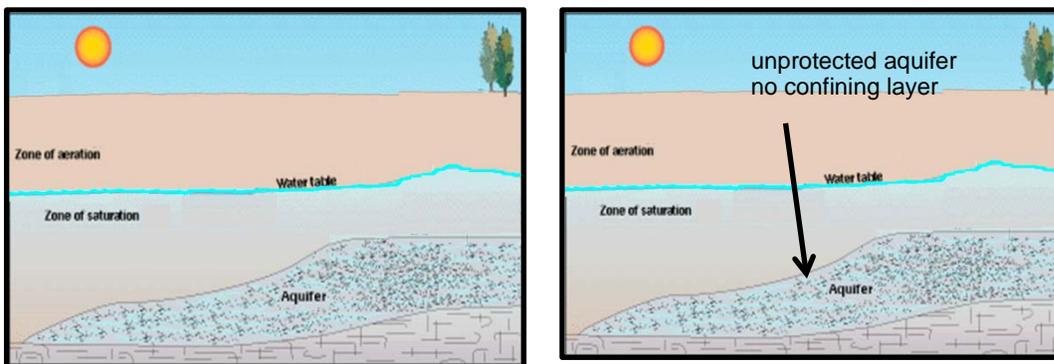
The residence time of groundwater, i.e., the length of time water spends in the groundwater portion of the hydrologic cycle, varies enormously.

- Water may spend as little as days or weeks underground, or as much as 10,000 years.
- Residence times of tens, hundreds, or even thousands of years are not unusual.
- By comparison, the average turnover time of river water, or the time it takes the water in rivers to completely replace itself, is about two weeks.

The glacial history of Michigan has left some areas with naturally protected aquifers.



However, many areas have only glacial outwash overlying deep sand aquifers



In Michigan there are:

- over 1,000,000 private drinking water wells
- an average of 25,000 domestic drinking water wells drilled per year
- there are twice as many groundwater supplies as surface water supplies for public drinking water use
- almost 2.6 million Michiganders depend on groundwater as their sole source of drinking water.

#### Part 22 Groundwater Discharge Permit - Legal authority- History

- The early regulation enacted in by the Michigan legislature declared that the Department shall protect and conserve the water resources of the state.
- Federal protections were put in place much later than Michigan’s water protection act. While the Federal Clean Water Act provides protection for surface water across the country there is no Federal groundwater discharge permit program.
- Michigan’s regulations (NREPA) were put in place to give Michigan the authority to enforce the Federal surface water permit program (NPDES), and they protect surface water and groundwater as one and the same as they are “Waters of the State.”
- These regulations are now Part 31 of the Natural Resources and Environmental Protection Act PA 1994 as amended (NREPA).
- Part 31 established the method to issue permits (Part 21) as well as monitoring, inspection and enforcement authority for those who violate the law.

- Both Administrative and criminal legal processes may be employed to protect waters of the state. Fines and penalties are included.
- Another group of regulations establishes standards for sewage collection, treatment and facility maintenance.
- Originally called Act 98, it was incorporated into the NREPA as Part 41.
- Part 41 applies to all public collection systems, and wastewater plants whether they discharge to surface water or groundwater. A public wastewater treatment plant is defined as a wastewater plant serving the public and requires a Part 41 Permit

serving the public?

- A mobile home park has a number of sites which are rented out to tenants.
- The owner may have an NPDES permit or a groundwater discharge permit for the site which the DEQ may inspect, but neither the collection system nor the WWTP will require a Part 41 Construction Permit.
- One owner may have an apartment house or a number of individual apartment houses on a site and a large number of units which are rented out to tenants.
- The owner may have an NPDES discharge permit or a groundwater discharge permit for the site which the DEQ will inspect, but neither the collection system nor the WWTP will require a Part 41 Construction Permit.
- One ownership entity may be developing a property as site condominiums.
- They may have an NPDES discharge permit or a groundwater discharge permit for the site which the DEQ will inspect, and both the collection system and the WWTP will require a Part 41 Construction Permit.

Legal authority - Part 41 of NREPA includes reference to:

- Construction Permits; Engineering Standards
- Maintenance requirements
- Facility Classification
- Operator Training and Certification

Municipal Facilities that discharge to groundwater are eligible to apply for both State and Federal construction grants and loans.

