



SOLIDProof
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Blockchain Security | Smart Contract Audits | KYC

MADE IN GERMANY

v1.0: 29. January, 2022

v1.1: 01. February, 2022

Audit

Security Assessment

14. February, 2022

For



Beli Finance

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Version	Date	Description
1.0	29. January 2022	<ul style="list-style-type: none">• Layout project• Automated- /Manual-Security Testing• Summary
1.1	01. February 2022	<ul style="list-style-type: none">• Reaudit
1.2	14. February 2022	<ul style="list-style-type: none">• Mainnet added

Network

Binance Smart Chain (BEP20)

Website

<https://beli.finance/>



Description

Beli Finance is a decentralized reserve policy-controlled currency protocol, Multi-Chain Yield Optimizer Aggregator platform that convert yield farm into \$BELI token and still earn small compound interest on their crypto holdings automatically. Each \$BELI token is backed by a basket of assets (e.g., USDT, BNB, BUSD Tokens etc etc) in the treasury, giving it an intrinsic value that it cannot fall below. Beli Finance also introduces economic and game-theoretic dynamics into the market through staking and compounding.

Project Engagement

During the 27th of January 2022, **Beli Finance Team** engaged Solidproof.io to audit smart contracts that they created. The engagement was technical in nature and focused on identifying security flaws in the design and implementation of the contracts. They provided Solidproof.io with access to their code repository and whitepaper.

Logo



Beli Finance

Contract Link

v1.0

- Github
 - <https://github.com/belifinance/beli-finance>
 - Commit: fe03b705871f742e0eabe3cad79ba9e75c781ff6

v1.1

- Github
 - <https://github.com/belifinance/beli-finance>
 - Commit: b4038bd4f1426e7d9bbf283e11bbb2caafef9139

v1.2

- VaultStaking
 - <https://bscscan.com/address/0x6a54473b04e52fb804e9d0493d2112bda146123b#code>

Vulnerability & Risk Level

Risk represents the probability that a certain source-threat will exploit vulnerability, and the impact of that event on the organization or system. Risk Level is computed based on CVSS version 3.0.

Level	Value	Vulnerability	Risk (Required Action)
Critical	9 - 10	A vulnerability that can disrupt the contract functioning in a number of scenarios, or creates a risk that the contract may be broken.	Immediate action to reduce risk level.
High	7 – 8.9	A vulnerability that affects the desired outcome when using a contract, or provides the opportunity to use a contract in an unintended way.	Implementation of corrective actions as soon as possible.
Medium	4 – 6.9	A vulnerability that could affect the desired outcome of executing the contract in a specific scenario.	Implementation of corrective actions in a certain period.
Low	2 – 3.9	A vulnerability that does not have a significant impact on possible scenarios for the use of the contract and is probably subjective.	Implementation of certain corrective actions or accepting the risk.
Informational	0 – 1.9	A vulnerability that have informational character but is not effecting any of the code.	An observation that does not determine a level of risk

Auditing Strategy and Techniques Applied

Throughout the review process, care was taken to evaluate the repository for security-related issues, code quality, and adherence to specification and best practices. To do so, reviewed line-by-line by our team of expert pentesters and smart contract developers, documenting any issues as there were discovered.

Methodology

The auditing process follows a routine series of steps:

1. Code review that includes the following:
 - i) Review of the specifications, sources, and instructions provided to SolidProof to make sure we understand the size, scope, and functionality of the smart contract.
 - ii) Manual review of code, which is the process of reading source code line-by-line in an attempt to identify potential vulnerabilities.
 - iii) Comparison to specification, which is the process of checking whether the code does what the specifications, sources, and instructions provided to SolidProof describe.
2. Testing and automated analysis that includes the following:
 - i) Test coverage analysis, which is the process of determining whether the test cases are actually covering the code and how much code is exercised when we run those test cases.
 - ii) Symbolic execution, which is analysing a program to determine what inputs causes each part of a program to execute.
3. Best practices review, which is a review of the smart contracts to improve efficiency, effectiveness, clarify, maintainability, security, and control based on the established industry and academic practices, recommendations, and research.
4. Specific, itemized, actionable recommendations to help you take steps to secure your smart contracts.

