



January 13, 2005

**TO: Anne M. Woiwode, Chapter Director
Sierra Club Mackinac Chapter**

**FROM: Alexander J. Sagady
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**RE: Memorandum report on animal waste pollution violations at the Michigan State University Beef Cattle Research and Teaching center
Bennett & Beaumont Roads – MSU farms south of Mt. Hope Road**

This memorandum is intended to brief you and others on Sierra Club Mackinac Chapter activities involving water pollution complaints and effluent discharge observations involving Michigan State University.

Specifically, this memo discusses serious water pollution violations involving animal waste contaminated wastewater effluents from an animal production area, the MSU Beef Cattle Research and Teaching Center¹ at the corner of Bennett and Beaumont Roads south of Mt. Hope Road and just to the east of Hagadorn Road.

This facility, along with MSU's dairy facility, beef calve facility and swine facility, are research and teaching-related animal production area facilities. They are required under federal and state law and regulation as well as USDA Natural Resource Conservation Service (NRCS) national and state agricultural conservation practices to be managed as "no discharge" facilities.

In general, there is an expectation that such production areas under federal law be prepared to contain all contaminated effluents under a precipitation condition involving up to a 25 year 24 hour storm event. Concentrated animal feeding areas, such as the MSU facilities and their respective land application areas, must comply with best management

¹ Web site at

http://beef.ans.msu.edu/Facilities/Beef_Cattle_Research_and_Teach/body_beef_cattle_research_and_teach.html

practices designed to prevent discharges from production areas and limit discharges from land application areas.

MSU does not have any wastewater permits for its production areas at the present time and any discharge without such a permit that makes best management practices legally enforceable is unlawful. Violations of federal and state clean water law provides for civil and criminal penalties of up to \$25,000 for each day of violation.

Sierra Club Activities at MSU December 2004 to Date

In the first part of December of 2004, Sierra Club became concerned about a field at MSU on College Road just north of Jolly where an application of animal waste and litter was made with no effort to incorporate the waste by plowing before winter. We observed significant amounts of highly turbid water downgradient from the application area that was entering a tile inlet. The tile inlet was connected to the Banta Drain which flowed to Sycamore Creek, a tributary of the Grand River, which has a pre-existing suspended solids water quality standard problem. The ponded wastewater was sampled and found to contain high total suspended solids and other indicators of agricultural waste runoff.

While checking on the resolution of the College Road problem and taking photographs to document the waste application in relation to a known tile inlet during a thaw on December 31, 2004, we decided to check other MSU locations for any obvious indications of problems. MSU is supposed to be a state exemplar in the implementation of animal feeding operations; in general, the public and regulatory agencies have high expectations that a teaching institution like MSU will set and reach high environmental protection standards for an activity like concentrated animal feeding operations.

Sierra Club Citizen Water Pollution Enforcement and Observation Activities Concerning the Beef Cattle Research and Teaching Center

During observation on December 31, 2004, this consultant noted that the Beef Cattle Research and Teaching Center was discharging highly turbid agricultural wastewater to a ditch on Beaumont Road that eventually led to a tile inlet further west on Bennett Road (we designate this as BCRTC Discharge Point #1²). Based on a MSU Farm Drain map, this tile inlet is known to discharge to the Bennett-Goritz drain and subsequently to the Red Cedar River at a location in the general area of Kalamazoo Street at the River. The same day, the Sierra Club filed a complaint by email with Megan McMahan, who is responsible for

² Discharge Point #1 is located at a tile emptying to the ditch on the east side of Beaumont Road at a location about 25-30 feet north of Bennett Road. This ditch empties to the east west ditch along Bennett Road which, at that point, flows downgradient to the west. About 1/4 of a mile to the west, flow from this ditch enters a tile inlet to the Bennett-Goritz Drain.

agriculture-related water quality enforcement in the Michigan Department of Environmental Quality Lansing District Office.

During observations on January 2, 2005, we again noted turbid effluent flow from BCRTC Discharge Point #1 on the west. Further, we noted that a second effluent point was also discharging turbid agricultural wastewater effluent from a ditch at the eastern-most point of the Beef Cattle facility buildings (we designate this as BCRTC Discharge Point #2³). This east discharge point effluent flowed to the east with a comparably greater volume than discharge point #1 in a ditch alongside Bennett Road.

