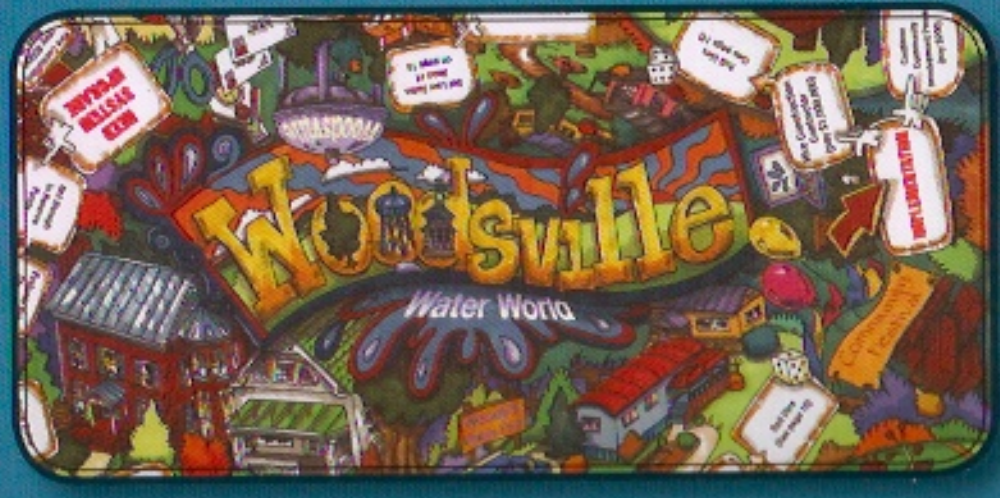
Bulletin 914

Woodsville Water World...



THE OHIO STATE UNIVERSITY EXTENSION

...A water system adventure game

Bulletin 914

Woodsville Water World...
...A water system adventure game

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TDD No. 800-589-8292 (Ohio only) or 614-292-1868
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Woodsville Water World ... ... A water system adventure game

Purpose

To build, operate, and maintain a viable water system for Woodsville.

Who Should Play

Any elected or appointed official interested in providing water service to residents.

Rules of the Game

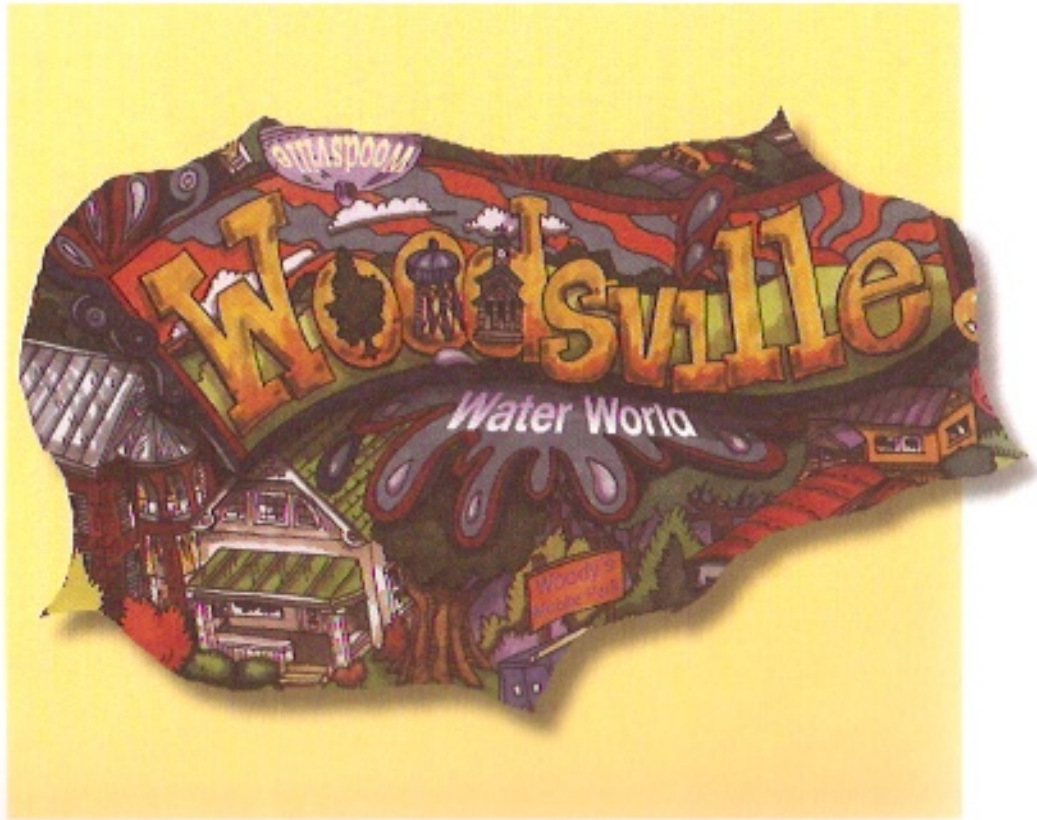
- Divide the group into three teams
- As you move from place to place, follow along in your workbook.
- Be ready to share what you have learned along the way.
- Each team starts the "game" with $60,000 in water bucks and may have the opportunity to accept a check in the amount of $1,000,000 to construct a community water system, if they follow the right path and leave little to chance.
- There is no time limit; in fact, for most communities this can take years or even decades. This is not a race to the finish; it's a challenge to build, operate, and maintain a viable water system.

