THE CITY OF GREENVILLE, OHIO
WASTEWATER BIOSOLIDS
MANAGEMENT PLAN

April 1999

Prepared for the City of Greenville by

Wheelabrator Water Technologies Inc.
Bio Gro Division
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I. GENERAL DESCRIPTION OF PROJECT

Wheelabrator Water Technologies Inc. - Bio Gro Division (hereinafter Bio Gro) proposes to recycle, by land application, the anaerobically digested wastewater biosolids generated by the City of Greenville, Ohio Wastewater Treatment Plant. These biosolids will be in either the liquid or dewatered cake form for land application. Bio Gro is a company experienced in the design and operation of such agricultural utilization projects.

Biosolids will normally be transported as a liquid in sealed tank trailers to agricultural land application sites. Bio Gro will land-apply stabilized biosolids on OEPA approved sites in accordance with the operational procedures and rates as indicated by this document. Truck routes will be chosen so as to not adversely impact local community transportation systems. Highway regulations, weight limits and other ordinances that pertain will be observed.

A number of farm operators are interested in receiving the wastewater biosolids from the City of Greenville for the nutrient content and beneficial effects of organic matter addition to the soil. The biosolids have been evaluated and found to be suitable for application on agricultural land. The biosolids meet the requirements of the 503 rule.

Based on U.S. and Ohio Environmental Protection Agency guidelines, the rate of application will be determined by the nitrogen content of the biosolids and/or maximum dry tonnage per acre. Dosage rate determinations are based on recommended nutrients and metals additions to agricultural land. These rates are set forth in the Land Application of Sludge Manual, (Ohio EPA, September, 1998) and the 40 Code of Federal Regulations Part 503.
II. METHOD OF OPERATION

This section contains detailed operational procedures designed to comply with applicable regulations and guidelines. Additional procedures and constraints have been incorporated based on Bio Gro's land application experience. The ultimate objective is a land application program that safeguards public health, surface and ground water supplies, and provides an agronomic benefit to the project area.

A. BIOSOLIDS ORIGIN AND GREENVILLE POTW DESCRIPTION

The City of Greenville Wastewater Treatment Plant is located at 209 North Ohio Street, Greenville, Ohio. The plant is designed to provide for preliminary, primary, secondary and advanced treatment, with disinfection of effluent discharged into the Greenville Creek which joins the Stillwater River in Covington, Ohio.

The plant has an average flow of 2.16 million gallons per day (MGD), and generates approximately .754 dry tons of biosolids per day. Wastewater influent from the sewage collections system converges from three waste streams into the bar screen structure. The bar screen removes the trash and larger solids. The screened raw sewage then enters the influent wet well where solids being returned from the secondary clarifiers are mixed with incoming sewage to provide an adequate mass for treatment in the oxidation ditches. The influent screw and centrifugal pumps transfer the raw sewage/return sludge mixture directly into the oxidation ditches where CBOD and ammonia are removed via aerobic microbial digestion. The mixed liquor from the oxidation ditches then flows into the secondary clarifiers, where it undergoes a reduction in flow velocity. This allows the suspended solids to separate from the liquid.

The clear effluent passes over the secondary weirs and flows to chlorination, dechlorination, post aeration, and finally is discharged into Greenville Creek. The solids which settle to the bottom of the secondary clarifiers are collected by flights which travel along the clarifier floor and scrape the sludge into the center hopper. From the center hopper the sludge is conveyed via ten-inch pipe from each clarifier to a return/waste sludge chamber by telescoping valves. The pumping into the sludge holding / gravity thickening / aerobic digester tank is accomplished by transfer pumps.

The sludge holding / gravity thickening / aerobic digester tank was formerly a 30-foot diameter anaerobic digester which was converted to the present application during the most recent treatment plant expansion. This tank receives the waste sludge from the sludge transfer pump's chamber via a 6-inch diameter force main. The biosolids holding tank provides an intermediate step by which biosolids is further stabilized and settled to facilitate the further thickening and subsequent volume reduction. During the decanting cycle the clear liquid portion (supernatant) is returned to the treatment plant flow scheme for treatment and ultimate discharge to the receiving stream. This step maximizes storage capability and reduces the management requirements of the
wastewater treatment plant personnel by minimizing pumping cycles. When decanting is done to satisfaction, a floating induction aerator is provided in the tank to provide additional aeration and to reblend the biosolids and liquid into a homogenous mix. The remixed blend may then be pumped to the anaerobic holding lagoon. Included in the appendix of the management plan is a diagram that shows the principle process flow schemes of the wastewater treatment facility. The pumping of the biosolids from the biosolids holding tank is accomplished by means of a progressive cavity pump and a 6-inch diameter force main for a distance of approximately one (1) mile to the anaerobic biosolids stabilization storage lagoon.

The anaerobic storage lagoon is an earthen structure, has a top width of 140 feet, a bottom width of 60 feet and a 20-foot depth. The tank will provide up to 230 days storage of the biosolids. This storage period will coincide with the frequency for mobilization of trucks to remove the biosolids for land application. The inner seal / liner of this tank is full of grout filled fabric that is impermeable to water and other liquids. The biosolids in the storage tank are received via discharge pipe of the force main manhole. The anaerobic biosolids stabilization tank has approximately 1.5 million gallons of storage capacity, and provides a low rate digestion site at the center or active zone within the tank. Anaerobic digestion takes place as the solids/liquid layers separate thus causing an anaerobic condition at the bottom of the tank. The liquid layers (supernate) is returned to the treatment plant headworks via a 4" Force Main at the Collection lagoon. The digested liquid biosolids stored in the tank, will be periodically pumped into truck tankers and removed to OEPA approved land application sites. Biosolids can enter the truck loading station from one of our four lines that interconnect each of the four hoppers at the bottom of the tank. From each of these hoppers the biosolids will enter a common distribution header that will connect to the truck loading station.

Biosolids stored in the tank will always be removed from the bottom of the tank. This will maintain the anaerobic conditions in the tank, and maximize the percent solids of the liquid being transported to the beneficial use farm sites.

