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Disposal of Oil & Gas Field Produced Waters: A Hydrologic Case Study of PA Brine Spreading Practice

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Introduction

Surface disposal of chemically-laden produced waters on roads, fields, or other land areas will lead to degradation of surface and groundwater resources. Assuming that produced brine use is ultimately allowed in the State of Pennsylvania, such brine should be treated to concentration levels equal to or below state and federal water quality standards, whichever is stricter. Preferably, surface disposal of produced water should be prohibited. At this time, PA DEP has a set of Operating Requirements that, if met, provide an approval procedure to dispose of poorly or untreated produced water on road and land surfaces. This report examines serious flaws in PA DEP guidance and enforcement, using an area in northwestern PA as a case study to illustrate why spreading of produced waters anywhere in PA (e.g., Warren County, Delaware River Basin, Susquehanna River Basin), or elsewhere, should be banned. This detailed study documents that regulations designed to “*protect and conserve water resources*” cannot be relied upon when permits are and can be obtained that authorize the disposal and dispersal of contaminated wastewater into waterways and aquifers. The principles discussed here apply equally to produced wastewaters, regardless of whether they are derived from unfracked or fracked conventional or unconventional wells.

This case study demonstrates that existing, in-situ, regulations regarding spreading of produced waters from conventional oil and gas wells, as is readily approved by PA DEP, exacerbates pollutant transport into waters of the Commonwealth. PA DEP documents establish their knowledge and concern relative to road salting practices and water quality degradation. Yet, their approvals to spread chemically-concentrated produced water that will only further degrade state water resources is disjunct from their own published environmental findings. Approvals require limited and infrequent chemical assessment of produced waters and fail to adequately consider off-road transport and fate of numerous pollutants. Furthermore, Operating Requirements fail to consider the provenance of shales and interbedded shales and sandstones that are geologically linked and exhibit similar geochemical signatures (e.g., black shales provide hydrocarbon-rich products that migrated upward into overlying sandstone reservoirs). The physical relationship between source rocks and reservoir rocks does little to alter contaminants in produced brine waters.