



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
Knoxville Environmental Field Office
3711 MIDDLEBROOK PIKE
Knoxville, TN 37921
Phone 865-594-6035 Statewide 1-888-891-8332 Fax 865-594-6105

December 4, 2020

Deerfield Resort Water System
Mr. Scott Fields, Owner & Certified Operator in Direct Charge
1235 Deerfield Way
LaFollette, Tennessee 37766

RE: **Sanitary Survey of Community Water System**
Deerfield Resort Water System
PWSID #0000912
Campbell County

Dear Mr. Fields:

On October 30, 2020, personnel from the Division of Water Resources (DWR) visited the Deerfield Resorts Water System and performed a Sanitary Survey. The survey consisted of a records review to document the operational performance of the system and an on-site inspection of the water treatment and distribution system. The survey covered the time period from March 2019 to October 2020. The Division would like to thank you and Mr. Dale Baker for your courtesy in ensuring the Sanitary Survey was completed. In accordance with the Sanitary Survey Manual the Deerfield Resort Water System earned 564 points out of a possible 599 points for a numerical score of ninety-four percent (**94%**). This rating drops the Deerfield Resort Water System into the State's "**Provisionally Approved**" category.

The Division of Water Resources utilizes EPA's Enforcement Tracking Tool (ETT) in tracking violations. Violation types are assigned a point value and if a public water system reaches a point total of 11, the Division must pursue enforcement action against the public water system. Based on the current ETT listing, Deerfield Resorts Water System has an ETT score of 5. It should be noted that the water system received an enforcement order during the survey period after the ETT score reached a score of 39. The execution of the order reset the ETT score, but recent monitoring violations and inaction on addressing deficiencies are again increasing the likelihood of further enforcement action, which could be in the form of certified operator license revocation. The following deficiencies, comments, and/or recommendations as outlined in the Sanitary Survey Rating Form were identified during the survey and should be addressed as applicable:

1. Section 1: System Management and Operation

• Subsection A. Record Keeping

Division staff was able to view the water system's operation and maintenance records for 2019 and first part of 2020 on the day of the Sanitary Survey. The records related to the well sources were organized in binders and contained water system information up to the first part of 2020. There were some record groups which were not available for review at the time of the survey and were requested following the on-site inspection. To date these record groups were not provided by Deerfield Resort and point deductions were assessed as applicable later in the survey letter.

One of the record groups that were not available were customer complaints. The Division is aware of a customer complaint on Wedgewood Lane. Division staff is aware that the water system investigated and attempted corrective action, but the full extent of the complaint investigation was not documented and available. All customer complaints regarding water quality and water quantity must be documented with the customer's name, date, nature of the complaint, date of investigation, and the results or actions taken to resolve the complaint.

Another area that needs to be addressed is provision of the Consumer Confidence Report. The Division has not received a copy of the 2019 Consumer Confidence Report (CCR) that is required by Federal law to be provided to customers no later than July 1 annually. Although this is not a points deduction within the survey manual, the failure to provide a CCR is considered a reporting violation and will add to the ETT score mentioned above.

• Subsection C. Submission of Monthly Operation Reports

Over the last few surveys, Deerfield Resorts Water System has failed to submit Monthly Operation Reports (MORs) or submitted late MORs. The Division is pleased to document for this survey all MORs have been received, with a hand full being late. Please continue to submit the MORs and applicable summary forms in a timely manner. MORs must be received by the Division no later than ten days after the end of the reporting period. Copies of the MOR and summary forms should be sent to the Knoxville Environmental Field Office and copies of the summary forms should be sent to our Central Office at the following address:

Division of Water Resources, Drinking Water Program
11th Floor William Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue
Nashville, Tennessee 37243

Deerfield Resort now has the capability to accurately monitor flow from the wells with the addition of new flow meters installed in each well house. As a result, the Division will request that water pumpage for each individual well be added to the MOR each month beginning in January 2021.