Greenville produces biosolids that meet the Class B requirements through 503.32 (b) (2) Alternative 1: Monitoring of fecal coliform. Vector attraction reduction is achieved through either Option 1: 503.33 (b) (1) 38% Reduction in Volatile Solids Content; Option 2: 503.33 (b) (2) Additional Digestion of Anaerobically Digested Sewage Sludge; or Option 9: I. 503.33 (b) (9) Injection.
B. MAILING ADDRESSES AND TECHNICAL CONTACTS

For correspondence with the generator regarding this land application project, the Wastewater Treatment Plant Superintendent oversees the WWTP and can be contacted at:

MAILING ADDRESS
Darrell S. Hollon, Superintendent
City of Greenville WWTP
100 Public Square
Municipal Building
Greenville, Ohio 45318

WWTP ADDRESS
Greenville WWTP
209 North Ohio Street
Greenville, Ohio 45318
937-548-3530

For correspondence with biosolids contractor, Wheelabrator Water Technologies Inc., Bio Gro Division:

MAILING ADDRESS
Midwest Regional Office
4343 Infirmary Road
Miamisburg, Ohio 45343

Technical Contact: Ms. Michelle Snyder, Technical Specialist
Mr. Steve Vizedom, Technical Specialist
Wheelabrator-Bio Gro
2800 Guthrie Road
Dayton, Ohio 45418
(937) 263-4824 (Project Office)
(937) 263-1731 (Fax)
msnyder1@wm.com (E-mail)
svizedom@wm.com (E-mail)
C. PHYSICAL DESCRIPTION OF OPERATIONS

GENERAL

Biosolids will be transported from the Greenville WWTP in approved transport units to permitted land application sites. The transport trucks will deliver the biosolids to the sites, where the stationed high flotation land application vehicles will perform all spreading on the sites. The truck units will be inspected, licensed, and appropriately marked, as required, for the purpose of transporting biosolids materials.

Bio Gro will utilize semi-truck tractors/ tanker trailers to haul the liquid biosolids. Biosolids will be hauled from plant storage as clean out time is needed. Biosolids will be transported between the hours of 6:00 a.m. to 6:00 p.m., Monday through Friday. Bio Gro will not create traffic or noise nuisances during morning operations. Transport cycle time will range between one and four hours per load. Bio Gro does not intend to operate on Saturday or Sunday or outside of these stated hours, although equipment breakdowns, weather, or field scheduling may occasionally require us to do so.

Agricultural utilization of biosolids from the City of Greenville will take place in the Ohio counties of Miami, Montgomery, and Shelby counties. Biosolids distribution on the land application sites will be uniform throughout the permitted area. To insure adequate control of the application rate for each site, the equipment to be used will be calibrated by measuring the amount spread on a known square footage. Operating variables such as ground speed, ram speed, and door control will be adjusted to maintain the flow rate necessary to achieve the specific permitted application rates for dewatered cake biosolids.

Approximately, 275 dry tons of biosolids are produced each year by the City of Greenville. Application rates are typically limited by nitrogen agronomic application rate to a 3.5 dry tons per acre. Therefore, approximately 100 acres will receive biosolids each year. Bio Gro typically permits three or four times the acres required in order to accommodate farm cropping schedules and the desires of landowners receiving biosolids.

Spreading operations will be discontinued during periods of inclement weather and will not be resumed until sufficient drying and/or freezing of the permitted farm fields has occurred.

Bio Gro's Project Manager and Technical Specialists will monitor ambient field moisture conditions, recent rainfall, seasonal groundwater tables, perched groundwater tables and depth to groundwater on all permitted sites prior to application. Farmer approval is always obtained prior to spreading biosolids on his/her land. If the farmer determines that it is too wet to operate, Bio Gro will not spread biosolids until conditions are appropriate.
BACK-UP CAKE OPERATION

As an emergency back-up, in cases when liquid application may not be possible due to extended wet weather or other unforeseeable cause, a dewatered cake may be produced. The cake would be produced through a short-term contract for mobile dewatering with an independent contractor. Dewatered biosolids will be transported from the wastewater treatment facility in dump trailers equipped with full mud flaps and sealed tailgates to approved land application sites. The biosolids will be deposited on the fields for loading into cake spreaders with a front-end loader for distribution on the fields by the cake spreaders.
STOCKPILE CAKE BIOSOLIDS OPERATING PROCEDURES

Bio Gro will stockpile cake biosolids on permitted sites during periods when weather and field scheduling prohibits land application operations on the permitted fields. Centralized stockpile areas may be utilized on permitted farms provided that biosolids designated for different fields is separated on the pad. Unloading/Storage sites will be chosen based upon the following criteria:

1. Isolated from public roadways and residences.
2. Outside of flood plains.
3. Away from swales, waterways, drainage ways, or low-lying wet areas.
4. 500 feet from neighbor occupied buildings.
5. 500 feet away from wells and ponds used for drinking water.
6. 100 feet from surface waters of the state.
7. On slopes less than 3%.
8. Well drained soils.

Stockpile storage areas with these characteristics will restrict migration of biosolids off the permitted sites. Bio Gro has successfully used this method of storage in the southwest section of the state for over 10 years.

During periods of heavy rainfall (in excess of one inch per 24 hour period) the Bio Gro Project Manager will comply with the following procedures:

1. The project manager or a designated employee will physically visit the storage site and determine the condition of the stockpiled biosolids.

2. If the biosolids appear to be migrating from the stockpile area with the possibility of the biosolids moving off the permitted site, the Project Manager shall implement containment actions such as:
   a. Utilize a front end loader to restack the biosolids.
   b. Placing containing materials such as bales of straw or silt netting screens to insure that biosolids do not leave the permitted site.

3. If, for whatever reason, biosolids appear to have moved off the permitted site, the Project Manager shall immediately:
   a. Notify the Ohio EPA Southwest District Office.
   b. Notify the City of Greenville.
   c. Take whatever action necessary to preclude any environmental damage as a result of the biosolids' movement.
LIQUID OPERATIONS

Daily hauling of liquid biosolids will be up to 40 tanker loads per day. Transport cycle
time will take approximately 1 to 3 hours per load. Liquid operations could require up
to five trucks to accommodate the hauling and a John Deere™ 4960 Tractor pulling a
6000 gallon Balzer Magnum™ Pressure/Vacuum Track Type Tank to handle the
spreading.

Biosolids will be transported from the treatment facility in water-tight, tanker type
trailers to the permitted land application sites. Semi-truck/Tankers will deliver the
biosolids to high flotation land application vehicles stationed on the fields receiving the
biosolids. Liquid transfer will be through a sealed suction hose, and the land
application vehicle will perform all biosolids distribution. The mode of liquid application
will either be subsurface injection and/or surface application on designated sites where
agronomic constraints warrant (fields which vegetation cannot be disturbed).

EQUIPMENT TO BE USED FOR LAND APPLICATION

Dewatered Cake Operations
- John Deere Tractor 4960™ or equivalent
- Farmco™ 14 cubic yard spreader box on tracks or equivalent
- John Deere Loader 624E™ or equivalent

Liquid Operations
- John Deere Tractor 4960™ or equivalent
- Balzer Magnum™ 6000 gallon pressure/Vacuum Track Type Tank
or equivalent
D. **SITE OPERATIONS**

**GENERAL**

1. Surface or surface with incorporation methods of land application will be employed.
2. Buffer zones will be identified as depicted on the site map and flagged. As a general rule, the Table I isolation distances will be maintained. Buffer zones and spreader routes will be briefed to the field operators.

