

COMMONWEALTH OF VIRGINIA

Department of Environmental Quality

629 East Main Street Richmond, Virginia 23219

MORANDUM

Subject: Interim Guidance #01-2005, Spray Irrigation and Reuse of Wastewater

To: Regional Directors

From: Larry G. Lawson



Date: January 18, 2001

Copies: Regional Permit Managers, Regional Compliance and Enforcement Managers, Regional Waste permit managers, Martin Ferguson, Richard Ayers, Kathy Frahm, Lily Choi, Dale Phillips

Background:

According to a 1999 survey, there are thirty-three facilities in Virginia that employ spray irrigation technology under permits issued by the Department of Environmental Quality. These facilities are regulated under either the Virginia Pollution Abatement (VPA) Permit Regulation (9 VAC 25-32-10 et seq.) that do not authorize a point source discharge to surface waters or the Virginia Pollutant Elimination Discharge (VPDES) Permit Regulation (9 VAC 25-31-10 et seq.) that do authorize such discharges. The Department issues a VPA permit to the entity that is responsible for the wastewater reclamation and reuse involving spray irrigation. If, in addition to spray irrigation, a facility has an obligation to discharge the reclaimed water from a point source, a VPDES permit is issued. The VPDES permit incorporates any applicable requirements pertaining to spray irrigation that would otherwise be included in a VPA permit.

A regulatory framework for wastewater reclamation and reuse involving spray irrigation has been established through the VPA Permit Regulation. However, the VPA Permit Regulation does not prescribe any technical standards for this type of operation. In order to assist the permit staff in reviewing permit applications and drafting permits, the Department developed two sets of guidance documents (Land application of municipal wastewater effluent (# 93-002) and land application of food processing waste(#93-022)) in 1993-1994.

Pursuant to the action of the 2000 General Assembly, the State Water Control Board must promote and establish requirements for the reclamation and reuse of wastewater that are protective of state water and public health as an alternative to directly discharging pollutants into state waters. Development of the regulations for the reuse of reclaimed wastewater is under way and a comprehensive guidance document will be issued when the regulation becomes effective.

In the interim, this guidance will update and replace the aforementioned Guidance Memoranda #93-023 and #94-002.

Disclaimer: This document is provided as guidance and, as such, sets forth standard operating procedures for the agency. However, It does not mandate any particular method nor does it prohibit any particular method for the analysis of data, establishment of a wasteload allocation, or establishment of a permit limit. If alternative proposals are made, such proposals should be reviewed and accepted or denied based on their technical adequacy and compliance with appropriate laws and regulations.

Specific Issues Update:

Water Balance and Hydraulic Loading Rates

It has been the staff guidance to use the Sewerage Regulations, the VDH proposed Sewage Collection and Treatment Regulations, and the EPA Process Design Manual for Land Treatment of Municipal Wastewater as the basis for review and approval of spray irrigation projects in Virginia. Specifically, these documents recognize the soil permeability or land treatment of wastewater provided by the soil profile. For the purposes of design, 4-10% of minimum soil profile permeability (or hydraulic conductivity), depending upon the soil conditions, may be considered in the water balance calculations.

It is important to note that the instantaneous numerical criteria (0.25 in/hr, 1 in/day, and 2 in/wk) along with any other site management conditions should be met at all time, and essentially, whichever is most stringent applies. For example, when ground is saturated, no irrigation should occur. In addition, one should not interpret that the weekly hydraulic loading rate (2 in/wk) would allow an annual application of 104 inches. In the design phase, an annual loading rate could be determined through the water balance calculations as discussed above.

2. Nutrient Management Requirements

The permit application and permit special conditions include a considerable number of site specific management requirements designed to limit nutrient loading, such as vegetative ground cover requirement, slope restrictions, application timing and methods, and restrictions due to distance to ground water, rock outcrops, and other standard buffers. However, a site specific Nutrient Management Plan (NMP), prepared by a certified nutrient management planner, may be required on a case-by-case basis depending on the characteristics of the specific site. For example, an NMP may be required when the spray sites exhibit very high soil test phosphorus. See discussion under item 4 below.

3. Site Selection Criteria

The following general criteria may be used to evaluate the suitability of the proposed spray sites. Any deviation from these criteria should be justified in the fact sheet and the application rate should be adjusted accordingly.

The maximum field area slope should be 12%. When it is necessary to locate field area on slopes of 8-12 %, special precautions should be taken to prevent seepage or runoff of effluent to nearby surface waters. The minimum soil depth to bedrock should be 3 feet and 5 feet of well-drained loamy soils are preferred. The hydraulic conductivity should be between 0.2-6.0 inches/hour. The minimum depth to the permanent water table should be 5 feet. The minimum depth to the seasonal high water table should be 3 feet. When the permanent water table is less than 5 feet and the seasonal water table is less than 3 feet, the application rate should be designed to prevent surface saturation. Field area should not be located within the 100-year floodplain.

4. Phosphorous

When the spray site exhibits very high soil test phosphorus of 55 ppm or more (Mehlich 1 analytical procedure or equivalent), an NMP or a soil conservation plan may be required. A soil conservation plan would be required if such sites exhibit a significant erosion potential based on site soils and topography. It is anticipated that phosphorus-based NMP would not be considered until phosphorus index becomes available.

5. Nitrogen

In those cases where the groundwater already contains elevated levels of nitrogen compounds (nitrate), basing the application rate on a water balance may not be acceptable. The application rate of nitrogen on such sites should be limited to what can be utilized by the crop. This may severely limit the application rate of water. A NMP should be considered for such sites.

If you have any questions regarding this interim guidance or require assistance, please contact Lily Choi or Dale Phillips.

Municipal Wastewater

Introduction

The most common land treatment designs are irrigation-slow rate, rapid infiltration and overland flow. During overland flow land treatment, wastewater is applied over the upper reaches of a spray field and allowed to flow across a vegetative surface to runoff collection ditches. At this point, the runoff may be discharged (VPDES Permit required) or recycled with the system. There is relatively little percolation involved, usually because of an impermeable soil. During rapid infiltration land treatment, most of the wastewater percolates through the soil and the treated effluent eventually reaches groundwater.

Irrigation-slow rate systems are designed to slowly land apply wastewater over a given area so that runoff and ponding does not occur. Since irrigation-slow rate is the most widely used in Virginia, this guidance will address irrigation-slow rate systems. If any other type of system is proposed, OWPP should be contacted for guidance on a case-by-case basis. This should be done early in the permit processing, even before an application is sent to the potential permittee.

The permit writer should realize the submission of a VPA permit is entirely a separate process from approval of final plans and specifications for the proposed or existing facilities. Final plans and specifications may be submitted after a VPA permit is issued. The Virginia Department of Health (VDH) and the DEQ both are currently responsible for reviewing final plans and specifications for municipal wastewater systems. The VDH is the lead agency for the review. Final approval is granted by the DEQ. When the Virginia Sewage Collection and Treatment (SCAT) Regulations are adopted, the VDH will be solely responsible for approval of final plans and specifications for the treatment works. When a VPA Permit has been issued and a Certificate to Construct (CTC) issued, and final plans and specifications have been approved, these facilities cannot be used until the VDH makes a final site inspection and the DEQ issues a Certificate to Operate (CTO). The CTO and CTC programs will also be delegated to VDH when the SCAT Regulations become effective.

Application

It is strongly recommended that a Preliminary Engineering Conference (PEC) be held with a potential permittee and their consultant and a representative from VDH long before a VPA permit application is submitted and final plans and specifications are developed. The appropriate sections of the VPA application should be reviewed along with the requirements of the proposed SCAT Regulations. All design criteria should be in conformity with the most recent VDH guidance.

During the PEC, an applicant should be provided with Form A and Form D. All Privately Owned Treatment Works (PVOTW) designed to serve 50 or more residences must be registered with the State Corporation Commission (SCC) prior to applying for a permit. The applicant must provide a copy of the SCC Certificate of Incorporation (for Virginia based operations) or the Certificate of Authority (for out of state operations) with the application.

The applicant must develop a narrative type application format following the outline contained in Form D-1. Each item in the application form must be addressed by the applicant. If the applicant believes that plans and specifications have been previously addressed and no changes have been made, then a written statement should be provided. The previous submittal and/or approval dates should be referenced.

Complete application information should be obtained for issuance and reissuance, in order to ensure that facilities are adequately protecting water quality. Permit modification requests for construction of new facilities or the addition of new sites will require completion of the applicable sections of the form.

