AuditAce
FROM INCEPTION TO SUCCESS

Smart Contract Audit

FOR

MTKP

DATED : 17 MAY 23'

AUDIT SUMMARY

Project name – MTKP

Date: 17 May, 2023

Scope of Audit- Audit Ace was consulted to conduct the smart contract audit of the solidity source codes.

Audit Status: **Passed**

Issues Found

Status	Critical	High	Medium	Low	Suggestion
Open	0	0	0	3	2
Acknowledged	0	0	0	0	0
Resolved	0	0	0	0	0

USED TOOLS

Tools:

1.Manual Review: The code has undergone a line-by-line review by the **Ace** team.

2.BSC Test Network: All tests were conducted on the BSC Test network, and each test has a corresponding transaction attached to it. These tests can be found in the "Functional Tests" section of the report.

3.Slither: The code has undergone static analysis using Slither.

Testnet version:
The tests were performed using the contract deployed on the BSC Testnet, which can be found at the following address:
https://testnet.bscscan.com/token/0xb8373e226b8a6ed1c91845cbffe308703a0da4e0

Token Information

Name : Peg-Martik

Symbol : MTKP

Decimals: 18

Network: BSC

Token Type: BEP20

Token Address: ---

Owner: ---(at time of writing the audit)

Deployer:---

Token Information

Fees:

Buy Fees: 0-10%

Sell Fees: 0-10%

Transfer Fees: 0-10%

Fees Privilige: Owner

Ownership : Owned

Minting: None

Max Tx Amount/ Max Wallet Amount: No

Blacklist: No

Other Priviliges: Including and excluding form fee - changing dividend token - changing fees

AUDIT METHODOLOGY

The auditing process will follow a routine as special considerations by Auditace:

- Review of the specifications, sources, and instructions provided to Auditace to make sure the contract logic meets the intentions of the client without exposing the user's funds to risk.
- Manual review of the entire codebase by our experts, which is the process of reading source code line-by-line in an attempt to identify potential vulnerabilities.
- Specification comparison is the process of checking whether the code does what the specifications, sources, and instructions provided to Auditace describe.
- Test coverage analysis determines whether the test cases are covering the code and how much code isexercised when we run the test cases.
- Symbolic execution is analysing a program to determine what inputs cause each part of a program to execute.
- Reviewing the codebase to improve maintainability, security, and control based on the established industry and academic practices.

VULNERABILITY CHECKLIST

- ✓ Return values of low-level calls
- ✓ Private modifier
- ✓ Multiple Sends
- ✓ Using Suicide
- ✓ Gas Limitand Loops
- ✓ Address hardcoded
- ✓ Exception Disorder
- ✓ Using inline assembly
- ✓ Divide before multiply
- ✓ Missing Zero Address Validation
- ✓ Compiler version not fixed
- ✓ **Gasless Send**
- ✓ Using block.timestamp
- ✓ Re-entrancy
- ✓ Tautology or contradiction
- ✓ Timestamp Dependence
- ✓ Revert/require functions
- ✓ Use of tx.origin
- ✓ Integer overflow/underflow
- ✓ Dangerous strict equalities
- ✓ Using SHA3
- ✓ Using throw

