



TechRate

AUDIT COMPANY

MoonBear

Smart Contract Security Audit

Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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The analysis of the security is purely based on the smart contracts alone. No applications or operations were reviewed for security. No product code has been reviewed.

Background

TechRate was commissioned by MoonBear to perform an audit of smart contracts:

Testnet

- <https://testnet.bscscan.com/address/0x7fd3d9f5ac1c283ee2c889748e9d10192eec5c8b#code> (MoonBear)
- <https://testnet.bscscan.com/address/0x2CC9f34Bccf5D3a4F279F8F5bAC8904d16a34f5E#code> (StableDistributor)
- <https://testnet.bscscan.com/address/0xb9d87bec7d92f7E38771045215abB6cB95e36cc#code> (TokenSale)

Mainnet

- <https://bscscan.com/address/0xe42239c0a910ecc7675f74e6cc6c59900e6da5f0#code> (MoonBear)
- <https://bscscan.com/address/0x9830C73d6Cd370B084ff4Bb8c68EF68B768290Cd#code> (StableDistributor)
- <https://bscscan.com/address/0x796e716317c6c05279F9c2b5553F80900D37Ae34#code> (TokenSale)

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

Issues Checking Status

Issue description	Checking status
1. Compiler errors.	Passed
2. Race conditions and Reentrancy. Cross-function race conditions.	Passed
3. Possible delays in data delivery.	Passed
4. Oracle calls.	Passed
5. Front running.	Passed
6. Timestamp dependence.	Passed
7. Integer Overflow and Underflow.	Passed
8. DoS with Revert.	Passed
9. DoS with block gas limit.	Passed
10. Methods execution permissions.	Passed
11. Economy model of the contract.	Passed
12. The impact of the exchange rate on the logic.	Passed
13. Private user data leaks.	Passed
14. Malicious Event log.	Passed
15. Scoping and Declarations.	Passed
16. Uninitialized storage pointers.	Passed
17. Arithmetic accuracy.	Passed
18. Design Logic.	Passed
19. Cross-function race conditions.	Passed
20. Safe Open Zeppelin contracts implementation and usage.	Passed
21. Fallback function security.	Passed

Security Issues

✓ High Severity Issues

1. ~~Logical issue~~ (fixed)

Issue:

- The function `includeInFee()` in MoonBear contract follows the logic of `excludeFromFee()` function.

Recommendation:

The function should set `false` instead of `true`.

✓ Medium Severity Issues

1. ~~Cycle error~~ (fixed)

Issue:

- The function `withdrawableBalance()` in MoonBearTokenSale contract has loop that will throw an error if every `unlockTime` property of `releaseSchedule` list is greater than current time.

Recommendation:

Set strict inequality in loop condition and inside the loop use `i - 1` index.

2. ~~No buyback~~ (fixed)

Issue:

- The function `_swapAndLiquify()` in MoonBear contract adds to liquidity BNB amount calculated by getting part of contracts balance. That logic can turn off any buybacks if `buybackAmount` is bigger than left balance after adding liquidity.

Recommendation:

Create variables to calculate buyback and liquidity funds separately.

3. ~~Exchange calculation~~ (fixed)

Issue:

- The function `calculatePurchaseAmount()` in MoonBearTokenSale contract does not take into consideration token decimals and has unusual calculation with pre-multiplying.

Recommendation:

Put all exchanging logic to one rate variable. Make it clear.

✓ Low Severity Issues

1. Calculation mistake (fixed)

Issue:

- The function `_burnAndReflectFee()` calculates burn and reflect shares but increasing `tFeeTotal` on half of all `tFee`.

Recommendation:

Add only reflect share to `tFeeTotal`.

2. Out of gas (fixed)

Issue:

- The function `includeInReward()` uses the loop to find and remove addresses from the `_excluded` list. Function will be aborted with `OUT_OF_GAS` exception if there will be a long excluded addresses list.
- The function `_getCurrentSupply` also uses the loop for evaluating total supply. It also could be aborted with `OUT_OF_GAS` exception if there will be a long excluded addresses list.

Recommendation:

Check that the excluded array length is not too big.

3. Centralized risk (fixed)

Issue:

- The function `addLiquidityETH()` sends owner addresses as `to` parameter. Owner address will acquire the generated LP tokens and after while accumulate a huge portion of LP tokens. It's unsecure to hold on one centralized address such a significant portion.

Recommendation:

Send contract or zero address as `to` parameter.

4. Wrong update (fixed)

Issue:

- The function `updatePendingAmounts()` in `StableDistributor` contract updates `lastDistributedTimeStamp` variable in any case.

Recommendation:

Remove timestamp checking or put updating variable inside of condition scope.

Owner privileges (In the period when the owner is not renounced)

MoonBear:

- Owner can pause and unpause.
- Owner can change the burn, reflection, liquidity, buyback and stable fee precents.
- Owner can change stable and buyback wallets.
- Owner can change the maximum transaction amount.
- Owner can exclude(include) from the fee and from rewards.
- Owner can change minimum tokens number to start swapping for liquidity.
- Owner can enable/disable swap and liquify feature.
- Owner can enable/disable buyback feature.
- Owner can change buyback amount.
- Owner can change router and pairs.

MoonBearTokenSale:

- Owner can enable/disable white list checking feature.
- Owner can withdraw BNB and not sold tokens.
- Owner can change:
 - sale start time;
 - sale duration;
 - white list members;
 - released status;
 - withdrawal wallet;

StableDistributor:

- Owner can add and remove member.
- Owner can call release function to all members.
- Owner can change allocation points of member.

Conclusion

Smart contracts do not contain any high issues!

TechRate note:

Please check the disclaimer above and note, the audit makes no statements or warranties on business model, investment attractiveness or code sustainability. The report is provided for the only contract mentioned in the report and does not include any other potential contracts deployed by Owner.