**Table I - ISOLATION DISTANCES FOR LAND APPLICATION OF BIOSOLIDS**

*(At ≤5.0 Dry Tons/Acre/Crop Year)*

<table>
<thead>
<tr>
<th>Isolation Parameter</th>
<th>Dewatered or Dried biosolids &gt;15% Solids</th>
<th>Liquid Biosolids Surface Applied &lt;15% Solids</th>
<th>Liquid Biosolids Injected &lt;15% Solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighbor Occupied Building</td>
<td>100 feet</td>
<td>300 feet*</td>
<td>200 feet**</td>
</tr>
<tr>
<td>Public Road</td>
<td>0 feet</td>
<td>0 feet</td>
<td>0 feet</td>
</tr>
<tr>
<td>Wells, Public or Private</td>
<td>300 feet</td>
<td>300 feet*</td>
<td>200 feet**</td>
</tr>
<tr>
<td>Ponds, Lakes, Streams, Ditches or Grassed Waterways</td>
<td>33 feet</td>
<td>33 feet</td>
<td>33 feet</td>
</tr>
<tr>
<td>Ponds, Lakes, Streams, Ditches or Grassed Waterways with &lt;6% slope and a vegetative barrier or dead furrow (distance from barrier)</td>
<td>0 feet</td>
<td>0 feet</td>
<td>0 feet</td>
</tr>
<tr>
<td>Springs</td>
<td>300 feet</td>
<td>300 feet*</td>
<td>200 feet**</td>
</tr>
</tbody>
</table>

* 10,000 gallon/acre/day, maximum daily application.
** 25,000 gallon/acre/day, maximum daily application.

Any variations in the isolation distances (established at the discretion of the OEPA) will be utilized during Bio Gro's operation of each site.

3. Provisions will be taken to prevent soil loss through erosion. Provisions will include contour application and avoidance of area where surface drainage patterns result in concentrated flow of runoff from rainfall.
4. Biosolids will not be applied when the soil moisture content is high enough to potentially generate immediate runoff or leaching of biosolids.
5. Biosolids will not be applied on areas exceeding a 12% slope. Areas with 6 - 12% slope will be utilized only if vegetative cover is 80% or more, or
6. Biosolids will not be applied when bedrock is within three feet of the surface.
7. Biosolids will not be applied when an aquifer system is within 10 feet of the surface when the surface soil percolation rate is > 2 inches/hour or 5 feet when the surface percolation rate is < 2 inches/hour.
8. The soil pH will be adjusted to a minimum of 5.5 S.U. prior to or concurrent with the application of biosolids (this may be accomplished with the calcium carbonate equivalency of the biosolids to be applied).

SITE RESTRICTIONS

1. Grazing of domestic animals will be restricted for 30 days after biosolids application.
2. Public access to sites with a low potential for public exposure shall be restricted for a period of 30 days from the last date of application; public access to sites with a high potential for public exposure will be restricted for one year from the last date of application.
3. Food crops with harvested parts that touch the biosolids/soil mixture and are totally above ground shall not be harvested for 14 months after application of biosolids.
4. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of biosolids when the biosolids remain on the land for four months or longer prior to incorporation.
5. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of biosolids when the biosolids remain on the land for less than four months prior to incorporation.
6. Other food, feed and fiber crops shall not be harvested for 30 days after application of biosolids.
7. Turf grown on land where biosolids are applied shall not be harvested for one year after application.

MANAGEMENT PRACTICES

The 503 rule specifies management practices that must be followed when biosolids are land applied. For bulk biosolids the 503 management practices are:

§503.14(a)
Bulk sewage sludge shall not be applied to the land if it is likely to adversely affect a threatened or endangered species listed under section 4 of the Endangered Species Act or its designated critical habitat.
§503.14(b)
Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen or snow-covered so that the bulk sewage sludge enters a wetland or other waters of the United States as defined in 40 CFR Part 122.2, except as provided in a permit issued pursuant to section 402 or 404 of the Clean Water Act.

§503.14 ©
Bulk sewage sludge shall not be applied to agricultural land, forest, or a reclamation site that is 10 meters or less from waters of the United States, as defined in 40 CFR 122.2, unless otherwise specified by the permitting authority.

§503.14(d)
Bulk sewage sludge shall be applied to agricultural land, forest, or a reclamation site at a whole sludge application rate that is equal to or less than the agronomic rate for the bulk sewage sludge, unless, in the case of a reclamation site, otherwise specified by the permitting authority.

The following Ohio EPA restrictions are related to the above management practices:

1. Biosolids may be applied at 5 dry tons per acre or less on frozen or snow-covered ground with a maximum slope of ≤ 2% with adequate crop residue to reduce surface runoff. During late winter or early spring, biosolids application will be reduced by suspending or restricting the land application of biosolids to prevent runoff when snow melting and water movement is most likely. Biosolids application is prohibited at times when the conditions of the soil (e.g. snow covered, ice, slope, vegetative cover) will result in the biosolids entering a wetland or water of the state.

2. The more restrictive distance of either the Table 3 distances, or 10 meters will be buffered from waters of the United States.

3. The biosolids will be applied at the most limiting of the agronomic rate or 5 dry tons per acre per crop year or up to 10 dry tons per acre per calendar year if 2 crops are grown, as determined by Ohio EPA.

4. Sites currently in agricultural production or drastically disturbed lands are not potential habitat for endangered species. Sites which are in a natural state and are converted to agricultural use are evaluated case by case.

Farmers participating in the City of Greenville land application program will be fully informed as to conditions required by Ohio EPA and U.S. EPA prior to the land application of biosolids. These conditions will include any restrictions on grazing, public access, crops to be grown, and soil pH requirements.
E. **TRANSPORTATION ROUTES**

The transport trucks will employ the most direct routes to the various land application sites as influenced by traffic conditions and weight restrictions. All local posting and bridge weight limitations will be observed, and State Routes will be utilized whenever possible. Local traffic patterns will be monitored, and truck traffic will be routed so as to provide for the least disturbance to the local community as possible.

F. **PROJECT QUALITY CONTROL**

In order to ensure that biosolids are applied at the correct application rate and in a manner consistent with the project design, a Bio Gro Project Manager is in direct charge of field operations. Duties shall include:

1. Flagging of buffer zones prior to application.
2. Formal field inspection each operating day.
3. Overseeing calibration of application vehicles to achieve specific permitted application rates.
4. Direct supervision of any field operations personnel in regard to acres to be spread, fields to receive biosolids and correct application rates.
5. Ensuring that trucks and field equipment are kept as clean as possible, and that if any mud is tracked onto roadways, that it is cleaned up as soon as possible.

G. **SPILL PREVENTION AND CONTROL**

In the unlikely event of a spill, Bio Gro will take the following immediate actions:

1. **HALT THE SOURCE OF THE SPILL;** e.g. ruptured line or valve of damaged tanker unit, or overturned trailer.
2. **CONTAIN SPILL;** Use straw bales to form a barrier for liquids.
3. **CLEAN UP;** Employ vacuum equipment on field applicator to remove as much spilled material as possible, for liquid operations. Then utilize absorbent material manually on the spill and then remove the material to the land application site and incorporate the material at the site. A similar procedure is observed for cake or dried biosolids, utilizing a front end loader for picking up large quantities of biosolids, then hand shoveling the remaining material, and finally sweeping the area with an absorbent material such as "floor dry," thoroughly.
4. **FINAL CLEAN UP;** Flush roadways with water, or sweep as necessary to clean, use a vacuum truck when necessary. Allow to dry and incorporate if spill occurs on non-paved and tillable area. In the event a spill occurs
on private property, final clean-up will be completed immediately to the satisfaction of the owner.

