Exhibit No.: _____

Issue(s) Receivership/Water Tower/
MDNR Violations/Customer Complaints/
Affiliate Transactions/
Fencing and Other Safety Precautions
Witness/Type of Exhibit: Meisenheimer/Surrebuttal
Sponsoring Party: Public Counsel
Case No.: WC-2002-155
(Consolidated with SC-2002-160)

SURREBUTTAL TESTIMONY

OF

BARBARA A. MEISENHEIMER

Submitted on Behalf of the Office of the Public Counsel

OFFICE OF THE PUBLIC COUNSEL

v.

WARREN COUNTY WATER & SEWER COMPANY
AND GARY L. SMITH

Case No. WC-2002-155
(Consolidated with SC-2002-160)

April 24, 2002

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

Office of the Public Counsel, Complainant,	)	
v.	)	Case No. WC-2002-155 (Consolidated with SC-2002-160)
Warren County Water and Sewer Company and Gary L. Smith, Respondents.	)	

AFFIDAVIT OF BARBARA A. MEISENHEIMER

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Barbara A. Meisenheimer, of lawful age and being first duly sworn, deposes and states:

1. My name is Barbara A. Meisenheimer. I am Chief Utility Economist for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my surrebuttal testimony consisting of pages 1 through 14 and Attachment BAM-S1.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Barbara A. Meisenheimer

Subscribed and sworn to me this 24th day of April, 2002.

Kathleen Harrison
Notary Public

My Commission expires January 31, 2006.

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INTRODUCTION

Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS ADDRESS.

A. Barbara A. Meisenheimer, Chief Utility Economist, Office of the Public Counsel, P. O. Box 7800, Jefferson City, Missouri 65102. I am also employed as an adjunct Economics Instructor for William Woods University.

Q. HAVE YOU PREVIOUSLY FILED TESTIMONY IN THIS CASE?

A. Yes, I filed direct testimony on September 26, 2001 and supplemental direct testimony on February 13, 2002.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. In this testimony, I will respond to the rebuttal testimony of Gary Smith filed on behalf of Warren County Water and Sewer Company (WCWS or the Company) in response to the Complaint filed by

the Office of the Public Counsel in September of 2001. In the Complaint, Public Counsel set forth the reasons we believe that the Company under its current management is failing its statutory duty to provide safe and adequate service to its customers as required by law.

Q. WHAT REMEDY IS PUBLIC COUNSEL SEEKING IN THIS CASE IF THE COMMISSION FINDS THAT THE COMPANY IS FAILING TO PROVIDE SAFE AND ADEQUATE SERVICE TO ITS CUSTOMERS?

A. Public Counsel is recommending that the Commission order the Company to immediately correct all of its actions or omissions that violate the law. In addition, Public Counsel is asking the Commission to act quickly to place the Company's water and sewer systems under the control and responsibility of a receiver, pursuant to Sec. 393.145 RSMo.

RECEIVERSHIP ISSUES

Q. WHY DOES PUBLIC COUNSEL BELIEVE THAT THE COMPANY'S WATER AND SEWER SYSTEMS SHOULD BE PLACED UNDER THE CONTROL AND RESPONSIBILITY OF A RECEIVER?

A. The Company has had serious, ongoing problems related to service quality, safety, customer billing, financial activities and record keeping. The serious and repetitive nature of these problems are described and documented in Public Counsel's direct and supplemental direct testimony, the Staff's rebuttal testimony and in the surrebuttal testimony depositions of employees of the Missouri Department of Natural Resources (MDNR) and the United States Environmental Protection Agency (EPA). In addition, the Company has had numerous customer complaints, many of which describe

recurring problems experienced by customers. Customer calls and letters received by Public Counsel as well as the testimony of customers at the March 11, 2002, public hearing attest to a high level of customer frustration with the Company's failure to respond to customer inquiries and failure to satisfactorily resolve service problems. Despite regulatory actions and federal criminal prosecution of Mr. Smith, the Company still refuses to comply with Commission Rules and State and Federal law. Safety and service problems persist, despite the intervention of the Commission, Public Counsel, MDNR and EPA. The Company's ability and willingness to correct these deficiencies in the future is questionable at best. Public Counsel strongly believes that the only lasting and meaningful remedy available to the affected public is for the Commission to seek court authority to place the Company under temporary receivership, and ultimately to transfer Company ownership to an entity unaffiliated with Mr. Smith.

Q. THE COMPANY HAS CHARACTERIZED THE POTENTIAL FOR RECEIVERSHIP AS AN ATTEMPT BY THE INCLINE VILLAGE HOME OWNER'S ASSOCIATION TO TAKE OVER WCWS POTENTIALLY LEAVING CUSTOMERS WITHOUT SERVICE. IS THIS A FAIR ASSESSMENT OF THE PUBLIC COUNSEL'S POSITION?

A. No, this characterization is a red herring. Although, at the public hearing, Dale Hinton, who lives at 261 English Road in Brandy Lynn subdivision, testified that he had received a letter from Gary Smith indicating that Incline Village was attempting to take over the WCWS,[1] it is my understanding that the Incline Village Board of Trustees would prefer that an experienced water and sewer operator act as

[1] Public Counsel's Exhibit No. 11

receiver and potentially assume ownership of the assets and service territory currently served by WCWS. While Public Counsel's initial Complaint filing indicated that the Board of Trustees was willing to act as a receiver, at least on a temporary basis, and was willing to retain a qualified operator for the system, Public Counsel has not recommended that a **specific** receiver be appointed. Rather, this information was provided to the Commission as an assurance that there was at least one entity which was aware of the problems being experienced by the Company and which was willing to assume the burden of receivership. In fact, I believe that the Board has been attempting to identify potential alternative providers in the event that receivership is ordered. Regardless of who assumes management through a receivership, Public Counsel emphatically rejects the suggestion that it would recommend to the Commission that some of the Company's customers be disconnected.

Q. HAS PUBLIC COUNSEL RECOMMENDED THAT THE OPERATIONS OF WARREN COUNTY WATER AND SEWER COMPANY BE CONVERTED TO A NON-REGULATED UTILITY CONTROLLED BY THE INCLINE VILLAGE BOARD OF TRUSTEES?