How to Win

- Consider alternatives.
- Take time and think through your choices; there may be more to consider than you realize.
- Seek input from others
- Water is not free; remember who ultimately pays for the system.

Mistakes to Avoid

- Be careful before you start: the game may never end.
- Be careful when presented with bargain solutions.
- Be careful to include community involvement.



Getting Started: Needs, Alternatives, and Planning

Getting Started: Needs, Alternatives, and Planning

The residents of Woodsville, population of 2,500, are dealing with a recurring water crisis. During the last drought, even more homeowners lost their well water supply and needed to haul water through the summer. Some of the homeowners are drilling newer, deeper wells, while others cannot afford to.

Unfortunately, the deeper wells, while they provide plenty of water, are high in iron. The local elected officials are considering a new community water system to serve the homes, businesses, and industries in the area.

There are two choices.

Hire a Design Consultant (pay $5,000)

The conventional choice is to hire a design consultant right away to begin planning a system to serve the community. Remember these professionals are experts at selecting equipment and designing infrastructure. They, however, are not charged with the responsibility of knowing what is best for a community.

Conduct a Public Hearing (pay $100)

Controversy and conflict often emerge once the design is completed and is presented to the public for the first time in a public hearing. Public hearings are required by law to ensure that public decisions are not made in secret. They are also intended to show that public support exists for the project. This type of meeting is supposed to provide an opportunity for the public to evaluate the plans and understand the rationale behind a major capital expenditure. Unfortunately, public meetings are a poor way of gathering public input. People who have strong opinions, for or against the project, tend to dominate the meeting.

#7 **Read #7—Information presented at public meeting enrages local opposition group. Yard signs against the local elected officials spring up all over town. You are voted out of office. Water system project is halted. GAME OVER.**

Initiate Community Involvement Process (pay $200)

Another approach is to initiate a community involvement process (CIP) to better define needs and concerns. Elected and appointed officials; water plant employees; community representatives; residential, commercial, and industrial water users; and local media all should be part of the community involvement process. For expensive community projects, a professional facilitator can help guide the inputs into the CIP. The facilitator will likely organize small, focused group discussions, community surveys, and expert panels to identify the following:

- Key community values
- Important public policies
- Relevant facts

This information, from all interests in the community, forms the basis for selecting the appropriate approach to solving the community's problem(s).

After the information is gained, community leaders face two more choices.

Hire Design Consultant (pay $5,000)

The information from the community involvement process can be shared with a design engineer to aid in the development of a water system. A system is designed to meet the community's needs, but may not be the best alternative.

Conduct Public Hearing (pay $100)

Even with community involvement, without examining alternatives, a design consultant can efficiently present a system plan at a public meeting. The outcome of this approach often depends on chance or "a roll of the dice."

Roll #1 or #2—Local residents object to system as designed and refuse to grant easements for construction. Without public support, project is abandoned. GAME OVER.

Roll #3 or #4—Proposed system as designed is too expensive for most citizens. System rejected. START OVER.