• Subsection G. Enforcement

Following the last Sanitary Survey, the Division issued Director's Order DW 19-003 due to an ETT score of over 11. Several contingencies were set out in the order to Deerfield Resorts Water System to achieve. The water system was able to meet some contingencies but failed

to meet contingencies related to timely MOR submittal, monitoring of disinfection by-products, submittal of a CCR, documenting line repairs and new service taps, submitting annual flushing reports for 2019 and 2020, and having a Ground Water Under the Direct Influence study conducted on Well #9. As a result, 10 points were deducted from the Sanitary Survey score. As mentioned above, continued failure to meet Federal and State Drinking Water Regulations and allow violations to occur will result in further enforcement action that could result in license revocation for failing to use reasonable care, judgment, and the application of knowledge in operating the water system.

- **Subsection H. Emergency Operations Plan**

Deerfield Resort Water System submitted an updated Emergency Operations Plan in 2019 and received Division approval. A draft Drought Management Plan was also submitted and was found acceptable by the Division. However, the water system has not yet provided a signed copy of the drought plan indicating that the water system has adopted the provisions set out in the drought plan. Please submit a signed Drought Management Plan by **January 8, 2021**. Both documents will be required to be updated and submitted to the Division for review every three years.

2. **Section 3: Source**

- **Subsection A. Source Adequacy**

Deerfield Resort Water System now utilizes seven ground water sources to serve the water system. The Division was notified during the Sanitary Survey that Well #1 was taken out of service and will be considered an emergency source in the future.

In the last survey and again in the Director's Order issued to the water system, Deerfield Resort was directed to either produce documentation that Well #9 was at low risk to surface water influence or conduct a Ground Water Under the Direct Influence study by a specific date. At the time of this survey, the water system was not able to produce any documentation. Four points were deducted for failing to evaluate ground water source for Ground Water Under the Direct Influence of Surface Water.

- **Subsection D. Source Protection Plans**

Deerfield Resorts Water System updated their Wellhead Protection Plan / Source Water Protection Plan in January 2020. Copies of the protection plans were submitted to the Division and were available on-site at the time of the survey. The next update for the Source Water Protection Plans will be June 2023. The updates will need to be the full plan with new photos of the wellhead area.

3. **Section 4: Treatment**

- **Subsection K. Master Meter**

During the survey period, Deerfield Resorts installed new flow meters in the well house of each source. The addition of the new meters is to be commended as it will provide the water system with more accurate data on water usage and help in identifying potential water leaks in the system. The Division will require that the water system begin reporting pumpage data on or with the MOR for each well. Daily pumpage would be preferred, but total pumpage for

each well would be acceptable as well. As mentioned earlier, pumpage data should be reported beginning with the January 2021 MOR.

- **Subsection L. Maintenance of Equipment, Buildings, & Grounds**

As part of the enforcement action against Deerfield Resort Water System, the well houses had several maintenance items that needed to be addressed. The Division would like to commend the water system for not only addressing these maintenance items, but also updating the equipment within the well houses. All wellhouses now have similar treatment, storage, and sampling facilities. The water system also established a laboratory space for conducting daily and water quality parameter tests. Please continue to conduct maintenance on the well houses as needed.

4. Section 5: Monitoring, Data Verification, & Compliance

- **Subsection A. Laboratory – Process Monitoring**

As a part of each survey, Division staff observe water system personnel collect and analyze water samples as a check on using the proper test equipment and procedures. During the on-site inspection, Deerfield Resorts Water System obtained the following results:

Source	Chlorine Residual	Comments / Notes
Well#1	N/A	Out of Service
Well #2	1.2 mg/L	
Well #3	1.2 mg/L	End of Wedgewood: Turbidity-22.8 NTU, pH 7.70
Well #4	1.2 mg/L	
Well #5	1.2 mg/L	
Well #6	1.5 mg/L	
Well#9	1.2 mg/L	Turbidity: 0.28 NTU, pH 8.26
Well #10	1.2 mg/L	

Free chlorine residuals were within State and Federal drinking water limits. Turbidity and pH obtained at Well # 9 was also within State and Federal drinking water standards. In accordance with Rule 0400-45-01-.14(1)(a), State approval for the analysis of free chlorine residual is hereby granted to Mr. Scott Fields and Mr. Dale Baker. This approval is effective until the next sanitary survey and is contingent upon use of approved methodologies and proper operation of the analysis equipment. 1. The updated Drinking Water Monitoring Program for the system in accordance with Rule 0400-45-01-.17(3) is enclosed.