5. MANAGEMENT OF CLEAN UP EFFORTS; The Project Manager shall take immediate charge and initiate clean-up activities. Bio Gro labor shall be secured as needed. The Project Manager or Technical Specialist shall also be on hand to communicate with the public or media on the scene, answering questions and advising of clean up activities.

6. REPORTING; In the event of a spill, the Project Manager or his/her representative shall immediately notify the Bio Gro Midwest Regional Office at (937) 384-0659. Bio Gro personnel to be notified are as follows in descending order of priority:

<table>
<thead>
<tr>
<th>Office</th>
<th>Car/Pager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Roell, Project Manager</td>
<td>937-263-4824</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Dave Deaton, Sr. Project Manager</td>
<td>937-384-0659</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Charles Miller, Regional Manager</td>
<td>937/384-0659</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After notification of a spill to Bio Gro’s management, the Project Manager shall notify the Ohio EPA Southwest District Office, and the City of Greenville WWTP Superintendent.

<table>
<thead>
<tr>
<th>OEPA Southwest District Office</th>
<th>937/285-6357</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenville WWTP</td>
<td>937/548-3530</td>
</tr>
<tr>
<td>Darrell S. Holon, Superintendent</td>
<td></td>
</tr>
</tbody>
</table>

7. SPILL PREVENTION; The Project Manager shall take the following steps:

a. Ensure truck drivers/press operator watch trailer while loading at plant.

b. Ensure tank hatches are closed and latched while transporting, and/or that tailgate seals are in place on dump trailers. If not, they will be replaced or repaired as necessary.

c. Inspect tank valves and trailers daily and replace or repair as
necessary.
d. Ensure dustcaps are in place while transporting liquid.
e. Ensure unloading operations in the field are conducted so as to minimize any hose drainage.
f. Instruct truck drivers of assured safe distances to follow traffic so as to prevent sudden stops.
III. BIOSOLIDS ANALYSIS AND DOSAGE RATE EVALUATIONS

A. BIOSOLIDS SAMPLING PROCEDURES

Each month that biosolids are removed from the plant for land application, a representative sample will be drawn. The sample will be made up of a composite of at least 10 subsamples from the biosolids being removed. The representative composite sample will be sent to an approved independent laboratory for analysis. The results will be used for all biosolids removed during that month. It is anticipated that the biosolids will be analyzed a minimum of two to three times per year.

B. CROPS AND DOSAGE RATE SELECTION

Land application of biosolids will occur on common agronomic crops planted in Ohio which include: corn, soybeans, wheat, oats, grass pasture, sod, and alfalfa/clover/grass hay. Bio Gro will maintain a land base which contains a variety of crops so that spreading opportunities will exist throughout the year.

A Dosage Rate Evaluation is calculated from the analysis to determine the correct application rate. The most limiting factor will be the nitrogen needs of the upcoming crop. A yield goal will be determined by the Technical Specialist in consultation with the grower. Typical nitrogen requirements are as in Table II.
<table>
<thead>
<tr>
<th>CROP</th>
<th>YIELD GOAL</th>
<th>RECOMMENDED NITROGEN (lbs. N/Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>180 bushels</td>
<td>220</td>
</tr>
<tr>
<td>Soybeans</td>
<td>50 bushels</td>
<td>190*</td>
</tr>
<tr>
<td>Wheat</td>
<td>90 bushels</td>
<td>110</td>
</tr>
<tr>
<td>Oats</td>
<td>160 bushels</td>
<td>125</td>
</tr>
<tr>
<td>Canola</td>
<td>50 bushels</td>
<td>120</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>6 Tons</td>
<td>340*</td>
</tr>
<tr>
<td>Turfgrass (Sod)</td>
<td>one year crop</td>
<td>≤ 300</td>
</tr>
<tr>
<td>Grass Pasture</td>
<td>over 3.5 Tons</td>
<td>175</td>
</tr>
</tbody>
</table>

Table II: Typical nitrogen requirements of Ohio crops

* Legumes will utilize soil available nitrogen rather than fixing nitrogen from the air.

There are nine metals which currently have land application limits established by the U.S. EPA, per 40 CFR Part 503, and the Ohio EPA. The limits are expressed as: Table 1, Biosolids Ceiling Concentrations that the biosolids cannot exceed if they are to be land applied; Table 2, Cumulative Loading Rates that specify loading limits for biosolids above the Monthly Average Concentrations; Table 3, Monthly Average Concentration below which biosolids may be applied with no site cumulative pollutant loading rate limitations. Since Greenville’s biosolids meet the US and Ohio EPA Average Monthly Pollutant Limits, the cumulative loading limits are not applicable. Cumulative loadings will be tracked if the biosolids analysis exceeds the Monthly Average Concentration.
IV. MONITORING AND REPORTING

This section describes the internal controls to be employed by Bio Gro to ensure compliance with established dosage rates and the procedures to be employed in reporting the results of the land application operations. Other monitoring requirements may also be included as a requirement of the NPDES (National Pollutant Discharge Elimination System) permit for the generator.

Land application activities are monitored on a daily basis through the use of a Daily Summary report. The results of each day’s application activity are recorded in a Daily Summary Report and are summarized weekly in a Weekly Summary Report. The Daily and Weekly Summary Reports are permanent records and serves as a source of dry tonnage information for computation of monthly reports. A Monthly Storage Report is also completed to track stockpiling and spreading activities.

Biosolids quality monitoring will be performed on a continuous basis while operating. A representative composite sample is analyzed for (as a minimum), percent total solids, pH, TKN, ammonium nitrogen, nitrate nitrogen, phosphorous, potassium, As, Cd, Cr, Cu, Pb, Hg, Mo, Ni, Se, Zn. The results of the analysis are entered in a Monthly Dosage Rate Evaluation. Frequency of monitoring of metals will be determined by 40 CFR Part 503 (§503.16 Table 1).

A Field Report is prepared monthly for each field receiving biosolids during the reporting period. The Field Report portrays activity during the reporting period in addition to the lifetime addition of metals.

The reporting and monitoring forms used by Bio Gro are shown in the attachments section of this document.