Roll #5 or #6—Lucky you! Affordable alternative was selected and designed; you are the hometown hero. GO TO NEED FINANCING (pages 9-12).

Hire Consultant to Conduct Alternative Analysis (pay $2,000)

Armed with the information from the community involvement process, the local officials can begin to consider alternatives. A professional will need to help with the technical aspects of an alternative analysis.

The major benefit of this step is to consider a variety of approaches to solve an identified problem in an appropriate way that fits well with the values, policies, and facts expressed during the community involvement process.

An alternative analysis, also known as a feasibility analysis or general facilities plan, considers the following:

- Detailed projections of water use
- Alternative analysis of each source of water (including water chemistry, hydrogeology, and engineering to treat and distribute water)
- Cost estimates for every alternative (broken out by obtaining yield, transmission, treatment, storage, distribution, and operation and maintenance)
- Comparisons of life cycle costs
- Consideration of financing options
- Estimation of rates and charges

Hire Design Consultant (pay $5,000)

Using the information from the CIP and the detailed alternative analysis, the design engineer is able to match the public policies with the community's values and design the most affordable system to provide the necessary capacity, adequate treatment, ease of operation and maintenance, and system viability.

Conduct a Public Hearing (pay $100)

A public hearing at this stage should be to merely fulfill the legal obligation. With adequate public involvement and detailed alternative analysis, all explanation, discussion, and exchange should have been resolved ahead of time. The public hearing is the opportunity to announce the final decision before the expenditure of public funds and to confirm public support for the project.

#8

Read #8—Public meeting is a success because of initial community involvement process. The most feasible and economic alternative is selected, project design plans are presented, residents know what to expect during the construction process and a financing strategy can be developed. GO TO NEED FINANCING (pages 9-12).

Lessons Learned

An ***outside facilitator*** should guide a community involvement process. Professionals skilled in gathering information from people with a wide range of interests can be found through local colleges, county extension offices, technical assistance providers, professional associations, and even the human resources departments of nearby companies.

An ***alternative analysis*** that includes detailed, separate cost information for developing different water sources, treating water to different levels of quality, and distributing water to different areas in and around the community will enable community leaders to match the development of water system components with important community values and policies.

Efficient design will save the community time, money, and frustration and will occur when design professionals know what the community really wants in order to solve a water supply problem. Design professionals are experts in making technical decisions. It is unfair to ask them to make community value and policy decisions.

Woodsville residents value their independence and community identity. Water hardness is not a big concern. They want water that is safe to drink and free of iron. If the water is hard, some people are willing to install and operate household water softeners. Some residents were also worried about providing fire protection for the century-old homes in town. The alternative analysis gave them the information they needed on the cost of buying high quality water from a nearby town, drilling wells five miles away that are free of iron but hard, or drilling ten wells in town that have high iron and hardness. The residents also liked the idea of a community water tower with the name of the town to give their community recognition.

Obtaining Financing and Financial Packaging

Obtaining Financing and Financial Packaging

After bringing together all different interests as a part of the community involvement process, several additional issues emerged. The community has three distinct housing areas with different needs. The oldest part of town has homes from the late 1800s with shallow wells. Owners on fixed incomes have little resources to develop a new water supply. A mobile home park that was developed 25 years ago has a water well to serve the trailers. The park is continually cited by the OEPA for bacteria violations on its community water system. A group of large executive homes have recently been built on large lots on the edge of town. Their deep wells are high in iron. A nursing home in the community has an opportunity to expand, doubling the number of jobs, but cannot do so because of an inadequate well. A food processing plant ten miles out of town is considering relocating to a nearby town with a public water system.

There are two choices.

Apply for Financing (pay $100)

Once a water system design is proposed, a community needs the money to make the plans a reality. It is tempting to apply to a large number of funding sources to try to find a single financing entity. Unfortunately, applying for financing in this manner can be a "roll of the dice." Each financing source will have its own application process, project activities, and project and reporting requirements (or strings attached).

Funding sources also have their own missions to fulfill: some agencies provide funds to do the following:

- Create jobs
- Eliminate blight
- Improve health and safety
- Serve special populations (such as low-income households, elderly persons, migrant workers, etc.)

Roll #1—Project is not eligible. Pay $500 for time wasted. Return to beginning of NEED FINANCING.