- **Subsection B. Bacteriological Monitoring**

As a part of each survey, Division staff request an updated count of the number of connections served. The Division requested a total connection count from Deerfield Resort Water System, but the Division has not received any response to date. The last count was listed as 437 connections, which when multiplied by the Campbell County household factor of 2.49 results in an estimated population served of 1,088. Based on the number of well sources serving the water system, Deerfield Resort Water system will collect 7 bacteriological samples each month.

- **Subsection G. Primary Chemicals Monitoring**

During the survey period, Deerfield Resort Water System incurred several primary monitoring violations. Three points were deducted from the survey score for this failure to monitor. The following primary violations were incurred by the water system and will require a Tier 3 public notice be provided to customers within one year of the violation occurring:

Parameter	When monitoring was due:
Synthetic Organics (Simazine, Atrazine, Lasso)	All wells, April – June 2020
Volatile Organics – 1 st quarter following detect	Well #1, January 2020 – March 2020
Volatile Organics – 2 nd quarter following detect	Well #1, April 2020 – June 2020
Volatile Organics – 3 rd quarter following detect	Well #1, July 2020 – Sept. 2020

Based on the Division's records and those records available on the day of the survey, Deerfield Resort Water System still needs to sample each well source for Nitrate in 2020. Please ensure that these samples are collected to avoid any further monitoring violations and refer to the water system's 2020 – 2022 chemical monitoring waiver letter dated January 31, 2020.

- **Subsection I. Lead & Copper Monitoring**

Deerfield Resort Water System was required to sample 10 sites for reduced Lead and Copper between June and September 2018. The water system failed to complete this monitoring and incurred a monitoring violation. This also resulted in the water system returning to routine monitoring and being required to conduct two consecutive, six month monitoring events for Lead and Copper. It also required the water system to conduct 12 months of water quality parameters. With the assistance of Communities Unlimited, Deerfield Resort conducted its first six month monitoring event between July 2019 and December 2019. The second six month event has not been completed to date. Evidence of water quality parameter monitoring could also not be provided at the time of the survey or following the survey. Three points were deducted from the survey score for the failure to monitor Lead and Copper along with water quality parameters.

Deerfield Resort Water System will not be able to get out from conducting this monitoring until the full requirements are met. Please ensure that 20 sites are sampled for Lead and Copper for two consecutive six month monitoring periods. Water quality parameters conducted for one year must also be completed before the monitoring can be reduced or ceased.

- **Subsection K. Disinfection / Disinfection By-Products & Precursor Monitoring**

Deerfield Resorts Water System is required to monitor for disinfection by-products (DBP) annually in September. During 2020, the water system failed to collect their required annual DBP sample and incurred a monitoring violation. Three points were deducted from the survey score for this violation. A Tier III public notice is required to be provided to customers within one year of the violation occurring.

5. Section 8: Distribution System & Cross Connection Controls

- **Subsection A. Notification, Inspection, Disinfection, & Sample Collection of New or Existing Facilities**

During the survey period, Deerfield Resort Water System replaced the piping in the well houses, which the Division commends the water system from a maintenance standpoint. However, at the time of the on-site inspection, records showing the new piping was properly disinfected and a bacteriological sample collected to show the effectiveness of the disinfection process was not available. With Deerfield Resort's sources being classified as at low risk to surface water influence, it is critical that any work conducted on piping be properly disinfected to avoid contamination of the drinking water. The Division was also made aware of other line repairs that occurred during the survey period without any available documentation at the time of the on-site inspection. Five points were deducted from the survey score for the lack of disinfection and sampling on the wellhouse pipe replacement and failure to document line repairs.

During the on-site inspection, Division staff learned that approximately five new service taps were added to the water system. However, the water system could not produce any record of the service tap being flushed and a chlorine residual collected as required by Division Rule. Three points were deducted from the Sanitary Survey score for failing to properly document new service taps.

In working with Communities Unlimited, Deerfield Resort Water System created a Distribution Standard Operating Procedure (SOP) and provided a copy to the Division. The Division would encourage the water system to review the SOP and follow the directives included within the document regarding line repairs and new service taps.