A. No. As I indicated in my direct testimony, Public Counsel believes that Warren County Water and Sewer Company should be operated by a qualified receiver as a regulated utility company, subject to the jurisdiction of the Commission. Any such receiver which is appointed would be obligated to run the entire company, and could not pick and choose which parts of the service territory it would continue to serve. Public Counsel has been in contact with other potential receivers, and believes that, if the Commission decides that a receivership is in the public interest, Public Counsel will be able to make additional suggestions regarding potential receivers.

Q. WHAT IS YOUR UNDERSTANDING OF THE RECEIVER'S AUTHORITY AND OBLIGATIONS TO THE COMPANY AND ITS CUSTOMERS DURING A RECEIVERSHIP?

A. I believe the receiver would have "the same powers and be subject to all the provisions, as far as they may be applicable, enjoined upon a receiver appointed by virtue of the law providing for suits by attachment." Sec. 393.145(4). As I understand it, the duty of a receiver is "to keep and preserve all property and protect any business or business interest entrusted to him pending any legal or equitable proceeding concerning the same, subject to the order of the court." Section 515.240 RSMo.

Q. WHY DO YOU BELIEVE THAT THE RECEIVER COULD NOT JUST DECIDE WHICH CUSTOMERS TO SERVE AND WHICH CUSTOMERS TO DISCONNECT?

A. It is my understanding that, in suits of attachment, a receiver continues to operate the business may issue bills and collect payments for the operation of the attached business; shall report all his proceedings to the appointing court, and shall hold all moneys collected and all property received subject to the order of the court. Section 521.310; 521.330 RSMo. Based on my understanding of the requirements of receivership, and the authority of the appointed court to oversee the receiver's actions, I believe that any receiver who took over this company would have to continue to operate the company as a regulated utility and provide service to all customers who are being served at the time the receiver takes control. As I understand it, the receiver would not have the authority to "convert" the system into an unregulated home owners' association, because, as the statute clearly states: "The receiver shall operate the utility so as to preserve the assets of the utility and to serve the best interests of its customers." Sec. 393.145(4). The statute also provides that "Control and responsibility for the utility

shall remain in the receiver until the utility can, in the best interests of its customers, be returned to the owners. If the court determines after hearing that control of and responsibility for the utility should not, in the best interests of its customers, be returned to the owners, the receiver shall proceed to liquidate the assets of the utility in a the manner provided by law." Sec. 393.145(5). It seems clear, from Public Counsel's reading of the receivership statute, that the best interests of all of the company's customers must be honored and served by the receiver. Because of these requirements, Public Counsel would oppose the appointment of a potential receiver who was unwilling to provide safe and adequate service to **all** of the Company's customers in the existing service territory.

WATER TOWER

Q. ON PAGES 3, LINE 5, THROUGH PAGE 4, LINE 6 OF HIS TESTIMONY, MR. SMITH DISCUSSES THE NEED AND CONDITIONS FOR CONSTRUCTION OF A NEW WATER TOWER. DO YOU HAVE CONCERNS REGARDING THIS PORTION OF HIS TESTIMONY?

A. Yes, I have two concerns. The first is that in Mr. Smith's testimony the need for the tower is only discussed in the context of serving the "conditional area". The testimony neither acknowledges nor addresses the need for a new tower in providing for growth in the existing service territory and addressing customer complaints regarding water pressure. Both the Staff and DNR have identified a need for a new tower and the company through verbal and tariffed language had indicated to customers that construction of a new tower was in the works.[2] My second concern is that although the

[2] See Barbara Meisenheimer's Direct Testimony Attachment 3 and Tr. Don Kassebaum, 2524 Village Lane, Foristell, Missouri.

Company's testimony at page 4, lines 13-19 claims that it did not expect pre-approval for rates to cover the cost of a new tower, the record of the Company's actions in other proceedings suggests otherwise. At page 4, lines 1-10, the Company, admits that it conditioned the loan to cover the towers construction on rate increases to cover other perceived operating losses. In my opinion this type of reasoning is little more than a "shell-game" and is not adequate justification for the Company's failure to move forward with construction of a tower. If WCWS had been able to demonstrate at that time that a rate increase to cover the other perceived operating losses was appropriate, it could have received one through one of the two informal rate proceeding it initiated after the Commission approved the Company's request for authority to construct the water storage tower. Public Counsel witness Kimberly Bolin will provide additional information regarding these applications in her surrebuttal testimony. The result of the most recent informal rate case proceeding was that the Company's supporting documentation was in such disarray that the information provided did not provide adequate grounds under which the Staff could support a rate increase. The Company's testimony fails to acknowledge that it was responsible for any deficiencies in the documentation provided to support its requested increase. Instead, characterizing the result of the informal rate proceeding as "what appears to be the typical gross overstatement of income and understatement of expenses". An earlier request for a rate increase was also rejected due to WCWS failure to appear at a prehearing conference and to file testimony in support of its request.[3]

[3] Case Nos. ST-2000-694 and WT-2000-695 Order Rejecting Tariffs. Updated 9/5/00.

MDNR Violations

Q. ON PAGE 6 LINES 7-18 OF MR. SMITH'S TESTIMONY THE COMPANY CLAIMS THAT IT HAS BEEN IN COMPLIANCE WITH ENVIRONMENTAL REGUALTIONS FOR A SUBSTANTIAL PORTION OF THE LAST 120 PLUS MONTHS. DOES PUBLIC COUNSEL AGREE WITH THIS CHARACTERIZATION?

A. No. Please refer to the surrebuttal testimonies of Paul Muleer, Vic Muschler and Daniel Doutherty regarding numerous violations in recent years.

Q. DOES THE COMPANY ACKNOWLEDGE THAT IT HAS ONGOING UNRESOLVED PROBLEMS WITH TREATMENT PLANT #1?

A. Yes, on page 6, lines 8-18, Mr. Smith states that it has been a problem for years. Ultimately he attributes the continuing problems to a lack of financing for improvements and points to a lack of Staff effort in securing loan approval for improvements.