Roll #2—Application rejected because instructions were not followed. Pay $500 for time wasted in making the corrections. ROLL DICE AGAIN.

Roll #3—Project requires environmental review. Lose a turn and pay $1,000. ROLL DICE AGAIN.

Roll #4—Funding compliance guidelines increase costs making project unaffordable. Pay $1,000 for additional compliance guidelines. ROLL DICE AGAIN.

Roll #5 or #6—Lucky you! Financing is acquired. Accept $1,000,000 check at the Woodsville Heritage Day Festival. PROCEED TO IMPLEMENTATION (pages 13-16).

Community Involvement in Financing (pay $200)

The community involvement process (CIP) brings out community values, policies, and facts. This type of information is needed when considering project financing. Some of the items to be considered in financing include the following:

- Pay-as-you-go
- Collecting eligibility data since some funding sources have income requirements
- Listing the community's current obligations relative to obtaining future financing, such as other outstanding loans or obligations
- The community's administrative capacity to manage the project through the acceptance of funds, paying bills, supervising contractors, repaying loans, and preparing for audits

Use Financing Coordinator (pay $500)

Financing coordinators are professionals who have expertise in matching community needs with funding sources. They are familiar with the goals and requirements of many funding sources and can package a number of funding options together to leverage the necessary funds. Once several financing options are identified, they can help a community work through the application process. Some financing coordinators can also aid in setting up the administrative system to administer the funds.

Your community may already have someone with this expertise. This can be supplemented by someone else in a nearby community with similar needs. Technical assistance providers also exist with these capabilities. Depending on their organizational mission and time commitments, such services may be available at a subsidized rate. In addition, some engineering consulting firms employ financing coordinators.

Apply for Financing (pay $100)

Matching the community values, policies, and facts with the sources of funding, the community, with the aid of a financing coordinator, can apply for funds. Since applying for funding takes time, the community can target the sources that share its mission. With the facts it has on hand, the application process is straightforward and more accurate. Understanding the funding programs allows a community to more easily package funds from multiple sources and leverage resources. Keeping community values in mind is critical—loans must be repaid by the water system users, so the residents must see the value in the services they receive.

#7 **Read #7—Funding package is put together from several sources; keeps interest rates low and includes external grants to make project affordable. Accept $1,000,000 check at Woodsville Heritage Day Festival. GO TO IMPLEMENTATION (pages 13-16).**

Lessons Learned

Community involvement in project financing is a continuation of the process started under facilities planning. The professional facilitator can help a community identify its values regarding the cost of service delivery, infrastructure, and community development. A professional facilitator can be found through local colleges, county extension offices, technical assistance providers, professional associations, and even the human resources departments of nearby companies.

Financing coordinators have special knowledge and skills relative to matching funding sources to community needs, values, and policies. They can be found through technical assistance service providers, funding agencies, and some charitable organizations. In Ohio, the Small Communities Environmental Infrastructure Group has developed a list of funding sources and has organized a financing committee that will meet with leaders of small communities to help identify and package funding sources.

Grant funds are limited and none will pay the entire project costs. Water supply and treatment projects are intended to be self-supporting through rates and charges. Although some grant funds are available, loans are more common and must ultimately be paid back by the users. Whenever possible, it is best to pay as you go in order to minimize debt and interest payments.

Woodsville has a variety of users in different categories. These categories match well with the missions of several funding sources. By gathering the facts, they can more easily apply for funding programs that help low-income residents, support the elderly, and create new jobs. Some of the residents are in a position to pay-as-they-go, reducing interest rates for the community. Working together with the nursing home as it plans to expand, the community was able to share a computer program to manage the funds. Since the community values its independence and community identity, it sold bricks at a community festival to build into the new water plant. The proceeds will go to provide grants to elderly, low-income residents.

Implementing a Water System Project

Implementing a Water System Project

Woodsville was successful in obtaining a low-interest loan for 60% of its project; the 30-year loan will be repaid through user fees and charges. Two grants were received totaling 30% of the total project cost. One was granted to allow the mobile home park to properly abandon its contaminated well and connect to the community system. Another grant was awarded because it was demonstrated that the project would result in job retention and/or creation. The community is expected to pay 10% of the total project cost up-front to cover design services. An additional grant will be available to assist low-income and elderly households directly with the cost of extending laterals.

