Smart Contract Security Audit

Audit details:

Audited project:	PhoenixSwap
Deployer address	0x5307f911e381b19546396e23e67459f28e082b88
Blockchain:	Binance Smart Chain
Project website:	https://www.phoenixswapdefi.com

May, 2021
TechRate

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 PhoenixSwap to perform an audit of smart contracts:

- *https://bscscan.com/address/0x92a22a13Fd0AE8E65F26bfcBf78e964551a74E0e#code*
- *https://bscscan.com/address/0x9aCA34BB227D6F5f6a37D028B288e08BAd58DE78#code*
- *https://bscscan.com/address/0x146dd49D89f02d6590DB1d64a11e69b127f9D2dD#code*
- *https://bscscan.com/address/0xaA3406Bd74c1CF3d4171e052edfFB828ba7dCE05#code*

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.

Contracts details

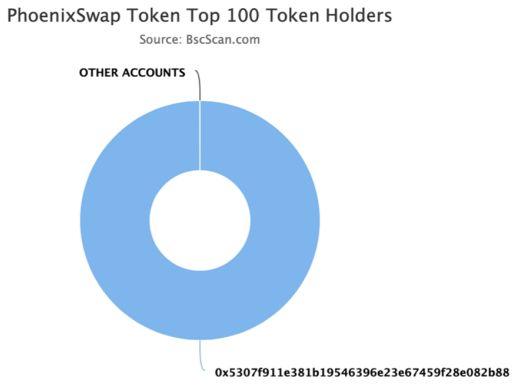
Token contract details for 20.05.2021.

Contract name:	PhoenixSwap
Compiler version:	v0.6.12+commit.27d51765
Contract address:	0x9aCA34BB227D6F5f6a37D028B288e08BAd58DE78
Total supply:	150000000000000000000
Token ticker:	PHX
Decimals:	18
Token holders:	1
Transactions count:	1
Top 100 holders dominance:	100 %
Contract deployer address:	0x5307f911e381b19546396e23e67459f28e082b88
Contract’s current owner address:	0xaa3406bd74c1cf3d4171e052edffb828ba7dce05

PhoenixSwap top 100 token distribution

The top 100 holders collectively own 100.00% (1,500.00 Tokens) of PhoenixSwap Token

Token Total Supply: 1,500.00 Token | Total Token Holders: 1



(A total of 1,500.00 tokens held by the top 100 accounts from the total supply of 1,500.00 token)

Rank	Address	Quantity (Token)	Percentage
1	0x5307f911e381b19546396e23e67459f28e082b88	1,500	100.0000%

Masterchef contract details for 20.05.2021.

Contract name:	MasterChef
Compiler version:	v0.6.12+commit.27d51765
Contract address:	0xaA3406Bd74c1CF3d4171e052edfFB828ba7dCE05
Dev address:	0x5307f911e381b19546396e23e67459f28e082b88
Fee address:	0x5307f911e381b19546396e23e67459f28e082b88
Token contract address:	0x9aca34bb227d6f5f6a37d028b288e08bad58de78
Token per block:	500000000000000000
Contract owner address:	0x5307f911e381b19546396e23e67459f28e082b88
Pool length:	0
Start block:	7692000
Total alloc point:	0
Bonus multiplier:	1
Referral commission rate:	200
Referral contract address:	0x92a22a13fd0ae8e65f26bfcbf78e964551a74e0e

Masterchef functions outline

+ [Int] IUniswapV2Router02 (IUniswapV2Router01)
  - [Ext] removeLiquidityETHSupportingFeeOnTransferTokens #

  - [Ext] removeLiquidityETHWithPermitSupportingFeeOnTransferTokens #
  - [Ext] swapExactTokensForTokensSupportingFeeOnTransferTokens #
  - [Ext] swapExactETHForTokensSupportingFeeOnTransferTokens ($)
  - [Ext] swapExactTokensForETHSupportingFeeOnTransferTokens #