Q. DID THE COMPANY RESPOND TO PUBLIC COUNSEL'S CONCERNS REGARDING IMPROPERLY OPERATING LIFT STATIONS?

A. Only by estimating a frequency of every 18-24 months as the average occurrence of serious pump problems and stating in general terms the Company's efforts at correcting problems with malfunctioning lift stations. Also, the Company's testimony indicates that it is financially challenged to make repairs when necessary and attributes this to the audit process.

Q. IS THERE EVIDENCE THAT SERIOUS PUMP PROBLEMS MAY BE OCCURRING MORE FREQUENTLY THAN EVERY 18-24 MONTHS?

A. Yes, Paul Mueller's surrebuttal testimony deposition indicates two serious violations which occurred within a recent 9 month period. In April of 2001, and January of 2002, lift stations overflowed causing raw sewage to be discharged by two different lift stations.[4] During each of the three site visits I participated in, warning devices were disconnected or found not to be working properly. Testimony from the public hearing suggests that there were additional periods during which raw sewage was escaping the system and warning devices were disconnected by the Company.[5] These serious violations resulted in unlawful discharges into waters of the United States, and formed the basis for the initial felony indictment of Mr. Smith, and the grounds for the violation of his federal probation in March of this year. For further information on the federal criminal investigation, please refer to the surrebuttal testimony deposition of Vic Muschler of the U.S. Environmental Protection Agency.

CUSTOMER COMPLAINTS

Q. DO YOU HAVE CONCERNS REGARDING THE COMPANY'S RESPONSE TO CUSTOMER COMPLAINTS?

A. Yes. The public hearing transcript is replete with complaints about what I will characterize as indifferent and at times abusive reactions to customer complaints and inquiries. The Company's testimony bears a similar tone in addressing the customer complaints discussed in Public Counsel's testimony and voiced by customers during the public hearing. In his rebuttal testimony, Mr. Smith

[4] Deposition of Paul Mueller, pages 10-13.

generally dismissed the customer complaints raised in Public Counsel's testimony by stating "I have found that the same people re-hash the same complaints at every opportunity" and responds to customer complaints regarding high chlorine by stating "I have found that a certain group in Incline Village can take a grain of fact and, after telling the story over and over, come up with some significantly exaggerated results." In one paragraph devoted to addressing some of the specific customer complaints voiced during the public hearing he describes some complaints as "rather ridiculous", one "the silliest" and another "borders on absurd". My experience working for Public Counsel has convinced me that most customers who write, call or testify at public hearings to voice complaints do so only after seeking resolution by contacting the utility and only as a last resort. Public Counsel is extremely disappointed with the Company's insensitive and dismissive treatment of customer complaints. It is difficult to envision the Company's apparent attitude toward customers changing to an attitude which will be conducive to addressing existing issues. It is extremely unlikely that, without a serious change in management style, or complete change in management, the Company's customers will have reason to make fewer complaints in the future.

AFFILIATE TRANSACTIONS

Q. WHEN A REGULATED UTILITY IS OWNED BY A PARENT COMPANY OR INDIVIDUAL WHICH ALSO OWNS UNREGULATED COMPETITIVE BUSINESS ENTERPRISES WHICH DO BUSINESS WITH THE REGULATED UTILITY, ARE THERE REASONS TO BE CONCERNED ABOUT WHETHER TRANSACTIONS

[5] Don Kassebaum, 2524 Village Lane, Foristell, Missouri.

BETWEEN THESE CO-OWNED, OR AFFILIATED COMPANIES, ARE FAIRLY PRICED OR HARM COMPETITION?

A. Yes. Economic theory suggests that a company offering a single service in an effectively competitive market will be driven by market forces to pass on in its rate for service an amount that approximates only an efficient level of costs. If the company is not an efficient producer or simply attempts to extract excess profit by charging rates that exceed costs then in response customers will be able to act their own behalf by migrating to competitors without substantial harm because in an effectively competitive market customers have meaningful alternatives. Economic theory also suggests that market distortions may result where integrated firms or affiliates offer services in both a monopoly market and a more competitive market. In this case, the monopoly's customers are "captive" in the sense that they do not have meaningful alternatives to choose from. An integrated company serving both markets or affiliate transactions that are not conducted "at arms length" may provide a vehicle by which cost recovery can be shifted from the competitive market to the monopoly market resulting in unfair rates to the captive customers of the monopoly service. Cost shifting offers an unfair advantage to the affiliate in the competitive market. Cost shifting carries the most significant potential to harm consumers when the good or service is a necessity. When a necessary service, such as water or sewer service is excessively priced, the customer cannot simply forgo consumption. The customer would then be forced to pay an unreasonable and unjust price or forgo a good or service essential to health or safety.

Competition in the more competitive market can also be restricted in cases when the integrated firm or affiliate is able to successfully tie receiving the monopoly service to the purchase of services offered by the unregulated affiliate. Whether the monopoly explicitly requires that a customer to purchase the

competitive service from the affiliated as a condition of receiving monopoly service, or whether it occurs simply because customers are led to believe they must buy both, the detriment to the proper operation of the competitive market will be similar. There was evidence at the local public hearing that WCWS presented new customers with informational material about the construction company's services together with information for regulated monopoly services. I believe that this is an inappropriate method of advertising the construction company's services.

Q. IN HIS REBUTTAL TESTIMONY, MR. SMITH CATEGORIZED MS. BOLIN'S TESTIMONY ABOUT AFFILIATED TRANSACTIONS AS " USE OF YOUR CONSTRUCT (SIC) COMPANY AS OPPOSED TO UNRELATED THIRD PARTIES FOR UTLITY WORK." FROM A POLICY PERSPECTIVE, IS MR. SMITH'S CHARACTERIZATION ACCURATE?

A. No. Public Counsel does not oppose the use of the construction company for utility work when the construction company offers the best deal for services based on reasonable price and quality comparisons between competitive providers. What Public Counsel does object to is the lack of documentation demonstrating that any such analysis was conducted and that the regulated utilities customers are paying only for work actually performed.

FENCING AND OTHER SAFETY PRECAUTIONS

Q. IN HIS REBUTTAL TESTIMONY, MR. SMITH TAKES ISSUE WITH PUBLIC COUNSEL'S CONCERNS ABOUT THE CONDITION OF COMPANY'S FENCES AROUND ITS TREATMENT PLANTS. DO YOU AGREE WITH HIS STATEMENT

THAT THE FENCES " SERVE AS A SCREEN AND ARE NOT DESIGNED, FOR SECURITY PURPOSES OR TO KEEP ANYONE OUT" ?