The community must now hire a contractor to construct the treatment plant and distribution system and hire an operator to run the system.

There are two choices.

Hire Construction Contractor (pay $1,000,000)

Contractors are often selected based on the lowest bid. Unfortunately, not every issue regarding system construction can be identified in a bid document. Contractors are working in residents' lawns and in front of their homes. Easements must be obtained to construct on private property. Permits must be obtained to ensure the project meets all regulatory requirements. Unforeseen obstacles can be encountered that create delays. Without a mechanism in the community to facilitate communication between the contractor and residents, misunderstandings can arise. Hiring a contractor can sometimes be a "roll of the dice."

Roll #1—Cost overruns of $50,000; RETURN TO NEED FINANCING.

Roll #2—Construction delays, contractor defaults; IMPLEMENTATION PROCESS STARTS OVER.

Roll #3—Complaints about construction nuisances; mayor and council voted out; GIVE YOUR GAME PIECE TO THE NEXT PLAYER.

Roll #4—Failed to obtain necessary permits; PAY FINES AND PENALTIES OF $1,000 BEFORE YOU PROCEED WITH IMPLEMENTATION.

Roll #5—Hire attorney to enforce construction contract; PAY LEGAL FEES OF $1,000 and GO TO "SET UP CONSTRUCTION TEAM."

Roll #6—Lucky you! PROCEED TO OPERATION (pages 17-20), repeat for 20 years, then PROCEED TO NEED SYSTEM UPGRADE (pages 21-24).

Continue Community Involvement Process (pay $200)

The community involvement process should not stop after the project is financed. Facts about the community and its infrastructure can greatly aid in the construction process. Policies regarding when construction can occur impact timelines. When roads and lawns are excavated, people's concerns about access and landscaping must be considered. The community involvement process yields important community information for the contractor to help keep the project on time, on budget, and to avoid conflicts.

Select Management Structure (pay $200)

While it may seem early, a management structure for the water system should be outlined. If a water system management structure is already in place, this is a good time to re-evaluate it. Additional management responsibilities may come with an upgrade, requiring more staff or at least more staff training. By establishing a management structure early, a chain of command can be outlined, staff training can be identified, and procedures can be laid out before too many "irreversible" decisions are made during construction.

Identify Operator (pay $200)

A qualified operator is critical to providing water and protecting the health and well-being of the citizens in a community. The size and level of treatment at a plant will determine what class of operator is necessary. In addition to the required certification, it is important for the qualified operator to have good organizational and communication skills, be resourceful, and be able to work as part of a team. Finding a qualified operator can be accomplished through placing a job advertisement in a local or regional paper and by contacting a water professional association or organization. It is important for the operator to be identified early so that he or she is able to do the following:

- Know the reasons why the system was developed a particular way
- Know where all of the system components are before they are buried
- Guide the implementation of the system to make it easier to operate

Set Up Construction Team

It is important to continue local oversight of the construction process to assure that everything runs smoothly and according to schedule. In addition to the design engineers and the contractor, a construction team might include the superintendent and operator, as well as representatives from community leaders, community members, and major water users. At the beginning of the implementation phase, it may be necessary to meet weekly in order to share information. After that, monthly meetings may be more appropriate. A local official should be named who can attend every meeting and has the authority to make decisions regarding the contract, because matters such as change orders and partial payment orders may arise (and if Council meets once a month, delays can be avoided).

Hire Construction Contractor (pay $1,000,000)

The design engineer will help develop the bid specification documents and assist in the evaluation of bids. It is important that the selection of a construction contractor be based on the qualifications of the firm (and its subcontractors), not just price. Factors to consider are the reputation of the firm, its ability to keep on time and on budget, and small community experience.