- **Subsection B. Flushing Program / Blow-offs**

The water system received at least one customer complaint during the survey period as the customer ultimately contacted the Division about the on-going issue. Although the issue appeared to be addressed after several weeks of on-going issues, Division staff had water system staff flush the end of Wedgewood Lane. Division staff noted high turbidity due to the presence of sand. Water system staff indicated that they would begin flushing the dead-end monthly to see if this would alleviate any remaining sand within the water system. In addition, the to the complaint, the water system was unable to provide flushing records for the survey period. Four points were deducted from the survey score for the failure to provide an active flushing program and lack of flushing that resulted in water quality issues.

- **Subsection E. Map of Distribution System**

Deerfield Resort Water System serves over fifty connections and is required to maintain a map of the water system showing the water main locations, main sizes, appurtenances. A copy of the water system map must be submitted to the Division every five years. In the past the Division has received a general layout map. However, Deerfield Resort Water System is large enough that they must provide a more accurate map that provides the required information by rule. The Division will once again request that a map of the water system showing water main locations and sizes, valve locations, and other appurtenances be provided by **March 26, 2021**.

- **Subsection G. Working Cross Connection Program**

Deerfield Resort Water System updated their cross connection policy and plan with the assistance of Communities Unlimited. A copy of the signed and executed document was provided to the Division. In addition, cross connection surveys were sent out to residents with about 20% responding back. In the customer response, several residents indicated that there was a back-flow prevention assemblies present or were unsure. Other customers reported that they have irrigation systems without any back-flow prevention assemblies. Although the water system is to be commended on establishing an active and on-going cross connection program, the Division would encourage water system personnel to verify these sites to ensure that potential cross connections are removed and that back-flow prevention assemblies are being tested every twelve months.

Again, I would like to thank Deerfield Resort Water System personnel for their assistance and courtesy. Although there have not been any Maximum Contaminant Level exceedances documented, it is difficult to fully determine the quality of the water when testing is not conducted. Deerfield Resort Water System provides water to over 400 customers who are depending on Deerfield Resort Water System to protect their drinking water each and every day. It is important that as the owner of the water system, you provide better oversight of the water system or take steps to ensure that the water system is adequately operated to protect the water system's customers. The Division will request that you provide a response, within forty-five days, on how Deerfield Resort Water System will address the above issues and begin maintaining compliance with Division Rules. If you have any questions or need additional information, please contact me at the (865) 594-5564 or Mr. Robert Ramsey at (865) 594-5515 at the Knoxville Environmental Field Office.

Sincerely,



Erich Webber, Environmental Consultant
Knoxville Environmental Field Office
Division of Water Resources

cc: Mr. Dale Baker, Water System Assistant, Deerfield Resort Water System (via email)

DRINKING WATER MONITORING PROGRAM
Deerfield Resort Water System
Water Treatment 1 / Distribution 2
PWSID#0000912, Campbell County
January 2020

The following Drinking Water Monitoring Program (DWMP) has been developed in accordance with Division Rule 0400-45-01-.17(3) and other applicable drinking water regulations. Unless otherwise noted, all results must be reported on the Monthly Operations Report (MOR). Please place this monitoring program in an easily accessible location for water system personnel to review.

Finished Water: Collect a representative sample after disinfection for each well in service.	
Parameter	Frequency
Chlorine residual, free	Daily grab from each well in accordance with Ground Water Rule
Flow / Pumpage	Document daily pumpage for each well

Distribution System	
Bacteriological	Seven (7) samples per month based on active well sources at time of issuance. Samples must be analyzed by a State Certified laboratory. Free chlorine residual must be collected at the same time and frequency of bacteriological sample.