A. No. The design guides contained in DNR Rules 10 CSR 20-8.020 (11) do require fencing sufficient to restrict entry by children and also require locks on gates.

Q. PLEASE EXPLAIN.

A. In his surrebuttal testimony deposition, Daniel Daugherty of the Missouri Department of Natural Resources, affirms the DNR policy regarding fencing of sewer treatment plants, on pages 15 and 16. He also refers to the Clean Water Commission regulation at 10 CSR 20-8.020(11)(C)11. That regulation describes the required safety provisions, including fencing, for small wastewater treatment facilities. This regulation requires, in subsection (A), that "All wastewater treatment facilities must be fenced sufficiently to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism." Subsections (B) through (G) of that regulation provide detailed construction standards for such fences. Clearly, Mr. Smith was mistaken in his comments at page 5 of his rebuttal testimony. Further, the DNR rules require additional safety measures that the Company is not in compliance with, including placing barbed wire around the top of the fences and posting warning signs on each side of the facility. I have included a copy of these requirements as Attachment BAM-S1 and highlighted the relevant portions of the rules. Also included in Attachment BAM-S1 is a copy of 10 CSR 20-8.020 (10) which requires working alarms and vandal-proof covers on pumping stations.

Q. PLEASE SUMMARIZE PUBLIC COUNSEL'S POSITION IN THIS CASE.

A. WCWS has a documented history of recurring customer complaints, quality, safety, billing, legal and financial problems. The first step to correcting a problem is to acknowledge that the problem exists. However, this company has failed to even take that first step. Instead, its testimony constitutes little more than finger pointing at the Staff, its customers and Public Counsel. The Company offers no appropriate proposals for correcting the deficiencies identified in Public Counsel's Complaint. We ask the Commission not to give this company any more chances because the customers have waited long enough for the relief they deserve. Time and again, the Staff and other regulatory agencies have tried to work with the Company to address the serious ongoing problems, but time and again, the Company has failed to follow through. Public Counsel believes that the only solution that will ensure WCWS's customers the safe and adequate service to which they are legally entitled, is to place the Company under the control and responsibility of a receiver. We share the Staff's belief that ultimately the Company's assets should be placed under new ownership.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Rules of
Department of Natural Resources
Division 20—Clean Water Commission
Chapter 8—Design Guides

Attachment BAM-S1

Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 20—Clean Water Commission
Chapter 8—Design Guides

10 CSR 20-8.010 Design of Municipal Waste Stabilization Lagoons in Missouri
(Rescinded August 13, 1979)

AUTHORITY: section 204.026, RSMo Supp. 1973. Original rule filed July 17, 1961, effective July 27, 1961. Amended: Filed Oct. 3, 1962, effective Oct. 13, 1962. Amended: Filed Dec. 4, 1975, effective Dec. 14, 1975. Rescinded: Filed May 4, 1979, effective Aug. 13, 1979.

10 CSR 20-8.020 Design of Small Sewage Works

PURPOSE: This rule sets out criteria as a guide in designing and constructing small sewage works. These criteria are not necessarily applicable to the design of works having daily flows in excess of 22,500 gallons per day. For works having larger flows, 10 CSR 20-8.110–10 CSR 20-8.220 reflect the minimum acceptable standards. This rule reflects the minimum requirements of the Missouri Department of Natural Resources for design, submission of plans, approval of plans and approval of completed small sewage works. These criteria are based on the best information presently available but they may be subject to periodic review and revision as additional information and methods appear. Deviation from minimum requirements will be allowed if sufficient documentation justifies the deviation. Addenda or supplements to this publication will be furnished to consulting engineers and city engineers. Others wanting to receive addenda or supplements should contact the Missouri Clean Water Commission to be added to the mailing list.

Editor's Note: The secretary of state has determined that the publication of this rule in its entirety would be unduly cumbersome or expensive. The entire text of the material referenced has been filed with the secretary of state. This material may be found at the Office of the Secretary of State or at the headquarters of the agency and is available to any interested person at a cost established by state law.

(1) Definitions. Definitions as set forth in the Missouri Clean Water Law and 10 CSR 20-2.010 shall apply to those terms when used in this rule unless the context clearly requires otherwise. Where used, the terms mean a mandatory requirement insofar as approval by the department is concerned unless justification is presented for deviation from the requirements. Other terms, such as should, recommend and preferred, indicate discretionary department requirements. Deviations are subject to individual consideration.

(2) General.

(A) Before work on engineering documents has begun, it is recommended that inquiry be made to the appropriate department office as to what effluent limitations the proposed facility will probably be required to meet. The engineer and applicant should also be aware that if a geological evaluation of the receiving stream or lagoon site is required it will take thirty to forty-five (30–45) days to receive the geological evaluation. In general the final engineering documents will not be reviewed until the other elements of a complete application have been received in accordance with 10 CSR 20-6.010 Construction and Operating Permits. All reports, plans and specifications shall be submitted at least sixty (60) days prior to the date upon which approval of the engineering documents by the department is desired or in accordance with NPDES or other schedules. For unusual or complex projects, it is suggested that the engineer meet with the appropriate department office to discuss the project and that preliminary reports be submitted for review prior to preparation of final plans and specifications.

(B) One (1) set of engineering documents should be submitted for formal approval. It shall include the engineer's report, if required, general layout and detailed plans, specifications and summary of design data. All engineering documents shall be prepared by a registered professional engineer licensed to practice in Missouri and shall bear the imprint of his/her seal and signature. If the engineering documents contain known deviations from the criteria contained in this rule, documentation and justification for the deviation should be submitted with the summary of design data. If stamped, approved copies of plans and specifications are desired, additional copies should be submitted with the original documents along with a letter indicating disposition of the extra set of plans and specifications.

(3) Engineer's Report. An engineer's report shall be submitted whenever required by the department, and for sewage works serving subdivisions or other expansible projects, or for projects which might be connected to a comprehensive system at a future date. The engineer's report referenced in subsections (2)(A) and (B) shall contain the information outlined in this section.