Used Code from other Frameworks/Smart Contracts (direct imports)

Imported packages:

```
./helpers/ERC20.sol  
./libraries/Address.sol  
./libraries/SafeERC20.sol  
./libraries/EnumerableSet.sol  
./helpers/Ownable.sol  
./interfaces/IPancakeswapFarm.sol  
./interfaces/IPancakeRouter01.sol  
./interfaces/IPancakeRouter02.sol  
./interfaces/IWBNB.sol  
./helpers/ReentrancyGuard.sol  
./helpers/Pausable.sol
```


Tested Contract Files

This audit covered the following files listed below with a SHA-1 Hash.

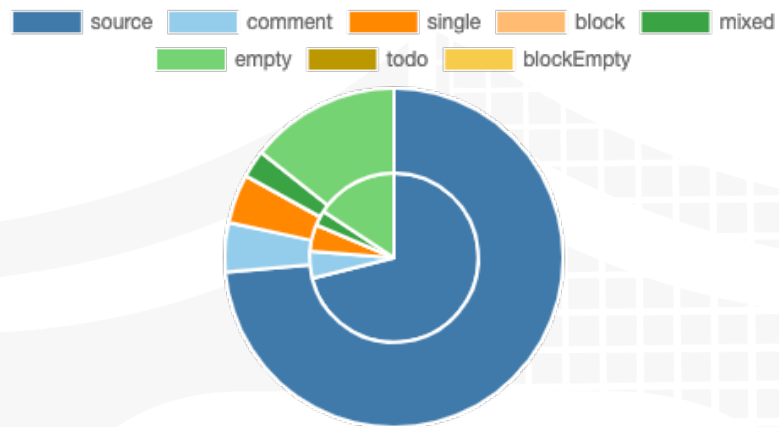
A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.

v1.0

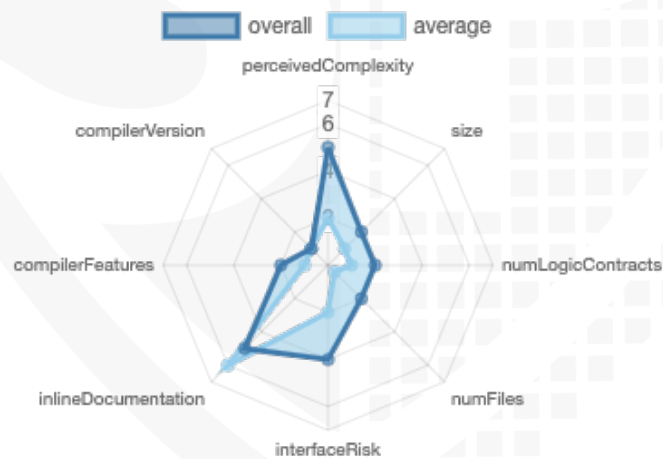
File Name	SHA-1 Hash
contracts/Vault.sol	1b90aca78098f6c7dd98963f42d1a010a056c7d2
contracts/Vault_BELILp.sol	c783f096f1876e434e295e0b688e7adb2150a493
contracts/Vault_Pancakeswap.sol	031a10617bc4e8497eae67b7dbb22e1c0616db1e
contracts/TimelockedVault.sol	891c0e668cf78cbbd83edb0a2fda63e48fd8bb3c
contracts/Vault_BELI.sol	a036c3361c804132e750eaac48f507ead3130bcf

Metrics

Source Lines v1.0



Risk Level v1.0



Capabilities

Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	3	0	0	2

Exposed Functions

This section lists functions that are explicitly declared public or payable. Please note that getter methods for public stateVars are not included.

