
*37th Annual New York Wine Industry Workshop*  
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**Overview**

- Background
- Best Practices Document
  - Timeline
  - Sources of information
  - Scope of guidance
- Outreach and education plan
- Acknowledgements

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**Regulatory and Legal Challenges**

- Tightening of regulations and permits
- Increased enforcement
- Increased monitoring

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**Technical Challenges & Sustainability**

- Surface Water/Groundwater Quality
  - Point source vs. non-point source
  - NPDES/SPDES
  - TMDLs
  - Part 360 land application

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**Winery Process Water Characteristics**

- Organics
  - BOD, COD, TOC, organic acids
- Nitrogen
  - Total, TKN, nitrate, ammonia
- Salts
  - TDS, FDS, VDS, EC, cations, anions

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**Project Timeline**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Develop detailed outline &amp; identify sources</td>
<td>Identify data gaps</td>
<td>Begin training</td>
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<tr>
<td>Synthesize and expand guidelines</td>
<td>Solicit &amp; incorporate feedback on draft</td>
<td>Integrate w/ Code of Sustainable Winegrowing Practices</td>
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</tbody>
</table>
Sources of Information

• Wine Institute and CAWG

Sources of Information (cont’d)

• BEST Winery Guidebook, Ernest Orlando Lawrence Berkeley National Laboratory (2005)
• Sustainable Winemaking Ontario (2007)

Sources of Information (cont’d)

• International Proceedings – Specialised Conference on Sustainable Viticulture and Winery Waste Management (2004 and 2006)

Sources of Information (cont’d)

• Pacific Gas and Electric Company (PG&E) recommendations for energy efficiency in wineries
• EPA Energy Star Reports

Approach

Conventional Operations

Step 1: Planning and Organization
Step 2: Assessment
Step 3: Data Evaluation & Option Identification
Step 4: Feasibility Analysis
Step 5: Implementation

Sustainable Operations

Step 1: Planning and Organization

• Seek management commitment
• Define assessment program objectives
• Organize implementation team
Step 2: Assessment

- Compile existing facility data
- Collect additional information

Supporting Materials

- Worksheets
  - Water use and sanitation inventories
  - Flow and analytical monitoring plans
- Case study
  - Includes waste stream chemistry data
  - Illustrates biggest sources
- Sampling tips for each waste stream (Section 2.2)
- Guidelines for data collection (Guideline 1)
  - Flow monitoring
  - Sampling

Water Use Inventory

<table>
<thead>
<tr>
<th>Winery Unit Oper.</th>
<th>Water Use Task</th>
<th>Flow Duration (mins)</th>
<th>Flow Rate (gpm)</th>
<th>Task Water Use (gals/task)</th>
<th>Task Freq. (x/day)</th>
<th>Daily Water Use (gals/day)</th>
<th>Annual Water Use (gals/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank Wash (60k gal)</td>
<td>Rinse</td>
<td>15</td>
<td>25</td>
<td>275</td>
<td>10 tanks</td>
<td>3,750</td>
<td>0.7M</td>
</tr>
<tr>
<td>Tank Wash (60k gal)</td>
<td>Caustic</td>
<td>20</td>
<td>25</td>
<td>800</td>
<td>10 tanks</td>
<td>5,000</td>
<td>0.9M</td>
</tr>
<tr>
<td>Subtotal:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8,750</td>
</tr>
</tbody>
</table>

Flow Monitoring Plan

Case Study: Waste Streams

- Wine processing
- Distillation
- Equipment and tank washing
- Barrel and bottle washing
- Sanitation
- Floor washing
- Softener regeneration
- Cooling tower and boiler blowdown
- Wine ion exchange regeneration

Step 3: Data Evaluation & Option Identification

- Generate options for source reduction, recycling and treatment
- Screen and select options for further study
Supporting Materials