#7 **Read #7—Congratulations on a job well done; proceed to OPERATION (pages 17-20), repeat for 20 years, then proceed to NEED SYSTEM UPGRADE (pages 21-24).**

Lessons Learned

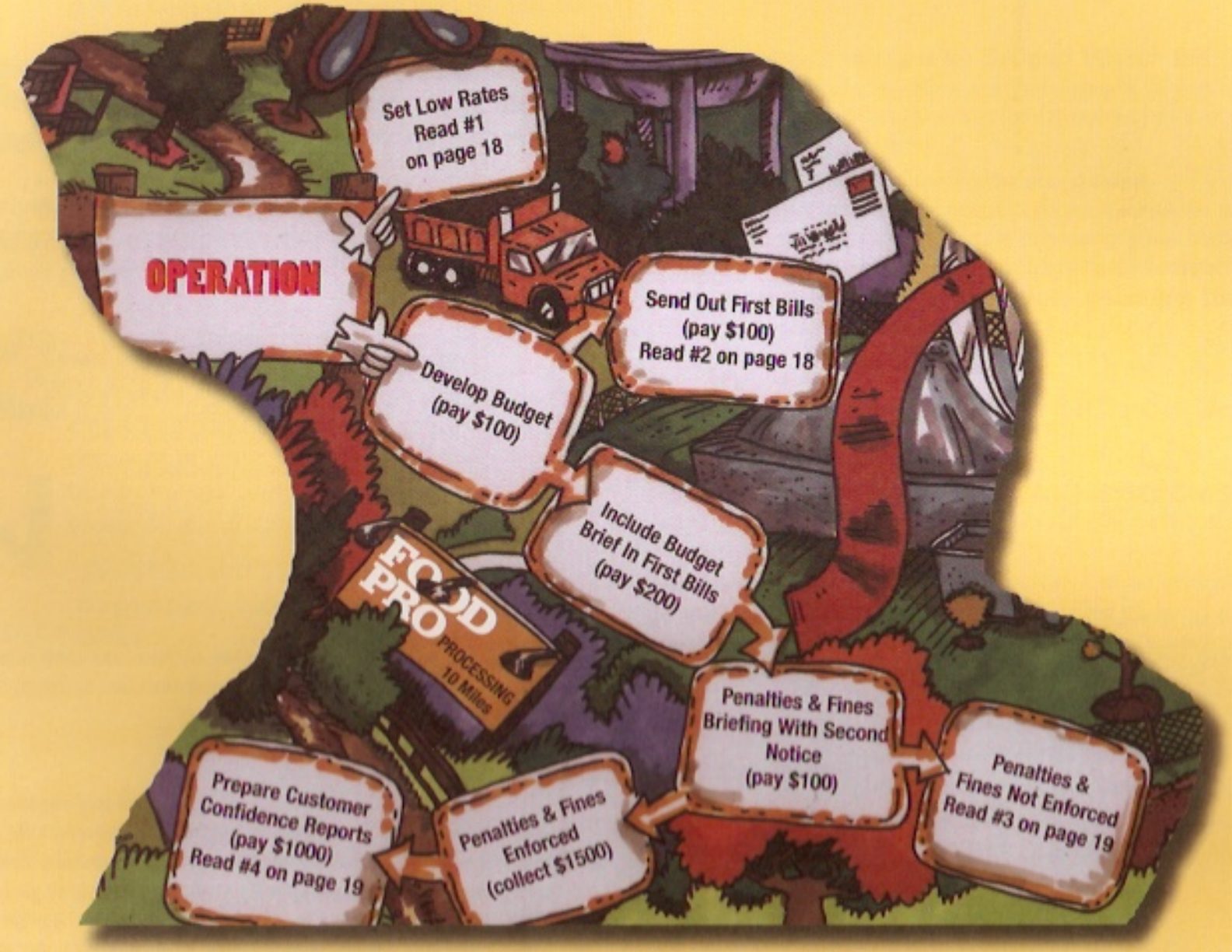
Cost control is important in maintaining community support for the project and confidence in the local elected officials and the managing authority. Cost overruns and fines are often not covered by grant or loan agencies and usually have to be covered by already tight local budgets.

Hire the superintendent and operator early in the process to represent community interests and save the community money in design and construction. It also contributes to their commitment to the project.

Management structure selection is critical to the successful operation of a water treatment system. It is important to start thinking about this in advance of construction.

Selecting a contractor that will build the system as designed by the engineers with input from the superintendent and operator will also ensure the successful operation of the system. This is a critical element in implementation because it will protect the significant capital investment of the community.