(A) Field Survey. The following items shall be determined and reported:

1. Nature and use of schools, resorts, subdivisions or establishments to be served by the proposed facilities;

2. Population to be served, present and ultimate, and in some cases, the twenty (20)-year population projection;

3. Character and quantity of wastes other than domestic sewage which will be discharged through the system, including present method of garbage disposal and the possibility of future disposal of garbage wastes with sewage. (Note: Method of garbage disposal is critical when designing treatment facilities to serve food service establishments.);

4. Existing sewage treatment facilities;

5. Consideration of the various sites available and the advantages of the one selected. The proximity of the site to buildings or developed areas and the possibilities of flooding of the plant site;

6. The proximity of wells, cisterns, supply lines or other water supply structures in relation to the sewage treatment facilities; and

7. The results of geological evaluations, detailed soils investigations and interpretation of any laboratory soils testing data taken from soil borings.

(B) Analysis of Field Survey Data. Review field findings to determine the best possible solution regarding location, type of treatment and population (present, twenty (20)-year projected and ultimate) to be served.

(C) Recommendations. Include recommendations in detail concerning the proposed treatment works and outline a plan for future extension of the works.

1. Alternate plans. Where two (2) or more solutions exist for a particular problem, each of which is feasible and practical, discuss the solutions and the reason for selecting the one (1) recommended.

2. Sewer system. Describe the drainage area and extent to which plans provide sewage facilities for future development.

3. Sewage treatment. Discuss the degree and type of treatment, reasons for adopting the proposed method and the provisions made for future needs.

4. Ownership and operation. State ownership and who will be responsible for the facility. Continuing authorities must be in accordance with 10 CSR 20-6.010(3).

(D) Industrial Wastewater Treatment Facilities. Industrial waste treatment facilities shall be designed based on a thorough evaluation of waste characteristics, waste treatability and

the sewer pipe. Where a bend occurs, the channel shall be curved uniformly from inlet to outlet. Changes in direction of flow should generally not exceed ninety degrees (90°). Where a junction of two (2) or more lines occurs, a separate channel shall be constructed for each incoming line with the channels gradually merging together ahead of the outlet using uniform curves. In general, the invert of any branch sewer should be slightly higher than the invert of the main sewer to avoid slack-water areas where solids may accumulate. The bench on either side of the flow channel should provide a secure footing for maintenance personnel and have enough slope to drain. A slope of one-half to one inch (.5—1.0") per foot is recommended.

4. Watertightness. Manholes shall be of the precast concrete or poured in place concrete type. Inlet and outlet pipes shall be joined to the manhole with a gasketed flexible watertight connection or any watertight connection arrangement that allows differential settlement of the pipe and manhole wall to take place. Watertight manhole covers are to be used wherever the manhole tops may be flooded by street runoff or high water. Locked manhole covers may be desirable in isolated locations where vandalism may be a problem.

5. Frame and cover. The frame and cover shall be of standard design with a minimum clear opening of twenty-two inches (22"). The frame and cover shall be designed as a unit. The cover shall be easily removable with the aid of ordinary hand tools, such as a pry bar. The cover shall be tight fitting and exclude surface water. The joint between the frame and manhole shall be watertight.

(D) Pressure Sewer Systems. A pressure sewer system is considered as two (2) or more individual pressurization units, such as grinder pumps, discharging into a common force main. Pressure sewer systems are not to be used in lieu of conventional gravity sewers but may be acceptable when it can be shown in the engineer's report that it is not feasible to provide conventional gravity sewers. When pressure sewer systems are utilized, the operating authority shall be responsible for the maintenance and operation of the individual pressurization units. When considering the use of a pressure sewer system, the problems of extreme flow variation and anaerobic conditions of the wastewater entering the treatment facility must be taken into consideration. Consideration shall also be given to the possible need for odor control facilities at receiving manholes or at the treatment facility. For pressure sewer systems to function as intended, all clear water from footing drains, basement sumps, leaky house connections and any other sources must be eliminated.

1. Design factors. Pressure sewer systems shall be laid out in a branched or tree configuration to avoid flow-splitting at branches which cannot be accurately predicted. The required pipe size shall be determined on the basis of three (3) principal criteria:

A. Velocities adequate to assure scouring should be achieved. A velocity of two to five feet (2—5') per second must be achieved at least once and preferably several times per day based on design flow.

B. Design shall be for peak sewage flow rates and negligible infiltration. Design shall be based on cumulative flow within the system. Infiltration and inflow must be considered when systems are being designed for existing residences where there is a potential for leaky house connections or leaky septic tanks.

C. Head loss should not exceed the pumping pressure capabilities. Head loss determination should be based on total dynamic head under the maximum flow expected to occur infrequently. It is recommended that a Hazen-Williams coefficient of one hundred twenty (120) be used to determine frictional head loss.

2. System arrangement. All pressure sewer pipe shall be installed at a depth sufficient to protect against freezing and mechanical damage. Attention must be given to the necessity for providing automatic air release valves at changes in slope. Release devices are required when the liquid flow velocity is insufficient to purge bubbles of trapped air. Pressure and/or flow control valves shall be installed at the end of all critical surge pipe runs in order to maintain a full pipe system and eliminate lift station flooding or plant washout. Water/sewer line crossings shall be in accordance with paragraph (9)(A)4. of this section.

3. System pressures. Pressure sewer system operating pressures in general should be in the range of twenty to forty pounds per square inch (20—40 lbs. psi) and shall not exceed sixty pounds per square inch (60 lbs. psi) for any appreciable amount of time. Provisions shall be made in both the system and the grinder pumps to protect against the creation of any long-term high pressure situations.

4. Materials. Many types of pipe materials may be used for pressure sewers. However, maximum benefit from the pressure approach can usually be achieved with nonmetallic materials such as polyethylene, fiberglass reinforced plastic and polyvinyl chloride. As a minimum the piping material should be equivalent to SDR 21 PVC pressure pipe. The small diameter service lines may be required to be constructed of a heavier pipe than SDR 21 PVC pressure pipe. Other materials may be used.