A monthly report to OEPA will consist of a Monthly Dosage Rate Evaluation, the most recent composite biosolids analysis from an independent laboratory, and Field Reports for each field to which biosolids was applied. Monthly reports will be submitted to the Ohio EPA Southwest District office, Division of Surface Water. Copies of monthly reports, as well as any other submittal (e.g. new farm site applications, spill reports, etc.) will also be forwarded to the City of Greenville.
V. SITE SELECTION AND APPROVAL

A prospective site for receiving biosolids is inspected by a Bio Gro Technical Specialist and evaluated for suitability. A site specific booklet will be prepared containing farm location, topography, soils and the landowners and farm operator consents for biosolids application on the farm. These permit books will be submitted to the Southwest District office of the Ohio EPA. The soils of a prospective site will be analyzed for pH, Cation Exchange Capacity, and background fertility levels. A site inspection will be conducted by Ohio EPA to confirm the site suitability. Once a site has received approval from the District Office of Ohio EPA, the site is eligible to receive biosolids. Bio Gro's Project Manager and Technical Specialist will work closely with the farmers in the program to stay abreast of crop rotations and spreading opportunities.

As the project progresses, additional sites will be selected for land application. Such additional sites will be submitted to the District office of Ohio EPA on a periodic basis for review and approval. New sites are added to insure that there is always adequate land.

A. SITE BOOKS

This section describes the contents of the information packets prepared for each site. A sample site information packet is provided in the Attachments. The standardized Biosolids Site Authorization Packet forms from Ohio EPA will be used to prepare site specific information. The Packet includes the following forms:

1. Summary Sheet (SAA-1) (Attachment 6)
2. Request and Consent for Biosolids - Bio Gro Form (Attachment 7)
3. Landowner Consent for Biosolids - Bio Gro Form (Attachment 8)
4. List of Sites (SAA-4) (Attachment 9)
5. Site Identification (SAA-5) (Attachment 10)
6. Soil Analysis (SAA-6) (Attachment 11)
7. Soils Maps - A map of the site drawn directly on a SCS soils map from the respective County Soil Survey (Attachment 12)
8. Vicinity Map - A section of a county map showing the site location (Attachment 13)
9. Site Map - An aerial photo showing site details (Attachment 14)
B. SOIL SAMPLE RESULTS

Soil samples will be obtained from all fields prior to application, and analyzed by an independent lab, with results on pH, CEC, and lime needs summarized in the site information packets.

C. SOIL SAMPLING PROCEDURE

When developing composite soil samples each field should be subdivided into 20 acre subareas. Subareas will be sampled by taking a number of cores and mixing them to form a composite sample. The cores will be obtained with a tube-type soil sampler (1" diameter) by first scraping away the surface litter and then inserting the sampler to plant root depth of six inches. The cores will be obtained while walking a "zigzag" pattern across the field so as to obtain a representative sample of the particular field.

![Typical Soil Sampling Pattern]

The number of cores will vary, depending upon variability of the field's soil types, color, slope and crop history; a minimum of 10 cores per subsample will be obtained. Care will be taken to avoid areas of soil conditions that are different, such as fertilizer spills, poorly drained areas, dead furrow, fertilizer bands, or any other unusual area.

Soil samples will be sent to an independent laboratory for analysis. The analytical results for each field will be kept on file in the Bio Gro project office and provided to the farmer.
D. FOLLOW UP MONITORING

All sites which receive biosolids will be soil sampled prior to the application of biosolids, as a function of assembling the permit package. As a minimum, after three years of application and prior to a fourth application, the fields in the site package will be re-sampled as a follow up tracking procedure. The purpose of this follow up soil sampling is to keep record of the actual in field status of the nutrient levels in the farm soils.

When a site has received a cumulative metals loading which is greater than 80 % of the cumulative limit for that metal the site will be sampled for background heavy metals. The purpose of this is to keep record of the actual in field status of the heavy metal accumulation in the farm soils.
VI. ATTACHMENTS

1. Dosage Rate Evaluation
2. A & L Biosolids Analysis (October of 1998)
3. Daily Report (Bio Gro Form)
4. Weekly Report (Bio Gro Form)
5. Field Report (Bio Gro Form)
6. Ohio EPA Summary Sheet (SAA-1)
7. Bio Gro Request and Consent Form
8. Bio Gro Landowner Consent Form
9. Ohio EPA List of Sites (SAA-4)
10. Ohio EPA Site Identification (SAA-5)
11. Ohio EPA Soil Analysis (SAA-6)
12. Soils Map
13. Vicinity Map - County Map
14. Site Plan - Aerial Photo
15. Ohio EPA Nitrogen Application Worksheet
16. Greenville WWTP Principal Process Flows Diagrams
17. Greenville WWTP Sludge Holding Facility
18. Biosolids Loading Facility
## DOSAGE RATE EVALUATION

FOR

City of Greenville -- October 1998

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONCENTRATION (ppm)</th>
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<th>LBS/ACRE (@5.0 DT/A)</th>
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<td>289.25</td>
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<td>% Avail N. surface</td>
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% SOLIDS 2.94
pH 7.30

Attachment 1
# AGRONOMIC RATE EVALUATION

**FOR**

*City of Greenville -- October 1998*

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<th>Pounds per Dry Ton</th>
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<table>
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<th>Crop Grown</th>
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<th>Tons Needed to Meet Nitrogen Requirement - Incorporated</th>
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<td>Oats - 160 Bushels</td>
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<td>Canola - 50 Bushels</td>
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## BIOSOLIDS ANALYSIS REPORT

**LAB NUMBER = 45093**  
**SAMPLE ID = *??*??*??*??-01-LIQ**

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<th>RESULT (MG/KG)</th>
<th>DETECTION LIMIT (MG/KG)</th>
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<th>ANALYSIS DATE</th>
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ALL VALUES ARE ON A DRY WEIGHT BASIS EXCEPT AS NOTED.

---

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# BIOSOLIDS ANALYSIS REPORT

**LAB NUMBER** = 45093  
**SAMPLE ID** = #??##??-01-LIQ

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<th>RESULT (MG/KG)</th>
<th>DETECTION LIMIT (MG/KG)</th>
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<th>ANALYSIS DATE</th>
<th>METHOD REFERENCE</th>
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All values are on a dry weight basis except as noted.