- State Revolving Fund Loan Program (SRF)
- USDA grants and loans
- SAW grants and loans

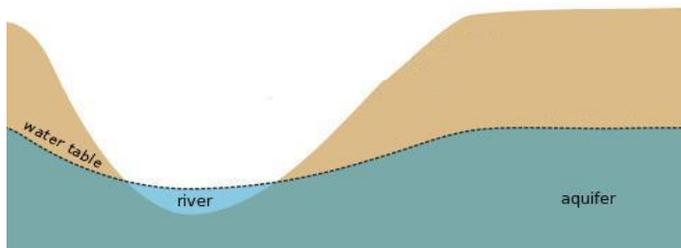
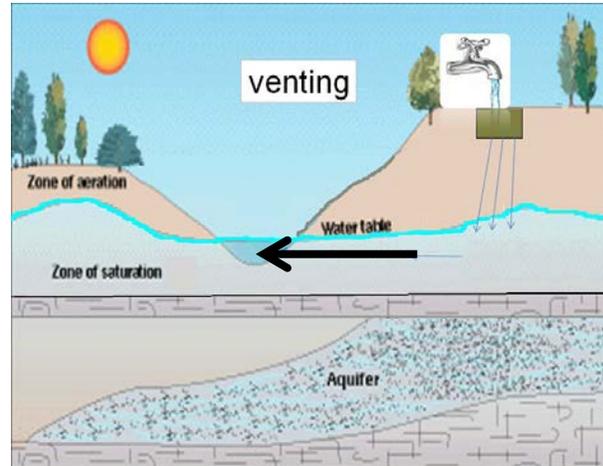
NREPA Part 22 Rules

- the Part 22 Rules were revised in 1999
- set specific discharge standards
- identify specific exemptions
- set specific permit types- "permit grades of regulation"
- no Federal oversight
- fees fund the groundwater permit program
- All groundwater discharges must meet certain general requirements that prohibit nuisance conditions and set isolation standards between polluting sources and drinking water wells.
- The rules set out a series of authorizations that have increasing regulation based on the characteristics of the discharge.

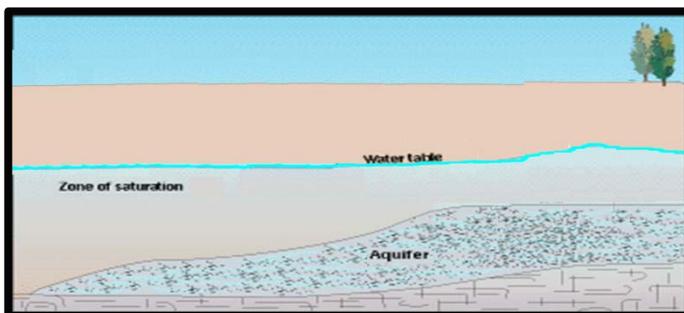
### The Permit

- In Michigan we rely heavily on groundwater as the source of our drinking water.
- The objective of the groundwater permit program is to preserve and maintain our groundwater aquifer resource for drinking water.

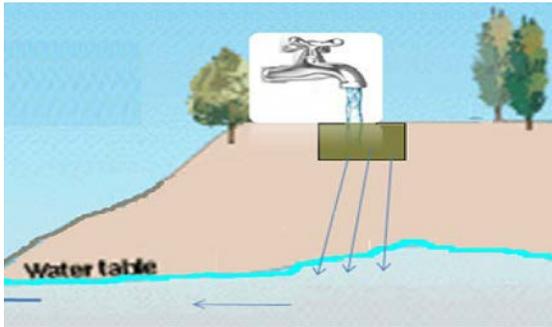
- Permit program includes health and resource based standards
- You can discharge only if you have a permit or if you are exempt from rules
- A permit can be denied
- Groundwater protection standards focus on nitrates or salts due to the direct health implications of consuming high nitrates and salts
- Surface water protections will focus more on ammonia, BOD and temperature because of the potential impacts to aquatic organisms, and phosphorous, because of its impact on aquatic plant growth.
- Recently revised groundwater sodium and chloride numbers upwards.
- The treatment standard for a discharge will vary depending on location and whether surface waters might be affected.
- Groundwater venting to surface water is considered to impart loading to the receiving stream in much the same way as a direct discharge from an outfall pipe.
- The technical review requires that the that the entire discharge footprint be located a minimum of 1000 feet from any surface drainage feature that is determined to be a potential receptor of groundwater venting to surface water or the proposed discharge would be considered to impart loading to the receiving stream in much the same way as a direct discharge from an outfall pipe.
- Under what circumstances would a groundwater permit for wastewater effluent to be discharged to the environment might be required?
  - It could be that a developer is looking to build a residential housing development
  - and will be required to provide water, water treatment, sewers and sewage treatment
  - but an NPDES Permit could not be obtained because



the first thing required for an NPDES Permit is the availability of a suitable surface watercourse