Developing a complete, well organized fact sheet is always important. The fact sheet can be used to defend the permit that is drafted. It also allows for a quick review of the operation should the facility later be assigned to another permit writer. It is suggested that items 8-12 of the fact sheet be given special attention. It is recommended that item #8 be covered by a summary memorandum which would include information pertaining to previous permit issuance and a general description of the operation. A good written inspection report should be included in information provided with the fact sheet. Item #10 should fully explain changes from the previously issued permit and changes during the permit/processing. Again, providing such information will help the permit writer should the proposed permit have to be defended. In addition to standard special conditions listed in the Procedures manual, site specific special conditions may be required on a case- by-case basis. Item #12 requires that reasons be given for the use of any site specific special conditions.

PART D-1

The purpose of this section is to give the permit writer a good description and overview of the proposed or existing operation.

1. List the same facility name as listed on Form A.
2. Design and Line Drawing of Waste Treatment System - The applicant shall provide a concise narrative of the facility's operations. This description should give the permit writer a good understanding of how the facility operates. Included in the narrative should be information on the treatment, storage and disposal of wastewater. The application should include information on seasonal or intermittent operations indicating average/maximum hours of operation per day, week, and month, if applicable. It may not be necessary to provide detailed information concerning the sewerage collection or conveyance system. To compliment the operation's narrative and further educate the permit writer, a flow diagram of the facility operations should be submitted. This diagram should be a "working tool" offering as much information as possible in an "easy to read" format. Information on this flow diagram should indicate where wastes are produced, the volume of wastes generated, treatment units, storage units, and the method of disposal.
3. Information provided by the applicant will probably be limited. The permit writer should be aware it may be necessary to place a special condition in the permit to require that a sludge management plan be submitted at a later date before land application commences. For proposed facilities, sludge management will be addressed by plans and specification review and approval. For existing facilities, a sludge management plan may be necessary on a case-by-case basis.
4. All industrial contributors to the wastewater treatment facility should be identified. This will help identify any additional parameters that should be sampled and tested in the wastewater and possibly sludge.
5. Leasing Agreements - Such information should be submitted with the VPA permit application. Each agreement should provide sufficient information to determine that the operation and maintenance of treatment, storage or land application facilities do not preclude compliance with all applicable regulations and anticipated permit requirements. The length of a leasing agreement may determine the length of the VPA permit.
6. The required copies of certification must always be submitted with the application.

7. The design flow should always be provided. This is especially necessary for existing facilities in order to determine if they are hydraulically overloaded.
8. Description of Wastewater - waste characterization recommendations for minimum screening purposes for existing systems are listed in Item #5 of Part D-IV Effluent Characterization Form. The permit writer may on a case-by-case basis want to consider additional parameters for screening purposes, especially after reviewing the list of industries contributing wastewater. Additional parameters to consider are as follows (as Total Recoverable Metals):

| | |
|------------|------|
| Lead | mg/l |
| Mercury | mg/l |
| Cadmium | mg/l |
| Selenium | mg/l |
| Copper | mg/l |
| Molybdenum | mg/l |
| Nickel | mg/l |
| Zinc | mg/l |
| Arsenic | mg/l |

The nine heavy metals noted should be considered because of concerns of the accumulative loading rates. Since proposed SCAT Regulations require a BOD₅ limitation of 60 mg/l and disinfection, a final limit should be placed in the permit for BOD₅ and TRC. Other parameters such as pH and TSS can be limited as necessary.

| <u>Parameter</u> | <u>Screening Req. by Application</u> | <u>Permit Limit</u> | <u>Permit monitoring</u> | <u>Sampling location</u> |
|--------------------|--------------------------------------|---------------------|--------------------------|-----------------------------|
| Flow* | x | x | x | Before irrigation-flow rate |
| BOD ₅ * | x | 60 mg/l | x | Before storage |
| TSS* | x | -- | x | Before storage |
| TRC* | x | 2.0 rag/ l | x | After Cl ₂ |
| pH* | x | 6.0-9.0 | x | Before irrigation-flow rate |
| Nitrate-N * | x | -- | x | Before irrigation-flow rate |
| Ammonia-N* | x | -- | x | Before irrigation-flow rate |
| TKN* | x | -- | x | Before irrigation-flow rate |
| Phosphorous | x | -- | x | Before irrigation-flow rate |
| Potassium | x | -- | x | Before irrigation-flow rate |
| Sodium | x | -- | x | Before irrigation-flow rate |

*Monitoring required by the proposed SCAT Regulations.

9. Please provide calculations for Nitrogen (PAN), Phosphorus (P₂O₅) Potassium (K₂O) and any liming that may occur at the land application sites. These parameters are usually the main land limiting parameters for municipal spray irrigation systems.
10. Conceptual Design, Storage Facilities and Groundwater Protection. The application does not clearly address Conceptual Plans of the proposed or existing treatment, storage and land application facilities. The staff believes those items should be addressed at this point in the application. In addition, it is strongly recommended the permit writer ensure that the following information is contained in the permit application and that each has been fully justified:

Calculations for required days storage

An annual water balance demonstrated on a monthly basis incorporating such factors as precipitation, evaporation, evapotranspiration, soil hydraulic conductivity, wastewater loading, resting periods and monthly storage (input and draw down)

A. Conceptual Designs - For permit reissuance, it is likely that the treatment/storage facilities have been previously approved by the Department.

1. In the case of previously approved facilities, the applicant should provide a list of the treatment/storage facilities and the dates of Board approval, if available. If the applicant is unable to supply the approval dates, at a minimum a statement must be provided that the facilities remain unchanged from those previously reviewed and approved by the Department.
2. If the previously approved facilities have been expanded or new facilities have been added since the last Board approval, we recommend that the applicant submit conceptual engineering plans of the new or expanded facilities for Department approval.

Unreported expansions or construction of new facilities are violations of the Permit Regulation, and the facility's existing VPA permit (for reissuance). Depending on the circumstances, you may also want to refer these cases to the Compliance Auditor for enforcement action, especially if the permit may expire due to delays in receiving the necessary information.

The review of the conceptual designs should be completed during the technical review of the application for new facilities or expansion of existing facilities.

B. For VPA permits, the applicant should submit conceptual designs for all proposed facilities with the VPA application. We suggest that review and approval of the conceptual designs be conducted in conjunction with the application technical review. The application should not be considered technically complete until the conceptual design is considered technically adequate.

C. Flood Potential - The no discharge criteria require treatment and storage facilities to remain operational and to be designed such that no discharge will occur except in the case of a 25 year 24 hour or greater storm event. Additionally, treatment and storage facilities including associated ground water monitoring wells should be protected from inundation by the 100-year flood wave action. In reviewing the application, we recommend that you ask the applicant to provide documentation to support whether or not the storage facilities are located in the 100-year flood plain. Sources for flood plain information include planning/zoning offices, soil surveys or FEMA maps. For existing facilities constructed within the 100-year flood plain that are not adequately designed, the facilities should be permitted with special, site specific conditions requiring necessary improvements.

For proposed facilities, requirements for the 100-year flood protection should be addressed in the conceptual plan prior to permit issuance.

D. Groundwater

1. Existing Facilities - Agency guidance presently requires ground water protection to be addressed in the VPA application for both proposed facilities and existing facilities.

Earthen treatment or storage facilities should be provided with adequate liners, or a ground water monitoring plan, or both, depending on the facilities. Whichever alternative that is used is a regional decision.

A ground water monitoring plan, which is basically a geo-technical report, is needed for all spray areas unless one was previously approved by the Board. The plan can also include the treatment and storage location area. The plan should include but not be limited to ground water flow direction and depth, perched water tables, seasonal fluctuations, rock formations and the proposed location of all monitoring wells.

Further guidance for earthen treatment or storage facilities is as follows:

In the case of previously approved facilities, the applicant should submit documentation, when available, that the storage facilities were constructed with an adequate liner. Documentation may include SCS inspection reports, engineer's statement, field permeability data, DEQ approval memoranda, etc.

Facilities which were previously approved without liner requirements or for which documentation of adequate liner construction are not available may, alternatively, submit the results of ground water monitoring or water balances to demonstrate that the facilities are not impacting ground water.

Facilities which can not provide (1) adequate documentation that a liner was constructed or (2) documentation which demonstrates that groundwater is protected should be permitted with a special, site-specific condition that either addresses collection of ground water protection data such as ground water monitoring, requires liner construction or requires a water balance.

As with the conceptual design review, we recommend that you make appropriate inquiries to ascertain whether ground water protection data exists. However, do not delay the permit action if this data cannot be provided or does not exist.