---

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<th>Mode</th>
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**TOTAL**

1. List hours of land application operations Start End

2. VAR was met through (check one) [ ] injection [ ] incorporation within 6 hours after biosolids application

Manager's Name: ______________________________ Signature: ______________________________

1110 Benfield Blvd. • Millersville, MD 21108 • 410-729-1440 • Fax 410-729-0854

**Attachment 3**
## WEEKLY REPORT

<table>
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<th>Day/Month/Date</th>
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<td><strong>Weekly Total</strong></td>
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Manager's Name: ____________________________

Signature: ________________________________

180 Admiral Cochrane Drive • Suite 305 • Annapolis, MD 21401 • 410-224-0022 • Fax: 410-224-0152

Attachment 4
**FIELD REPORT**

Project: GREENVILLE, OH
Date As Of: 12/01/98

Rate: 200 LBS PAN/ACRE
Field: DA 13 - 16
Latitude: 40°13'00"
Longitude: 84°37'00"
Total Acres: 32.1
Total Hectares: 13.0

GALLONS APPLIED: Month to Date: 456000.00 Year to Date: 456000.00

DRY TONS/ACRE APPLIED: Month to Date: 1.77 Year to Date: 1.77
Project to Date: 1.77

********** POUNDS PER ACRE APPLIED **********
(Kilograms Per Hectare Applied)

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<th>PROJECT TO DATE</th>
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**DAILY FIELD LOADING SHEET**

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Attachment 5
## Sludge Site Authorization

### Summary Sheet

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<td>Location:</td>
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<tr>
<td>Phone No:</td>
<td>( )------------------</td>
</tr>
<tr>
<td>Plant Superintendent:</td>
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| NPDES Permit No: |  |

<table>
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<th>Responsible Official:</th>
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<tbody>
<tr>
<td>Title:</td>
<td></td>
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<tr>
<td>Address:</td>
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</tbody>
</table>

| Land Owner(s): |  |

| Farm Operator(s): |  |

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<th>Applicator:</th>
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<tr>
<td>Address:</td>
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<tr>
<td>Contact:</td>
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<tr>
<td>Phone No:</td>
<td>( )------------------</td>
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</tbody>
</table>

I hereby agree that all contents of this package are, to the best of my knowledge, true and accurate.

<table>
<thead>
<tr>
<th>Responsible Official</th>
<th>DATE</th>
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</table>

| Title |  |

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**Attachment 6**

Rev 06/97

SAA-1
REQUEST AND CONSENT FOR BIOSOLIDS

SOURCE: ________________________________
FARM OPERATOR: ________________________________
ADDRESS: _______________________________________

PHONE: (_____) ___________________________
FARM LOCATION: _____________________________

TOTAL ACREAGE: ________________ COUNTY: __________
CROPS: ________________________________

1. I agree to be responsible for adhering to the following conditions, where applicable:
   
a. The soil pH will be adjusted to ≥ _____ when biosolids are applied. (This may be accomplished through the application of lime-treated biosolids.)

b. Do not graze animals on the land for 30 days after the application of biosolids. In addition, animals intended for dairy production shall not be allowed to graze on the land for _______ days after the application of biosolids.

c. Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface shall not be harvested for _______ months after the application of biosolids.

d. Food crops with harvested parts below the surface of the land shall not be harvested for _______ months after the application of biosolids when the biosolids remain on the land surface ≥ 4 months prior to incorporation into the soil, or 38 months when the biosolids remain on the land surface < 4 months prior to incorporation.

e. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of biosolids.

f. Public access to land with a low potential for public exposure shall be restricted for _______ days. Public access to land with a high potential for public exposure shall be restricted for 1 year.

g. Turf grown on land where biosolids are applied shall not be harvested for one year after application of biosolids when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

2. I understand that this transaction is not contemplated by the parties to be a sale of goods, and that Wheelabrator Water Technologies Inc. – Bio Gro Division (hereinafter Bio Gro) is willing to provide to me without charge the service of land applying biosolids which have been approved by the appropriate regulatory agencies for land application.

3. I understand that successful crop production depends on many variables, such as weather, soil conditions and specific farming practices and that while Bio Gro has experience with land application of biosolids, the responsibility for properly accommodating agricultural practices to biosolids utilization are solely mine. I have also read and understand the "Important Information About Using Biosolids as a Fertilizer" which is on the reverse side and incorporated by reference in this Request and Consent.

OPERATOR'S SIGNATURE ___________________________ DATE ___________________________

WWT-Bio Gro Division • 550 East Dayton Yellow Spring Road • Fairborn, OH 45324 • 513/878-0057
BGDRQNC • 9/96 WHITE: Regional Office CANARY: Farmer

Attachment 7
Wheelabrator Water Technologies Inc.
Bio Gro Division
A VMX Technologies Company

LANDOWNER CONSENT FOR BIOSOLIDS APPLICATION

The undersigned hereby agrees to the application of biosolids by Wheelabrator Water Technologies Inc. – Bio Gro Division (hereinafter Bio Gro) at application rates in accordance with applicable laws and regulations.

OWNER NAME: ____________________________
ADDRESS: ____________________________________________________________

PHONE: (_______) _________________________
OPERATOR NAME: ___________________________
FARM LOCATION(S): ____________________________________________________

TOTAL ACRES: _______ COUNTY: _________

1. I understand that Bio Gro will coordinate biosolids deliveries with my farm operator hereinafter (leasee) unless otherwise advised by me.

2. I agree to allow Bio Gro and federal, state and local regulatory staff access to my land for the purposes of permitting the site, inspecting the site, applying biosolids, obtaining samples from the site and testing. I reserve the right to ask the above parties for proper identification at any time.

3. I understand that the following conditions apply to my land following biosolids applications and that my leasee has signed an agreement form with Bio Gro stating that my leasee will be responsible for following these conditions where applicable:
   a. Do not graze animals on the land for 30 days after the application of biosolids. In addition, animals intended for dairy production shall not be allowed to graze on the land for ____ days after the application of biosolids.
   b. Food crops (crops consumed by humans including but not limited to fruits, vegetables and tobacco) with harvested parts that touch the biosolids/soil mixture and are totally above the land surface shall not be harvested for ____ months after the application of biosolids.
   c. Food crops with harvested parts below the surface of the land shall not be harvested for ____ months after the application of biosolids when the biosolids remain on the land surface > 4 months prior to incorporation into the soil, or 36 months when the biosolids remain on the land surface < 4 months prior to incorporation.
   d. Food crops, feed crops and fiber crops shall not be harvested for 30 days after application of biosolids.
   e. Public access to land with a low potential for public exposure (land the public uses infrequently including but not limited to agricultural land and forests) shall be restricted for ____ days. Public access to land with a high potential for public exposure (land the public uses frequently including but not limited to a public contact site such as parks, playgrounds and golf courses) shall be restricted for 1 year.
   f. Turf grown on land where biosolids are applied shall not be harvested for one year after application of biosolids when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

4. I agree that this is an exclusive agreement with Bio Gro and I will not accept delivery of biosolids from persons other than Bio Gro.

5. I have also read the "Information About Biosolids" which is on the reverse side and incorporated by reference in this Consent.

6. The term of this Consent shall continue until written notification is given by either party to terminate this agreement.

7. I certify that I am holder of legal title to the above described property or am authorized by the holder to give consent for the land application of biosolids and that there are no restrictions to the granting of consent under this form.

OWNER SIGNATURE (If signing as a representative, include title) ____________________________ DATE __________

WWT–Bio Gro Division • 550 East Dayton Yellow Spring Road • Fairborn, OH 45324 • 513/878-0057
BGDLOCEx • 4/96 WHITE: Regional Office CANARY: Landowner PINK: Farm Operator
Attachment 8
OhioEPA
Sludge Site Authorization

List of Sites

Please fill out the site identification column for as many sites that are being proposed for sludge application.