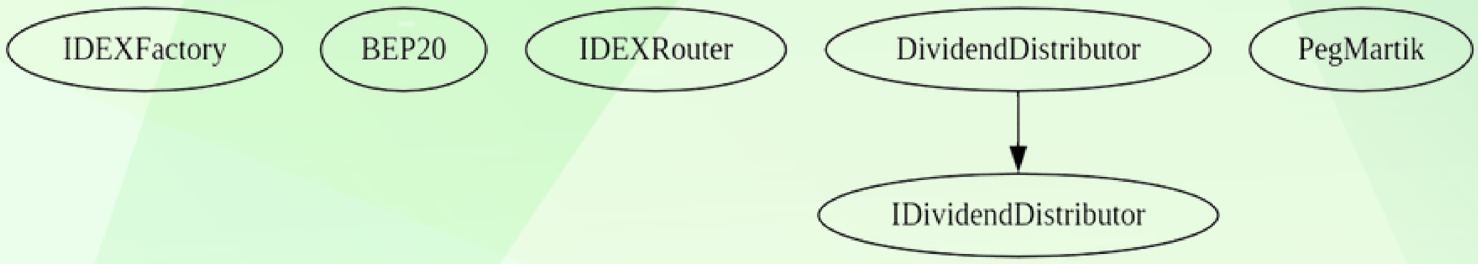
CLASSIFICATION OF RISK

Severity	Description
🟥 Critical	These vulnerabilities could be exploited easily and can lead to asset loss, data loss, asset, or data manipulation. They should be fixed right away.
🟫 High-Risk	A vulnerability that affects the desired outcome when using a contract, or provides the opportunity to use a contract in an unintended way.
🟧 Medium-Risk	A vulnerability that could affect the desired outcome of executing the contract in a specific scenario.
🟨 Low-Risk	A vulnerability that does not have a significant impact on possible scenarios for the use of the contract and is probably subjective.
🟦 Gas Optimization /Suggestion	A vulnerability that has an informational character but is not affecting any of the code.

Findings

Severity	Found
🟥 Critical	0
🟫 High-Risk	0
🟧 Medium-Risk	0
🟨 Low-Risk	3
🟦 Gas Optimization / Suggestions	2

INHERITANCE TREE



POINTS TO NOTE

- Owner is not able to change buy/sell/transfer fees over 10% each
- Owner is not able to blacklist an arbitrary address.
- Owner is not able to disable trades
- Owner is not able to set max buy/sell/transfer/hold amount to 0
- Owner is not able to mint new tokens

CONTRACT ASSESMENT

```
| Contract | Type | Bases | | |
|:----------:|:-------------------:|:----------------:|:---------------:|:---------------:|
| └ | **Function Name** | **Visibility** | **Mutability** | **Modifiers** |
||||||
| **IDEXFactory** | Interface | |||
| └ | createPair | External ❗ | 🛑 |NO ❗ |
||||||
| **BEP20** | Interface | |||
| └ | balanceOf | External ❗ | |NO ❗ |
| └ | transfer | External ❗ | 🛑 |NO ❗ |
| └ | approve | External ❗ | 🛑 |NO ❗ |
| └ | transferFrom | External ❗ | 🛑 |NO ❗ |
||||||
| **IDEXRouter** | Interface | |||
| └ | factory | External ❗ | |NO ❗ |
| └ | WETH | External ❗ | |NO ❗ |
| └ | addLiquidityETH | External ❗ | 💵 |NO ❗ |
| └ | swapExactTokensForETHSupportingFeeOnTransferTokens | External ❗ | 🛑 |NO ❗ |
| └ | swapExactETHForTokensSupportingFeeOnTransferTokens | External ❗ | 💵 |NO ❗ |
| └ | getAmountsOut | External ❗ | |NO ❗ |
||||||
| **IDividendDistributor** | Interface | |||
| └ | setDistributionCriteria | External ❗ | 🛑 |NO ❗ |
| └ | setShare | External ❗ | 🛑 |NO ❗ |
| └ | deposit | External ❗ | 💵 |NO ❗ |
| └ | process | External ❗ | 🛑 |NO ❗ |
||||||
| **DividendDistributor** | Implementation | IDividendDistributor |||
| └ | <Constructor> | Public ❗ | 🛑 |NO ❗ |
| └ | setDistributionCriteria | External ❗ | 🛑 | onlyToken |
| └ | setShare | External ❗ | 🛑 | onlyToken |
| └ | deposit | External ❗ | 💵 | onlyToken |
| └ | process | External ❗ | 🛑 | onlyToken |
| └ | shouldDistribute | Internal 🔒 | | |
| └ | distributeDividend | Internal 🔒 | 🛑 | |
| └ | claimDividend | External ❗ | 🛑 | onlyToken |
| └ | getUnpaidEarnings | Public ❗ | |NO ❗ |
| └ | getCumulativeDividends | Internal 🔒 | | |
| └ | addShareholder | Internal 🔒 | 🛑 | |
| └ | removeShareholder | Internal 🔒 | 🛑 | |
| └ | setDividendTokenAddress | External ❗ | 🛑 | onlyToken |
||||||
| **PegMartik** | Implementation | |||
```

