Issue Paper:
Sand And Gravel Mining

1. Introduction And Background

1.1. Purpose and Scope
This issue paper examines contamination of ground water through sand and gravel mining operations. The goal is to ensure that regulatory programs are adequate to prevent adverse effects from sand and gravel mining operations upon ground water quality.

Sand and gravel operations do have the potential to adversely impact ground water quality, both as a result of the extraction process and in site reclamation. However, sand and gravel mining is also an important economic resource as well as a necessary resource for transportation and development purposes. Unfortunately, some of the characteristics that make sand and gravel resources valuable, also make them very good aquifer and/or recharge materials.

Sand and gravel mining within an aquifer recharge area will, at a minimum, increase the vulnerability of an aquifer to be contaminated because it decreases the distance between the ground water table and land surface. In some cases, the excavation actually penetrates the shallow aquifers, creating a pond or lake and a direct access to ground water.

The primary effluent discharged at a sand and gravel mine operation is turbid rinse water. Generally, operators are required to collect waste water on-site in retention and settling ponds where the fine sediment settles out. The collected water is then allowed to infiltrate back to the water table. Often the excavation pit is a component of the treatment system. High concentrations of suspended solids in the wash water does not pose a serious ground water problem since sediment is unable to migrate beyond the immediate infiltration site. Even though the turbid wash water at a gravel mine is not a significant ground water pollutant, the excavation pit and the continual collection and infiltration of wash water does raise the potential for other sources of contaminant to migrate to the aquifer. Hydrologic susceptibility is increased at the pit site when saturated or near saturated conditions exist under the pit. Any chemical contaminants that are allowed to enter the pit via wash water or spills in the area would have quicker access to the aquifer. Once in the ground water, a chemical substance would be free to move with the water in the aquifer. Possible contaminants found at a mining site include lubricants and fuels. These materials may be stored on-site or may enter the excavation pit from contaminated road and work area runoff.

Beyond the risks associated with active mining, one of the largest threats to ground water appears to be the excavation pit itself. Redamation of a site may include refilling a pit as well as slope and drainage stabilization. Within the recharge areas of a vulnerable aquifer, the decision to fill or not fill an excavation is one of the most critical with regards to water
quality. Excavation pits have been used both legally and illegally as dump sites for a variety of wastes. In the past, little care has been given to the classification of the material used as fill. Many community landfills have been developed in "reclaimed" gravel pits. Industries have used excavation pits as disposal sites for mixed wastes. Over the years it has not been uncommon to find pits used as "dumps" for a variety of potentially hazardous fill materials. In many cases, materials historically used to fill pits would today be classified as a dangerous waste, not inert material (Ch. 173-303 WAC).

Future land use is an important factor to consider in reclamation of a site. The increased vulnerability of underlying aquifers to contamination should be factored into any land use permitting decisions. Additional controls to be established under the Growth Management Act should address sand and gravel mining and reclamation operations which overlie aquifer recharge areas.

The exact number of sand and gravel operations (existing and old) in Kitsap County is not known with certainty. However, the State Department of Natural Resources (DNR), which has permitting authority over all sand and gravel mining operations of greater than three acres, has identified 43 existing, closed, or potential sites (29 active; 10 terminated; 2 pending applications; and 2 canceled).

Notwithstanding the potential for ground water contamination from sand and gravel mining, there have been few, if any, documented incidents in Kitsap County. This may indicate that existing controls (and operations) are adequate to generally protect ground water, or it may only mean that monitoring is lacking, so problems go undetected.

2. Current Laws, Practices And Procedures

DNR has had the direct permit authority since 1971 for surface mines (e.g., sand and gravel) under Chapter 78.44 RCW and Chapter 332-18 WAC. Small pits, under three acres, do not require permits from DNR. All new sand and gravel mining operations must comply with the State Environmental Policy Act (SEPA). In general, this requires that a preliminary evaluation of environmental impacts (SEPA checklist) be made; this may result in a requirement for an environmental impact statement (EIS). Kitsap County (Department of Community Development) would be the primary reviewer of the project for SEPA compliance. Concerns identified in this review can be addressed and/or mitigated by terms or conditions placed on the DNR permit. The permit also includes a reclamation plan to be put in effect during phased operations or at termination of a project. Annual reports are required from the operator and DNR does have inspection authority and responsibility. Like many other State (and local) regulatory programs, staffing and funding constraints limit the effectiveness of the regulatory program, although complaints about improper operation can generally be addressed. The program has no major emphasis on the protection of ground water (quality or quantity).