<table>
<thead>
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<th>Site Identification</th>
<th>Site # (OEPA Use Only)</th>
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</table>
Ohio EPA
Sludge Site Authorization

Site Identification Form

Site #: ______________________
(OEPA Use Only)

Site Identification: ____________________________

If known, Latitude: _________________ Longitude: _________________

Lat/Long reference point: ____________________________

Has sludge been applied to this site previously, since 1993 (Yes/No)? __________

If yes, list sources and years: ____________________________

Do you know of any endangered species or endangered species habitats located on the land application site (Yes/No)? __________

If yes, what is the endangered species or habitat: ____________________________

Maximum agronomic sludge application rate _______________ dry tons/acre/crop year.

Copy Item F from the Nitrogen Application Loading Worksheet (for assistance in completing this worksheet you may wish to consult with your county extension agent or a professional fertilizer applicator).

Maximum sludge application rate _______________ dry tons/acre/crop year.

The lesser of the maximum agronomic rate or 5 dry tons/acre/crop year.
Soil Analysis

Site #: (OEPA Use Only)

Site Identification: ________________________________
Laboratory Name: ________________________________
Lab Contact: ________________________________
Phone No: ( ) ________________________________

Size of Site: __________ acres
Soil pH: __________ range
Soil CEC: __________ meg/100g
Bedrock Depth: __________ feet
Phosphorus: __________ ppm

Please submit the following information if available. This information is not required unless CPLR sludge is to be applied (Include lab report if available).

Lead: ______ mg/kg
Cadmium: ______ mg/kg
Nickel: ______ mg/kg
Copper: ______ mg/kg
Zinc: ______ mg/kg
Mercury: ______ mg/kg
Arsenic: ______ mg/kg
Molybdenum: ______ mg/kg
Selenium: ______ mg/kg

Soil Map: [ ] Included [ ] Unavailable
Soil Type(s): ________________________________

Rev 06/97  Attachment 11  SAA-6
Nitrogen Application Loading Rate Worksheet

Complete the following information to determine the agronomic application rate for a particular sludge in relation to a specific site. If you are unsure how to complete this calculation, please review the detailed explanation found in the most recent edition of the Land Application of Sludge Manual or contact your County Extension Agent or professional fertilizer applicator for assistance.

A. Crop Nitrogen Needs ___________ lb/acre

   Type of crop
   Yield goal

B. Existing Available Nitrogen ___________ lb/acre

   The amount of nitrogen left from previous applications and crop residue must be determined. Consult with an agronomist or agricultural engineer (e.g. county extension agent). The available nitrogen is dependent on the type of crop last planted, the geographic area, any crop residue left on the ground, and other factors.

C. Non-sludge Nitrogen Applications ___________ lb/acre

   Calculate or estimate the total amount of available nitrogen that will be applied to the property for the growing season, including: available nitrogen from commercial fertilizers, septage application, animal waste application and other materials applied to the land

D. Maximum possible additional Nitrogen Application ___________ lb/acre

   Maximum (D) = Crop (A) - Existing (B) - Nonsludge (C)
Nitrogen Application Loading rate Worksheet (cont.)

E. Available Nitrogen in the sludge ________________ lb/ton

Using a sludge analysis average, calculate the available nitrogen in the sludge you will be applying.

Ammonium Nitrogen*        __________ mg/kg x 0.002 = __________ lb/ton
Nitrate                       __________ mg/kg x 0.002 = __________ lb/ton
Total Kjeldahl Nitrogen      __________ mg/kg x 0.002 = __________ lb/ton
Organic N = Total Kjeldahl Nitrogen - Ammonium Nitrogen
Organic N = __________ lb/ton - __________ lb/ton
Organic N = __________ lb/ton
Available N = Ammonium nitrogen + Nitrate + 30%** of Organic N
Available N = __________ lb/ton + __________ lb/ton + 0.30** x __________ lb/ton
Available N = __________ lb/ton (copy this value into E. above)

* Ammonia values may be substituted for ammonium provided the ammonia was analyzed using SM 4500-NH₃B.
** Use 15% for compost and advanced alkaline stabilized sludge.

F. Maximum agronomic sludge application rate ________________ ton/acre. This value must be included on form SAA-5.

Sludge application (dry) = Maximum additional nitrogen (D) ÷ Available nitrogen in sludge (E)
Sludge application (dry) = __________ lb/acre + __________ lb/ton
Sludge application (dry) = __________ ton/acre

This value is on a dry basis. To determine total tons/acre you need the percent total solids from the sludge analysis.

Total Solids % __________

Max. sludge application rate = Sludge application (dry) ÷ Total Solids (use value, i.e. 10% = 0.10)
Max. sludge application rate = __________ ton/acre ÷ __________ % Total Solids
Max. sludge application rate = __________ ton/acre (copy this value into F. above)
Attachment 16
EXISTING DRAW-OFF LINE

EXISTING ANAEROBIC LAGOON

EXISTING DRAW-OFF LINE

EXISTING LIFT STATION

EXISTING SWALE

EXISTING GRASS LANE

EXISTING DRAINAGE CULVERT

PROPOSED SUMP AREA

PROPOSED 15" COLLECTOR/TRANSMISSION LINE

PROPOSED 2" WATERLINE LAND DISPOSAL

PROPOSED TURN AROUND

EXISTING GRAVEL DRIVE

PROPOSED 2" WATERLINE LAND DISPOSAL

BIOSOLIDS LOADING FACILITY
June 17, 1999

Re: Darke County
Greenville
Application No. 05-392-PW
Detail Plans of Biosolids Management Plan
for the City of Greenville Wastewater
Treatment Plant
Plans Received April 16, 1999
From Wheelabrator Water Technologies, Inc.

Mayor and Council
City of Greenville
100 Public Square
Greenville, OH 45331

Attn: Darrell S. Hollon, Superintendent

Ladies and Gentlemen:

The Ohio Environmental Protection Agency has reviewed the plans submitted pursuant to Ohio Revised Code Sections 6111.44 et. seq. and Ohio Administrative Code Section 3745-31-02(B) in compliance with Ohio Administrative Code Section 3745-31-04(C). These plans are approved subject to your being responsible for the supervision, inspection, reporting, and responding to any complaints regarding the actual application of your sludge. You are also responsible for compliance with all applicable laws, rules, regulations, standards, and permits as part of your wastewater treatment program.

Substantial land application of sludge must take place within eighteen months of the effective date of this approval. This deadline may be extended by up to twelve months, as provided by ORC 3745-31-06(C).

This approval shall become void or may be amended when so ordered by the Director of the Ohio Environmental Protection Agency.

The Director of the Ohio Environmental Protection Agency or his authorized representatives may enter the site(s) authorized for this plan approval for land application of sewage sludge at any reasonable time for the purpose of making inspections, conducting tests, examining records or reports pertaining to sludge application.

The entity shall perform the proposed land application operation in strict accordance with the conditions given in this approval and with the method of operation outlined in the application submitted for this approval to the Director of the Ohio Environmental Protection Agency. Approval of your method of sludge application as outlined in this approval does not constitute an assurance that the proposed operation will be in compliance with all Ohio laws and regulations.