2. Proposed facilities - It is recommended that ground water protection be completely addressed during the permit application technical review. Processing of the VPA draft permit should not begin until the ground water protection proposal is considered technically adequate along with the application. (This may include a ground water monitoring plan and/or liner.)
3. Parameters recommended for groundwater routine monitoring as listed in Table F of the draft SCAT Regulations are as follows:

Annual Parameters

Total Kjeldahl Nitrogen
Ammonia Nitrogen
Phosphorus
Sodium
Boron
Copper
Lead
Nickel
Cadmium
Chromium

Quarterly Parameters

Nitrate Nitrogen
pH
Conductivity
Chlorides
Static Water Level

Zinc
Hardness
Alkalinity
COD (TOC)
Pathogen Indicator Organism

It is recommended that a regional geologist review the draft permit before this list of parameters is adopted for use into the VPA Permit.

11. These calculations should clearly demonstrate the land area requirements for every pertinent parameter.
12. General Location Map - The purpose of the general location map is to allow the staff to find the facilities and land application sites.
- 13,14 Topographic Site Map - Also needed is a topographic map which clearly delineates the field boundaries and property lines and identifies any landscape features requiring buffer zones such as drinking water wells, rock outcrops, surface waters, sinkholes, steep slopes and occupied dwellings (refer to complete listing). Depending on the complexity of the site, the topographic map and site plan could possibly be incorporated into one plan.

In reviewing the site plans and maps for completeness, we recommend that you consider whether the required information is presented with enough detail and accuracy so that you can verify the location of field boundaries, property lines and the various landscape features via physical inspection. We suggest that, as a minimum, each map include a north arrow, a scale, contour interval designation (if applicable) and a legend which defines map symbols.

Site plan/topographic map omissions noted as a result of your site inspection visit should be corrected by the applicant during the technical review process prior to deeming the application complete. Buffer zone requirements should be determined during the site inspection. Net acreage should be calculated and submitted along with the revised site maps if updates are needed based on the net acreage land applied.

15. A Detailed Soil Map, etc.

This part of the application is intended to identify the major soil types present at each land application site in order to (1) confirm soil productivity classes, absorption characteristics, hydraulic conductivity, and anticipated crop yield, and (2) identify sites which may be unsuitable due to high water tables.

- A. If the county where the land application site is located has been mapped by the SCS, the applicant may submit SCS soil survey data to fulfill the requirements of this section.

If the applicant decides to use this information, we recommend that, at a minimum, the submittal include a copy of the soil map with the land application site boundary superimposed on this map.

Alternatively, the applicant may submit a corrected SCS map or redefine the soil characteristics for the land applications site if it is determined that the soil survey has not properly mapped this particular field location. Preferably, this work should be conducted by a technically qualified person(s), such as a soil scientist.

B. For unmapped counties, the applicant will be required to conduct a soil characterization for each land application site to fulfill the application requirements. Again, although not a requirement, it is strongly recommended that a technically qualified person(s) undertake this work. Assistance can also be obtained from the local USDA-SCS office or Virginia Cooperative Extension.

16. Soil Borings - Soil borings are intended to verify the soil survey information provided under Item 16 above.

A. For previously approved land application sites, soil borings are not required unless the technical review site inspection indicates that borings are necessary to verify soil characteristics or site conditions.

B. For proposed facilities and new land application sites, soil borings are required. Remember, the goal of this section of the application is to review absorption characteristics, hydraulic conductivity and to develop reliable soil productivity classes which will provide the DEQ with some estimate of crop yield on which to base land area calculations and to identify sites which may be unsuitable due to high water tables. It is important that this information be provided with all land application permit applications.

17. Soil Monitoring

Soil samples should be representative of the site and collected to the depth of 1 foot (Appendix F, SCAT Regulations). A representative sample typically consists of a composite of 20 randomly collected samples from tract sizes of 5-10 acres. Larger tract sizes can be justified if soils are uniform.

Proposed wastewater effluent sites require at least background and generally annual sampling and testing to serve as a basis for comparing changes to soil properties. Sampling should be performed in the spring and/or fall. Applicants should be referred to the Virginia Agronomy Handbook for further instructions on how to collect representative soil samples. (Procedures for subsequent soil sampling required by the VPA permit should be included in the facility's O & M Manual.)

Sampling frequency for the required parameters is usually based upon the staff's Best Engineering Judgement (BEJ).

18,19 Agronomic Practices

At a minimum, selected crops, planting and harvesting schedules and anticipated yields based on productivity class should be submitted for each land application site. Additional information concerning how the application of waste will be scheduled relative to the planting date and growth periods of the crops is also appropriate under this item. Attached to this guidance are some examples as follows: a plant growth chart (Figure 1), a nitrogen loading chart (Table 9.6), a water balance chart (Table 9-7), a planting and harvesting chart (Figure 4-1) and an anticipated harvesting schedule (Figure 10).

Figure 1.

Bermudagrass

2. Ky. bluegrass
White clover
(northern Piedmont,
west of Blue Ridge
mts.)

3. Orchardgrass
Ladino clover

4. Tall fescue
Ladino clover

5. Orchardgrass
Lespedeza

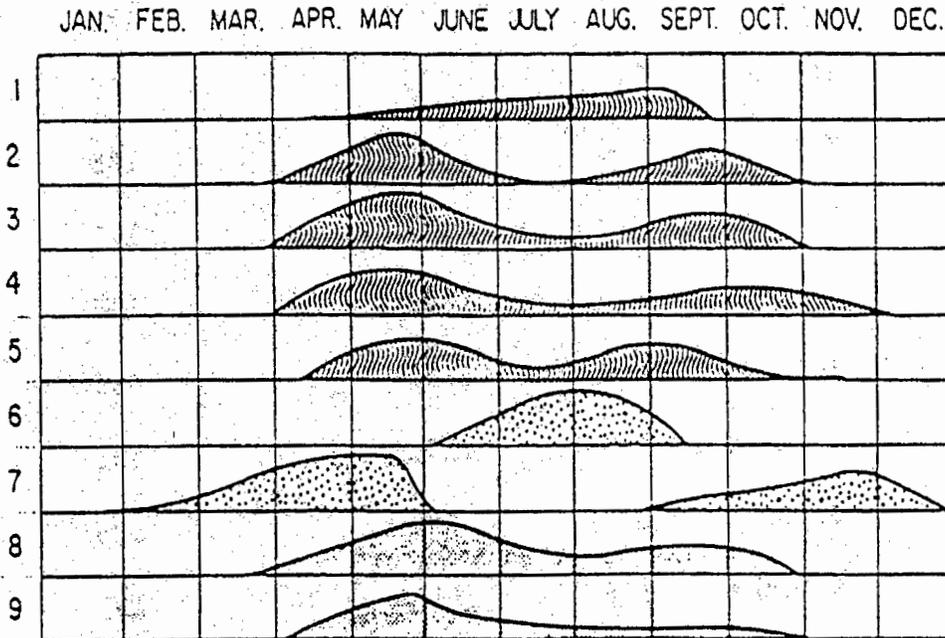
6. Sudangrass, sorghum
sudan, pearl millet

7. Small grains or
ryegrass

8. Alfalfa
Orchardgrass

9. Red clover

SEASONAL GROWTH OF FORAGE SPECIES AND MIXTURES



December-March are the traditional winter feeding months. No plants grow when temperature is much below 50°F.

Plan to have hay or silage for 60 to 120 days. Small grains and stockpiled tall fescue for pasture will reduce the winter feeding period.

April, May, and June are the surplus grass months. Save excess growth by making silage or hay. Seed sudangrass or pearl millet for hot-weather pasture.

July and August are the critical pasture months. Make definite plans for these months. Some suggestions are:

1. Use rotational grazing.

2. Use reserve regrowth from hayfields.

3. Graze sudangrass or pearl millet.

4. Graze one cutting of alfalfa if necessary.

5. Use lespedeza for pasture.

6. Use bermudagrass pasture.

7. Feed hay if pastures become overgrazed. Use permanent pastures during these months (Sept., Oct., and Nov.). Topdress tall fescue or other pasture growth to provide late fall and winter grazing. Seed small grains or ryegrass for winter grazing.