+ [Int] IUniswapV2Router01
  - [Ext] factory
  - [Ext] WETH
  - [Ext] addLiquidity #
  - [Ext] addLiquidityETH ($)
  - [Ext] removeLiquidity #
  - [Ext] removeLiquidityETH #
  - [Ext] removeLiquidityWithPermit #
  - [Ext] removeLiquidityETHWithPermit #
  - [Ext] swapExactTokensForTokens #
  - [Ext] swapTokensForExactTokens #
  - [Ext] swapExactETHForTokens ($)
  - [Ext] swapTokensForExactETH #
  - [Ext] swapExactTokensForETH #
  - [Ext] swapETHForExactTokens ($)
  - [Ext] quote
  - [Ext] getAmountOut
  - [Ext] getAmountIn
  - [Ext] getAmountsOut
  - [Ext] getAmountsIn

+ [Int] IUniswapV2Pair
  - [Ext] name
  - [Ext] symbol
  - [Ext] decimals
  - [Ext] totalSupply
  - [Ext] balanceOf
  - [Ext] allowance
  - [Ext] approve #
  - [Ext] transfer #
  - [Ext] transferFrom #
  - [Ext] DOMAIN_SEPARATOR
  - [Ext] PERMIT_TYPEHASH
  - [Ext] nonces
  - [Ext] permit #
  - [Ext] MINIMUM_LIQUIDITY
  - [Ext] factory
  - [Ext] token0
  - [Ext] token1
  - [Ext] getReserves
  - [Ext] price0CumulativeLast
  - [Ext] price1CumulativeLast

  - [Ext] kLast
  - [Ext] mint #
  - [Ext] burn #
  - [Ext] swap #
  - [Ext] skim #
  - [Ext] sync #
  - [Ext] initialize #

+ [Int] IUniswapV2Factory
  - [Ext] feeTo
  - [Ext] feeToSetter
  - [Ext] getPair
  - [Ext] allPairs
  - [Ext] allPairsLength
  - [Ext] createPair #
  - [Ext] setFeeTo #
  - [Ext] setFeeToSetter #

+ ReentrancyGuard
  - [Int] <Constructor> #

+ Context
  - [Int] _msgSender
  - [Int] _msgData

+ [Lib] Address
  - [Int] isContract
  - [Int] sendValue #
  - [Int] functionCall #
  - [Int] functionCall #
  - [Int] functionCallWithValue #
  - [Int] functionCallWithValue #
  - [Int] functionStaticCall
  - [Int] functionStaticCall
  - [Int] functionDelegateCall #
  - [Int] functionDelegateCall #
  - [Prv] _verifyCallResult

+ [Lib] SafeMath
  - [Int] tryAdd
  - [Int] trySub
  - [Int] tryMul
  - [Int] tryDiv
  - [Int] tryMod
  - [Int] add
  - [Int] sub
  - [Int] mul

  - [Int] div
  - [Int] mod
  - [Int] sub
  - [Int] div
  - [Int] mod

+ Ownable (Context)
  - [Int] <Constructor> #
  - [Pub] owner
  - [Pub] renounceOwnership #
    - modifiers: onlyOwner
  - [Pub] transferOwnership #
    - modifiers: onlyOwner

+ [Lib] SafeBEP20
  - [Int] safeTransfer #
  - [Int] safeTransferFrom #
  - [Int] safeApprove #
  - [Int] safeIncreaseAllowance #
  - [Int] safeDecreaseAllowance #
  - [Prv] _callOptionalReturn #

+ [Int] IPhoenixReferral
  - [Ext] recordReferral #
  - [Ext] getReferrer

+ [Int] IBEP20
  - [Ext] totalSupply
  - [Ext] decimals
  - [Ext] symbol
  - [Ext] name
  - [Ext] getOwner
  - [Ext] balanceOf
  - [Ext] transfer #
  - [Ext] allowance
  - [Ext] approve #
  - [Ext] transferFrom #

+ BEP20 (Context, IBEP20, Ownable)
  - [Pub] <Constructor> #
  - [Ext] getOwner
  - [Pub] name
  - [Pub] decimals
  - [Pub] symbol
  - [Pub] totalSupply
  - [Pub] balanceOf
  - [Pub] transfer #

- [Pub] allowance
- [Pub] approve #
- [Pub] transferFrom #
- [Pub] increaseAllowance #
- [Pub] decreaseAllowance #
- [Pub] mint #
  - modifiers: onlyOwner
- [Int] _transfer #
- [Int] _mint #
- [Int] _burn #
- [Int] _approve #
- [Int] _burnFrom #

