Cybersecurity Event Logs and Monitoring Management Standard



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MCS Cybersecurity Department

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DOCUMENT VALIDATION & DISTRIBUTION

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1 ABBREVIATIONS & DEFINITIONS

- ➤ MCS: Modern Chemicals and Services Company
- **HCIS:** High commission for Industrial security
- > NCA: National Cybersecurity Authority
- **ECC:** Essential Cybersecurity Controls standard issued by NCA 2018
- > IT: Information technology
- ➤ CSSC: Cybersecurity Steering Committee
- Asset: Anything tangible or intangible that has value to the organization. There are many types of assets, and some of which include obvious things, such as: persons, machineries, utilities, patents, software, and services. The term could also include less obvious things, such as: information and characteristics (e.g., organization's reputation and public image, as well as skill and knowledge).
- **Penetration Testing:** The practice of testing a computer system, network, web application or mobile application to find vulnerabilities that an attacker could exploit.
- ➤ Cybersecurity: According to the Royal Decree number 6801, dated 11/2/1439H, cybersecurity is the protection of networks, IT systems, operational technologies systems and their components of hardware and software, their services, and the data they contain, from any penetration, disruption, modification, access, use or unauthorized exploitation. The concept of cybersecurity also includes information security and digital security.
- > Cybersecurity requirements: It is the cybersecurity requirements which covers in the cybersecurity policy and procedures.
- **ECC-1**:2018: Essential Cybersecurity Controls
- ➤ OTCC-1:2022:Operational Technology Cybersecurity Controls

2 PURPOSE

This Standard aims to define the detailed cybersecurity requirements for cybersecurity event logs and monitoring management of MCS to achieve the main objective of this Standard which is minimizing cybersecurity risks resulting from internal and external threats at MCS.

The requirements in this standard are aligned with the Cybersecurity Event Logs and Monitoring Management Policy and the cybersecurity requirements issued by the National Cybersecurity Authority (NCA) including but not limited to (ECC-1:2018) and (CSCC-1:2019), in addition to other related cybersecurity legal and regulatory requirements.

3 SCOPE

This standard covers all MCS cybersecurity event logs and monitoring management and applies to all personnel (employees and contractors) in the MCS. This standard must follow the NCA's operating model for cybersecurity operation centers and NCA's regulatory cybersecurity requirements.

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4 STANDARDS

1	Log Format		
Objective	To enforce a standard and consistent log format including all the required information.		
Risk Implication	If logs are recorded on an inconsistent basis, it may be difficult to compare multiple different logs. This leads to a higher risk of misinformation, thus potentially making security incidents more challenging to remediate.		
Requirements			
	Events log format must include:		
	1-1-1 Event Log Type: Such as System, Security, Audit, Kernel, Authorization, Mail, etc.		
	1-1-2 Location of the event or source/system of the log.		
1-1	1-1-3 Date and Timestamp of the event log.		
	1-1-4 Event Status: Success, Failure, Up, Down, Allow, Deny, etc.		
	1-1-5 Event Severity: Emergency, Alert, Critical, Error, Warning, Notice, Informational, etc.		
	1-1-6 Event Message: Actual message of the event.		
1-2	Additional details must be included in logs wherever applicable, such as user, source address/port, destination address/port, and other useful elements.		
2	Timestamps - Synchronized Redundant Time Servers		
Objective	To enforce a credible system for internal information and technology assets.		
Risk Implication	If logs are recorded on an inconsistent basis, it may be difficult to compare multiple different logs. This leads to a higher risk of misinformation, thus potentially making security incidents more challenging to remediate.		
Requirements			





2-1	The information and technology assets must be synchronized with three redundant central time servers within milliseconds from a trusted synchronization source.		
3	Event Logging		
Objective	To ensure that cybersecurity incidents and unauthorized activity in the environment do not go undocumented and unnoticed.		
Risk Implication	It is important to record main events executed in the environment. If fails to log the specified events in the control requirements, this would lead to an increased risk of unidentified and possible unauthorized events occurring in the environment, which could cause potential business impact depending on the severity of the incident.		
Requirements			
3-1	All the events specified under these control requirements must be logged: 3-1-1 Successful login attempts. 3-1-2 Unsuccessful login attempts, along with the identification of whether the login attempt involved an invalid password. 3-1-3 All logoffs. 3-1-4 Additions, deletions and modifications to user accounts/privileges. 3-1-5 Users switching IDs during an online session. 3-1-6 Attempts to perform unauthorized functions. 3-1-7 Activities performed by privileged accounts. 3-1-8 Modifications to system settings (parameters). 3-1-9 Read or write access to protected information, where there is a potential for theft of that information. 3-1-10 Exfiltration of materials related to classified information outside MCS. 3-1-11 Detections in inbound and outbound communications for unusual or unauthorized activities including the detection of malware (such as malicious code, spyware, and adware). 3-1-12 Additions, deletions and modifications to security/audit log parameters. 3-1-13 Faults (technical problems in information and technology assets) that could potentially be attributed to a security event.		