Once the contractor was selected and an operator hired, the construction management team began meeting weekly. This made it possible to foresee any problems early and respond to them before construction delays occurred. Especially important was coordinating road closings and excavations on front lawns to minimize inconvenience in the community. The superintendent and operator also noticed that a ladder in the original plan would have restricted the ability to move chemicals and suggested that stairs would be more appropriate.



Operating a Water System

Operating a Water System

Woodsville had a big ribbon-cutting ceremony for the new water plant. The local elected officials, water board members, the new superintendent, and the operator were all in attendance. Special guests were Ohio EPA regulators, funding agency representatives, consultants, and the technical service providers that advised the community. Now that the water is flowing to the homes, it is time to send out the first water bills.

There are two choices.

Set Low Rates

The water board is very concerned about low-income and elderly customers and does not want to impose a hardship on anyone. They set low water rates for the town.

#1 **Read #1—Low rates are, at first, popular; however, costs exceed revenues and loan payments are late. Low salaries result in turnover of staff; lax operation results in violations and fines. Poor quality water service generates complaints. Water board members are not re-elected. GAME OVER.**

Send Out First Bills (pay $100)

The water bills are sent out to customers with no explanations, with rates higher than they expected.

#2 **Read #2—Customers complain about high rates so board lowers them. Board members don't approve any O & M expenditures and pray that no emergencies happen until things cool down. Employee morale suffers. Operator and superintendent quit; Ohio EPA cites water system for violations. GAME OVER.**

Develop Budget (pay $100)

The water board, operator, and superintendent work together to identify all costs of the water system. They also recognize the need to establish an emergency contingency fund and begin building up a fund for equipment replacement. Based on the detailed budget, they set appropriate water rates and send out the first bills.

There are two choices.

Include Budget Briefing with First Bill (pay $200)

Water bills are sent out to customers along with a brief explanation of what they are paying for and how it is calculated. While some complain about the higher rates, they appreciate knowing where the money is going. Letters to the editor in the local paper are favorable.

Penalty Briefing with Second Water Bill (pay $100)

When the second water bill is sent to customers, a brief explanation is included on penalties and late fees for delinquent payments.

Penalties and Fines Are Not Enforced

Water board is reluctant to impose late fees and penalties when customers don't pay their water bills.

#3 Read #3—Many customers pay bills at first, but learn that overdue fines and shut-off policy are not enforced and some stop paying their water bills. Soon costs exceed revenues. One of the pumps breaks down with no money to fix it, so the operator is unable to keep the water tower filled to capacity. Town hall burns to the ground when the fire department drains the water tower. GAME OVER.

Penalties and Fines Are Enforced (collect $1,500)

Water board enforces fines and penalties and collects additional revenue. They are able to balance the budget and keep water rate increases low the next year.

Prepare Annual Consumer Confidence Reports (pay $1,000)

In preparing the required annual consumer confidence report, a budget update is included. Customers learn what their money was used for, what portion stays in the community, and can plan for small rate increases in the future.

#4 Read #4—Water system runs smoothly and maintains a contingency fund. Lightning strikes, ruining one of the well pumps. Contingency funds are used for a quick replacement to reduce service interruption while waiting for the insurance company to settle the claim with the electric utility. GO TO NEED SYSTEM UPGRADE (pages 21-24).

Lessons Learned

Low water rates, while popular, cannot sustain a viable water system.

Involve the water system staff when setting water rates. They are in the best position to judge the need for emergency contingencies and upcoming equipment replacement.

Keep the customers informed about how their money is being used to maintain water service. Most people appreciate knowing why their water rates are set at a certain level.

Fines and penalties for delinquent payments ensure that everyone pays his or her fair share. Late fees can be an additional source of revenue for a water system.

Consumer confidence reports present a good opportunity to update customers on the budget and future needs of a water system.

High quality water at a reasonable price is now available to all Woodsville residents and businesses. As a result, property values rise and public health improves. Fire insurance rates are now lower, which helps offset the new water bills. While some people in town still complain about having to pay for water, most residents are happy to have a reliable supply when the next drought hits. Others are removing their home water treatment equipment. The town council is re-elected. Everything runs smoothly until new federal regulations require additional treatment to meet stricter water quality standards.