5. Service connections. Building service connections from individual grinder pumps to the collectors should be of one and one-fourth inch (1 1/4") PVC pipe and should include a full-ported valve (such as a corporation stop or "u" valve) located in the service line to isolate the pump from the main. Check valves specifically suited to wastewater service should be provided in the pressure service line before it enters the main.

6. Cleanouts and fittings. In place of manholes normally provided in gravity systems, pressure systems shall have cleanouts at intervals of approximately four hundred to five hundred feet (400—500'), at major changes of direction and where one (1) collector main joins another main. These cleanouts shall include an isolating valve and capped Y-branch fitting located on either side of the isolating valve and pointed both upstream and downstream for access during maintenance procedures.

A. Access for cleaning shall be provided at the upstream end of each main branch.

B. All appurtenances and fittings shall be compatible with the piping system used and shall be full bore with smooth interior surfaces to eliminate obstruction and keep friction loss to a minimum.

7. Pumping equipment. Proper system design and installation shall assure that each grinder pump will be able to adequately discharge into the piping system during all normal flow situations including peak design flow. Combined static, friction and miscellaneous head losses during peak design flows for given paths of flow through the system shall be maintained below the recommended operating head of any unit on the given path. The equipment shall be designed and manufactured with materials appropriate to wastewater service and shall meet all applicable safety, fire and health requirements arising from its intended use in or near residential buildings. Inside installations must be examined for freedom from noise, odors and electrical hazards. Both free-standing and below-the-floor type installations are acceptable. Outside installations shall be provided with an access from the surface which is suitably graded to prevent the entrance of surface water and equipped with a vandal-proof cover for safety. Installation of nonsubmersible grinder/macerator pumps must be protected against entrance of surface water into the electrical portions of the equipment. This

A. The duration of pressure tests shall be a minimum of one (1) hour unless otherwise directed by the engineer. Test pressure shall be fifty pounds per square inch (50 lbs. psi) minimum with a recommended pressure of two and one-half (2 1/2) times the maximum system operating pressure. All tests are to be conducted under the supervision of the engineer.

B. The pipe line shall be slowly filled with water. The specified pressure measured at the lowest point of elevation shall be applied by means of a pump connected to the pipe in a manner satisfactory to the engineer.

C. During filling of the pipe and before applying the specified pressure, all air shall be expelled from the pipeline by making taps at the point of highest elevation. After completion of the test the taps shall be tightly plugged at the main.

14. Septic tank effluent pump (STEP) systems. Septic tank effluent pump pressure sewer systems may be considered a similar application of the pressure sewer principle and the criteria contained in this rule may be used for these systems. Deviations from the criteria in this section when designing STEP systems will be judged on a case-by-case basis using substantiating information and material submitted with the design by the consulting engineer.

(10) Sewage Pumping Stations. Pumping stations serving subdivisions or other properties which might become incorporated into an existing or proposed comprehensive sewerage system at some future date shall be designed and constructed in accordance with 10 CSR 20-8.130 Sewage Pumping Stations.

(A) General. Every effort should be made to eliminate the necessity of pumping sewage in installations of the type covered in this rule.

1. Location. Sewage pumping stations should be located above the twenty-five (25)-year flood level and shall be readily accessible for maintenance. As a minimum, an unobstructed all-weather access road should be provided to the pump station.

2. Water supply protection. There shall be no physical interconnection between any potable water supply and a sewage pumping station or any of its components which under any conditions might cause contamination of a potable water supply. Sewage pumping stations shall be located at least one hundred feet (100') and preferably three hundred feet (300') from any potable water supply well.

3. Duplicate pumps required. At least two (2) pumps or pneumatic ejectors shall be provided. Each pump shall be capable of handling the design and maximum flows so that each unit is a duplicate of the other. The pump installation shall be designed to handle as a maximum flow four (4) times the average daily flow. Single pump installations may be given consideration only for very small installations, where average daily flows are less than fifteen hundred (1500) gallons per day, and only if the station is designed to permit the installation of a future duplicate unit without structural change and satisfactory means are provided to detect malfunctions and take corrective actions before an overflow to waters of the state could occur.

(B) Design Considerations. All pumps except suction-lift types shall be placed so that under normal operating conditions they will operate under a positive suction head. Design of the sewage pumping stations shall consider the following:

1. Types of pumps. Sewage pumping units may be categorized as follows: submersible pumps, pneumatic ejectors, vertical pumps and suction-lift pumps.

A. Submersible pumps shall be readily removable and replaceable without dewatering the wet well and with continuity of operation of the other unit(s) maintained. Both standard and cutter/grinder pumps are acceptable. Submersible pump installations shall be equipped with check and shutoff valves on each discharge line located in a box outside of the wet well.

B. Pneumatic ejector station structures constructed of metal shall be coated with an acceptable corrosion-resistant material and shall be supplied with two (2) properly sized anodes for cathodic protection to be buried on opposite sides of the structure and securely connected to the structure by heavy copper or aluminum wire. The air storage chamber and sewage receiving chamber (wet well) shall be capable of withstanding one hundred fifty percent (150%) of the design working pressure.

C. Suction-lift pumps shall be of the self-priming type as demonstrated by a reliable record of satisfactory operation. The total suction lift should not exceed fifteen feet (15');

2. Pump openings. Pumps shall be capable of passing a two and one-half inch (2 1/2") sphere when pumping raw sewage. These pumps shall have suction and discharge openings of at least three inches (3") in diameter. Pumps handling settled sewage need not necessarily meet these requirements depending upon the outflow design from the settling device. If cutter/grinder pumps are used, the previously mentioned requirements may be modified;

3. Accessibility. Adequate openings and facilities to permit maintenance, cleaning and removal of pumps and equipment shall be provided;

4. Protection of motors. Pump motors shall be so located to prevent damage by flooding or corrosion or otherwise satisfactorily protected from this damage;

5. Ventilation. Adequate ventilation shall be provided in all pump stations. Where the pump pit is below the ground surface, mechanical ventilation providing at least twelve (12) complete air changes per hour shall be provided. Portable ventilation equipment should be available when entrance to the wet well is required;