CONTRACT ASSESMENT

```
| └ | <Constructor> | Public ❗️ | 🛑  |NO ❗️ |
| └ | <Receive Ether> | External ❗️ | 💵 |NO ❗️ |
| └ | totalSupply | External ❗️ |   |NO ❗️ |
| └ | owner | Public ❗️ |   |NO ❗️ |
| └ | decimals | External ❗️ |   |NO ❗️ |
| └ | symbol | External ❗️ |   |NO ❗️ |
| └ | name | External ❗️ |   |NO ❗️ |
| └ | getOwner | External ❗️ |   |NO ❗️ |
| └ | balanceOf | Public ❗️ |   |NO ❗️ |
| └ | allowance | External ❗️ |   |NO ❗️ |
| └ | transfer | External ❗️ | 🛑  |NO ❗️ |
| └ | approve | Public ❗️ | 🛑  |NO ❗️ |
| └ | transferFrom | External ❗️ | 🛑  |NO ❗️ |
| └ | setPair | Public ❗️ | 🛑  | onlyOwner |
| └ | excludeFromFee | Public ❗️ | 🛑  | onlyOwner |
| └ | includeInFee | Public ❗️ | 🛑  | onlyOwner |
| └ | setDividendExempt | Public ❗️ | 🛑  | onlyOwner |
| └ | isExcludedFromFee | Public ❗️ |   |NO ❗️ |
| └ | _burn | Internal 🔒 | 🛑  | |
| └ | toMartik | External ❗️ | 🛑  |NO ❗️ |
| └ | toPegMartik | External ❗️ | 🛑  |NO ❗️ |
| └ | setmigrate | External ❗️ | 🛑  | onlyOwner |
| └ | _burnIN | Internal 🔒 | 🛑  | |
| └ | shouldSwapBack | Internal 🔒 |   | |
| └ | setmarketingFeeReceivers | External ❗️ | 🛑  | onlyOwner |
| └ | setbuytokensReceiver | External ❗️ | 🛑  | onlyOwner |
| └ | setSwapBackSettings | External ❗️ | 🛑  | onlyOwner |
| └ | value | Public ❗️ |   |NO ❗️ |
| └ | _isSell | Internal 🔒 |   | |
| └ | BURNFEE | Internal 🔒 |   | |
| └ | MKTFEE | Internal 🔒 |   | |
| └ | LIQUIFYFEE | Internal 🔒 |   | |
| └ | REFPOOLFEE | Internal 🔒 |   | |
| └ | _transferFrom | Internal 🔒 | 🛑  | |
| └ | _basicTransfer | Internal 🔒 | 🛑  | |
| └ | _txTransfer | Internal 🔒 | 🛑  | |
| └ | getamount | Internal 🔒 |   | |
| └ | swapBack | Internal 🔒 | 🛑  | swapping |
| └ | setFees | External ❗️ | 🛑  | onlyOwner |
| └ | multiTransfer | External ❗️ | 🛑  |NO ❗️ |
| └ | manualSend | External ❗️ | 🛑  | onlyOwner |
| └ | setDistributionCriteria | External ❗️ | 🛑  | onlyOwner |
```

