



Office of Water Management

Attention: Sewage Enforcement Officers

Several sewage enforcement officers (SEOs) recently requested the Department to provide guidance on implementing 25 PA Code 73.13(c)(8) and (d)(7) as they relate to both existing and planned mine subsidence areas. This regulation established a minimum horizontal isolation distance between the perimeter of the aggregate in an absorption area of an onlot system or wetted perimeter of a spray field and mine subsidence areas. As part of its review of these regulations, the Department has evaluated mine subsidence sites to determine the relationship between onlot system function and the impacts of subsidence. In Greene and Washington Counties, DEP's records show that from 1999 through 2000, 224 permits for new onlot systems were issued. There have been no documented cases of onlot system failures of new systems caused by mine subsidence reported to DEP. Repairs to existing onlot systems damaged by mine subsidence are paid for by mine operators under state law and there have been no reported failures of these systems except for broken pipes. The following establishes DEP's findings regarding the above-referenced regulations and the relationship between an onlot system and a mine subsidence area:

- i. What is the basis for the existing regulation that establishes a 100-foot isolation distance between an onlot system absorption area and a "mine subsidence area"?

DEP has reevaluated 25 PA Code 73.13(c)(8) and 73.13(d)(7) in the context of the other physical features listed in the subsections (sinkholes and boreholes) and in relation to the siting of an onlot system absorption area (the aggregate filled area of an onlot system where sewage from the treatment tank seeps into the soil). The regulations apply to a surface manifestation of mining activity resulting from a cave-in of the roof of a shallow mine known as "pit subsidence." This type of opening to the surface of the ground has historically been associated with room-and-pillar mining at shallow depths of 100 feet or less overburden. Pit subsidence, like a sinkhole or borehole, is evidenced by a visible opening to the surface extending to rock rubble of the mine void in the underlying strata. These openings, like a sinkhole or borehole, would provide a direct conduit from the surface to groundwater. The 100-foot isolation distance from these surface features was intended to isolate an absorption area to prevent short circuiting of sewage through the surface opening to groundwater.



2. Does the 100-foot isolation distance in 25 PA Code 73.13(c)(8) and 73.13(d)(7) apply to longwall mining or retreat mining subsidence areas?

No. As described above, this isolation distance applies only to pit subsidence associated with the cave-in of shallow mine overburden resulting in an opening to the surface of the ground similar to a sinkhole or borehole.

3. What if an existing onlot system is located in an area of existing pit subsidence resulting from previous room and pillar mining?

DEP has determined that there are areas of the state where onlot systems have been permitted and are currently in use over previously mined areas that have existing pit subsidence or have the potential for future pit subsidence. These locations are typically over old mines that used room and pillar mining technology. The fact that these systems are located near pit subsidence does not independently constitute documentation of a malfunction of these systems. Any future evaluation of these systems for malfunction resulting from complaints or observation would be based on the same criteria used for any other system not located in a pit subsidence area. These criteria are:

Evidence of an unplanned surface discharge of sewage to Waters of the Commonwealth or ground surface as documented by bacteriological sampling and dye testing or direct observation of the source of discharge;

Evidence of unplanned discharge of sewage to groundwater as documented by bacteriological sampling of water wells and dye testing.

Where repair of an existing onlot system in a pit subsidence area is required, the SEO should determine the distance from the edge of open or filled pit subsidence and the absorption area of the repair system. Where the 100-foot isolation distance cannot be met, the SEO may apply the provisions at 25 PA Code 73.3(b) that allows an SEO to use a systematic, logical approach to resolving onlot system malfunctions. In considering corrective measures for malfunctioning sewage systems, the SEO is to attempt to comply with existing regulations where possible, but is not restricted by 25 PA Code Chapter 73. In considering best technical guidance, the SEO must attempt to meet the required 100-foot isolation distance but may permit a system with less isolation. Where the proximity of a repair system may result in short-circuiting of sewage directly to groundwater via the pit subsidence area, individual residential spray irrigation systems designed in accordance with the requirements of 25 PA Code 73.161 through 73.167 and A/B Soil Systems described in DEP's *Alternate Systems Guidance*, publication number 362-0300-007, dated April 1, 2002, should be considered for use. These two systems ameliorate the potential impacts on groundwater by providing disinfection prior to soil renovation and treatment in the upper horizons of the soils. These systems, which SEOs are authorized to permit, consist of treatment tanks followed by filters, disinfection units

and soil treatment, either through a spray irrigation system or a low profile absorption area consisting of piping in aggregate and cover soil.