6. Wet wells. The wet well size and control setting shall be appropriate to avoid heat buildup in the pump motor due to frequent starting and to avoid septic conditions due to excessive detention time. The floor of the wet well shall have a minimum slope of one to one (1:1) to a hopper bottom. The horizontal area of the hopper bottom shall not be greater than necessary for proper installation and function of the inlet. The high water level in the wet well during normal operation shall be at least one foot (1') below the invert of the incoming sewer;

7. Controls. Control float bulbs, tubes, wires etc. should be located as not to be unduly affected by flows entering the wet well or by the turbulence created by the suction of the pumps. In stations with duplicate units, provision of automatic alternation of pump use shall be provided. Electrical equipment in enclosed places where hazardous gases may accumulate shall comply with the National Electrical Code for Class I Group D Division 1 locations;

8. Valves. Suitable shut-off valves shall be placed on the suction line of each pump except on submersible or suction-lift pumps. Suitable shut-off and check valves shall be placed on the discharge line of each pump. The check valve shall be located between the shut-off valve and the pump. Check valves shall not be placed on the vertical portion of discharge piping. No valves may be located in the wet well;

9. Overflows. Sewage pumping stations shall be designed to prevent bypassing of raw sewage to waters of the state and to prevent backups of sewage into buildings or property served by the sewerage system. A satisfactory method shall be provided to prevent or treat overflows. If a less preferred method is proposed, justification shall be provided for its choice. The following examples of some of the methods which will be considered are listed in order of their preference:

A. A holding basin with capacity for twenty-four (24)-hour retention of peak flows unless data justifies the use of a smaller

basin. The basin must be designed to drain back into the wet well or collection system as the influent flow recedes;

B. A portable pump capable of being connected to the pumping station or a portable generator; or

C. Storage of excess flow in trunk line sewers provided sufficient capacity for twenty-four (24)-hour storage of peak flows is available and flooding of basements will not occur; and

10. Alarm systems. Alarm systems shall be provided for all pumping stations. The alarm shall be activated in cases of power failure, pump failure or any cause of high water in the wet well. If possible, the alarm should be telemetered to a location that is manned twenty-four (24) hours per day. Audio-visual alarms with self-contained power supply shall be provided as a minimum. A sign shall be posted at each pump station in a clearly visible location, listing a telephone number to be called if the alarm is seen or heard; and

11. Instructions and equipment. Sewage pumping stations and their operators should be supplied with a complete set of operational instructions including emergency procedures, maintenance schedules, tools and spare parts as may be necessary.

(C) Force Mains. Design considerations for force mains are as follows:

1. Velocity. At design average flow, a cleansing velocity of at least two feet (2') per second shall be maintained;

2. Size. In general, three-inch (3") diameter pipe shall be the smallest used for raw sewage force mains. However, use of grinder pumps or similar equipment may allow use of smaller pipe. These instances will be reviewed on an individual basis. Piping materials may be pressure pipe normally used for conveying potable water, however the effects of surges and pressures within the system should be considered in the selection of the piping material. As a minimum SDR 21 PVC pressure pipe or its equivalent should be used. The force main and fittings including reaction blocking shall be designed to withstand normal pressure and pressure surges (water hammer);

3. Air relief valves. An automatic air relief valve shall be placed at high points in the force main to prevent air locking. However, consideration will be given to alternate proposals with proper substantiation;

4. Termination. Force mains should enter the gravity sewer system at a point no more than two feet (2') above the flow line of the receiving manhole; and

5. Water line and sewage force main separation. There shall be at least a ten-foot (10') horizontal separation between water lines and sewage force mains. There shall be an eighteen-inch (18") vertical separation at crossings as required in paragraph (9)(A)4. of this rule. Only in extenuating circumstances will deviations be allowed to these minimum separation distances.

(11) Small Wastewater Treatment Works. Treatment the extent of which will depend on 10 CSR 20-7.015 Effluent Regulations and 10 CSR 20-7.031 Water Quality Standards shall be provided in connection with all installations. Secondary treatment shall be the minimum acceptable degree of treatment. Wastewater treatment plants should be designed to provide for the estimated population and flows to be fifteen (15) or twenty (20) years hence. The following items shall be taken into consideration in planning sewage treatment works:

(A) Plant Location. In general to avoid local objections, the wastewater treatment facilities should be located as far as is practical from any present built-up area or any area which will develop within a reasonable future period. No sewage treatment facility shall be located closer than fifty feet (50') to any dwelling or establishment.

1. The treatment facility shall be located above the twenty-five (25)-year flood level.

2. An all-weather access road shall be provided from a public right-of-way to every treatment facility. Sufficient room shall be provided at the site to permit turning vehicles around. In determining the type of roadway and method of construction, consideration shall be given to the types of vehicles and equipment necessary to maintain and operate the facility. If access is required for heavy sludge trucks, the road must be of more substantial construction than one (1) used only for access of mowing equipment or other light vehicles. Gravel roads to be used by heavy vehicles shall have a minimum depth of six inches (6") of crushed rock material with a bottom layer of four inches (4") of two to three inch (2–3") size material and a top layer two inches (2") thick of three-fourths inch (3/4") size material. In general, the grade of the access road shall not exceed twelve percent (12%).

3. Wastewater treatment facilities shall not be located within one hundred feet (100'), and preferably three hundred feet (300') of any well or water supply structure;

(B) Design.

1. Type of treatment. Careful consideration should be given to the type of treatment before making a final decision. A few of the important factors to consider are the location and topography of the plant site; character and quantity of the wastes to be treated; operating costs and the probable type of supervision and maintenance the plant will receive. Particular care must be used in choosing methods of treatment for seasonal use developments, such as parks and campgrounds, and for developments which produce waste loads which fluctuate between wide extremes from day-to-day. The use of activated sludge type plants is generally not recommended for these developments because a high degree of operating efficiency for these plants is dependent in part upon a relatively stable loading condition. Where all use of the development is confined to a specific season, consideration should be given to designing lagoon systems on the draw-and-fill concept, retaining all wastewaters generated during the season of use and discharging them after an appropriate period during the off season or utilizing the stored water for irrigation.