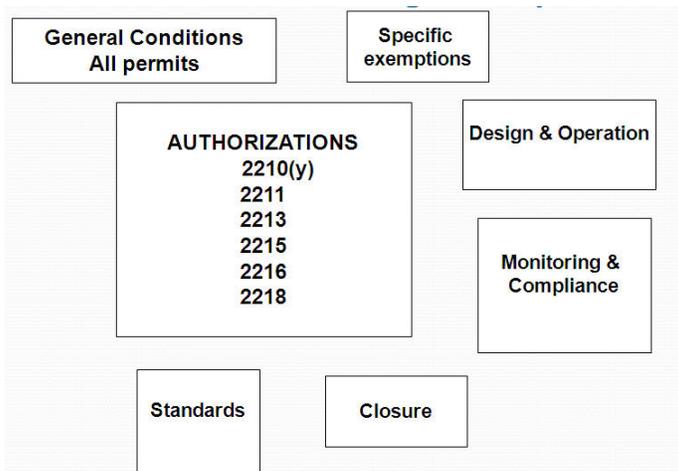
and none is available



A groundwater discharge permit might be appropriate

### NREPA Part 22 Rules

- The rules also set out the permit application process, permit monitoring and reporting requirements, closure requirements for regulated facilities, discharge standards and some design and operation requirements for wastewater treatment facilities discharging to groundwater.



### EXEMPTIONS 2210

Rule 2210 outlines things that do not need a groundwater permit like a discharge that is covered by other statutes (home septic systems, storm water, animal feed lots) and discharge of things that likely will not cause harm (such as non-contact cooling water), sanitary sewage < 6,000 gpd with LHD approval.

- Authorization 2210(y)
- Insignificant Discharge

### AUTHORIZATIONS 2211

Rule 2211 is a simple notification authorization for low hazard discharges such as small laundromats, portable power washers, and sanitary sewage >6,000gpd and < 10,000gpd requiring LHD approval and annual reporting to DEQ (Rule 2212).

### AUTHORIZATIONS 2213

Coordinates groundwater cleanups with the DEQ Remediation Division

### AUTHORIZATIONS 2215

Rule 2215 are general permits which can be applied for

- above ground sewage disposal <10,000gpd
- vehicle wash not open to the public <2,000gpd
- slaughterhouse <2,000gpd
- gravel, sand, limestone, or dolomite mining
- application of oil field brine
- vehicle wash open to the public <3,000gpd

## AUTHORIZATIONS 2216

Rule 2216 is for discharges with some specific treatment designs

- <20,000gpd to constructed wetland
- <20,000gpd laundromat, no dry cleaning
- <50,000gpd sanitary sewage

## AUTHORIZATIONS 2218

> 50,000gpd sanitary sewage

Some discharges are not regulated by the groundwater program

- discharge to surface waters (NPDES)
- specific Exemptions of Rule 2210
- residential septic systems (health department permit)

## Part 22, Part 41 Rules

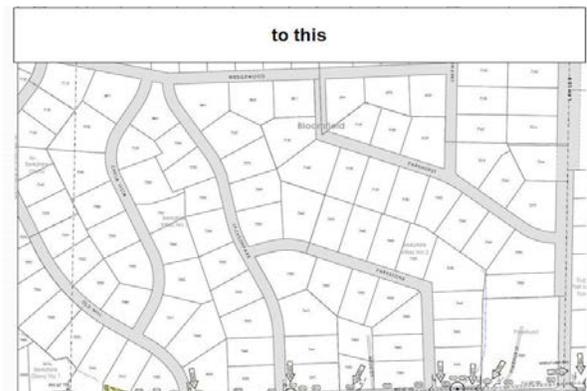
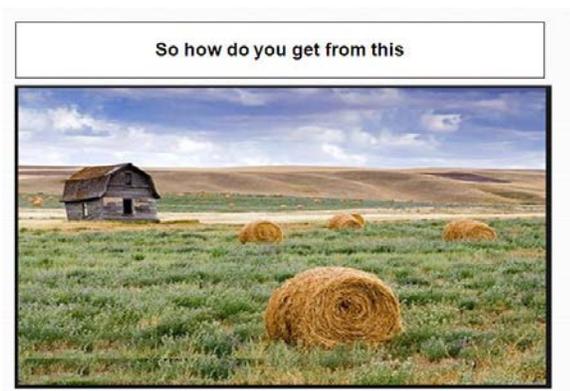
- Most discharges to groundwater require some form of treatment to meet the groundwater discharge standards.
- Public facilities, and privately owned facilities serving the public, must meet strict engineering standards as outlined by Part 41 of NREPA which also requires a construction permit.
- Other than above, private plants are not regulated by Part 41 (construction permits) but still need a groundwater discharge permit and must meet State discharge standards.