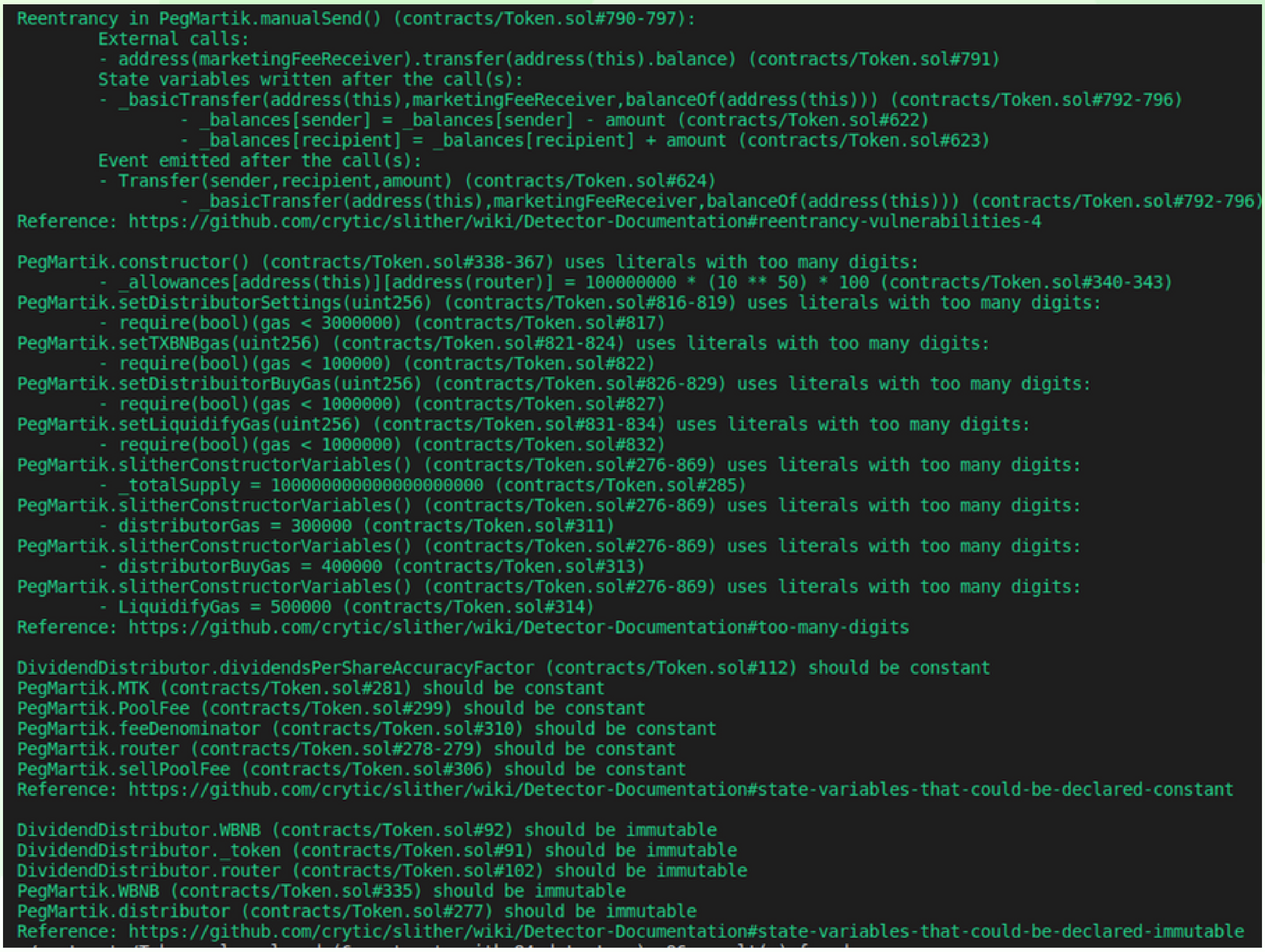
CONTRACT ASSESMENT

└	claimDividend	External ❗	🛑	NO ❗
└	getUnpaidEarnings	Public ❗		NO ❗
└	setDistributorSettings	External ❗	🛑	onlyOwner
└	setTXBNBgas	External ❗	🛑	onlyOwner
└	setDistribuitorBuyGas	External ❗	🛑	onlyOwner
└	setLiquidifyGas	External ❗	🛑	onlyOwner
└	setDividendToken	External ❗	🛑	onlyOwner
└	renounceOwnership	Public ❗	🛑	onlyOwner
└	transferOwnership	Public ❗	🛑	onlyOwner
└	_transferOwnership	Internal 🔒	🛑	