Sanitary Survey Rating

PWSID: TN0000912

Water System Name: Deerfield Resort Water System

Survey Date: 30-Oct-20

System Category (Points): 421
488
599

421 - Consecutive Systems/Distribution Only
488 - Treatment Systems/Wholesalers
599 - Both Treatment and Distribution

1. System Management and Operation (94)

	Requirement	Points Range	Deduction	Comments
A.	Record Keeping 0400-45-01-.20	(0)	Narrative	Records were mostly organized except for 2020. Complaint records unavailable.
B.	Construction Projects 0400-45-01-.05, 0400-45-01-.17	(1-5)	0	No new construction in system, but well houses were reworked, new well source discussed
C.	Submission of Monthly Operations Reports 0400-45-01-.17	(0)	Narrative	Late submittal of MORs, but all submitted since last survey. Add pumpage to MORs
D.	Reporting Requirements 0400-45-01-18	(4-30)	0	No known major issues during the survey period.
E.	Public Notification 0400-45-01-.19	(3-10)	0	Public notification for several monitoring violations incurred in 2020.
F.	Facility Maintenance Fee	(0)	Narrative	Okay
G.	Enforcement - TCA §68-221-701 et seq	(4-10)	10	Director's Order DW 19-003, failed to meet schedules included in order
H.	Emergency Operations Plan 0400-45-01-.17	(3)	0	EOP submitted and approved in 2019, signed drought plan still needed.
Deficiency Subtotal			10	

2. Operator Compliance (23)

	Requirement	Points Range	Deduction	Comments
A.	Certified Operator – Plant and Distribution System 0400-45-01-.17(1) and 0400-49-01- 04	(3-15)		Scott Fields WT1, DS1
Deficiency Subtotal			0	

3. Source (25)

	Requirement	Points Range	Deduction	Comments
A.	Source Adequacy 0400-45-01-.02, .05, .16, .17(13) and .34(3)	(3-5)	4	Seven wells. Well 1 taken out of service at time of survey. No GWUDI Determination for Well 9
B.	Intake 0400-45-01-.05, .17	(2)		N/A
C.	Wellhead/Springbox Construction 0400-45- 01-.05(12),16 and 17(3) and (16)	(2)		Okay, well houses rehabbed.
D.	Source Protection Plans 0400-45-01-.34	(1-2)	0	Wellhead Protection Plans submitted January 2020
Deficiency Subtotal			4	

4. Treatment (153)

	Requirement	Points Range	Deduction	Comments
A.	Aerator 0400-45-01-.05, .17	(2)		N/A
B.	Chemicals / Chemical Feeders 0400-45-01- .05 (8) and .17,36	(2)		Sodium hypochlorite for disinfection
C.	Mixing 0400-45-01-.02, .05, .17	(2)		N/A
D.	Flocculation 0400-45-01-.02, .05, .17	(2)		N/A
E.	Sedimentation 0400-45-01-.02, .05, .17	(2)		Wells 3 & 4 have sand separators installed as treatment.
F.	Filtration / Alternative Technology 0400-45- 01-.17(12) and (27)	(2-30)		N/A
G.	Re-Wash / Filter-to-Waste 0400-45-01- .17(35)	(2)		N/A
H.	Turbidimeters / Calibration 0400-45-01- .05(11), .17, .31, .39	(2-4)		N/A
I.	Disinfection/Calibration 0400-45-01-.02, .17, .31, .36	(2-30)		HACH Color Wheel used for daily chlorine residual monitoring
J.	Disinfection Contact Time 0400-45-01-.02, .17,31	(2-4)		Okay, may need to update CT times
K.	Master Meter 0400-45-01.17(2) and (3)	(1-2)		New flow meters installed, recommend that they be calibrated annually
L.	Maintenance of Equipment, Buildings and Grounds 0400-45-01-.02, .17(3), (17) and (19)	(1)		Well houses have been updated
M.	Laboratory Facilities 0400-45-01-.02, .14, .17(3)	(1-3)		Okay. New laboratory area set-up at Mr. Fields residence
N.	Safety 0400-45-01-.02	(2)		Okay
O.	Sludge Handling/Backwash Handling 0400- 45-01-.05	(2)		N/A
P.	Sanitary Conditions 0400-45-01-.17(17)	(2)		Okay
Q.	Fluoridation Techniques 0400-45-01-.06, .12, .17	(2)		N/A
R.	Design Capacity 0400-45-01-.05(10)	(2-4)		Okay
S.	Filter Backwash Recycling 0400-45-01-.31(9)	(1)		N/A
Deficiency Subtotal			0	