4. What requirements must be met when new land developments are proposed in areas of room-and-pillar mining that may have pit subsidence?

When the development is being planned, the SEO and developer should pay close attention to the location and extent of pit subsidence. These features must be mapped as part of the Sewage Facilities Planning Module. Onlot sewage system absorption areas must be isolated by 100 feet from the perimeter of any observed pit subsidence.

5. What concerns does DEP have regarding the use of onlot systems in areas where coal was extracted using longwall or retreat mining techniques?

Longwall mining and most retreat mining occur much deeper than room-and-pillar mining, so pit subsidence is not an issue. Therefore, the 100-foot isolation distance specified in PA Code 73.13(c)(8) and 73.13(d)(7) does not apply. However, these mining techniques can result in surface cracking and voids that are the result of surface stresses created when planned subsidence takes place. These stresses are not uniform, nor are they significant in relation to onlot systems in all areas over longwall or retreat mining. Where there are surface manifestations of soil cracking or voids and changes in surface slope caused by mine subsidence, the provisions of PA Code 73.12(c) apply. This section states that absorption areas or spray fields shall be sited only in or on undisturbed soils. There is an accompanying definition of "undisturbed soil" which is "Soils or soil profile, unaltered by removal or other man-induced changes, except for agricultural activities, that would adversely affect the siting or operation of onlot systems."

6. How does Section 73.12(c) apply to existing onlot systems in areas that are undermined using longwall or retreat mining techniques?

Longwall mining and retreat mining techniques create planned subsidence. The surface impacts of this planned subsidence are variable across the mined area and are dependent upon numerous factors related to local geology, depth of the mining activity and surface topography. Because of these variables, it is difficult to predict the potential impact on a specific onlot system. From in-field observations it is evident that there are three areas of concern regarding maintaining a viable onlot system in areas that subside as a result of longwall mining or retreat mining:

- a. Mine operators often take specific measures to protect structures from damage. One technique is the excavation of a pressure relief trench adjacent to the structure. A pipe and aggregate are often placed in these trenches. These trenches, with or without the aggregate or piping, have the potential to short circuit sewage flow through a soil profile. The trenches constitute surface drainageways under PA Code 73.13(c)(7) and must be isolated from absorption

areas by 10 feet. At a minimum, in planned longwall mining areas, the location of the absorption area must be staked out and clearly marked by the mine operator so that proper isolation distances may be maintained between relief trenches and the absorption area. Failure to take these precautions may result in an illegal discharge of sewage from the property.

- b. In-field evaluations of the impact of subsidence on existing onlot systems has confirmed that, dependent upon the location of the system in the profile of the area impacted by subsidence, system components may be altered from the required slope restraints. In one case, the original absorption area slope of zero percent was modified to one-inch drop in four feet (a potential 12 inch change in elevation in a fifty foot long system). These radical changes in slope may contribute to ponding of sewage in the down gradient extent of the absorption area and eventual malfunction of the system. The changes in slope may also damage or impact the function of septic tanks or dosing tanks. In planned subsidence areas, the mine operator should determine original elevations across the length and width of the absorption area. The mine operator should excavate the septic tank, dosing tank and distribution box or header pipe to determine changes in level. These pre-subsidence elevations should be compared to post-subsidence elevations to determine the extent, if any, of the change on slope/level. In addition, the mine operator should check the structural integrity of tanks and piping following subsidence. The mine operator should make the property owner aware of any changes in slope/level or structural integrity of system components. The property owner should contact the SEO to determine the potential impact these may have on the long-term function of the onlot system. The property owner can continue to use the existing system without repair; however, the potential for a future malfunction in systems with slope changes or damage to the tanks, distribution devices or absorption area is high. If a malfunction is documented in the future, the property owner would be required to repair the system. If the property owner chooses to repair the system, the SEO must attempt to comply with existing regulations where possible, but is not restricted by 25 PA Code Chapter 73. The property owner may want to consider the use of an individual residential spray irrigation system authorized under 25 PA Code 73.161 through 73.167 or A/B Soil Systems described in DEP's *Alternate Systems Guidance*, publication number 362-0300-007, dated April 1, 2002, described in item 3 above if the conditions described in item 6c.below are present.
- c. In the planned subsidence areas, surface cracking of soils and surface voids may occur. These features are evident from visual observations of parallel cracks and voids ranging from 1/4 inch to several inches in width following the longitudinal path of the mining activity or traversing the perpendicular plane of the mining panel at the beginning and end of the panel. The depth of these cracks varies between one-inch to several feet. Where existing onlot systems are in use, such cracks and voids in the soil horizon may result in short circuiting of sewage,