Version	Public	Payable
1.0	33	0

Version	External	Internal	Private	Pure	View
1.0	3	50	0	0	5

State Variables

Version	Total	Public
1.0	50	50

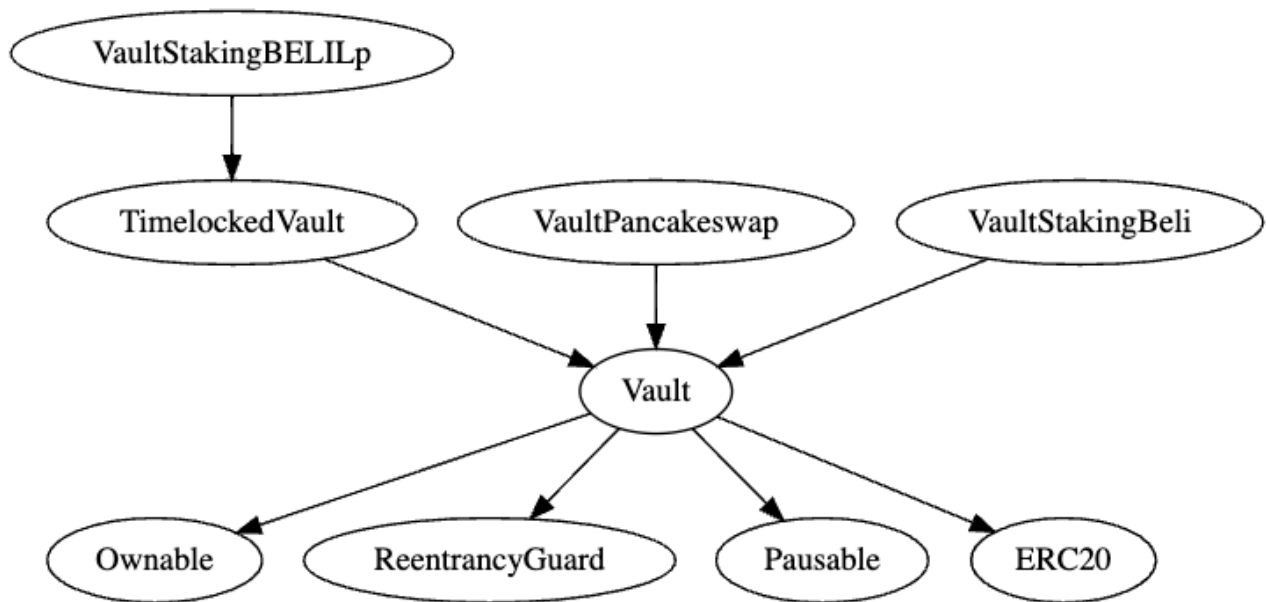
Capabilities

Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	0.6.12	ABIEncoderV2			

Version	Transfers ETH	Low-Level Calls	DelegateCall	Uses Hash Functions	EC Recover	New/Create/Create2
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1.0	yes					
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Inheritance Graph v1.0



CallGraph

v1.0



Scope of Work/Verify Claims

The above token Team provided us with the files that needs to be tested (Github, Bscscan, Etherscan, files, etc.). The scope of the audit is the main contract (usual the same name as team appended with .sol).

We will verify the following claims:

1. Deployer cannot mint any new tokens
2. Deployer cannot burn or lock user funds
3. Deployer cannot pause the contract
4. Overall checkup (Smart Contract Security)



Write functions of contract

v1.0

Vault

deposit
farm
withdrawEarly
withdraw
transferConvertedEarn
mintShareToReceipt
burnReceiptForShare
earn
convertDustToEarned
pause
unpause
setSettings
setGov
setUniRouterAddress
setBuyBackAddress
setRewardsAddress
inCaseTokensGetStuck
wrapBNB

renounceOwnership
transferOwnership

transfer
approve
transferFrom
increaseAllowance
decreaseAllowance

TimelockVault (inherits from Vault)

deposit
withdraw
withdrawEarly
setPenaltyAddress
setMinTimeToWithdraw

VaultPancakeswap inherits from Vault

VaultStakingBeli inherits from Vault

VaultStakingBELILp inherits from TimelockedVault

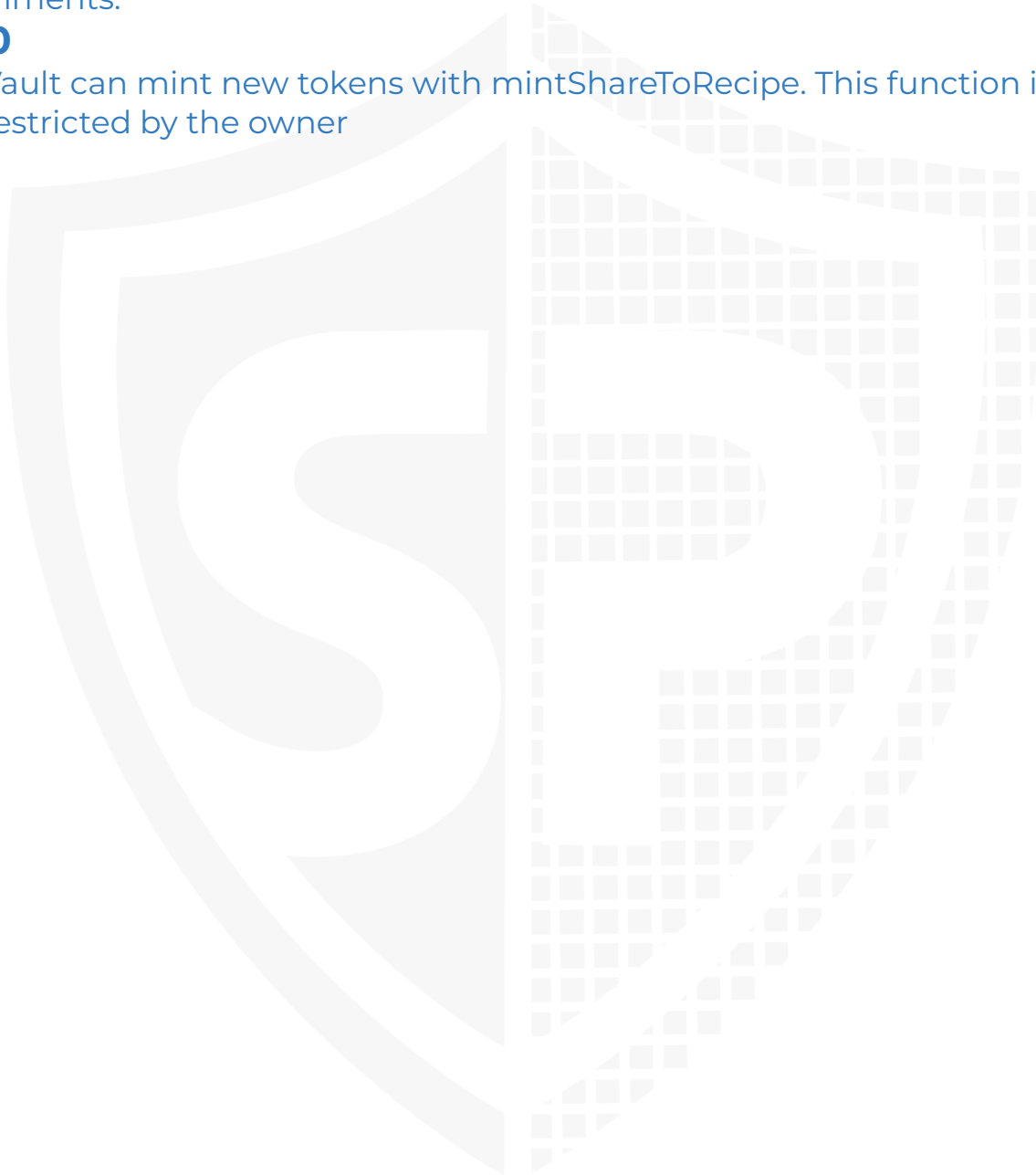
Deployer cannot mint any new tokens

Name	Exist	Tested	Status
cannot mint	✓	✓	✗

Comments:

v1.0

- Vault can mint new tokens with mintShareToRecipe. This function is restricted by the owner



Deployer cannot burn or lock user funds

Name	Exist	Tested	Status
Deployer cannot lock	✓	✓	✓
cannot burn	✓	✓	✗

Comments:

v1.0

- Vault can burn tokens with burnReceiptForShare function. This function is restricted by the owner

Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer cannot pause	✓	✓	✗

Comments:

v1.0

- Deployer can pause following functions
 - Deposit
 - Earn
 - convertDustToEarned



Overall checkup (Smart Contract Security)

Tested	Verified
✓	✓














































Legend

Attribute	Symbol
Verified / Checked	✓
Partly Verified	⚠
Unverified / Not checked	✗
Not available	—






Modifiers and public functions

v1.0

Vault

✓  deposit	✓  renounceOwnership
 onlyOwner	 onlyOwner
 nonReentrant	
 whenNotPaused	
✓  farm	✓  transferOwnership
 nonReentrant	 onlyOwner
✓  withdrawEarly	
 onlyOwner	
 nonReentrant	
✓  withdraw	
 onlyOwner	
 nonReentrant	
✓  transferConvertedEarn	
 onlyOwner	
✓  mintShareToReceipt	
 onlyOwner	
✓  burnReceiptForShare	
 onlyOwner	
✓  earn	
 nonReentrant	
 whenNotPaused	
✓  convertDustToEarned	
 whenNotPaused	
✓  pause	
 onlyAllowGov	
✓  unpause	
 onlyAllowGov	
✓  setSettings	
 onlyAllowGov	
✓  setGov	
 onlyAllowGov	
✓  setUniRouterAddress	
 onlyAllowGov	
✓  setBuyBackAddress	
 onlyAllowGov	
✓  setRewardsAddress	
 onlyAllowGov	
✓  inCaseTokensGetStuck	
 onlyAllowGov	
✓  wrapBNB	
 onlyAllowGov	

TimelockVault

- ✓  deposit
 - Ⓜ onlyOwner
 - Ⓜ nonReentrant
 - Ⓜ whenNotPaused
- ✓  withdraw
 - Ⓜ onlyOwner
 - Ⓜ nonReentrant
- ✓  withdrawEarly
 - Ⓜ onlyOwner
 - Ⓜ nonReentrant
- ✓  setPenaltyAddress
 - Ⓜ onlyAllowGov
- ✓  setMinTimeToWithdraw
 - Ⓜ onlyAllowGov













Comments

- Deployer can set following state variables without any limitations
- Deployer can enable/disable following state variables
- Vault
 - OnlyOwner can call following functions
 - Deposit
 - withdrawEarly
 - Withdraw
 - transferConvertedEarn
 - mintShareToReceipt
 - burnReceiptForShare
 - Only govAddress can call following function
 - Earn
 - Pause
 - Unpause
 - setSettings
 - setGov
 - setUniRouterAddress
 - setBuyBackAddress
 - setRewardsAddress
 - inCaseTokensGetStuck
 - wrapBNB
- TimelockedVault
 - onlyOwner
 - Deposit
 - Withdraw
 - withdrawEarly
 - Only govAddress can call following function
 - setPenaltyAddress
 - setMinTimeToWithdraw

Please check if an OnlyOwner or similar restrictive modifier has been forgotten.

Source Units in Scope

v1.0

Type	File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score	Capabilities
	contracts/Vault.sol	1	————	615	554	446	41	327	
	contracts/Vault_BELILp.sol	1	————	59	59	45	3	11	
	contracts/Vault_Pancakeswap.sol	1	————	51	51	42	2	7	
	contracts/TimelockedVault.sol	1	————	180	147	115	3	96	
	contracts/Vault_BELI.sol	1	————	55	55	43	1	11	
	Totals	5	————	960	866	691	50	452	

Legend

Attribute	Description
Lines	total lines of the source unit
nLines	normalized lines of the source unit (e.g. normalizes functions spanning multiple lines)
nSLOC	normalized source lines of code (only source-code lines; no comments, no blank lines)
Comment Lines	lines containing single or block comments
Complexity Score	a custom complexity score derived from code statements that are known to introduce code complexity (branches, loops, calls, external interfaces, ...)

Audit Results

AUDIT PASSED

Critical issues

No critical issues

High issues

No high issues

Medium issues

No medium issues

Low issues

Issue	File	Type	Line	Description
#1	Vault	Missing Zero Address Validation (missing-zero-check)	554, 540, 563, 545	Check that the address is not zero

Informational issues

Issue	File	Type	Line	Description
#1	TimelockedVault	State variables that could be declared constant (constable-states)	12	Add the `constant` attributes to state variables that never change
#2	Main	NatSpec documentation missing	-	If you start to comment your code, also comment all other functions, variables etc.

Audit Comments

29. January 2022:

- Read whole report for more information

01. February 2022:

- Read whole report for more information

14. February 2022:

- Mainnet address has been provided from Beli Finance team



SWC Attacks

ID	Title	Relationships	Status
SW C-1 36	Unencrypted Private Data On-Chain	CWE-767: Access to Critical Private Variable via Public Method	PASSED
SW C-1 35	Code With No Effects	CWE-1164: Irrelevant Code	PASSED
SW C-1 34	Message call with hardcoded gas amount	CWE-655: Improper Initialization	PASSED
SW C-1 33	Hash Collisions With Multiple Variable Length Arguments	CWE-294: Authentication Bypass by Capture-replay	PASSED
SW C-1 32	Unexpected Ether balance	CWE-667: Improper Locking	PASSED
SW C-1 31	Presence of unused variables	CWE-1164: Irrelevant Code	PASSED
SW C-1 30	Right-To-Left-Override control character (U+202E)	CWE-451: User Interface (UI) Misrepresentation of Critical Information	PASSED
SW C-1 29	Typographical Error	CWE-480: Use of Incorrect Operator	PASSED
SW C-1 28	DoS With Block Gas Limit	CWE-400: Uncontrolled Resource Consumption	PASSED

SW C-1 27	Arbitrary Jump with Function Type Variable	CWE-695: Use of Low-Level Functionality	PASSED
SW C-1 25	Incorrect Inheritance Order	CWE-696: Incorrect Behavior Order	PASSED
SW C-1 24	Write to Arbitrary Storage Location	CWE-123: Write-what-where Condition	PASSED
SW C-1 23	Requirement Violation	CWE-573: Improper Following of Specification by Caller	PASSED
SW C-1 22	Lack of Proper Signature Verification	CWE-345: Insufficient Verification of Data Authenticity	PASSED
SW C-1 21	Missing Protection against Signature Replay Attacks	CWE-347: Improper Verification of Cryptographic Signature	PASSED
SW C-1 20	Weak Sources of Randomness from Chain Attributes	CWE-330: Use of Insufficiently Random Values	PASSED
SW C-11 9	Shadowing State Variables	CWE-710: Improper Adherence to Coding Standards	PASSED
SW C-11 8	Incorrect Constructor Name	CWE-665: Improper Initialization	PASSED
SW C-11 7	Signature Malleability	CWE-347: Improper Verification of Cryptographic Signature	PASSED

SW C-11 6	Timestamp Dependence	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SW C-11 5	Authorization through tx.origin	CWE-477: Use of Obsolete Function	PASSED
SW C-11 4	Transaction Order Dependence	CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition')	PASSED
SW C-11 3	DoS with Failed Call	CWE-703: Improper Check or Handling of Exceptional Conditions	PASSED
SW C-11 2	Delegatecall to Untrusted Callee	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SW C-11 1	Use of Deprecated Solidity Functions	CWE-477: Use of Obsolete Function	PASSED
SW C-11 0	Assert Violation	CWE-670: Always-Incorrect Control Flow Implementation	PASSED
SW C-1 09	Uninitialized Storage Pointer	CWE-824: Access of Uninitialized Pointer	PASSED
SW C-1 08	State Variable Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED
SW C-1 07	Reentrancy	CWE-841: Improper Enforcement of Behavioral Workflow	PASSED
SW C-1 06	Unprotected SELFDESTRUCT Instruction	CWE-284: Improper Access Control	PASSED

SW C-1 05	Unprotected Ether Withdrawal	CWE-284: Improper Access Control	PASSED
SW C-1 04	Unchecked Call Return Value	CWE-252: Unchecked Return Value	PASSED
SW C-1 03	Floating Pragma	CWE-664: Improper Control of a Resource Through its Lifetime	PASSED
SW C-1 02	Outdated Compiler Version	CWE-937: Using Components with Known Vulnerabilities	PASSED
SW C-1 01	Integer Overflow and Underflow	CWE-682: Incorrect Calculation	PASSED
SW C-1 00	Function Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED

The logo features the words "SolidProofed" in a white, handwritten-style script. The text is superimposed on a blue background that includes a faint, stylized shield emblem with a grid pattern. The shield is composed of several overlapping layers, creating a sense of depth and security.

SolidProofed

Blockchain Security | Smart Contract Audits | KYC

A small horizontal bar representing the German flag, with black, red, and gold stripes.

MADE IN GERMANY