



CERTIK

Crudeoil

Security Assessment

March 8, 2021

For :

Crudeoil





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- A document describing in detail an in depth analysis of a particular piece(s) of source code provided to CertiK by a Client.
- An organized collection of testing results, analysis and inferences made about the structure, implementation and overall best practices of a particular piece of source code.
- Representation that a Client of CertiK has indeed completed a round of auditing with the intention to increase the quality of the company/product’s IT infrastructure and or source code.

## Project Summary

Project Name	<a href="#">Crudeoil</a>
Description	a decentralized finance with tokens and reward pool
Platform	Bsc; Solidity;
Codebase	<a href="#">GitHub Repository</a>
Commits	<a href="#">fff82d75b7c6d541d1359806c456da168666453f</a>

## Audit Summary

Delivery Date	Mar. 8, 2021
Method of Audit	Static Analysis, Manual Review
Consultants Engaged	2
Timeline	Feb. 24 - Feb. 26, Mar. 8, 2021

## Vulnerability Summary

Total Issues	5
● Total Critical	0
● Total Major	0
● Total Minor	1
● Total Informational	4



## Executive Summary

This report has been prepared for **Crudeoil** smart contract to discover issues and vulnerabilities in the source code of their Smart Contract as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Dynamic Analysis, Static Analysis, and Manual Review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.



## File in Scope

ID	Contract	SHA-256 Checksum
IJ	Injection.sol	3493268dce660a38a5a617bab4f3ff9b3fab82f902bce9f496b6455819064710



## Documentation

The sources of truth regarding the operation of the contracts in scope were lackluster and are something we advise to be enriched to aid in the legibility of the codebase as well as project. To help aid our understanding of each contract's functionality we referred to in-line comments and naming conventions.

These were considered the specification, and when discrepancies arose with the actual code behaviour, we consulted with the **Crudeoil** team or reported an issue.

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## Review Notes

Certain optimization steps that we pinpointed in the source code mostly referred to coding standards and inefficiencies, however 1 Minor vulnerabilities were identified during our audit that solely concerns the specification.

Certain discrepancies between the expected specification and the implementation of it were identified and were relayed to the team, however they pose no type of vulnerability and concern an optional code path that was unaccounted for.

The project has adequate documentation and specification outside of the source files, and the code comment coverage is good.

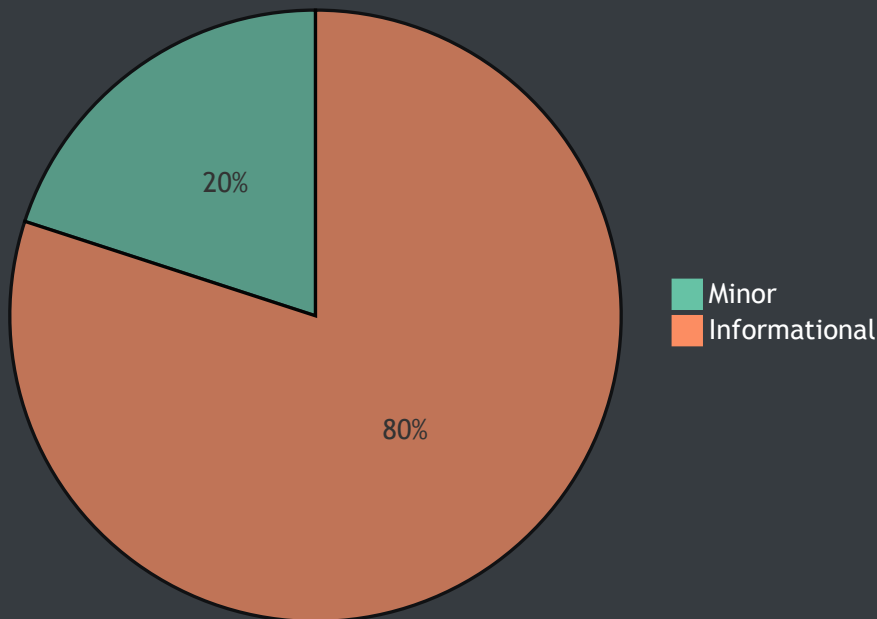
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## Recommendations

Overall, the codebase of the contracts should be refactored to assimilate the findings of this report, enforce linters and / or coding styles as well as correct any spelling errors and mistakes that appear throughout the code to achieve a high standard of code quality and security.

### Finding Summary



ID	Title	Type	Severity	Resolved
<a href="#">IJ-01</a>	Missing Check for Function <code>transfer</code> and <code>transferForm</code>	Logical Issue	<div></div> Informational	
<a href="#">IJ-02</a>	Missing Some Important Checks	Logical Issue	<div></div> Minor	
<a href="#">IJ-03</a>	Proper Usage of "public" and "external" Type	Gas Optimization	<div></div> Informational	
<a href="#">IJ-04</a>	Some Variables May Lose Accuracy	Logical Issue	<div></div> Informational	
<a href="#">IJ-05</a>	Discussion For Function <code>withdrawMainToken</code>	Logical Issue	<div></div> Informational	



## IJ-01: Missing Check for Function `transfer` and `transferFrom`

Type	Severity	Location
Logical Issue	● Informational	<a href="#">Injection.sol L524</a> , <a href="#">L530</a> , <a href="#">L614</a> , <a href="#">L641</a>

### Description:

Values of `_totalSupply` , `_balances[msg.sender]` , `rewards[msg.sender]` had been changed before `transfer()` , `transferFrom()` .If `transfer()` , `transferFrom()` return false(means transfer failed), values of `_totalSupply` , `_balances[msg.sender]` , `rewards[msg.sender]` will be incorrect since transfer failed, all the value change should be reverted.