TABLE 9.6

A Method for Calculating Monthly Wastewater Apportionment

| Month | (1) ET(in). | (2) Fraction | X Tot ET | (3) N Loading | (4) N Apportionment | (5) ww Loading |
|-----------|----------------|-----------------|-------------|------------------|------------------------|----------------------|
| March | 1.1 | .037 | | 195 | 7.2 | 0.613 |
| April | 2.7 | .090 | | 195 | 17.6 | 1.492 |
| May | 3.6 | .120 | | 195 | 23.4 | 1.989 |
| June | 4.7 | .157 | | 195 | 30.6 | 2.601 |
| July | 4.9 | .163 | | 195 | 31.8 | 2.701 |
| August | 4.6 | .153 | | 195 | 29.8 | 2.536 |
| September | 3.9 | .130 | | 195 | 25.4 | 2.154 |
| October | 2.9 | .097 | | 195 | 18.9 | 1.608 |
| November | 1.6 | <u>.053</u> | | 195 | <u>10.3</u> | <u>0.878</u> |
| | 30.0 | 1.000 | | | 195.0 | 16.572 |

Table 9.7

Summary of a Water Balance Assuming Zero Nitrogen Leaching and A Complete Apportionment of Wastewater Throughout the Active Growing Season

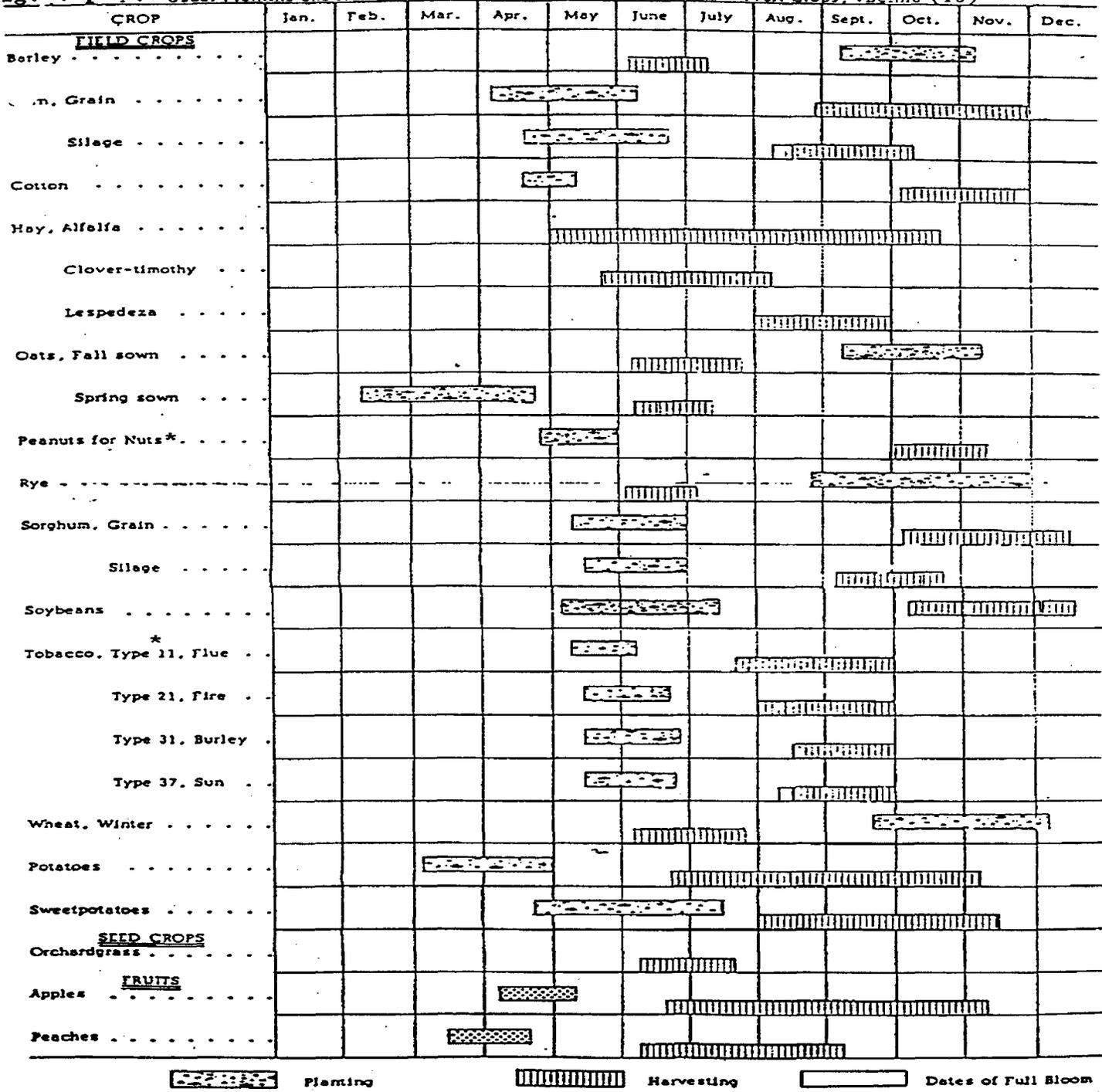
| Month | Precipitation Inches | Evapo- Transpiration (inches) | Allowable Percolation (inches) | Maximum Water addition (inches) | Actual ^a Wastewater Loading (inches) | Change in ^b Storage | Total Storage (inches) |
|-----------|-------------------------|-------------------------------------|--------------------------------------|---------------------------------------|---|--------------------------------------|------------------------------|
| January | 4.0 | 0.2 | 8.64 | 4.84 | 0 | 1.580 | 3.735 |
| February | 4.1 | .5 | 8.64 | .4 | 0 | 1.580 | 5.315 |
| March | 4.0 | 1.1 | 8.64 | 5.74 | .702 | .878 | 6.193 |
| April | 3.7 | 2.7 | 8.64 | 7.34 | 1.706 | -.126 | 6.067 |
| May | 4.3 | 3.6 | 8.64 | 7.94 | 2.275 | -.695 | 5.372 |
| June | 5.0 | 4.7 | 8.64 | 8.34 | 2.977 | -1.397 | 3.975 |
| July | 9.1 | 4.9 | 8.64 | 4.44 | 3.09 | -1.510 | 2.465 |
| August | 8.4 | 4.6 | 8.64 | 4.84 | 2.90 | -1.321 | 1.144 |
| September | 5.4 | 3.9 | 8.64 | 7.14 | 2.465 | -0.885 | 0.259 |
| October | 5.2 | 2.9 | 8.64 | 6.34 | 1.830 | -0.259 | 0 |
| November | 6.0 | 1.6 | 8.64 | 4.24 | 1.005 | 0.575 | 0.575 |
| December | <u>4.9</u> | <u>0.4</u> | <u>8.64</u> | <u>4.14</u> | <u>0</u> | <u>1.58</u> | <u>2.115</u> |
| | 44.21(avg) | 31.1 | 103.70 | 69.98 | 18.96 | | |

- Developed from procedure similar to that outlined in table 9.6
- Monthly value, determined as the difference between monthly wastewater generation (AC-in/AC) and the actual monthly wastewater loading rate. For example, the value for March is calculated:

$$\frac{18.96 \text{ AC-in/AC}}{12 \text{ mos.}} = 1.58 \text{ AC-in/AC/MO (Quantity of wastewater generated each month AC-in/AC)}$$

$$1.58 \text{ AC-in/AC} - 0.702 \text{ AC-in/AC} = +0.878 \text{ AC-in/AC (surplus is stored)}$$

Fig. 4-1 . . . Usual Planting and Harvesting Periods for Major Field, Seed, and Fruit Crops, Virginia (16)



*Animal wastes should not be applied to these crops for agronomic reasons.

Field Operating Schedule (Figure 10)

| | |
|---------------|-----------------------|
| March 1 | - Begin spraying |
| June 10 | - End spraying |
| June 11-12 | - Cut hay |
| June 13 | - Rake and dry hay |
| June 14 | - Bale and remove hay |
| June 16 | - Resume spraying |
| August 10 | - End spraying |
| August 11-12 | - Cut hay |
| August 13 | - Rake and dry hay |
| August 14 | - Bale and remove hay |
| August 15 | - Resume spraying |
| October 10 | - End spraying |
| October 11-12 | - Cut hay |
| October 13 | - Rake and dry hay |
| October 14 | - Bale and remove hay |
| October 15 | - Resume spraying |
| November 15 | - End sprayings |

Food Processing Wastewater

Introduction

This document was developed to provide permit writers with additional guidance on the review of applications for the items which may need further explanation in addition to the instructions in the application and the guidance in the permit manual. It is highly suggested that permit writers hold an initial meeting with the permittee to communicate specific information developed for this category to the permittee. For example, to discuss the parameters required for the waste characterization, items to be submitted for verification of lagoon liner integrity or groundwater protection, and items needed for each land application site. This will aid the permittee in developing the application with the correct information on the first submittal and it will save regional time in attempting to obtain a complete application.

Application Part C-1

2. Sources of Waste

This section of the application is to identify sources of waste and to describe the facility operations. The required flow diagram/narrative may also serve to meet the application requirements for Item 5 (wastewater treatment facilities). Also, narrative statements are only required if the flow diagram is not self-explanatory.

- A. The applicant should provide a concise narrative of the facility operations. This description should give the permit writer a good understanding of what the facility actually does.
- B. To compliment the operations narrative and further educate the permit writer, a flow diagram of the facility operations should be submitted. This diagram should be a "working tool" offering as much information as possible in an "easy to read" format. Information on this flow diagram should indicate where industrial wastes and other wastes are produced, the volume of wastes generated and their method of disposal, raw materials that are used and where they enter the process as well as finished products and where they exit the process.