This approval applies only to sludge generated from the municipal wastewater treatment plant serving the City of Greenville.

The farm owner of the site to which spreading will be made shall be advised that the land may not be used for growing root crops or leafy vegetables for one year after the application of sludge to that field.
All farm animals should not be allowed access to any field for at least one month after the application of sludge to that field. Also, all lactating dairy animals shall not be allowed access to any field for at least one year after the application of sludge to that field.

A record of the source, quantity, and location of sludge applied including cumulative totals (dry ton/acre, dry ton/acre/year) by farm field compared to the approved loadings shall be submitted to the district office. Reports are required every month a site is used and are due by the 15th of the month following the reporting period.

Should there be any questions regarding the requirements, meaning, or interpretations of any of the above which we may clarify, please contact the appropriate district office of the Ohio Environmental Protection Agency.

You are hereby notified that this action of the director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code by any person who was a party to this proceeding. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Review Appeals Commission within thirty days after notice of the Director’s action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency and the Environmental Law Division of the Office of the Attorney General within three days of filing with the board. An appeal may be filed with the Environmental Review Appeals Commission at the following address:

Environmental Review Appeals Commission
236 East Town Street, Room 300
Columbus, Ohio 43266-0557

Sincerely,

Christopher Jones
Director

CJ/pls

cc: Chris Bowman, DSW, Central Office
    Southwest District Office
    Darke County Health Department
    Wheelabrator Water Technologies
Interpretation of sludge storage tank after Fabriform was installed on the upper slopes. Subsequently, the tank's lower slopes and floor were also protected. Sludge distribution hoppers are centered in the four concrete pads.

HIGH RISE PIT GETS A FABRIFORM® LINING

From a distance, the enormous mound of earth rising above the surrounding terrain suggests a flat-topped Mayan pyramid. However, the view from the top of the mound dispels such notions for there in the center of the earthen mass is a huge, four-sided pit with 1:2 sloping walls. The pit's purpose — strictly utilitarian. It was designed to serve as a sludge storage and distribution "tank" for a nearby sewage treatment plant. And, Intrusion-Prepakt's Fabriform is an important part of that design.

The City of Greenville, Ohio, had always disposed of sludge by hauling it away as an agricultural enrichment product. In a move to improve wastewater treatment facilities, consultants recommended an entirely different method of handling sludge. The proposed system would offer more operational efficiency and flexibility as well as an enhanced potential for revenue in the future.

Essentially, the plan called for constructing a 1.5 million gallon sludge storage tank on landfill property about a mile from the treatment plant, the tank consisting of a pit in the center of a huge, truncated pyramid of well-compacted clay. Three large, freeform settling ponds or terraces were constructed adjacent to the pit/tank, having 4-foot differentials in elevation from one terrace to another. Each terrace is bordered with an all-weather road for good accessibility.

In operation, a sludge slurry composed of 97% water/3% solids is pumped to the site from the treatment plant. A feature of the system is that once the sludge has been pumped into the storage tank, no further energy is required. Four hoppers in the flat floor of the tank can distribute the slurry by gravity alone, the tank bottom being higher than terrace elevations. When released onto a terrace, the liquid content of the slurry percolates downward through a 6-inch sand base into a 13,000 lineal-foot underdrain system which channels the filtered water into a small creek. Whenever solid residue accumulates sufficiently on the surface of a terrace, it easily can be collected, loaded, and trucked away. An alternate plan at Greenville is to explore the feasibility of growing sod on the enriched surface cake of a terrace, for sale to builders and landscapers.

The tightly-compacted clay interior walls of the earthen tank were considered to be erosion-resistant when completely submerged as there is little movement in the sludge slurry once it is in the tank. However, the initial design called for the operational sludge level to range between Elevation 1042.0 (2 ft. from the top) and approximately El. 1032.0. This meant that whenever the sludge level was drawn down, the exposed upper slopes of the tank interior would be subject to temperature cycles and weather erosion. Any gully ing action in the earthen walls would produce mud and silt that might interfere with sludge distribution and filtering processes. It was, therefore, decided that the upper slopes of the pit/tank must have surface protection against erosion and Fabriform® RevetMATS™ were selected to provide it.

Eight-inch Filter Point style Fabriform was considered suitable because the revetment protection did not need to be impermeable. The clay walls themselves minimized leakage and any minor seepage could move outward only as far as a vertical sand drain seam which was built into the compacted walls during construction.

"Fabriform" is a registered trademark of Intrusion-Prepakt, Incorporated, Cleveland, Ohio.
The double-walled Fabriform material was pre-assembled at the factory into wide panels, 33 ft. in length from top to bottom. Prior to installation, a trench was cut into the flat crest around the rim of the square pit/tank. Each of the four sides measured about 148 ft. at the top. Fabriform panels were anchored in the trench, then ran down the slope to a point below the calculated surface level with the sludge drawn down. Diagonal panels for the corners were prefabricated to fit. Cutouts for the incoming sludge main, an emergency discharge and two supernatant withdrawal pipes were hand-tailored on the job. Some 17,000 square feet of Fabriform was required to complete the project according to contract.

Ordinarily, this would conclude the account of a successful Fabriform installation. But, there’s more to the Greenville story. Sometime during the later stages of the overall project, a simple and very logical design change was proposed with regard to the pumping of the sludge slurry and the storage of same once it had arrived at the site. A bypass was installed in the pipeline so that sludge could optionally be pumped directly to the settling ponds without passing through the storage tank.

The original concept of the storage tank was to hold back sludge during the winter when freezing weather would prevent proper distribution and filtering in the settling ponds. However, in mild weather, there seemed to be no necessity for passing sludge through the tank enroute to the settling terraces, hence the bypass line. But, this created another problem. There was concern that any implementation of the bypass could make the unprotected lower sections of the earthen pit walls subject to erosion if no sludge happened to be stored in the tank at the time.

Consequently, in the early winter of 1982, Prepakt was authorized to return to the job site to complete Fabriform placing on the lower walls and the bottom of the pit. After some infill and hand grading of mildly eroded areas, an additional 6500 sq. ft. of Fabriform was required to protect remaining exposed sections of the pit’s sides and bottom. The job was finished two days before Christmas, in time for the storage tank to be fully operational in the freezing weather just ahead.

Consulting Engineers for the Greenville sludge disposal project were the Snell Environmental Group of Akron, Ohio. B. G. Danis Co. of Dayton was the General Contractor. The improvement program was monitored by Walt Hovecar, Greenville Service Director. Fabriform installation was under the supervision of personnel from Intrusion-Prepakt’s Cleveland District Office.

"RevetMAT" is a trademark of Intrusion-Prepakt, Inc., Cleveland, Ohio.

The Prepakt Concrete Co. is a wholly-owned subsidiary of Intrusion-Prepakt, Inc.