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	 3-1-14 Activation or deactivation of activities by a specific service. 3-1-15 System crashes or restarts. 3-1-16 Password changes. 3-1-17 Enablement of all critical systems logs. 			
4	Event Sou	ırces		
Objective			ation and technology assets even	_
Risk Implication	Failure to detect unauthorized activity will prevent to respond to suspicious events appropriately before they expand into a greater security incident.			*
Requirements				
4-1	logs over	reliable and co	nd logging systems must be commonly used event log transponentation Interface (WMI), SNN	ort protocols such as
All event logs must be collected from the sources specific requirement:		specified under this		
	4-2-1	•	eluding Operating Systems, applications, etc., covering logs.	_
	4-2-2	•	tems, including Operating S vorks, Applications, etc., covering logs.	
	4-2-3	Events of sens	sitive and privileged accounts.	
4-2	4-2-4	Operating Sys	stem Events (e.g., Linux)	
	4-2-5	Database Eve	nts	
	4-2-6	=	tion events (e.g., Web applicate evention (DLP), Multifactor Au	
	4-2-7		ted in the events of Internet and Wi-Fi connections.	browsing, Internet
	4-2-8	Events genera	ating from data transfer to extern	nal storage.
	4-2-9	File Integrity	Monitoring (FIM) event logs.	





	4-2-10 Event logs generated from system configuration changes, system updates and patches, and application changes.	
	4-2-11 Abnormal activities such as those detected by Intrusion Prevention System (IPS).	
	4-2-12 Events generated by security solutions including Antimalware, Remote-Access Technologies (such as Virtual Private Network VPN), Web Proxies, Vulnerability Management Software, Host Intrusion Prevention System (HIPS), Authentication Servers, etc.	
	4-2-13 Events generated by perimeter devices including firewalls, routers, traffic managers, etc.	
	4-2-14 Sysmon Event Logs (SEL), a Microsoft tool that records events that the operating system does not log and is very important and useful in security monitoring and incident response.	
	4-2-15 Events generated by virtualization environments and their underlying tools and infrastructure.	
	4-2-16 Enable Domain Name System (DNS) query logging wherever technically applicable.	
	4-2-17 Event logs generated by Industrial Control Systems (ICS).	
4-3	All levels of logging as well as audit trail and security logs must be enabled on all web application and technical components.	
4-4	Server logging and audit trail must be configured to be forwarded to a centralized logging system as per NCA's regulatory cybersecurity requirements MCS's Cybersecurity Event Logs and Monitoring Management Policy and Standard.	
5	Events Monitoring	
Objective	To identify unauthorized network activity that may indicate a security incident.	
Risk Implication	Failure to detect unauthorized network activity will prevent an organization to respond to suspicious events appropriately before they expand into a greater security incident.	
Requirements		



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5-1	Security event alerts generated from firewalls must be reviewed on continuing bases to detect any unauthorized access attempts or unusual behaviour. MCS can monitor alerts from firewalls, for example, by observing logs daily or by observing other system aspects such as access attempt patterns, characteristics of access, etc.
5-2	Wireless network monitoring must be enabled to detect unauthorized wireless access points. Wireless signals may radiate beyond the confines of organization-controlled facilities. Organizations must proactively search for unauthorized wireless connections including performing thorough scans for unauthorized wireless access points. Scans must not be limited to those areas within facilities containing information and technology assets, but also must include areas outside facilities as needed to verify that unauthorized wireless access points are not connected to the systems.
5-3	Host-based monitoring mechanisms must be implemented on endpoint system components for high-risk information and technology assets. Information and technology asset components where host-based monitoring can be implemented include servers, workstations, and mobile devices.
5-4	Signature-based and behaviour-based code monitoring mechanisms (such as Antivirus, EDR, and APT tools) must be implemented on information and technology assets to detect malicious code.
5-5	Signature-based and behavior-based code monitoring mechanisms must be kept current with all available signatures or indicators.
5-6	Monitoring devices must be deployed to monitor communications at the external boundary of the system (e.g., system perimeter) and at key internal boundaries (e.g., logical/physical interfaces within the information and technology asset) to discover anomalies, detect covert exfiltration of information and track specific types of transactions of interest to MCS. For example, Network segments where systems that are accessible from the Internet are located.