Treatment options

- application to land, and land treatment (plant nutrients)
- septic tanks
- neutralization
- lagoons
- activated sludge processes

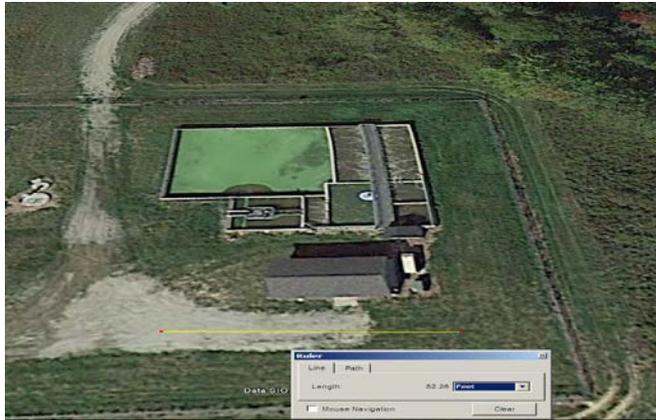
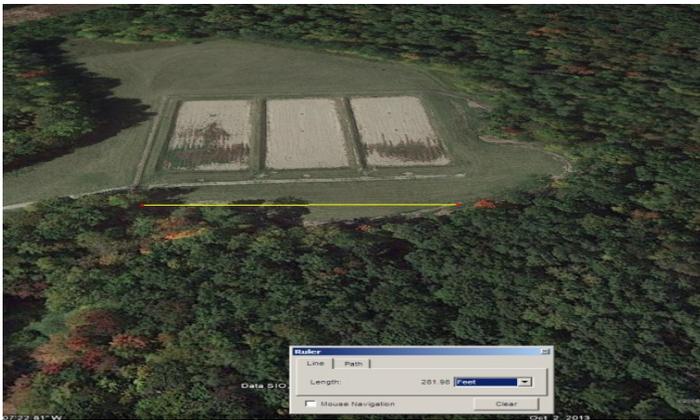
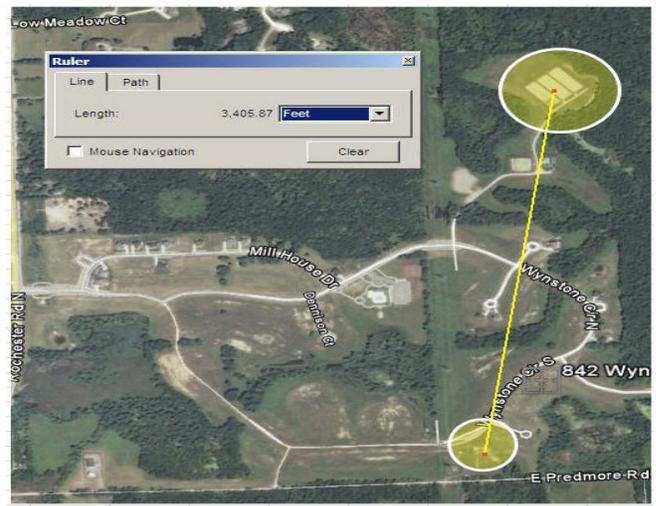
Discharge options

- drainfield / subsurface
- spray irrigation
- rapid infiltration



NREPA Part 22 Rules 2218

- sanitary discharge permit for >50,000gpd of sanitary sewage



**Extensive documentation is required for a 2218 Permit**

- a hydrogeologic study
- an irrigation management plan
- characterization of the wastewater
- toxicity information
- operation and maintenance manual
- design information

If you happen to be a Private wastewater system serving the public, additional financial information and financial assurances are required.