5. Monitoring, Data Verification and Compliance (175)

	Requirement	Points Range	Deduction	Comments
A.	Laboratory-Process Monitoring (excluding Turbidity and Chlorine Residual) 0400-45-01-17(3)	(2-4)	0	Chlorine residuals collected at each well site visited
B.	Bacteriological Monitoring	(3-6)	0	RTCR bacteriological sample site plan submitted in 2019
C.	Bacteriological Compliance 0400-45-01-.06	(4-7)		Okay
D.	Turbidity Monitoring	(2-3)		N/A
E.	Turbidity Compliance	(4-7)		N/A
F.	Chlorine Residual Monitoring 0400-45-01-.17,31,36, 40	(2-3)		Okay
G.	Primary Chemicals Monitoring	(2-3)	3	Missed SOC, Quarterly VOC (Well 1) in 2020
H.	Primary Chemicals Compliance	(4)		Okay
I.	Lead and Copper Monitoring 0400-45-01-.33	(2-3)	3	Failed to sample for January 2020 -June 2020
J.	Lead and Copper Action Level 0400-45-01-.33	(3-5)		Okay on collected samples
K.	Disinfection/Disinfection By-Products and Precursors Monitoring 0400-45-01-.36, .37, .38	(2-3)	3	Missed 2020 DBP monitoring
L.	Disinfection/Disinfection By-Products and Precursors Compliance 0400-45-01-.06, .36	(2-30)	0	Monitoring conducted only in 2019 during survey period, no issues.
M.	Secondary Chemicals 0400-45-01-.12	(2)		Okay
N.	Secondary Chemicals Compliance 0400-45-01-.12	(3)		Okay
O.	Cryptosporidium Monitoring 0400-45-01-.39	(0)	Narrative	N/A
Deficiency Subtotal			9	

6. Finished Water Storage (25)

	Requirement	Points Range	Deduction	Comments
A.	Adequate Storage 0400-45-01-.17(14)	(3-15)	0	Pressure tanks in each well house
B.	Inspection and Maintenance of Reservoirs, Tanks and Clearwell 0400-45-01-.17(16), (17), (33) and (34)	(1-10)	0	New pressure tanks installed since last survey.
Deficiency Subtotal			0	

7. Pumps, Pump Facilities and Controls (18)

	Requirement	Points Range	Deduction	Comments
A.	Pump Facilities 0400-45-01-.17(9) and (13)	(1-4)		Okay
B	Maintenance of Pumping Equipment 0400-45 - 01-.17(13)	(1-3)		Okay
Deficiency Subtotal			0	

8. Distribution System and Cross Connection Controls (86)

	Requirement	Points Range	Deduction	Comments
A.	Notification, Inspection, Disinfection and Sample Collection of New or Existing Facilities 0400-45-01-.17(8), (19)	(3-5)	8	No disinfection documented for well house reworks, no chlorine on new service taps
B	Flushing Program / Blow Offs 0400-45-01-.17(10) and (23)	(3-4)	4	No flushing records, Ferrar complaint due to lack of flushing
C.	Fire Hydrants 0400-45-01-.17(18)	(0)	Narrative	Fire hydrants cannot not meet fire flow, notification provided in 2019. Fire hydrant policy develop.
D.	Adequate Pressure 0400-45-01-.17(9)	(5)		Okay, no known complaints of low water pressure
E.	Map of Distribution System 0400-45-01-.17(15)	(3)	0	Need detailed map of distribution system
F.	Approved Cross Connection Policy or Ordinance and Plan 0400-45-01-.17(6)	(4)	0	Cross-Connection Policy and Plan updated in 2019
G.	Working Cross Connection Program 0400- 45-01-.17(6)	(3-9)	0	No known back-flow prevention assemblies in water system, but surveys show possible hazards
H.	Percent Estimated Water Loss(real loss/water produced)	(0)	Narrative	Unknown
Deficiency Subtotal			12	

Rating

95% - 100% Approved
 90% - 94% Provisionally Approved
 0% - 89 % Unsatisfactory

Total Deficiency Points	-35
Overall Rating	564
	94.16%

Inspectors Signature

Ch. Webb

Additional Comments/Explanation: