



# Minswap - withdraw0 feature

## Preliminary Comments

CertiK Assessed on Feb 27th, 2025





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## Minswap - withdraw0 feature

These preliminary comments were prepared by CertiK, the leader in Web3.0 security.

### Executive Summary

**TYPES**  
DEX**ECOSYSTEM**  
Cardano (ADA)**METHODS**  
Manual Review**LANGUAGE**  
Aiken**TIMELINE**  
Delivered on 02/27/2025**KEY COMPONENTS**  
N/A**CODEBASE**

(<https://github.com/scisamir/minswap-dex-v2/tree/11b18d887dc97ec39afdf70e5614a8771c1d8f5a>)

[View All in Codebase Page](#)**COMMITTS**

[11b18d887dc97ec39afdf70e5614a8771c1d8f5a](#)

[View All in Codebase Page](#)

### Vulnerability Summary



4

Total Findings

0

Resolved

0

Mitigated

0

Partially Resolved

0

Acknowledged

0

Declined

4

Pending

**0 Critical**

Critical risks are those that impact the safe functioning of a platform and must be addressed before launch. Users should not invest in any project with outstanding critical risks.

**1 Major**

1 Pending

Major risks can include centralization issues and logical errors. Under specific circumstances, these major risks can lead to loss of funds and/or control of the project.

**0 Medium**

Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.

**0 Minor**

Minor risks can be any of the above, but on a smaller scale. They generally do not compromise the overall integrity of the project, but they may be less efficient than other solutions.

**1 Informational**

1 Pending

Informational errors are often recommendations to improve the style of the code or certain operations to fall within industry best practices. They usually do not affect the overall functioning of the code.

**2 Discussion**

2 Pending

The impact of the issue is yet to be determined, hence requires further clarifications from the project team.

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# CODEBASE | MINSWAP - WITHDRAW0 FEATURE

## Repository

<https://github.com/scisamir/minswap-dex-v2/tree/11b18d887dc97ec39afdf70e5614a8771c1d8f5a>

## Commit

[11b18d887dc97ec39afdf70e5614a8771c1d8f5a](https://github.com/scisamir/minswap-dex-v2/tree/11b18d887dc97ec39afdf70e5614a8771c1d8f5a)

# AUDIT SCOPE | MINSWAP - WITHDRAW FEATURE

6 files audited ● 2 files with Pending findings ● 4 files without findings

ID	Repo	File	SHA256 Checksum
● AUT	scisamir/minswap-dex-v2	validators/authen_minting_policy.ak	1ed4c68712d7a2d42040a6ca62325b3480bd9dcf44b771a6b3b1ffe0ab3cc62f
● POO	scisamir/minswap-dex-v2	validators/pool_validator.ak	d9ccd0d2ab6abed811620dfa9f6c3f5a43f4c5eacf7713e2a09c95de29cd00f0
● ALW	scisamir/minswap-dex-v2	validators/always_success.ak	a4e91e23f791958dc26a51833e3f13683f73760f326b8f241f872f884643b026
● FAC	scisamir/minswap-dex-v2	validators/factory_validator.ak	63aaaa524e1f871328edd7b39634f03984da07b3fdd93407d591d7da60d06a82
● ORD	scisamir/minswap-dex-v2	validators/order_validator.ak	afbf62ae780c05bb976a1290e234f1ca3d65adf850991fe297275f8933aa141
● SAM	scisamir/minswap-dex-v2	validators/sample_multi_sign.ak	1b194f53d1bd9e22a2a44b6bd679cc596ba9192c05c8ef7caa7dd0e9bd28211f

## APPROACH & METHODS | MINSWAP - WITHDRAW0 FEATURE

This report has been prepared for Minswap to discover issues and vulnerabilities in the source code of the Minswap - withdraw0 feature project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing 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.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Testing the smart contracts against both common and uncommon attack vectors;
- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.



# FINDINGS | MINSWAP - WITHDRAW0 FEATURE



4

Total Findings

0

Critical

1

Major

0

Medium

0

Minor

1

Informational

2

Discussion

This report has been prepared to discover issues and vulnerabilities for Minswap - withdraw0 feature. Through this audit, we have uncovered 4 issues ranging from different severity levels. Utilizing the techniques of Manual Review to complement rigorous manual code reviews, we discovered the following findings:

ID	Title	Category	Severity	Status
VAL-02	Centralization Related Risks	Centralization	Major	● Pending
TYP-01	Potential For Multiple Roles Per Address	Access Control	Informational	● Pending
GLOBAL-01	Lack Of Documentation And Detailed Specifications Related To This Update	Coding Issue	Discussion	● Pending
GLOBAL-02	Incomplete And Outdated Offchain Code	Coding Issue	Discussion	● Pending

## VAL-02 | CENTRALIZATION RELATED RISKS

Category	Severity	Location	Status
Centralization	Major	validators/authen_minting_policy.ak: 170~171; validators/pool_validator.ak: 36~37, 67~68, 180~181	Pending

### Description

#### Admin

In the validator `authen_minting_policy.spend()`, the role `admin` has the authority to spend the `GlobalSetting` token of the protocol, and therefore to update the Global Setting. In particular the `admin` can:

- change the list of authorized `batchers` as long as the list is not empty;
- change the address allowed to update the Pool's base fee and fee-sharing;
- change the address allowed to withdraw the Pool's fee-sharing;
- change the address allowed to update the Pool's credential;
- change the address allowed to update the Pool's dynamic fee;
- transfer the `admin` role to another address;

Any compromise to the `admin` account may allow a hacker to take advantage of this authority and:

- transfer `admin` privileges to an address they control;
- grant the below privileges to addresses they control;

#### Batcher

In the validator `pool_validator.pool_batching_validator.withdraw()`, the role `batcher` has the authority to apply orders and validate the new state of the pool by:

- `Batching` to submit a batch of orders in a transaction;
- `MultiRouting` to trigger a multi swap order;

Any compromise to a `batcher` account may allow a hacker to take advantage of this authority and submit transactions, potentially allowing manipulation of the order of transactions.

#### Fee Updater

In the validator `pool_validator.validate_pool()` the `pool_fee_updater` can use the action:



- `UpdatePoolFee` to modify the pool fees;

Any compromise to the `pool_fee_updater` account may allow a hacker to take advantage of this authority and update a liquidity pool's fee.

## Fee Taker

In the validator `pool_validator.withdraw()` the `fee_sharing_taker` can use the action:

- `WithdrawFeeSharing` to withdraw protocol fees and send them to any address;

Any compromise to the `fee_sharing_taker` account may allow a hacker to take advantage of this authority and steal the protocol fees.

## Stake Key Updater

In the validator `pool_validator.validate_pool.withdraw()` the `pool_stake_key_updater` can use the action:

- `UpdatePoolStakeCredential` to change the stake credential of a pool;

Any compromise to the `pool_stake_key_updater` account may allow a hacker to use this authority and change the credentials of a pool.

## Dynamic Fee Updater

In the validator `pool_validator.validate_pool.withdraw()` the `pool_dynamic_fee_updater` can use the action:

- `UpdateDynamicFee` to enable or disable the dynamic fees;

Any compromise to the `pool_dynamic_fee_updater` account may allow a hacker to use this authority and disallow `Batcher` to choose the fee's volatility in a batch transaction.

## Recommendation

The risk describes the current project design and potentially makes iterations to improve in the security operation and level of decentralization, which in most cases cannot be resolved entirely at the present stage. We advise the client to carefully manage the privileged roles especially the `admin` to avoid any potential risks of being hacked. In general, we strongly recommend centralized privileges or roles in the protocol be improved via decentralized mechanisms.

The team should ensure total transparency about the `batcher` and `admin` roles, their mechanisms, and the potential risk through articles or blog posts.

They should set clear expectations for how the batcher is supposed to behave (e.g. ruling out front-running) and clarify how it can be monitored to mitigate unexpected events.

## TYP-01 | POTENTIAL FOR MULTIPLE ROLES PER ADDRESS

Category	Severity	Location	Status
Access Control	● Informational	lib/amm_dex_v2/types.ak: 327~341	● Pending

### Description

`GlobalSetting` type is intended to maintain a record of address permissions for specific sensitive actions. However, when setting or updating those addresses, there are no constraints to prevent a single address from being assigned multiple or even all roles. This concentration of privileges can lead to a higher degree of centralization and increases security risks if the address is compromised.

### Recommendation

We recommend adding constraints to prevent an address from being set multiple times in `GlobalSetting`.

## GLOBAL-01 | LACK OF DOCUMENTATION AND DETAILED SPECIFICATIONS RELATED TO THIS UPDATE

Category	Severity	Location	Status
Coding Issue	● Discussion		● Pending

### Description

High-level documentation is very important to understand the contract architecture, the interaction of on-chain and off-chain components, the economic model, etc. Detailed technical design documentation can help verify that the code implementation meets the specifications. Specifications include but are not limited to use cases, user stories, function interfaces, variable definitions, constant variable intervals, etc.

The codebase lacks sufficient documentation with the changes regarding the current implementation. Comprehensive documentation is essential for maintaining, auditing, and understanding the code. The absence of detailed specifications impedes our ability to fully assess the system's design and behavior.

### Recommendation

Consider creating extensive documentation and adding comments that explain the variables, functions, and logic behind the calculation and implementation. We also recommend documenting the various program use cases with unit and integration tests. Documentation and test files can make some findings or discussions easier to understand.

## GLOBAL-02 | INCOMPLETE AND OUTDATED OFFCHAIN CODE

Category	Severity	Location	Status
Coding Issue	● Discussion		● Pending

### Description

Using unit tests to test smart contracts is one of the best ways to identify potential logic errors and security vulnerabilities in the smart contract. The unit test files in folder `./tests` seem to be incomplete and the files in the folder `./src` are out of date.

### Recommendation

We recommend the team to add more test cases to cover more test coverage and finish the incomplete tests.

## APPENDIX | MINSWAP - WITHDRAWN FEATURE

### Finding Categories

Categories	Description
Coding Issue	Coding Issue findings are about general code quality including, but not limited to, coding mistakes, compile errors, and performance issues.
Access Control	Access Control findings are about security vulnerabilities that make protected assets unsafe.
Centralization	Centralization findings detail the design choices of designating privileged roles or other centralized controls over the code.

### Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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