3. Non-Hazardous Declaration

The non-hazardous declaration must be signed in accordance with the Permit Regulation in order for the application to be administratively complete. The certification statement does not need to be supported with analytical results such as TCLP testing. However, the applicant may submit test results with the application if available.

If any of the waste is determined to be hazardous, the application should be returned and the applicant referred to the DEQ Waste Division for further information.

4. Waste Characterization

This document is intended to provide the minimum testing requirements for application sections 4a, b, and c for waste generated by the various food processing industries. It is recommended that the minimum requirements for the waste characterization be communicated to the permittee in the

initial meeting to ensure that the application will be correct on the first submittal.. Waste characterization recommendations are included for the following food processing categories:

1. Slaughterhouse and Rendering operations
2. Further Processed Meat Products
3. Dairy Products (Non-animal)
4. Fruit and Vegetable Processing (Flume water only)
5. Fruit and Vegetable Processing (Preserved and canned)
6. Beverage Industry
7. Seafood Industry

The permit writer may determine that additional parameters require analysis based on best professional judgement. It is recommended, however, should you decide to eliminate any of the suggested parameters in this guidance document, that you provide justification for doing so in the fact sheet or statement of basis prepared in the permit development. For new facilities it may be most effective to include a special condition in the permit that requires the owner to provide the actual waste characterization after the facility starts operation.

A. Slaughter and Rendering operations

Slaughterhouse and rendering wastes typically exhibit a high nitrogen content and may have significant amounts of phosphorus. Other potentially land limiting parameters may include salts and sulfates, particularly if the facility engages in hide processing. Heavy metals are usually present in the waste, but experience from the permits already issued has not indicated that these are land limiting factors.

The application should contain data for the following parameters:

Flow or Volume
pH
% Solids
Conductivity
COD
TSS
TOC
TKN
Oil and Grease
Ammonia Nitrogen
Nitrate/Nitrite
Phosphorus
Potassium
Chlorides
Sodium
Calcium
Magnesium
Sulfate
Copper*
Lead*
Zinc*
Nickel*
Cadmium*

* These pollutants have not typically been land limiting for these wastes. For the permit issuance, however, it is recommended that the required testing be conducted to demonstrate that this is the case. For reissuance, analyses for these parameter can be waived, with concurrence of the regional management, if the prior data indicated that these parameters were not a problem. For permit modifications involving expansions or significant change of process, it is recommended that you request a new round of tests to demonstrate that these pollutants continue to remain of no concern. This additional testing may be required through a special condition of the permit.

B. Further Processed Meat Products

This category is intended to apply to process waste resulting from the washing, cooling or cooking of consumable meat products. Refer to the slaughter/rendering category for operations engaged in processing of blood, hair, offal, paunch or viscera, These wastes will vary depending on the meat product and how it is processed. Wastes may contain significant amounts of nitrogen in the form of nitrate and lesser amounts of phosphorus.

The application should contain data for the following parameters:

Flow or Volume
pH
% Solids
TSS
Conductivity
COD
TOC
TKN
Oil and Grease
Ammonia Nitrogen
Nitrate/Nitrite
Phosphorus
Potassium*
Sodium*
Calcium*
Magnesium*
Sulfate
Copper*
Lead*
Zinc*
Nickel*
Cadmium*

* These pollutants have not typically been land limiting for these wastes. For the permit issuance, however, it is recommended that the required testing be conducted to demonstrate that this is the case. For reissuance, analysis for these parameter can be waived, with concurrence of the regional management, if the prior data indicated that these parameters were not a problem. For permit modifications involving expansions or significant change of process, it is recommended that you request a new round of tests to demonstrate that these pollutants continue to remain of no concern. This additional testing may be required through a special condition of the permit.

C. Dairy Wastes (Non-animal)

Dairy wastes are typically high in dissolved organic matter and can exert a significant oxygen demand. Sludges may be black, heavy and odorous. Typically pH is low but to a greater degree in cheese plant waste due to the presence of whey. Wastes usually have some macro nutrient value and may have significant concentrations of chlorides.

The application should contain data for the following parameters:

Flow or Volume
pH
% Solids
TSS
Conductivity
COD
TOC
TKN
Oil and Grease
Ammonia Nitrogen
Nitrate/Nitrite
Phosphorus
Potassium*
Chlorides*
Sodium*
Calcium*
Magnesium*
Copper*
Lead*
Zinc*
Nickel*
Cadmium*

* These pollutants have not typically been land limiting for these wastes. For the permit issuance, however, it is recommended that the required testing be conducted to demonstrate that this is the case. For reissuance, analysis for these parameters can be waived, with concurrence of the regional management, if the prior data indicated that these parameters were not a problem. For permit modifications involving expansions or significant change of process, it is recommended that you request a new round of tests to demonstrate that these pollutants continue to remain of no concern. This additional testing may be required through a special condition of the permit.

D. Fruit and vegetable Processing - Flume Water only

These wastes result strictly from fruit and vegetable washing. Refer to the preserved and cannery category for operations where the fruit or vegetable is also peeled, skinned, sliced and/or cooked.

Application review may include a review of pesticides/herbicides used in the specific operation and/or MSDSI Certain pesticide/herbicide formulations may include heavy metals; it is recommended that the waste be tested for any heavy metal identified in your review. Land

limiting parameters are typically hydraulic loading considerations. Macro nutrients are rarely present in significant quantities.

The application should contain data for the following parameters:

Flow or Volume
pH
TSS
COD*
TKN
Pesticides**

* These wastes do not normally exhibit high COD results. It is recommended that this testing be performed for the permit issuance only to screen for the presence of additional waste streams.

** At a minimum, it is recommended that you require testing for the pesticide/herbicide most frequently applied and the pesticide/herbicide most toxic. Also require analysis for specific heavy metals included in these formulations.

E. Fruit and Vegetable Processing - Preserving and Cannery Wastes

The strength of the waste and waste constituents will vary depending on the fruit/vegetable type and the extent to which it is processed. Land limiting parameters to consider are hydraulics, oxygen demand and sodium adsorption ratio. Salts should be of particular interest when lye peeling is employed. Wastes are not typically rich in macro nutrients and heavy metals are not typically land limiting.

The application should contain data for the following parameters:

Flow or Volume
pH
% Solids
TSS
Conductivity
COD
TOC
TKN
Oil and Grease
Ammonia Nitrogen*
Nitrate/Nitrite
Phosphorus*
Sodium
Sulfates
Calcium
Magnesium
Copper*
Lead*
Zinc*
Nickel*
Cadmium*

* These pollutants have not typically been land limiting for these wastes. For the permit issuance, however, it is recommended that the required testing be conducted to demonstrate that this is the case. For reissuance, analysis for these parameter can be waived, with concurrence of the regional management, if the prior data indicated that these parameters were not a problem. For permit modifications involving expansions or significant change of process, it is recommended that you request a new round of tests to demonstrate that these pollutants continue to remain of no concern. This additional testing may be required through a special condition of the permit.

F. Beverage Industry - Alcoholic and Non-alcoholic

The application should contain data for the following parameters:

Flow or Volume
pH
% Solids
TSS
Conductivity
COD
TOC
TKN
Ammonia Nitrogen*
Nitrate/Nitrite
Phosphorus
Total Alkalinity
Sodium
Sulfates
Calcium
Magnesium
Copper*
Lead*
Zinc*
Nickel*
Cadmium*

* These pollutants have not typically been land limiting for these wastes. For the permit issuance, however, it is recommended that the required testing be conducted to demonstrate that this is the case. For reissuance, analysis for these parameter can be waived, with concurrence of the regional management, if the prior data indicated that these parameters were not a problem. For permit modifications involving expansions or significant change of process, it is recommended that you request a new round of tests to demonstrate that these pollutants continue to remain of no concern. This additional testing may be required through a special condition of the permit.

G. Seafood Processing Industry

The seafood industry is mainly comprised of relatively small operations that are concentrated in areas on the water, or very close to the water. The majority of wastewater flows are seasonal/intermittent in nature and of a relatively low volume. (Note: This industry does not usually generate sludge as the treatment technologies available are not advanced enough to create sludge.) The strength of the waste and waste characteristics will vary depending on the type of

raw product. However, for most cases nitrogen, oil and grease and chlorides(salts) may be land limiting factors.

The application should contain data for the following parameters:

Flow or Volume
pH
% Solids
TSS
Conductivity
COD
TOC
TKN
Ammonia Nitrogen
Nitrate/Nitrite
Phosphorus
Oil and grease
Sodium
Calcium
Magnesium
Chlorides
Copper*
Lead*
Zinc*
Nickel*
Cadmium*

* These pollutants have not typically been land limiting for these wastes. For the permit issuance, however, it is recommended that the required testing be conducted to demonstrate that this is the case. For reissuance, analysis for these parameter can be waived, with concurrence of the regional management, if the prior data indicated that these parameters were not a problem. For permit modifications involving expansions or significant change of process, it is recommended that you request a new round of tests to demonstrate that these pollutants continue to remain of no concern. This additional testing may be required through a special condition of the permit.

5. Handling, Treatment and Disposal of Wastes

This section of the application is to provide information to the permit writer on specific handling, treatment and disposal of the wastes (this info may be covered in item 2). This information coupled with conceptual design and construction of facilities and chosen land application sites should assist the permit writer in making a determination on appropriate methods for each. A good reference manual to use for this section is EPA Design Manual document #625/1-80-012 "Onsite Wastewater Treatment and Disposal Systems". Detailed information is provided in a very useable text.

6-9. Storage Facilities, Conceptual Designs, and Groundwater Protection

A. For permit reissuance, it is likely that the treatment/storage facilities have been previously approved by the Department.

1. In the case of previously approved facilities, the applicant should provide a list of the treatment/storage facilities and the dates of DEQ approval if available. If the applicant is unable to supply the approval dates, at a minimum, a statement must be provided that the facilities remain unchanged from those previously reviewed and approved by the Department.
2. If the previously approved facilities have been expanded or new facilities have been added since the last approval, the applicant should submit conceptual engineering plans of the new or expanded facilities for Department approval with the application.

Unreported expansions or construction of new facilities are violations of the Permit Regulation, the facility's existing VPA permit (for reissuance). Depending on the circumstances, you may also want to refer these cases to the Compliance Auditor for enforcement action, especially if the permit may expire due to delays in receiving the necessary information.

The review of the conceptual designs should be completed during the technical review of the application for new facilities or expansion of existing facilities.

- B. For VPA issuances, the applicant should submit conceptual designs for all proposed facilities with the VPA application. We suggest that review and approval of the conceptual designs be conducted in conjunction with the application technical review. The application should not be considered complete until the conceptual design is considered technically adequate.

C. Groundwater

1. Existing Facilities: In the case of previously approved facilities identified in Item 9 of the application, the applicant should submit documentation, when available, that the storage facilities were constructed with an adequate liner. Documentation may include SCS inspection reports, engineer's statement, field permeability data, DEQ approval memoranda, etc.

Facilities which were previously approved without liner requirements or for which documentation of adequate liner construction are not available may, alternatively, submit the results of groundwater monitoring or water balances to demonstrate that the facilities are not impacting groundwater.

Facilities which can not provide (1) adequate documentation that a liner was constructed or (2) documentation which demonstrates that groundwater is protected should be permitted with a special, site-specific condition that either addresses collection of groundwater protection data such as groundwater monitoring, requires liner construction or requires a water balance.

2. Proposed facilities: It is recommended that groundwater protection be completely addressed during the permit application technical review. Processing of the VPA draft permit should not begin until the groundwater protection proposal is considered technically adequate along with the application. (This may include a groundwater monitoring plan and/or liner.)

3. The case of discharges to drainfields, VPA applications for these types of facilities should be returned to the applicant and referred to the EPA as a potential candidate for the Underground Injection Control Program in accordance with current OWRM guidance.

4. In the case of existing pump and haul or recycle systems, be sure you have data which demonstrate groundwater protection before you decide not to issue a VPA permit for these small

facilities. A VPA permit is recommended for cases where adequate groundwater protection cannot be demonstrated through the application process.

1^c Flood Potential

The no discharge criteria requires that the storage facilities remain operational and to be designed such that no discharge will occur except in the case of a 25-year 24-hour or greater storm event. Additionally, storage facilities including associated groundwater monitoring wells should be protected from inundation by the 100-year flood wave action.

in reviewing the application, it is recommended that you ask the applicant to provide documentation to support whether or not the storage facilities are located in the 100-year flood plain. Sources for flood plain information include planning/zoning offices, soil surveys or FEMA maps.

A. For existing facilities constructed within the 100-year flood plain that are not adequately designed, the facilities should be permitted with a special, site specific condition requiring necessary improvements.

B. For proposed facilities, requirements for the 100-year flood protection should be addressed in the conceptual plan prior to permit issuance.

Part C-11

1. - 2. Land Application Sites

T. part of the application form is to provide detailed information on the site (s) to receive land application (Items 1 - 3) and the crops to be grown on each site (Item 4).

A. Site Plans and Maps: The applicant's submittal should consist of a site plan and topographic map which clearly delineates the field boundaries and property lines and identifies any landscape features requiring buffer zones such as drinking water wells, rock outcrops, surface waters, sink holes, steep slopes and occupied dwellings (Refer to Item C.11.1 for complete listing). Depending on the complexity of the site, the topographic map and site plan could possibly be incorporated into one plan.

In reviewing the site plans and maps for completeness, it is recommended that you consider whether the required information is presented with enough detail and accuracy so that you can verify the location of field boundaries, property lines and the various landscape features via physical inspection. We suggest, as a minimum, that each map include a north arrow, a scale, contour interval designation (if applicable) and a legend which defines map symbols.

Site plan/topographic map omissions noted as a result of your site inspection visit should be corrected by the applicant during the technical review process prior to deeming the application complete.

B. Buffer zone Requirements and Net Acreage: Buffer zone requirements should be determined during the site inspection. Net acreage should be calculated and submitted along with the revised site maps if updates are needed based on the site inspection. Subsequent determinations of land area requirements should be reviewed based on the net acreage for land application.

C. Multiple Sites: For applications proposing multiple, non-contiguous sites, Part C-II should be completed for each site. Preferably, the submittal should be presented as site booklets organized by county and land owner/operator. In addition to the site plan/topographic map, each booklet should contain a general county location map which indicates the location of the land application sites and hauling routes (more important for frequent land application proposals).

3. Agronomic Practices:

At a minimum, selected crops, planting and harvesting schedules and anticipated yields based on productivity class should be submitted for each land application site.

Additional information concerning how the application of waste will be scheduled relative to the planting date and growth periods of the crops is also appropriate under this item. In some cases submittal of this information can be delayed if it is later included in an Operations and Maintenance (O&M) Manual. The requirement to submit and maintain an up-to-date O&M Manual should be a Special Condition of every VPA permit.

4. Soil Maps:

This part of the application is intended to identify the major soil types present at each land application site in order to (1) confirm soil productivity classes and anticipated crop yield and (2) identify sites which may be unsuitable due to high water tables.

A. If the county where the land application site is located has been mapped by the SCS, the applicant may submit SCS soil survey data to fulfill the requirements of this section.

If the applicant decides to use this information, it is recommended that at a minimum the submittal include a copy of the soils map with the land application site boundary super-imposed on this map. The applicant should also list on the application form each major soil type identified by the soil survey along with the corresponding soil characteristics, i.e. texture classification, permeability range, available water capacity, depth to bedrock, depth to seasonal water table and soil productivity classification.

Alternatively, the applicant may submit a corrected SCS map or redefine the soil characteristics for the land application site if it is determined that the soil survey has not properly mapped this particular field location. Preferably, this work should be conducted by a technically qualified person(s) such as a soil scientist.

B. For unmapped counties, the applicant will be required to conduct a soil characterization for each land application site to fulfill the application requirements. Again, although not a requirement, it is strongly recommended that a technically qualified person(s) undertake this work. Assistance can also be obtained from the local USDA-SCS office or Virginia cooperative Extension.

Remember the goal of this section of the application is to develop reliable soil productivity classes which will provide the Department with some estimate of crop yield on which to base land area calculations and to identify sites which may be unsuitable due to high water tables. It is important that this information be provided with all land application permits.

6. Soil Boring:

Soil borings are intended to verify the soil survey information provided under Item 5 above.

A. For previously approved land application sites, soil boring are not required unless the technical review site inspection indicates that boring are necessary to verify soil characteristics or site conditions.

3. For proposed facilities and new land application sites, soil borings are required. However, this requirement may be waived for land application sites in counties which have been mapped by the SCS. The provisions under which soil boring waivers will be considered are as follows:

1. The applicant has been informed that in the absence of soil boring information, we will be using the most conservative values provided by the SCS survey to develop water table and soil productivity data, and that under these terms marginal fields may be found to be completely unsuitable as land application sites.

2. The technical review site inspection does not reveal any obvious discrepancies between actual site conditions and the SCS survey.

Soil boring will be required if the applicant is unwilling to accept the conditions of the soil boring waiver approval or the site inspection indicates the need for site specific data.