Legend

Symbol	Meaning
🛑	Function can modify state
💵	Function is payable

STATIC ANALYSIS



```
Reentrancy in PegMartik.manualSend() (contracts/Token.sol#790-797):
        External calls:
        - address(marketingFeeReceiver).transfer(address(this).balance) (contracts/Token.sol#791)
        State variables written after the call(s):
        - _basicTransfer(address(this),marketingFeeReceiver,balanceOf(address(this))) (contracts/Token.sol#792-796)
                - _balances[sender] = _balances[sender] - amount (contracts/Token.sol#622)
                - _balances[recipient] = _balances[recipient] + amount (contracts/Token.sol#623)
        Event emitted after the call(s):
        - Transfer(sender,recipient,amount) (contracts/Token.sol#624)
                - _basicTransfer(address(this),marketingFeeReceiver,balanceOf(address(this))) (contracts/Token.sol#792-796)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-4

PegMartik.constructor() (contracts/Token.sol#338-367) uses literals with too many digits:
        - _allowances[address(this)][address(router)] = 100000000 * (10 ** 50) * 100 (contracts/Token.sol#340-343)
PegMartik.setDistributorSettings(uint256) (contracts/Token.sol#816-819) uses literals with too many digits:
        - require(bool)(gas < 3000000) (contracts/Token.sol#817)
PegMartik.setTXBNBgas(uint256) (contracts/Token.sol#821-824) uses literals with too many digits:
        - require(bool)(gas < 100000) (contracts/Token.sol#822)
PegMartik.setDistribuitorBuyGas(uint256) (contracts/Token.sol#826-829) uses literals with too many digits:
        - require(bool)(gas < 1000000) (contracts/Token.sol#827)
PegMartik.setLiquidifyGas(uint256) (contracts/Token.sol#831-834) uses literals with too many digits:
        - require(bool)(gas < 1000000) (contracts/Token.sol#832)
PegMartik.slitherConstructorVariables() (contracts/Token.sol#276-869) uses literals with too many digits:
        - _totalSupply = 1000000000000000000000 (contracts/Token.sol#285)
PegMartik.slitherConstructorVariables() (contracts/Token.sol#276-869) uses literals with too many digits:
        - distributorGas = 300000 (contracts/Token.sol#311)
PegMartik.slitherConstructorVariables() (contracts/Token.sol#276-869) uses literals with too many digits:
        - distributorBuyGas = 400000 (contracts/Token.sol#313)
PegMartik.slitherConstructorVariables() (contracts/Token.sol#276-869) uses literals with too many digits:
        - LiquidifyGas = 500000 (contracts/Token.sol#314)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#too-many-digits

DividendDistributor.dividendsPerShareAccuracyFactor (contracts/Token.sol#112) should be constant
PegMartik.MTK (contracts/Token.sol#281) should be constant
PegMartik.PoolFee (contracts/Token.sol#299) should be constant
PegMartik.feeDenominator (contracts/Token.sol#310) should be constant
PegMartik.router (contracts/Token.sol#278-279) should be constant
PegMartik.sellPoolFee (contracts/Token.sol#306) should be constant
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-constant

DividendDistributor.WBNB (contracts/Token.sol#92) should be immutable
DividendDistributor._token (contracts/Token.sol#91) should be immutable
DividendDistributor.router (contracts/Token.sol#102) should be immutable
PegMartik.WBNB (contracts/Token.sol#335) should be immutable
PegMartik.distributor (contracts/Token.sol#277) should be immutable
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-immutable
```

Static Analysis

an static analysis of the code were performed using slither. No issues were found

FUNCTIONAL TESTING

Router (PCS V2):
0xD99D1c33F9fC3444f8101754aBC46c52416550D1

1- Adding liquidity **(passed):**
https://testnet.bscscan.com/tx/0x4b8cf1d429fc4280c40056e45bcedb2f6187e49d0cfffcce28c195dfbb6c073a

2- Buying when excluded (0% tax) **(passed):**
https://testnet.bscscan.com/tx/0x1291768086170ef0be92f1be0c21cdf830ae5d943b4e7c8ca5883674c10ed13d

3- Selling when excluded (0% tax) **(passed):**
https://testnet.bscscan.com/tx/0xd1c28057e33f43b4abbb417353eba63c7add00dad83e5d95b6bb74344be29805

4- Transferring when excluded from fees (0% tax) **(passed):**
https://testnet.bscscan.com/tx/0x96f5af12fbee7bf7ed93364eb3644be44e81af0943b9204062a96cb4390f3c9e

5- Buying when not excluded from fees (0-10% tax) **(passed):**
https://testnet.bscscan.com/tx/0xb72ae08f770ee1b5cf0a5890e4971ced4776c36ded6b46d92d0ec5825857db1b

6- Selling when not excluded from fees (0-10% tax) **(passed):**
https://testnet.bscscan.com/tx/0x9ac734eb5fb6061d5466258abdc017abab3f59272c6cb7718302fb2b37180dc8

7- Transferring when not excluded from fees (0-10% tax) **(passed):**
https://testnet.bscscan.com/tx/0x0f86bef79275746fecde149872003962413e10658e20aa6eeb507625e4c6f114

FUNCTIONAL TESTING

8- Internal swap (marketing + rewards) **(passed):**
https://testnet.bscscan.com/tx/0x0d1e137a0b30063263c3b23bee3b12b9575dd34438d6de292970b22e0f6f5a45

9- Bridging **(passed):**
to Matrik
https://testnet.bscscan.com/tx/0xe4a302af4da6a5647d56b2f81855bb1db3417c2ebf38d0c601059cd7608e38fb
to peg-matrik
https://testnet.bscscan.com/tx/0x39568006a416ade0ee8e7bf018d50413094068a40fe21fdd229928622fe44258