+ PhoenixToken (BEP20)
- [Pub] <Constructor> #
  - modifiers: BEP20
- [Pub] mint #
  - modifiers: onlyOwner
- [Int] _transfer #
  - modifiers: antiWhale
- [Prv] swapAndLiquify #
  - modifiers: lockTheSwap,transferTaxFree
- [Prv] swapTokensForEth #
- [Prv] addLiquidity #
- [Pub] maxTransferAmount
- [Pub] isExcludedFromAntiWhale
- [Ext] <Fallback> ($)
- [Pub] updateTransferTaxRate #
  - modifiers: onlyOperator
- [Pub] updateBurnRate #
  - modifiers: onlyOperator
- [Pub] updateMaxTransferAmountRate #
  - modifiers: onlyOperator
- [Pub] updateMinAmountToLiquify #
  - modifiers: onlyOperator
- [Pub] setExcludedFromAntiWhale #
  - modifiers: onlyOperator
- [Pub] updateSwapAndLiquifyEnabled #
  - modifiers: onlyOperator
- [Pub] updatePhoenixSwapRouter #
  - modifiers: onlyOperator
- [Pub] operator
- [Pub] transferOperator #
  - modifiers: onlyOperator
- [Ext] delegates
- [Ext] delegate #
- [Ext] delegateBySig #

- [Ext] getCurrentVotes
- [Ext] getPriorVotes
- [Int] _delegate #
- [Int] _moveDelegates #
- [Int] _writeCheckpoint #
- [Int] safe32
- [Int] getChainId

+ MasterChef (Ownable, ReentrancyGuard)
- [Pub] <Constructor> #
- [Ext] poolLength
- [Pub] add #
  - modifiers: onlyOwner
- [Pub] set #
  - modifiers: onlyOwner
- [Pub] getMultiplier
- [Ext] pendingPhoenix
- [Pub] massUpdatePools #
- [Pub] updatePool #
- [Pub] deposit #
  - modifiers: nonReentrant
- [Pub] withdraw #
  - modifiers: nonReentrant
- [Pub] emergencyWithdraw #
  - modifiers: nonReentrant
- [Int] safePhoenixTransfer #
- [Pub] setDevAddress #
- [Pub] setFeeAddress #
- [Pub] updateEmissionRate #
- [Pub] setPhoenixReferral #
  - modifiers: onlyOwner
- [Pub] setReferralCommissionRate #
  - modifiers: onlyOwner
- [Int] payReferralCommission #

($) = payable function
= non-constant function

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.	Low issues
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.	Medium issues
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

No high severity issues found.

Medium Severity Issues

1. Wrong burning

Issue:

There is sending tokens to the dead address in overridden _transfer functions, instead of burning them in token contract.

```
    // default tax is 5% of every transfer
    uint256 taxAmount = amount⬆.mul(transferTaxRate).div(10000);
    uint256 burnAmount = taxAmount.mul(burnRate).div(100);
    uint256 liquidityAmount = taxAmount.sub(burnAmount);
    require(taxAmount == burnAmount + liquidityAmount, "PHX::transfer: Burn value invalid");

    // default 95% of transfer sent to recipient
    uint256 sendAmount = amount⬆.sub(taxAmount);
    require(amount⬆ == sendAmount + taxAmount, "PHX::transfer: Tax value invalid");

    super._transfer(sender⬆, BURN_ADDRESS, burnAmount);
    super._transfer(sender⬆, address(this), liquidityAmount);
    super._transfer(sender⬆, recipient⬆, sendAmount);
    amount⬆ = sendAmount;
```

Recommendation:

There should be a burn instead of sending to the dead address.

Low Severity Issues

1. Block gas limit

Issue:

The updateEmissionRate function can fail due to the block gas limit if the pool size is too big.

2. add function issue

Issue:

If some LP token is added to the contract twice using function add, then the total amount of reward in function updatePool will be incorrect.

Recommendation:

Add the mapping from address to bool and check that the same address will not be added twice.

Owner privileges

- ❏ Owner can withdraw tokens sent by mistake from the Referral contract.
- ❏ Owner can change the operator of the Referral contract and record Referral.
- ❏ Owner can change the referral contract.
- ❏ Operator can change the transfer tax rate and burn rate.
- ❏ Operator can change the router contract address, which could be not audited contract.

Conclusion

Smart contracts contain medium severity and low severity 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.