7. Soil Analysis

The soil samples should be representative of the site and be collected to depths of 0-6 inches. A representative sample typically consists of a composite of 20 randomly collected samples from tract sizes of 5-10 acres. Larger tract sizes can be justified if soils are uniform. Applicants should be referred to the Virginia Agronomy Handbook for further instructions on how to collect representative soil samples. (Procedures for subsequent soil sampling required-by the VPA permit should be included in the facility's O&M Manual.)

Example Draft Permit Pages
For Food processing Category

A. MONITORING REQUIREMENTS

- 1. During the period beginning with the permit’s effective date and lasting until the permit’s expiration date, the permittee is authorized to manage pollutants from the **(Plant location, storage facility locations, etc.,)** and the land application sites listed in Attachment A.
- 2. The pollutants shall be limited and monitored by the permittee as specified below:

WASTEWATER MONITORING

| <u>PARAMETERS</u> | <u>LIMITATIONS</u> | <u>UNITS</u> | <u>MONITORING REQUIREMENTS</u> | |
|-------------------|--------------------|--------------|--------------------------------|--------------------|
| | | | <u>Frequency</u> | <u>Sample Type</u> |

Parameters not included with this page. This is a format example only. A list of possible parameters for this page is provided in the table on the next page.

NL = No Limit, this is a monitoring requirement only

- 3. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **(State monitoring location or refer to attachment).**
- 4. Refer to Attachment A for field productivity classifications and Attachment B for PAN limitations.

****NOTE: Monitoring Frequency is minimum recommended frequency. For year-round operations, monthly or quarterly monitoring may be more appropriate.**

Part I.A.1.b Wastewater monitoring

The following is a list of recommended Part I.A wastewater test parameters for facilities classified under one of the six previously identified food processors categories. In addition to the recommended parameters, the permit writer should also evaluate the waste characterization reported with the application to determine if additional monitoring requirements should be included.

| Parameters | Slaughter & Rendering Operations | Fruit & Vegetable Processors FLume Water | Fruit & Vegetable Processors Canned & Preserved | Beverages Industry | Dairy Products | Further Processed Meats | Seafood Industry |
|---|----------------------------------|---|--|--------------------|----------------|-------------------------|------------------|
| Flow (MG) | x | x | x | x | x | x | x |
| Application Rate (Max Hourly) (in/hr) | x | x | x | x | x | x | x |
| Application Rate (Max Weekly) (in/week) | x | x | x | x | x | x | x |
| pH (S.U.) | x | x | x | x | x | x | x |
| TKN (mg/l) | x | | x | x | x | x | x |
| Nitrate (mg/l) | x | | x | x | x | x | x |
| Sulfate as S04 (mg/l) | x | | | | | x | |
| Sodium | | | x | | | | x |
| Oil and Grease (Mg/l) | | | | | | | x |
| PAN | x | x | x | x | x | x | x |
| Chlorides | x | | | | | | |

1. Maximum hourly application rate of 0.25 inches per hour and a maximum weekly rate of 2.0 inches per week.

Suggested frequency of monitoring is once per year. Analysis should be performed on a composite sample.

B. MONITORING REQUIREMENTS

1. During the period beginning with the permit’s effective date and lasting until the permit’s expiration date, the permittee is authorized to manage pollutants from the **(Plant location, storage facility locations, etc.,)** and the land application sites listed in Attachment A.
2. The pollutants shall be limited and monitored by the permittee as specified below:

SOILS MONITORING

| <u>PARAMETERS</u> | <u>LIMITATIONS</u> | <u>UNITS</u> | <u>MONITORING REQUIREMENTS</u> | |
|-------------------|--------------------|--------------|--------------------------------|--------------------|
| | | | <u>Frequency</u> | <u>Sample Type</u> |

Parameters not included with this page. This is a format example only. A list of possible parameters for this page is provided in the table on the next page.

NL = No Limit, this is a monitoring requirement only

3. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **(State monitoring location or refer to attachment).**
4. Soil composite samples shall be representative of the soil types delineated by the SCS Soil Survey (or equivalent). Samples shall be taken at 0 – 6 inches soil depth for each application site.

Part I.A.2.b.(1) Soils Monitoring

The following is a list of recommended Part I.A soil monitoring parameters for facilities classified under one of the six previously identified food processors categories. In addition to the recommended parameters, the permit writer should also evaluate the waste characterization reported with the application to determine if additional monitoring requirements should be included.

| Parameters | Slaughter & Rendering Operations | Fruit & Vegetable Processors | Beverages Industry | Dairy Products | Further Processed Meats | Seafood Industry |
|------------------------------|----------------------------------|------------------------------|--------------------|----------------|-------------------------|------------------|
| pH (s.u.) | x | x | x | x | x | x |
| Cation Exch. Cap. (meq/100g) | x | x | x | x | x | x |
| Avail. Phosphorous (mg/kg) | x | x | x | x | x | x |
| Exch. Potassium (mg/100g) | x | x | x | x | x | x |
| Hydraulic Cond. (in/hr) | x | x | x | x | x | x |

Suggested frequency of monitoring is once per year. Analysis should be performed on a composite sample.

C. MONITORING REQUIREMENTS

1. During the period beginning with the permit's effective date and lasting until the permit's expiration date, the permittee is authorized to manage pollutants from the **(Plant location, storage facility locations, etc.)** and the land application sites listed in Attachment A.
2. The pollutants shall be limited and monitored by the permittee as specified below:

GROUNDWATER MONITORING

| <u>PARAMETERS</u> | <u>LIMITATIONS</u> | <u>UNITS</u> | <u>MONITORING REQUIREMENTS</u> | |
|-------------------|--------------------|--------------|--------------------------------|--------------------|
| | | | <u>Frequency</u> | <u>Sample Type</u> |

Parameters not included with this page. This is a format example only. A list of possible parameters for this page is provided in the table on the next page.

NL = No Limit, this is a monitoring requirement only

3. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **Groundwater Monitoring Wells Nos. _____ located at locations noted in the approved groundwater monitoring plan.**
4. The static water level shall be measured prior to bailing well water for sampling. At least 3 well volumes of groundwater shall be withdrawn immediately prior to sampling each monitoring well.

Part I.A.3 Groundwater Monitoring

The following is a list of suggested Part I.A groundwater monitoring parameters for all facilities classified under one of the six previously identified food processors categories.

Static Water Level (elevation)

pH (S.U.)

Total Organic Carbon (mg/l)

Chlorides (mg/l)

Total Dissolved Solids (mg/l)

Nitrate-Nitrogen (mg/l)

Sulfate (mg/l)

Suggested frequency of monitoring is 1/3 months. Analysis should be performed on a grab sample (except for static water level).

D. MONITORING REQUIREMENTS

1. During the period beginning with the permit’s effective date and lasting until the permit’s expiration date, the permittee is authorized to manage pollutants from the **(Plant location, storage facility locations, etc.)** and the land application sites listed in Attachment A.
2. The pollutants shall be limited and monitored by the permittee as specified below:

SURFACE WATER MONITORING

| <u>PARAMETERS</u> | <u>LIMITATIONS</u> | <u>UNITS</u> | <u>MONITORING REQUIREMENTS</u> | |
|-------------------|--------------------|-------------------|--------------------------------|--------------------|
| | | | <u>Frequency</u> | <u>Sample Type</u> |
| See attached list | NL | See attached list | 1/3 Months | Grab |

NL = No Limit, this is a monitoring requirement only

3. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **(State monitoring location or refer to attachment).**

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Part I.A.4 Surface Water Monitoring

The following is a list of suggested Part I.A surface water monitoring parameters for facilities classified under one of the six previously identified food processors categories.

pH (S.U.)
Chlorides (mg/l)
Dissolved Oxygen (mg/l)
TKN (mg/l)
Nitrate-Nitrogen (mg/l)
Sulfates (mg/l)

Suggested frequency of monitoring is 1/3 months. Analysis should be performed on a grab sample.

The following special conditions are general and apply to all food processing category permittees:

B. Other Requirements or Special Conditions

1. There shall be no discharge of pollutants to surface waters from this operation except in the case of a 25 year 24 hour or greater storm event. The operation of the facilities of the owner permitted herein shall not contravene the Water Quality Standards, as adopted and amended by the Board, or any provision of the Water Control Law.
2. (For Facilities with Material Storage) Any and all product, materials, industrial wastes, and/or other wastes resulting from the purchase, sale, mining, extraction, transport, preparation, and/or storage of raw or intermediate materials, final product, by-product or wastes, shall be handled, disposed of, and/or stored in such a manner so as not to permit a discharge of such product, materials, industrial wastes, and/or other wastes to State waters, except as expressly authorized.
3. (For Facilities without an approved O & M Manual) The owner shall develop an operations and Maintenance (O&X) Manual for the treatment works/pollutant management system permitted herein. This manual shall detail practices and procedures, including applicable Best Management Practices, which will be followed to ensure compliance with the requirements of this permit. The manual shall be submitted for staff approval within 90 days of the (effective/ modification) date of this permit (and approved prior to start-up of operations*). The owner shall operate the treatment works/pollutant management system in accordance with the approved O & M Manual which becomes an enforceable part of the permit.