2. New processes, methods and equipment. The policy of the department is to encourage rather than obstruct the development of new methods and equipment for the treatment of sewage wastes. The lack of inclusion in these standards of some types of wastewater treatment processes or equipment should not be construed as precluding their use. The department may approve other types of wastewater treatment processes or equipment under the following conditions:

A. The operational reliability and effectiveness of the process or device shall have been demonstrated with a suitably sized prototype unit operating at its design load conditions to the extent required by the department; and

B. The department may require test results and engineering evaluations demonstrating the efficiency of the processes or equipment. The department may also require that appropriate testing be conducted and evaluations, other than those employed by the manufacturer or developer, be made under the supervision of a competent process engineer.

3. Sewage flow and strength. Minimum design loadings for all treatment processes shall be calculated using the following table unless the engineer can document the validity of lower per capita figures based on actual waste strength and/or flow data from the development to be served or from similar developments.

Table 1

Type of Establishment	Pounds BOD per person (unless otherwise noted)	Gallons per day per person*
Employee Sanitary Waste	.05	15

8. Potable water supply protection. No piping or other connections shall exist in any part of the treatment works which, under any conditions, might cause the contamination of a potable water supply. Potable water from a municipal or other supply may be used above grade for water closet, lavatory, drinking fountain or similar fixtures. A reduced pressure backflow preventer or break tank shall be used to isolate the potable system from all plant uses other than the ones provided for in this rule. Where a break tank is used, water shall be discharged to the break tank through an air-gap at least six inches (6") above the maximum flood line, ground level or the spill line of the tank, whichever is higher. Backflow preventers shall be located above the maximum flood line or ground level. A sign shall be permanently posted at every hose bib, faucet, hydrant or sill cock located on the water system beyond the break tank or backflow preventer to indicate that the water is not safe for drinking. Where a separate nonpotable water system is to be provided, backflow prevention will not be necessary but all system outlets shall be posted with a permanent sign indicating that the water is not safe for drinking.

9. Sewage flow measurement. Flow measurement shall be provided for all wastewater treatment facilities. Flow measurement should not be less than pump calibration time clocks or calibrated flume or weir and stilling basins as required.

10. Protection from the elements. All sewage treatment facilities except those which operate only seasonally shall be designed to assure effective operation under all weather conditions. Protection from the elements must be given special consideration since small wastewater treatment facilities will frequently be located in remote areas and may not receive daily attention. Freezing temperatures affect most treatment facilities to some degree. Open sand filters and small extended aeration plants are likely to be affected the most. Provisions for covering exposed process areas with boards or insulating panels may be sufficient in many cases. The use of heat tapes around sludge and scum return piping may be helpful in addition to covering the tanks. Sufficient electrical outlets should be provided at the plant site for this purpose. Tanks which are not completely backfilled on all sides may require additional protective measures during freezing weather. Any such measures taken to comply with these provisions shall not present a hazard to the operator nor hinder the operation of the treatment facility.

11. Safety. Adequate provisions should be made to protect the operator and any visitors from unnecessary hazards.

A. All wastewater treatment facilities must be fenced sufficiently to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.

B. Fences shall be a minimum of five feet (5') in height and shall be constructed of durable materials appropriate to the site and nature of the treatment facilities. Posts shall be imbedded to a sufficient depth or otherwise securely anchored to prevent displacement and shall not be spaced more than twenty feet (20') apart. Barbed wire, woven wire fabric or chain link mesh shall be securely fastened to the posts with fasteners designed for the type of material used.

C. Fences shall be located far enough back from all process units to permit easy access for operation and maintenance and for access of mowing equipment, sludge trucks and similar equipment. A minimum four foot (4') clearance from all units is recommended.

D. Woven wire fabric will generally be acceptable for fencing lagoons and other small facilities having a minimum of mechanical equipment. The fabric should nearly touch the ground surface and should have small enough mesh in the lower two feet (2') to prevent passage of small animals. Larger and more complex treatment facilities should be provided with chain link or similar fencing.

E. At least two (2) strands of barbed wire shall be provided above the fence fabric spaced no more than six inches (6") apart.

F. At least one (1) gate shall be provided for access of maintenance equipment and vehicles and each gate shall be provided with a lock. Gates shall be constructed in a manner and of materials comparable to those used for the fence. Gates shall be designed to prohibit entry of the enclosure by crawling underneath. When sizing the gate, consideration must be given to the need for entry of mowing equipment, sludge trucks or other vehicles or equipment necessary for routine maintenance and operation.

G. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. A sign shall be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.

(12) Primary Treatment. For general requirements applicable to all types of treatment facilities, refer to section (11) of this rule.

(A) Grease Traps. Grease traps shall be provided on kitchen drain lines from institutions, hotels, restaurants, school lunch rooms and other establishments from which relatively large amounts of grease may be discharged to the treatment facility.

1. Grease traps should be located as close to the fixtures being served as possible and should receive only the waste streams from grease-producing fixtures. Sanitary waste streams, garbage grinder waste streams and other waste streams which do not include grease should be excluded from passing through the grease traps. Grease traps must be cleaned on a regular basis and must be readily accessible for this purpose.

2. Sizing of grease traps is based on wastewater flow and can be calculated from the number and kind of sinks and fixtures discharging to the trap. In addition, a grease trap should be rated on its grease retention capacity, which is the amount of grease (in pounds) that the trap can hold before its average efficiency drops below ninety percent (90%). Current practice is that grease-retention capacity in pounds should equal at least twice the flow capacity in gallons per minute. The following two (2) equations may be used to determine the capacity of grease traps for restaurants and other types of commercial facilities:

A. Restaurants.

$$D \times Gl \times Sc \times \frac{Hr}{2} \times Lf = \text{Size of grease trap in gallons, where:}$$

D = Number of seats in dining area;
Gl = Gallons of wastewater per meal, normally 5 gallons;
Sc = Storage capacity factor, minimum of 1.7;
Hr = Number of hours open; and
Lf = Loading factor,

1.25 interstate highways
1.0 other freeways
1.0 recreational areas
0.8 main highways
0.5 other highways.

B. Hospitals, nursing homes, other type commercial kitchens with varied seating capacity.

$$M \times Gl \times Sc \times 2.5 \times Lf = \text{Size of grease trapin gallons, where:}$$

M = Meals per day;
Gl = Gallons of wastewater per meal, normally 4.5;
Sc = Storage capacity factor, minimum of 1.7; and