During observations on January 4, 2005, we again noted effluent flow from Discharge Point #1 on the west. Discharge Point #2 on the east was not flowing, but ponded effluent was evident in the north south ditch that reached the facility fence line.

Effluent flow from Discharge Point #1 and ponded effluent from Discharge Point #2 were sampled by this consultant on January 4, 2005 and sent to the MDEQ laboratory under standard handling and sampling protocols. The MDEQ laboratory made the following report for E. Coli present in the wastewater:

Effluent	E. Coli Results
Discharge Point #1 (west)	500,000 cfu per 100 ml
Discharge Point #2 (east)	5,200,000 cfu per 100 ml

The Michigan water quality standard for total body contact recreation for E. Coli bacteria is 300 cfu/100 ml as a maximum and 130 cfu/100 ml as a geometric mean. This means that each gallon of the east discharge point effluent would have to be diluted by at least 17,333 gallons of clean water to meet the maximum exposure water quality standard for E. Coli bacteria.

This facility is not one where confounding E. Coli inputs from wild animals/birds would be likely to have contributed to the E. Coli sampling results shown. As a result, the E. Coli testing [as well as building observations] is dispositive evidence of the occurrence of animal waste-water runoff contact and intermingling.

Information on the January 2 and 4 discharges were again framed as complaints to MDEQ's Megan McMahon.

³ Discharge Point #2 is located at the southern-most terminus of a north-south drain flowing south along the west side of a site farm road leading to the eastern most extreme of the building on site. To the east of the adjacent road is the open beef feedlot with some potential for flow to the road and to the north-south ditch. Discharge Point #2 empties into the north ditch along Bennett Road which, at that point, flows downgradient to the east to a low spot where there is a 12 inch tile riser that directs flow to Herron Creek, according to a MSU Planning department Farm Drainage Plan map.

Note also here that pathogens are not the only pollutants to be concerned about in such a situation. Animal waste contaminated wastewater can also be expected to include elevated concentrations of pollutants such as ammonia, nitrates, phosphorus, total kjedahl nitrogen, total suspended solids, total chloride, hormones, veterinary medicines and other pollutants. Sierra Club, however, did not sample for these pollutants at this time.

The Sierra Club released its findings to some media sources and stories appeared on the local NBC and FOX affiliate newscasts. A newspaper article also appeared in the MSU State News concerning the Sierra Club complaints.

During observations at 5:30 PM on January 12, 2005 after a day of snow melt, no discharge was observed from the west discharge point #1 as MSU was conducting pump and haul operations on an apparent diked sump area. This represented MSU's first remediation steps to this problem observed by this consultant. At the same time, however, discharge point #2 to the east had a very high flow out from the facility and downgradient along the Bennett Road ditch to the east. Highly turbid conditions were observed in this wastewater discharge flow at 5:20 PM.

During observations the same day at 8:15 PM, some evidence of turbid flow was again noticed at discharge point #1 to the west and there was no evidence of any continuing remediation activity. Discharge Point #2 continued a high rate of flow of apparent turbid wastewater.

Discussion of Discharge Point #2, Discovery of Unknown Tile Source and Physical Relation to Effluent Discharge to Herron Creek/Red Cedar River

MDEQ's McMahon acknowledged in personal conferences that effluents from Discharge Point #1 reached waters of the United States through the tile inlet but she had not yet been persuaded that the eastern Discharge Point #2 reached waters of the United States.

Review of a MSU Division of Campus and Park Planning map of the MSU Farm Drainage Plan shows a 12 inch drain leading from Herron Creek due west across Hagadorn and then trending to the south around some apparent higher terrain and then terminating on the south side of Bennett Road opposite the Bennett Woodlot. The map indicates that termination point as being about 700 feet from the centerline of Hagadorn Road. However actual measure shows the drain termination to be about 980 feet from the centerline of Hagadorn Road. There is no indication of a tile inlet on the south side of Bennett at the 700 foot location west of Hagadorn Road.