**After acquiring the Permit, and installing the required Infrastructure, you need to**

- ensure proper operation
- sample and monitor
- to report as required
- comply as required

Monitoring requirements will be detailed in the permit

- effluent sampling prior to discharge is important
- groundwater monitoring well sampling and data reporting
- is a common permit requirement
- the data is required to evaluate how well the wastewater is treated by the facility and how groundwater may be being affected by the discharge

## District people

Cadillac	Janice Heuer, Dave Walters
Grand Rapids	Leslie Sorensen, Keith Zahn, Derrick Simmons
Jackson	Michael Kennedy
Kalamazoo	Steve Norton
Lansing	Chris Babcock, Brent Bodnar
Saginaw Bay	Matt <u>Silar</u>
SE Michigan	Matt Goddard, Dennis Ryan
UP	Randy Conroy

## Lansing HQ people

Permit coordinators	Jeanette Bailey, Justin Pung
Geologists	Angela Strong, Doug Thompson, Jeff Warner
Soil Scientists	Bob Deatrck, Geoff List, Jeanette Makries,
Toxicologist	Amy Babcock
Chief of permits unit	Rick Rusz

### The inspection –

why do we inspect?

- we inspect to ensure that the permittee is doing the things they promised to do during the acquisition process through which the permit was allowed
- the permittee has a duty to comply with the terms and conditions of the Permit

There are basically 3 types of inspections, in order of increasing complexity:

- 1) a Reconnaissance Inspection (RI)
- 2) a Compliance Evaluation Inspection (CEI), a more in-depth inspection, and
- 3) a Compliance Evaluation Inspection with sampling by the DEQ which is known as a Compliance Sampling Inspection (CSI)

After acquiring the Permit, and installing the required

- ensure proper operation
- sample and monitor
- to report as required
- to comply as required

An inspection can be broken down into different elements

- 1) the inspector prepares for the inspection
  - In depth, by reviewing previous inspections, the file, checking for violations, reviewing the Permit, checking permit dates, trends, complaints, compliance history, and previous interactions with the owner.
- 2) the arrival
  - by design it is our intention is to arrive for an inspection unannounced, however, sometimes this works out better than others, so on occasion 24 hours notice of inspection can be expected.
  - the inspector will indicate to you under what Act and what regulation the inspection is being carried out (for purposes of this presentation it is Part 22, NREPA, Act 451).
  - DEQ staff have the right of access for necessary inspections
- 3) the opening meeting
  - the inspector must understand the activities conducted at your facility, so you may be asked to describe the operation, such as loadings, hydraulic issues, raw materials used, for documentation such as logs, manifests, records, data, QA/QC on analytical, samples, O&M Manuals, discharge management plans, sampling plans or MSDS sheets.

**Keep your documents organized so this information is readily available**

4) the walk through

- the inspector is interested in seeing processes in action, and you will be asked questions about operational practices, analytical methods, data recording, man-power and the condition of physical structures
- notes and samples may be taken and a camera used to document various items
- the inspector will be looking at the grounds for physical conditions relating to evidence of spills, maintenance issues, odors, by passes, and general housekeeping
- following discharge management plan
- surface runoff
- dikes - no deep rooted plants, erosion, slumping, animal burrowing, breakthrough
- even distribution of wastewater during application, alternately loaded and rested
- solids on the soil surface
- ponding or saturated soil
- all areas within a system accessible for maintenance equipment
- if vegetation is present in the discharge area, does it interfere with system performance
- discharge areas inspected daily are inspections recorded in a log on site any detectable odors
- have there been odor complaints or other complaints regarding nuisances
- are nuisance conditions noted in an inspection log
- is effluent applied at least 100 feet from property lines, unless a lesser distance has been authorized.
- all treatment units in service
- problems with chemical feed system, secondary containment
- breached dykes
  - \* Take a good look around. \*
- does the facility conduct sampling in accordance with the requirements in the Sampling and Analysis Plan?
- all treatment units in service
- do the number of wastewater treatment personnel appear to be adequate
- adequate funding, asset management plan
- how are alarms/upsets monitored and responded to, and during off hours
- evidence of bypasses, chemical spills, surcharges and/or overflows
- accumulation of solids, grease, foam or floating materials
- general housekeeping
- fencing
- any jury rigged systems, why
- integrity of liner protected
- no runoff to, ponding on, or flooding of adjacent property
- part 201 issues
- sludge storage, sludge disposal
- monitoring wells, located, locked, protected, operating properly

5) the closing meeting

- the inspector will go over the inspection results with you, details findings, upgrades and improvements required, any violations observed, and discuss the options and a timetable for follow up action if appropriate
- you will be made aware of subsequent follow up actions, if any, which the inspector will be undertaking as a result of the inspection
- You have an opportunity to go to our Web site and provide feedback on the inspection

[www.michigan.gov/deq](http://www.michigan.gov/deq) (about the DEQ)(DEQ Inspections)

6) follow up actions

- the inspector has a number of options available for follow up after the inspection, ranging from a straight forward letter, to a requirement to upgrade the facilities, to complex legal action, as follows