### Recommendation:

Add require check around `transfer()` and `transferFrom()` , for example:

```
require(LPToken.transferFrom(msg.sender, address(this), amount), "stake transfer failed");
```





## IJ-02: Missing Some Important Checks

Type	Severity	Location
Logical Issue	● Minor	<a href="#">Injection.sol L248</a>

### Description:

Function `setRewardDistribution()` in contract `IRewardDistributionRecipient.sol` is missing parameter address zero check.

### Recommendation:

Consider adding necessary checks, for example:

```
function setRewardDistribution(address _rewardDistribution)
    external
    onlyOwner
{
    require(_rewardDistribution != address(0),
        "IRewardDistributionRecipient: _rewardDistribution is the zero address");
    rewardDistribution = _rewardDistribution;
}
```



## IJ-03: Proper Usage of "public" and "external" Type

Type	Severity	Location
Gas Optimization	<span style="color: green;">●</span> Informational	<a href="#">Injection.sol</a> <a href="#">L179</a> , <a href="#">L205</a> , <a href="#">L214</a>

### Description:

"public" functions that are never called by the contract could be declared "external" . When the inputs are arrays "external" functions are more efficient than "public" functions.

### Examples:

Functions like : `owner()` , `renounceOwnership()` , `transferOwnership()` .

### Recommendation:

Consider using the "external" attribute for functions never called from the contract. For example:

```
function owner() external view returns (address) {  
    return _owner;  
}
```



## IJ-04: Some Variables May Lose Accuracy

Type	Severity	Location
Logical Issue	<span style="color: green;">●</span> Discussion	<a href="#">Injection.sol L570-L575,L625,L629</a>

### Description:

```
rewardRate = reward.div(DURATION).
```

Please check whether the `rewardRate` has precision. If not, `rewardRate` may lose accuracy when `DURATION` can't divide `reward`.



## IJ-05: Discussion For Function `withdrawMainToken`

Type	Severity	Location
Logical Issue	● Discussion	<a href="#">Injection.sol L641</a>

### Description:

We noticed that `rewardDistribution` can transfer tokens of this contract to the `_owner`. When will this function be used? Is this function under governance of community?

```
function withdrawMainToken(uint256 amount) external onlyRewardDistribution {
    require(MainToken.balanceOf(address(this)) > amount, "amount exceeds");
    rewardRate = 0;
    periodFinish = 0;
    MainToken.transfer(_owner, amount);
}
```

### Alleviation:

**Crudeoil Response :** The function `withdrawMainToken` can only be called from the `rewardDistribution` address and it will be set to a TimeLock contract. Hence, if this function is called, the users can see it few days before executing the function.

## Appendix

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### Finding Categories

#### Gas Optimization

Gas Optimization findings refer to exhibits that do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

#### Mathematical Operations

Mathematical Operation exhibits entail findings that relate to mishandling of math formulas, such as overflows, incorrect operations etc.

#### Logical Issue

Logical Issue findings are exhibits that detail a fault in the logic of the linked code, such as an incorrect notion on how `block.timestamp` works.

#### Control Flow

Control Flow findings concern the access control imposed on functions, such as owner-only functions being invoke-able by anyone under certain circumstances.

#### Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

#### Data Flow

Data Flow findings describe faults in the way data is handled at rest and in memory, such as the result of a `struct` assignment operation affecting an in-memory `struct` rather than an instorage one.

#### Language Specific

Language Specific findings are issues that would only arise within Solidity, i.e. incorrect usage of `private` or `delete` .

#### Coding Style

Coding Style findings usually do not affect the generated byte-code and comment on how to make the codebase more legible and as a result easily maintainable.

#### Inconsistency

Inconsistency findings refer to functions that should seemingly behave similarly yet contain different code, such as a `constructor` assignment imposing different `require` statements on the input variables than a setter function.

### Magic Numbers

Magic Number findings refer to numeric literals that are expressed in the codebase in their raw format and should otherwise be specified as `constant` contract variables aiding in their legibility and maintainability.

### Compiler Error

Compiler Error findings refer to an error in the structure of the code that renders it impossible to compile using the specified version of the project.

### Dead Code

Code that otherwise does not affect the functionality of the codebase and can be safely omitted.

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### Icons explanation

✓ : Issue resolved

ⓘ : Issue not resolved / Acknowledged. The team will be fixing the issues in the own timeframe.

ⓘ✓ : Issue partially resolved. Not all instances of an issue was resolved.