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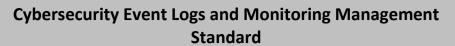


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Monitoring tools must be employed to detect indicators of *denial-of-service* 5-7 attacks against MCS's information and technology assets and infrastructure. 6 **Event Alerting** To ensure event alerting is enabled and configured and the appropriate Objective personnel in MCS are notified to be able to handle a security incident most effectively. If alerting is not configured on logging systems, then security incidents could **Risk Implication** be addressed incorrectly or may not even be addressed at all. Requirements Alerts for information and technology assets must be generated when 6-1 previously defined security monitoring events occur and/or thresholds for indications of potentially malicious activity are met. Alerting methods, including email, SMS, video wall systems, etc., must be 6-2 configured to notify the appropriate personnel. Alert Threshold Objective To have a documented approach for the cases when alerts should be triggered. If the scope and intent of alerts are not documented, they may not be **Risk Implication** appropriately configured and potentially malicious events may go unnoticed. Requirements Specific thresholds for alerting on security monitoring events must be 7-1 identified and documented. Thresholds must be periodically revised and updated to stay current with trending security attacks. Firewall Event Alerting





Objective	To notify appropriate personnel who are able to address possible security-related events originating from a security incident.
Risk Implication	If personnel are not notified of events, MCS will be unaware of malicious unauthorized attempts to connect to the network. Accordingly, if such event is successful, MCS's business will be compromised as a result.
Requirements	
8-1	Alarms or monitoring tools must be configured to alert the appropriate personnel of security-related events originating from the firewall.
9	Application Event Alerting
Objective	To ensure that security incidents and unauthorized activity in the environment do not go undocumented and unnoticed.
Risk Implication	It is important to record main events of MCS's applications. If MCS fails to log the specified application related events in the control requirements, this would lead to an increased risk of unidentified and possible unauthorized events occurring in the application, which could cause potential business impact depending on the severity of the incident.
Requirements	
9-1	All client requests and server responses must be logged.
9-2	All account information (e.g., successful and failed authentication attempts and account changes) must be logged.
9-3	All usage information (e.g., the number of transactions occurring in a certain period) must be logged.
9-4	All significant operational actions (e.g., application startup and shutdown, application failures, and application configuration changes) must be logged.
10	Malware in Communication Monitoring
Objective	To identify the presence of malware (e.g., malicious code, spyware, adware) in MCS's communications before it can cause damage.

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If unauthorized use of activities including malware presence goes unnoticed, MCS will not become aware of the malware before it spreads, which will put the business at risk of a widespread security attack.
Inbound and outbound MCS's communications (such as emails, file attachments, downloads) must be monitored for malware (such as malicious code, spyware and adware).
Event Log Review Analytics
Log analysis and SIEM can help detect abnormalities and anomalies, enhance the incident response capabilities, and detect attacks that other security systems missed, and this must be aligned with NCA's operating model for cybersecurity operation centers and NCA's regulatory cybersecurity requirements.
Failure to recognize security events and incidents will increase the risk that cyber-attacks will go unnoticed and will compromise MCS's information and technology assets as a result.
All event logs must be forwarded to a centralized log analytics or Security Information and Event Management (SIEM) system for log correlation, analysis and alerting.
Regular review on SIEM must be performed to monitor and detect abnormal behavior and anomalies.
SIEM system must be tuned on a regular basis to better identify actionable events and decrease event noise.
Event logs and alerts must be periodically reviewed, using manual and automated techniques.