surface malfunctions or pollution of groundwater. When onlot systems are located in a planned subsidence area, post-subsidence observations of the areas adjacent to and above these systems should be conducted by the SEO to determine if surface cracking has occurred. If such cracking is observed, the SEO should alert the property owner to the potential impacts of this condition on the onlot system serving that property. The property owner can continue to use the existing system; however, there is a potential for a future malfunction to the surface of the ground, pollution of surface water or ground water. If such a malfunction were to be documented in the future, the property owner would be required to repair the system. If the property owner chooses to repair the system, the SEO must attempt to comply with existing regulations where possible, but is not restricted by 25 PA Code Chapter 73. The property owner may want to pursue a repair to the system using an individual residential spray irrigation system authorized under 25 PA Code 73.161 through 73.167 or A/B Soil System described in DEP's *Alternate Systems Guidance*, publication number 362-0300-007, dated April 1, 2002, described in item 3 above.

DEP's mining program requires the mine operator to repair any damage to an onlot system and to replace the system if necessary.

7. How does Section 73.12(c) apply to proposed onlot systems in areas that were undermined using longwall or retreat mining techniques?

Where a previously undermined area is proposed for new land development, additional information must be included in the Sewage Facilities Planning Module (Module) to determine suitability of the soils for onlot system use:

- a. A map of all soils profile evaluations and representative percolation tests must be overlaid, as is current practice. All observed surface cracks and open voids must be mapped.
- b. The proposed locations and types of onlot systems to be used must be mapped based on the general site suitability requirements of PA Code 71.62. In addition, soil profile evaluations must include a description of any observed open cracks or voids.
- c. Where the proposed system is located in an area where cracks or voids are found in soils horizons or on the surface of the ground, there is a potential for the short-circuiting of sewage through these cracks and voids. These areas are not suitable for onlot system use unless the onlot system chosen includes a disinfection process. Individual residential spray irrigation systems authorized under 25 PA Code 73.161 through 73.167 and A/B Soil Systems described in DEP's *Alternate Systems Guidance*, publication number 362-0300-007, dated April 1, 2002, use a disinfection process. These systems are permitted by Sewage Enforcement

Officers and may be proposed in Sewage Facilities Planning Modules (Modules) as options for use in areas of mine subsidence where cracks or voids are observed on the surface of the ground or in soil profiles (see description in item 3 above). When planning for these alternate onlot system options is approved by DEP, the SEO may issue onlot permits based on this approval if the other siting, design and operation requirements of the system are met.

In addition to the above, the developer should also consider a subdivision design that relocates the onlot systems to areas outside of these unsuitable areas. This approach could include clustering of dwellings. The developer should also consider other alternatives such as collection and conveyance of sewage to public sewers or package treatment plants and use of small flow treatment facilities.

As an alternative to the options outlined in this section, the developer may want to engage the services of a soil scientist to evaluate the soils in the areas where surface cracks or voids are observed. Where this option is chosen, a detailed soils report and a statement confirming suitability of the soils for onlot system use, signed by the soil scientist, must be submitted with the Sewage Facilities Planning Module. Where such documentation is submitted, any onlot system, otherwise approvable, may be used.

The above should provide some needed guidance on some aspects of this issue while DEP continues to develop a more comprehensive guidance document. If you have any questions regarding this letter, please contact the Division of Wastewater Management at 717-787-8184.

Sincerely,



Christine Martin
Deputy Secretary for
Water Management