* owner shall maintain an operations and Maintenance (O&M) Manual for the treatment works/pollutant management For proposed facilities only

OR

(For Facilities with an approved O & M Manual)

The system permitted herein. This manual shall reflect the practices and procedures, including applicable Best Management Practices, followed by the permittee to ensure compliance with the requirements of this permit. Any changes in those practices and procedures shall be documented and submitted for staff approval within 90 days of the effective date of the changes. Upon approval of the submitted manual change, the revised manual becomes an enforceable part of the permit.

The following special conditions are specific to wastewater management in the food processing category:

B. Other Requirements or Special Conditions (cont)

1. Wastewater shall be applied only at the sites identified in (Part I A. or Attachment A).
2. (For spray irrigation systems) Wastewater shall not be applied at the rates that exceed (0.25 in/hr maximum), (1 in/day maximum), and (2 in/week, maximum). (Rates may be increased if justified otherwise.)
3. operations limitations during periods of inclement weather:
 - a. Wastewater shall not be applied when the ground is saturated or during periods of rainfall.
 - b. Wastewater shall not be applied to cultivated or bare ground covered with ice or snow.
 - c. Wastewater shall not be applied to frozen ground.
4. A summary report of each (reporting period) activities shall be submitted to the Department by the 10th of the following month, covering the previous (reporting period) activities. Reports shall include:
 - a. Analyses of composite samples of Industrial wastewater land applied during the previous (reporting period) reported on the monitoring report provided in Attachment
 - b. Results of (soils, groundwater, and surface water) monitoring in accordance with Part I A. of the permit reported on the monitoring report provided in Attachment
 - c. Land Application Site information describing the wastewater applied to each field during the previous (reporting period) reported on monitoring report provided in Attachment
 - d. A summary of the quantities of wastewater stored in or withdrawn from storage facilities and the remaining storage capacity.
 - e. A summary of staff gauge readings demonstrating freeboard maintenance.
 - f. A summary of spray head utilization demonstrating compliance with the hydraulic loading schedule of the O & M Manual.
5. An annual summary report shall be submitted to the Department by February 10th of each year. The report shall include:
 - a. The yearly wastewater balance showing such items as inputs/drawdown from storage facilities.
 - b. Land application site information describing the wastewater applied to each field during the previous year with the annual and cumulative loading constituents and the remaining site life for each field.
 - c. A summary of the agronomic practices which occurred during the preceding growing season including but not limited to the timing and number of crop cuttings, an estimate of total crop yield (bushels/acre or tons/acre) removed from the site, any lime and fertilizer additions made to the site (describe type and quantities), and reseeding.
6. The application of wastewater together with any other source of PAN shall not exceed the agronomic loading rate for the crops grown on each site. The application rates shall be calculated for each field based upon the PAN and productivity class table provided in Attachment B. PAN calculations should be made using the results from at least the last 12 month's wastewater samples. The resulting

application rates shall be included in the (reporting period) 10th-of-the-month reports sent to the Department.

7. The permittee shall cease production operations resulting in wastewater generation should all holding capacity (excluding minimum freeboard) be used and inclement weather and/or plant growth schedule preclude wastewater land application.
8. Wastewater land application shall be controlled by the plant growth schedules in the facility's O & M Manual.

The following are site specific special conditions (Paragraph C) to be used with wastewater operations:

1. (Wastewater-existing)
 - a. Within 60 days of the effective date of this permit the permittee shall submit to the Regional Office for approval a protocol to establish either a water balance or a ground water monitoring program for the earthen lagoon.
 - b. If the water balance option is selected, then the following requirements shall apply:
 1. Within 60 days after approval of the protocol, the permittee, utilizing the approved protocol, shall submit by the 10th of each month valid water balances for the previous month. The staff may terminate this requirement at any time by written notification to the permittee.
 2. Should any monthly water balance indicate leakage of the lagoon at a rate in excess of 1×10^6 cm/sec, the permittee, upon written notification by the Regional Director, shall within 60 days of such notification submit for approval a plan and schedule for corrective action. If the corrective action plan specifies installation of a liner, the liner must exhibit a coefficient of permeability of no more than 1×10^6 cm/sec.
 3. Failure to submit the protocol, the monthly water balances, and/or the corrective plan and schedule as required above, shall be deemed a violations of this permit.
 - c. If the ground water monitoring program option is selected, then the following requirements shall apply:
 1. Within 60 days of approval of the protocol, the permittee, utilizing the approved protocol, shall submit groundwater monitoring data. Thereafter, the permittee shall submit ground water monitoring data in accordance with the protocol schedule. The staff may terminate this requirement at any time by written notification to the permittee.
 2. Should this ground water monitoring data indicate contamination to groundwater, the permittee, upon written notification by the Regional Director, shall within 60 days of such notification submit for approval a plan and schedule for corrective action. If the corrective action plan specifies installation of a liner, the liner must exhibit a coefficient of permeability of no more than 1×10 cm/sec.

3. Failure to submit the protocol or, the ground water monitoring information, or the corrective plan and schedule as required above, shall be deemed a violations) of this permit.
2. (Wastewater, required if facilities have design flows of > 0.04 MGD appropriate) A licensed operator class is required at this facility.
3. (Where storage and treatment are provided). A Facilities Closure Plan shall be developed prior to termination of the pollutant management activities covered under this permit. The plan shall incorporate:
 - a. The volume, percent solids, nutrient content, and other waste characterization information appropriate to the nature of the waste materials.
 - b. A listing of all waste products at the facility along, with a description of procedures for removal, land application, or other proper disposal of the wastes.
 - c. Closure plans for all waste treatment, storage, and handling facilities.

The Facilities Closure Plan shall be submitted to the Department review and approval prior to implementation of the plan.

4. (For facilities that Land Apply) Buffer zones shall be maintained as follows:
 - a. Distance from improved roadways 25 feet
 - b. Distance from occupied Dwell.ings 100 feet
 - c. Distance from water supply wells or springs 100 feet
 - d. Distance from surface water courses 50 feet
 - e. Distance from property lines 50-feet
 - f. Distance from rock Outcropping
(with the exception of limestone outcrops) 25 feet
 - g. Distance from Limestone outcroppings 50 feet
 - h. (Use where applicable) 50 feet
Distance from artificial agricultural drainage ditches whose primary purpose is to lower the seasonal high water table and where slopes are less than or equal to 2%.
 - i. Wastewater shall not be applied in such a manner that it would discharge to sinkholes that may exist in the area.

5. (Fruit Processing-Flume water only)

The permittee shall notify the Regional office immediately of any change in pesticides usage such that the pesticides identified in the application as "most toxic used" and "most used" change. The Regional Office may require wastewater monitoring for the reported change(s).

NOTE TO PERMIT WRITER: THE FOREGOING SPECIAL CONDITION RECOMMENDATIONS ARE MINIMUM RECOMMENDATIONS FOR THE FOOD PROCESSING CATEGORY. THE PERMIT WRITER IS ENCOURAGED TO DEVELOP AND UTILIZE SITE SPECIFIC SPECIAL CONDITIONS WHICH ARE WARRANTED BY SCREENING DATA AND JUSTIFIED IN A PERMIT SHEET. CARE SHOULD BE EXERCISED TO NOT REQUIRE ANY EXTRANEIOUS OR REDUNDANT INFORMATION WHICH WILL NOT BE USED TO VERIFY SITE MANAGEMENT AND PERMIT COMPLIANCE.

Attachment A
Summary of currently Approved Land application Sites

| <u>County</u> <u>Acres</u> | <u>Field</u> <u>Operator</u> <u>Class</u> | <u>Productivitiy</u> <u>Owner</u> | <u>Designation*</u> | <u>Net</u> |
|-------------------------------|---|--------------------------------------|---------------------|------------|
| Goochland | Howard Smith | Howard Smith | GO 1-1 | 49.71 |

*The exact location of all sites can be found in the VPA application.

Industrial Wastewater Not addressed above:

Since the characteristics of industrial wastewater (or combined municipal and industrial wastes) other than that addressed above are so variable, this guidance will not address such wastes. It is recommended that such applications be handled with site and case specific decisions. Please contact the central office for assistance with such applications.