FUNCTIONAL TESTING

Logical – Flashload attack

Severity: Low

function: toPegMatric and toMatrik

Status: Not Resolved

Overview:

The functions 'toPegMartik' and 'toMartik' can be utilized to convert peg-martik to matrik and vice versa. If a significant price or supply disparity exists between the two tokens, a malicious actor could exploit this by purchasing a large quantity of peg-martik, promptly converting them to MTK tokens (or vice versa), and subsequently selling these tokens at a substantially higher price or buying at a lower price. This opens the possibility for a flash loan attack and other arbitrage opportunities that may affect token priec.

Suggestion

- **Conversion Limit**: Establish a limit on the number of peg-martik tokens that can be converted to MTK (and vice versa) per account within a specified timeframe. This limit could dynamically adjust based on the price gap between the two tokens.
- **Conversion Fee**: Implement a fee for converting between the two tokens. This fee could discourage malicious actors from exploiting the price gap, as it would reduce their potential profit.
- **Disallow Contract Senders**: To prevent flash loan bots from exploiting this vulnerability, ensure that 'msg.sender' is not a contract. This could be implemented with a modifier that checks if the calling address is a contract.

Example of a modifier which only allows calls from an EOA:

```
modifier onlyEOA() {
   require(msg.sender == tx.origin, "Contracts not allowed");
   _;
}
```

FUNCTIONAL TESTING

Logical – Locked MTK tokens

Severity: Low

function: toPegMatric and toMatrik and _burnIN

Status: Not Resolved

Overview:

peg-martik token has burn tax which means a portion of peg-matrik is burned on each transaction which could leave some MTK tokens being having no backed tokens of peg-matrik and be locked in the contract

Suggestion

since contract acts as a smart bridge, ensure that peg tokens are not burnt

FUNCTIONAL TESTING

Logical – Calculation of BNB fees

Severity: Low

function: swapBack

Status: Not Resolved

Overview:

swapBack function is using getAmountsOut function of pancake router to retrieve amount of BNB that marketing and reflection contract receive, however this amounts may not be accurate or even be higher than current ETH in the contract

Suggestion : use below approach to calculate bnb share of marketing and reflections

```
    uint256 balanceBefore = address(this).balance;

router.swapExactTokensForETHSupportingFeeOnTransferTokens(

    a,
    0,
    path,
    address(this),
    block.timestamp
);
uint256 received = address(this).balance - balanceBefore;
if (marketing > 0) {
    (bool success, ) = payable(marketingFeeReceiver).call{
        value: (marketing * received) / a,
        gas: txbnbGas
    }("");
    require(success, "Failed to send Ether to marketing fee receiver");
}
if (reflection > 0) {
    try
        distributor.deposit{
            value: received - ((marketing * received) / a),
            gas: distributorBuyGas
        }()
    {} catch {}
}
```

FUNCTIONAL TESTING

Informational– Use of MTK as Reward Token in Smart Contract

Severity: Informational

Status: Not Applicable

Overview:

The audited smart contract employs **MTK (0x116526135380E28836C6080f1997645d5A807FAE)** as a reward token. The specific operations involving the **MTK** token include transferring the token to users and monitoring its balance in the contract.

However, it is important to note that this audit does not cover the MTK token itself. The MTK token has not been evaluated for its functionality, security, or any potential issues that might ari from its use.

Implications:

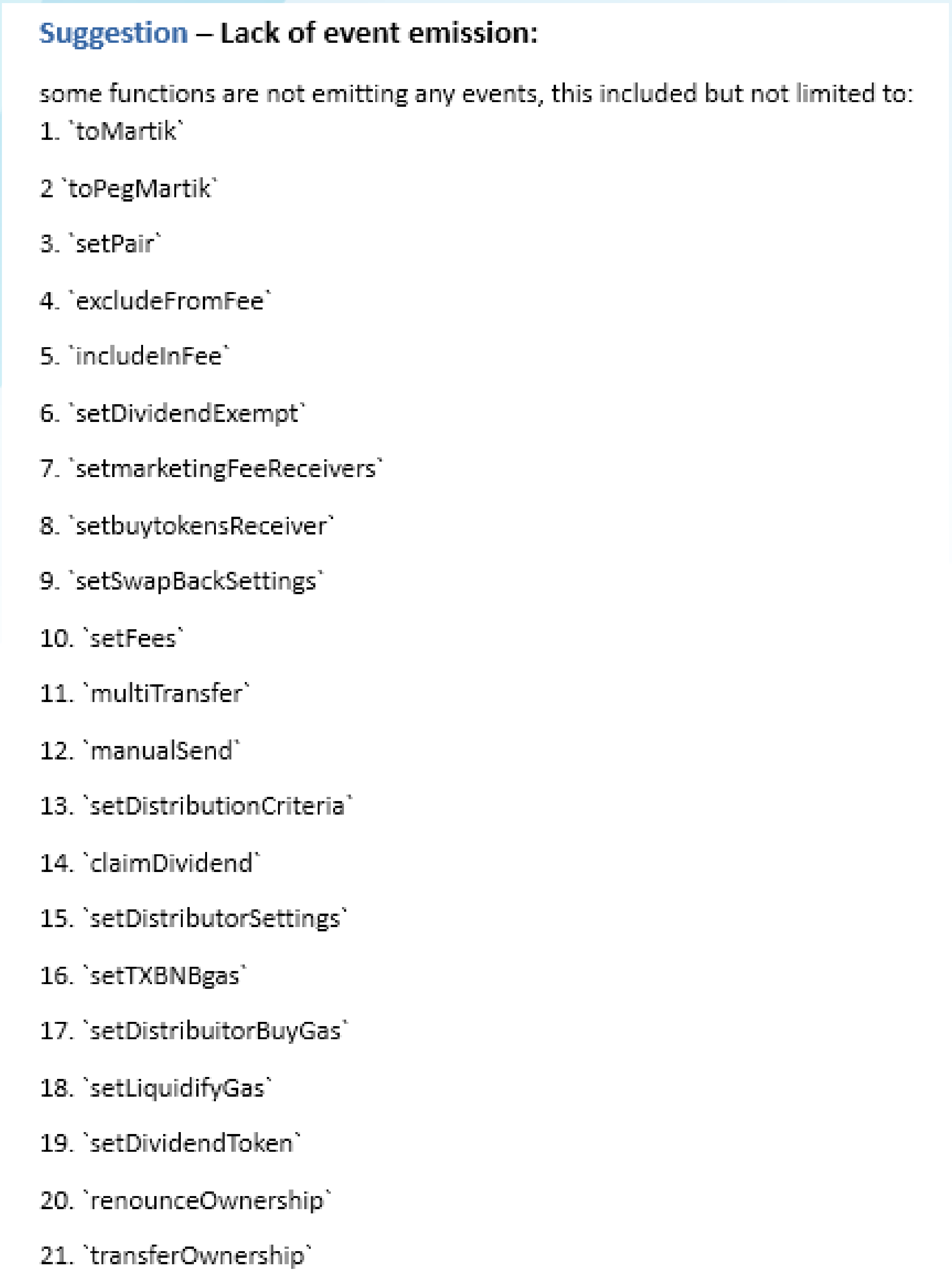
The use of an external token like MTK as a reward presents potential risks, such as the reliance on the functionality and security of the MTK token. If the MTK token has vulnerabilities or issues, it could potentially impact the operations of the audited contract. Users interacting with the contract could also be affected.

Suggestion

While the MTK token is not within the scope of this audit, it is strongly advised to conduct a separate comprehensive audit of the MTK token contract. This will help ensure its security and functionality, thus mitigating potential risks associated with its use in the audited contract.

Furthermore, developers and users should be made aware that the MTK token has not been audited in conjunction with the current contract, and they should exercise caution and due diligence when interacting with it.

FUNCTIONAL TESTING



Suggestion – Lack of event emission:

some functions are not emitting any events, this included but not limited to:

1. `toMartik`

2 `toPegMartik`

3. `setPair`

4. `excludeFromFee`

5. `includeInFee`

6. `setDividendExempt`

7. `setmarketingFeeReceivers`

8. `setbuytokensReceiver`

9. `setSwapBackSettings`

10. `setFees`

11. `multiTransfer`

12. `manualSend`

13. `setDistributionCriteria`

14. `claimDividend`

15. `setDistributorSettings`

16. `setTXBNBgas`

17. `setDistribuitorBuyGas`

18. `setLiquidifyGas`

19. `setDividendToken`

20. `renounceOwnership`

21. `transferOwnership`

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