Ground water resource protection is the responsibility of the Department of Ecology (Ecology). Ecology's role in sand and gravel operations is at least twofold. First: Ecology
has an opportunity for environmental review of a proposed project. Second: In the past several years, Ecology as a water quality authority has identified some best management practices (BMP’s) for sand and gravel operations. Originally, Ecology planned to adopt BMP’s as either guidelines or formal rules for industry to follow in order to comply with the requirements of chapter 173-200 WAC Water Quality Standards for Ground Waters of the State of Washington. Some of the BMP’s first identified are:

- For sites with a planned excavation depth lower than the ground water table, a detailed hydrologic report should be filed. The report may be a part of a complete EIS or an appendix to a SEPA check list.
- When mining activities are to be located in designated wellhead protection areas, special protection areas, sensitive aquifer areas, or principal recharge zones, an EIS should be considered.
- Mining activities located in designated wellhead areas or special protection areas identified under Ch. 173-200 WAC should be considered for a State Waste Discharge Permit by the regional office of the Department of Ecology. If Ecology determines specific protection measures should be required to protect water quality, they may be incorporated into the terms of the DNR operation permit or established as a separate permit administered by the regional office of Ecology.
- Where possible, mining sites should utilize internal drainage, in order to support continued ground water recharge and minimize off-site discharges.
- When ground water is exposed during the mining operation and the resulting impoundment is larger than three acres, ground water should be monitored for both water level (monthly) and water quality (quarterly to semi-annually) over the life of the operation. Water level and water quality monitoring should also be considered when depth to seasonal high water is reduced to five feet or less.
- Associated activities such as concrete, asphalt, and other industries located at sites described in 2 above, will be reviewed for State Waste Discharge Permits by Ecology.
- Associated activities such as concrete, asphalt, or other batch processing plants shall not be located immediately adjacent to exposed ground water.
- Truck and equipment wash runoff should be routed to an approved retention and treatment facility, equipped with an oil-water separator prior to its release to retention ponds.
- Fuel (oils) storage and handling facilities should be located some distance from the main sediment and wash water retention facility. All such facilities should be equipped with approved containment, monitoring, and collection systems. Fuel storage should be above ground. These sites should be lined and bermed with sufficient capacity to accommodate spills and leaks. Runoff from adjacent surfaces should be routed to a retention pond that can be monitored and cleaned in the event of a spill.
- All sites should maintain a fuels/ hazardous waste management plan. The plan will be maintained by the operator and be available on the site at all times.
- At the closure of the site, after accidental spills, or at the request of DNR/ Ecology, all contaminated material will be removed and disposed of with approved methods and at approved disposal sites. Contaminated material will not be used as fill at the site.
In general, impoundments of greater than three acres should not be filled. These sites should be stabilized as lakes and ponds and the surrounding area revegetated to ensure stability of the site. Future land use decisions should reflect increased ground water vulnerability at the site. Individual sites may be filled if it can be demonstrated that sufficient inert material can be obtained to serve as fill. Impoundments of less than three acres should not be filled if there is doubt as to the quality or supply of inert fill.

Excavation pits should not be used as landfill disposal sites for unclassified or non-inert wastes. In general, municipal landfills are not an appropriate use for sand and gravel sites located over semi-confined and unconfined ground water.

Pits with standing water that are slated to be filled may use only approved inert earth materials (native fill/overburden) to fill the area up to the high water table. The remaining fill should meet the conditions described in 12 and 13.

Future land use should reflect the increased vulnerability of ground water at the site.

After further evaluation, Ecology determined the above BUMP’s, or modifications thereof, will not be formalized. Rather the water quality (both surface and ground waters) will be protected through the Emergency Waste Discharge General Permit Program (see chapter 173-226 WAC); or the standard individual National Pollutant Discharge Elimination System (NPDES) or state waste discharge permit systems. Some of the above BMP’s (and possibly a few others) probably will be incorporated as conditions of the permits issued under the general permit program for surface mining which includes sand and gravel operations. This change of direction does not preclude DNR from using BMP’s to encourage development of new mining and reclamation technologies designed to protect ground water.

In Kitsap County, a new sand and gravel operation requires an Unclassified Use Permit (even for a site less than three acres). The application for permit triggers the SEPA process and also a public hearing process (Renee’ Beam - personal communication, June, 1992). DNR normally give much weight to the local evaluation in its permit-decision process.

3. Gaps And Problems

Although not discussed above, there are several other laws and federal and State agencies that are peripherally involved in sand and gravel mining to some degree. For example, the State Department of Fisheries regulates mining in river channels as part of its Hydraulic Permit process under Chapter 75.20 RCW. DNR has proposed amendments to Chapter 78.44 RCW to clarify and tighten up the regulatory guidance in existing statutes, but they have not been passed by the Legislature. The proposed amendments are intended to clarify local vs. state authorities. For example, county government would have the authority to regulate mining operations such as truck traffic, public safety and noise; and could become the sole regulation of mine reclamation. The amendments would codify reclamation requirements and ensure the right of local government to regulate land use. However, according to DNR staff (Personal communication. Norman, November 1992),
the department does not intend to offer the amendments as an Agency-request bill during the 1993 Legislative session.

The apparent low DNR priority (possibly not shared by dedicated staff) has precluded a push for stronger controls, and may indicate the department does not consider sand and gravel mines to be a significant threat to ground water.

4. **Recommendations And Strategies**

SG 1. Kitsap County, through its Department of Community Development, should utilize the draft BMPs in SEPA review of new sand and gravel mining proposals to assure adequate consideration has been given to ground water protection in the project design.

SG 2. Kitsap County and cities include a policy in their Comprehensive Plans which provides that land use of reclaimed sand and gravel mines be carefully evaluated because of the increased susceptibility of aquifers to contamination due to the mining activities.

SG 3. Encourage DNR to fully consider Ecology’s draft BMPs to assure permits are conditioned, as they relate to operation and site-reclamation, to ensure ground water protection.