Discharge Point #2 to the east goes from a north-south ditch on the Center's property site and flows to an east downgradient ditch down Bennett Road to a low point along the north side of the road adjacent to a wetland. The low point is a couple hundred feet east from Discharge Point #2.

During first observations a metal standpipe of about 2.5 inches was noted with an orange painted tip. Vegetation obscured other structures. Directly across Bennett Road to the South is a grate tile inlet and drain junction box. In the last 2 days I had the opportunity to observe the junction box during a non-precipitation time and noted that it was inundated with apparent clear water. The junction box showed a 12 inch output tile directly to the south and a 12 inch input tile to the north under Bennett Road. Subsequent observations on the north side of the road showed that there was a 12 inch tile inlet at the lowspot on the north side that receives the flow of Discharge Point #2 down the Bennett Road-side drain. This demonstrates an apparent drain connection between the north side low point and the junction box and its outlet continuation that presumably flows to Herron Creek and waters of the United States based on the MSU farm drain map. At this writing this environmental consultant asserts there is a high preponderance of evidence indicating that Discharge Point #2 has a clearly available hydrological connection to waters of the United States through discharge to Herron Creek and then to the Red Cedar River.

In addition to the two 12 inch tiles input to and output from the junction box on the south side of Bennett Road, there is also a 6 inch flexible drain tile of more recent genre' that is input to the junction box on the NWN side of the junction. This 6 inch tile is not shown on the MSU Farm Drain planning map. In the NWN direction is the open cattle feeding lot at the Beef Cattle Center. Although the ultimate source of the 6 inch tile is presently unknown, it is absolutely essential that MDEQ and MSU identify the source of this tile and where its inlet structures are. **The worst possible situation that could conceivably exist would be that this 6 inch tile drains inlet structures located at points in the open beef cattle feedlot located at the eastern end of the Beef Cattle Teaching and Research center.** If this were indeed the case, it would represent the facility's third major uncontrolled discharge point.

During observations on January 12 during a wholesale snow melt, the junction box was overflowing, and both turbid water and a dirty appearing foam were present. The surface of the water over the submerged grate-style inlet over the junction box was roiling from apparent introduction of energetic flow. The only potential source of energetic flow would be the 6 inch tile discussed above draining areas at elevations from 20-30 feet higher towards the Beef Facility.⁴

⁴ During observations on January 12, some reverse flow out of the tile inlet on the north side of Bennett Road was noted, probably as a result of the energetic flow volume evident that was overflowing the grate tile inlet on the south side of Bennett Road. But even if wastewater coming downgradient in the ditch from Discharge Point #2 were temporarily diverted to the wetland to the north of the Bennett Road tile inlet, that same wastewater would again be discharged to the 12 inch tile after energetic high flow volumes to the junction box on the south side of Bennett Road subsided.

Problematic Configuration of the MSU Beef Cattle Research and Teaching Center

The reason for the apparent serious pollution violations at this MSU facility is the poor design of the Beef Cattle facility for control of wastewater pollution. The two main barn buildings feature south facing pens that are in part covered by a roof and in part not covered by a roof. This allows precipitation to be entrained with animal waste in runoff from the uncovered areas.

A key exacerbating design defect is that roofwater from the southfacing covered portion of the facility is allowed to flow unchecked into the open pen areas because of failure to incorporate gutters in the building design. A failure to incorporate gutters in such a circumstance violates a key USDA Natural Resources Conservation Service national agricultural conservation practice #558 for Roof Runoff Management System.

However, even incorporating gutters on the covered portion of the roof will not finally solve the pollution problem from this facility. The facility is likely to continue discharging from the open pen areas during heavy rainstorms that are still less than a 25 year 24 hour storm event.

Best management practices dictate that precipitation water be kept from intermingling with animal waste exposed areas. The only way to do this at this site is to extend the facility's roof over the presently uncovered pen areas. The only other alternative would be to increase storage capacity from storing waste contaminated runoff and then pumping/hauling this for treatment or land disposal.