- Worksheets
  - Brainstorming options
  - Option description form
  - Option evaluation by statistical methods
- Overview of Waste Minimization Techniques (Figure 3-1)
- Waste Minimization and Treatment Options (Appendix E)

Waste Minimization

- Source Reduction
- Recycling

Order of Exploration
- FIRST
- LAST

Relative Environmental Desirability
- HIGH
- LOW

Waste Minimizing Techniques

- SOURCE REDUCTION
  - Product Changes
  - Source Control
  - Use and Reuse
  - Reclamation
- RECYCLING
  - Onsite and Offsite
  - Good Operating Practices

Examples of Options

- Source Reduction
  - Good operating practices
  - Technology changes or upgrades
  - Input material/product changes
- Recycling
  - Use and reuse
  - Reuse facilitated by treatment
  - Reclamation

Examples of Options (cont’d)

- Treatment
  - At the source
  - End of pipe

Technology Screening (Appendix E)
Land Application

Test Basin Instrumentation

Constituents Analyzed

Field Summary

Guideline Flowcharts (End of Year 2)

- Characterization for initial site selection
  - Site soil and groundwater
- Limiting constituent analysis
  - BOD, TDS, pH, TN, IDS (salt)
- Process water application management
  - Hydraulic load, cycle time, infiltration, treatment
- Program management
  - Nitrogen and salt management, rotation schedule, basin management

<table>
<thead>
<tr>
<th>Constituents Analyzed</th>
<th>Process Water and Lysimeter Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pH</td>
</tr>
<tr>
<td></td>
<td>Organics</td>
</tr>
<tr>
<td></td>
<td>Nitrates</td>
</tr>
<tr>
<td></td>
<td>Salt, Uptake</td>
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<tr>
<td></td>
<td>Reduction +</td>
</tr>
<tr>
<td></td>
<td>calculation status</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soil Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collected at depths of 0.5, 1.0, 2.0, 3.0, and 4.0 feet</td>
</tr>
<tr>
<td>pH</td>
</tr>
<tr>
<td>Organics</td>
</tr>
<tr>
<td>Nitrates</td>
</tr>
<tr>
<td>Salt, Uptake</td>
</tr>
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<tr>
<td>calculation status</td>
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</table>

Field Summary

- Load/rest cycles
  - Non-Stillage: 10 cycles – 6 to 29 days/cycle
  - Stillage: 12 cycles – 7 to 21 days/cycle
- Samples collected
  - 128 water samples
  - 91 soil samples
Basic Results (2002 and 2003)
• Land application was shown to be a viable natural treatment technology at stillage and non-stillage sites
• Effective management results in:
  – Odor control
  – pH buffered to neutral values
  – Near complete BOD$_5$ removal at 5 feet
  – Effective total nitrogen treatment

Basic Results (2002 and 2003)
• Natural soil processes affect ion ratios regardless of source of water
• Salt treatment is complex
  – Load in approximately equal to load out
  – Some ions accumulate in soils
  – Some ions move with water
  – Some ions are generated in soil profile

Step 4: Feasibility Analysis
• Conduct technical evaluation
• Conduct economic evaluation
• Identify preferred options
• Develop action plan

Supporting Materials
• Worksheets
  – Capital costs for proposed improvements
  – Utility costs
  – Impact on operating costs/revenues
  – Impact on profitability/payback
• Guidelines
  – Land Application (Guideline 2)
  – Treatment Technology Selection (Guideline 3)

Step 5: Implementation
• Justify projects and obtain funding
• Install equipment
• Implement procedural changes
• Evaluate performance
• Re-check periodically

Outreach and Education
• Solicit and incorporate feedback
  - CSWA and PG&E workshops
  - Geographic outreach
• Integrate Guidance with the Code of Sustainable Winegrowing Practices
• Develop online application
• Training program
Acknowledgements

- American Vineyard Foundation
- Wine Institute
- California Association of Winegrape Growers
- California Sustainable Winegrowing Alliance
- National Grape and Wine Initiative
- Pacific Gas and Electric