Need System Upgrade

Need System Upgrade

Woodsville has been operating its water system now for 15 years. The older 19th-century homes have been restored and are now on the area walking tour, bringing tourists into the town's businesses. The mobile home park has been slowly replacing old trailers with new mobile homes and has planted trees and landscaping now that water is available for a sprinkler system. The nursing home expanded as expected and the improved housing in the community has allowed them to attract new employees. The food processing plant hasn't relocated yet and they are now talking to Woodsville officials about access to the water system.

Even with careful maintenance, water system components wear out and need replacement. Advancing technology also introduces new and improved ways to treat and deliver water to customers. Also, changes in federal and state regulations require water systems to upgrade to improve the safety and reliability of the water supply.

There are two choices.

Adequate Reserve Funds Exist

The superintendent and operator do their research to estimate the cost of the needed upgrade. Because of careful budgeting, the community has adequate funds on hand to upgrade the system without raising water rates.

Form Construction Management Team (pay $100)

The superintendent, operator, water board members, and a facilities director at a local company work with the consultant as a team to develop strategies for a system upgrade.

#3 **Read #3—Management and operations staff and outside consultants work together to develop a plan for upgrade. Notice of upgrade plans raises a few calls of concern that are handled at public meetings. Water system continues to operate and send out consumer confidence reports. Repeat OPERATION until you NEED SYSTEM UPGRADE (go to NEED FINANCING when necessary).**

Hire Consultant (pay $5,000)

To design the details of the needed upgrade, a consultant is retained.

#2 **Read #2—Water system staff came up with an easy, inexpensive way to upgrade system. Since they were never included in discussions with outside consultant, they got mad and took jobs at a water plant in another town. Without water system operators, upgrade could not be completed. Return to NEED SYSTEM UPGRADE.**

Not Enough Reserve Funds Exist

After researching the cost of the needed upgrade, the superintendent and operator estimate that the cost will exceed the funds on hand

Evaluate Rate Structure (pay $200)

Since the customers ultimately pay for any water system upgrades, the rate structure should be examined and adjusted. Make sure that the rates are equitable, and that the highest water users are paying their fare share.

Continue Community Involvement Process (pay $200)

A representative from the water board, a local elected official, a residential customer, a commercial customer, the superintendent, and the operator form a committee to discuss the needed upgrade, costs, and how to adjust water rates to cover the costs. They also contact a technical assistance provider to gather information on grants available for upgrades. A strategy is developed to present the case to the customers.

Raise Rates Following Budget Briefing with Next Water Billing (pay $500)

An explanation of the needed upgrade and costs along with the impact on water rates is presented to the customers. While some complain, most appreciate being informed.

Form Construction Management Team (pay $100)

The superintendent, operator, water board member, and a facilities director at a local company work with the consultant to develop strategies for a system upgrade.

#3

Read #3—Management and operations staff and outside consultants work together to develop plan for upgrade. Notice of rate increase and/or upgrade plans raises a few calls of concern that are handled at public meetings. Water system continues to operate and send out consumer confidence reports. Repeat OPERATION until you NEED SYSTEM UPGRADE (go to NEED FINANCING when necessary).

Raise Rates

Based on the evaluation of the rate structure, the decision was made to raise water rates with the next bill.

#1

Read #1—Rates are raised without notice. Work on the needed upgrade results in the streets being torn up. Complaints arise and many refuse to pay higher bills. Lack of cooperation from residents results in delays and increased costs. Upgrade not completed. System fined for not meeting new water quality requirements. GAME OVER.

Lessons Learned

Customers pay for upgrades; be prepared to raise water rates and save for predictable upgrades.

Continue to inform and involve the community in the upgrading of a water system. The community involvement process that works so well when a new system is being developed is critical to the successful implementation of upgrades.

Be sure to include water system staff and community resource people in planning upgrades. Often they can pull together local force labor and borrow equipment and/or expertise to keep upgrade costs low.

This game never ends. Once you start out on the water system game your community is committed forever.

High quality water at a reasonable price is now available to all Woodsville residents and businesses. As a result, property values have risen and public health has improved. The population and businesses in the town are stable. Woodsville continues to operate and upgrade its water system for 50 years. The food processor closed, so the community was grateful that it did not try to overextend its water service. The water tower continues to be a focal point in the community and the bricks sold to fund the water plant remind the residents of the forethought and commitment to its leaders. The town council is re-elected.