The open feedlot at the east of the facility complex poses a different challenge. This is an unvegetated feedlot with a significant downgradient slope to the east with at least some potential for discharge to the wetland even further to the east and subsequent discharge to waters of the United States and Herron Creek. This consultant is not presently aware of any best management practices being implemented by MSU to control pollution from this feedlot. Roadside/off-property evaluations are not sufficient to pass judgements about the feedlot, although there may be significant pollution potential. As noted in a prior paragraph it is essential to determine whether the feedlot is an inlet source of the unknown tile to the junction box on the south side of Bennett Road.

Michigan's office of the USDA Natural Resources Conservation Service has not yet adopted barnyard water management system as part of the Michigan Field Office Technical Guide. However, the New York office of NRCS has published such a standard and it is unknown at this time what BMP measures MSU is presently taking for its sloped, unvegetated open feedlot at the eastern end of the Beef Cattle Complex.

Given what this consultant has observed and assuming the facility configuration has existed since its construction, **it is my judgement that the animal waste contaminated effluents associated with the south-facing open pens and roofwater intrusion to these pens has probably been responsible for discharges of animal waste contaminated**

runoff at this site for the last 40 years during any substantial rain or snow meltoff. This would also constitute a longstanding federal and state law violation as well.

What is disappointing is that these problems should have been obvious to any passersby during and after precipitation events and certainly should have been obvious to MSU Beef Cattle facility personnel. What appears to have happened is that this facility has never been subjected to periodic environmental auditing which almost certainly would have caught such a serious water pollution problem a long time ago. Even more disappointing is that the implied educational example of ignoring such problems at this facility has been passed on to agricultural students for an entire generation, even as MSU extension heavily promotes concentrated animal feeding operations in the field. Problems at this MSU facility reflect the same kind of conditions occurring at some of MDEQ's previous worst agricultural water pollution enforcement targets. MSU should not be rewarded with any special treatment on the part of MDEQ that fails to specifically identify the university as being in violation of federal and state law in some kind of deference to MSU's organizational prestige as an education and research institution.

Needed Agency Environmental Enforcement and Inspection Activities and Local Inter-Agency Concerns

At this writing to the best of my knowledge, MDEQ has not yet conducted an unannounced on-site inspection of the MSU Beef Cattle facility. Given the apparent nature and gravity of the problems, an on-site inspection is certainly justified in order to identify elements of all of the outstanding problems at the site and to ensure that both interim and final remediation measures provide appropriate control and best management practices.

Two areas which this environmental consultant is unable to adequately evaluate without the opportunity of his own onsite inspection (which is unlikely to be forthcoming from MSU) involve the open barnyard feedlot area to the east end of the complex and the disposition/disposal of silage leachate. It is essential that the open feedlot be ruled out as the source for the unknown 6 inch tile that discharges at the junction box/grate inlet south of Bennett Road. I have previously viewed photographs taken by another individual of drainage of silage leachate at this site to a wetland. I cannot judge adequate detail from these photographs but uncontrolled disposal of silage leachate to a wetland and groundwater does not constitute a best management practice for control of such a contaminated wastewater.

MDEQ Water Bureau should conduct any needed testing to support a formal Notice of Violation for this facility. There is no reason to treat MSU any different than any other party out of compliance with water pollution control requirements. The gravity and longevity of this discharge problem is a basis for a penalty and/or requirement for a supplemental environmental protection project.

Given the fact that ultimate remediation of this problem is not likely to occur without some delay, a timetable and schedule of compliance should be incorporated into a legally

enforceable consent order. In addition, MDEQ should require Michigan State University to comply with National Pollution Discharge Elimination System permitting requirements.

This facility is capable of taking some remedial interim measures. It is not unreasonable to require that some of the beef cattle be moved to pasture areas to the south in order to limit animal waste inputs to the problem prior to final remedial measures. While this might have some potential disruption to the institution it must be balanced against continued harm of quartering the animals where their waste will continue to be washed to area watercourses.

As to local interagency concerns about this facility, the following institutions should take note of these problems with the MSU facility. Meridian Township and the Ingham County Drain Commission will have concerns about water quality planning and pre-existing problems in the Red Cedar River.

[The author had intended to incorporate two marked up aerial photos with this memo but computer scanner problems kept them from being incorporated. They are available via fax upon request.]

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