Cybersecurity Management Cybersecurity Event Logs and Monitoring Management



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11-5	Significant unauthorized activity related to information and technology assets must be detected.		
11-6	Misuse of privileged user accounts must be detected.		
12	Log Conversion and Parsing		
Objective	To ensure all MCS's information and technology assets event logs are monitored to identify unauthorized network activity that may indicate a security incident.		
Risk Implication	It is important to record the main events executed in the environment. If MCS fails to log the specified events in the control requirements, this would lead to an increased risk of unidentified and possible unauthorized events occurring in the environment, which could cause potential business impact depending on the severity of the incident.		
Requirements			
12-1	Log conversion utilities must be used to convert logs unsupported by MCS's logging system to a standard or supported log format.		
12-2	Logging software with parsing mechanisms must be implemented to retrieve logs properly from unsupported systems.		
13	Continuous Monitoring		
Objective	To enable continuous monitoring of all information and technology assets logs to detect malicious activity and to maintain the effectiveness of the monitoring over time, and this must be aligned with NCA's operating model for cybersecurity operation centers and NCA's regulatory cybersecurity requirements.		

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If a monitoring plan is not defined and documented, the risk of ad hoc or **Risk Implication** inadequate monitoring increases, which increases the risk that malicious activity may go unnoticed. Requirements Develop and prepare a plan for continuous monitoring (such as: aspects that must be monitored within the scope of work, the monitoring method, and 13-1 testing the effectiveness of monitoring) for information and technology assets and updating them when needed. 14 Logging System Security To ensure the protection and security of the logging system underlying Objective infrastructure including log collectors, log aggregators and correlation engines. Leaving MCS's logging infrastructure unprotected could allow the attackers **Risk Implication** to leverage weaknesses in the logging systems and exploit vulnerabilities to gain unauthorized access to MCS's network and data. Requirements 14-1 Logging systems software must be installed on dedicated servers. A log collector must be implemented in each zone in the network architecture, and only these collectors must be allowed to communicate with the centralized logging system or logging aggregation systems. A log collector must be placed, at a minimum, in the following zones: 14-14-1Place a log collector in the DMZ. 14-2 14-14-2Place a log collector in the database zone. 14-14-3Place a log collector in the application zone. 14-14-4Place a log collector in the corporate services zone. 14-14-5Place a log collector in the user zone. 14-14-6Place a log collector in the management zone. 15 Retaining Event Logs

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Objective	To avoid deleting security event logs during a period where they can be of use.
Risk Implication	If security event logs are deleted before an audit or investigation, MCS would be left unable to defend or investigate activities that occurred on its information and technology assets.
Requirements	
15-1	Event logs must be retained for at least twelve (12) months for all assets, and at least eighteen (18) months for critical assets, or for a longer period, as per MCS's Cybersecurity Policy.
15-2	The archival and deletion of event logs must be restricted to authorized users and only after the expiration of the retention period. Appropriate information and technology asset administrators must be authorized to carry out event log archival and deletion.
16	Alternate Logging Capability
Objective	To enable MCS to continue to capture critical security event activity even when the primary logging method (such as central logging) fails, and this must be aligned with NCA's operating model for cybersecurity operation centers and NCA's regulatory cybersecurity requirements.
Risk Implication	If the primary logging method fails for a critical technology asset and there is no alternate logging capability, it may not be possible to create an audit trail or identify malicious activity because there are no records that can be used by MCS for monitoring and investigation actions. Higher risk assets have a greater impact on the organization's business in the event of a security incident.
Requirements	





16-1	High risk information and technology assets must be configured to maintain local logs in the event of network connectivity failure.
17	Event Log Availability
Objective	To maintain the continuous operation of log capturing functionality and reliability for critical information and technology assets.
Risk Implication	If log functionality is unavailable, this would increase the likelihood of a malicious activity going unnoticed and the inability to conduct incident investigation which could result in a costly security incident.
Requirements	
17-1	MCS's information and technology assets with protected information or designated through risk management assessment as requiring event logs, must be configured to generate event logs at all times.
17-2	Multiple redundant logging systems with failover capabilities must be configured.
18	Log Classification
Objective	To protect all cybersecurity event logs in a secure manner.
Risk Implication	If logs that contain data classified as Highly Confidential enforce the controls required for a lower classification of data, then this data will be at a higher risk of compromise due to less strict controls.
Requirements	
18-1	Centralized logging solutions must be treated as if they contain, at a minimum, MCS's Secret and Confidential data, and as if they comply with all relevant confidentiality controls.
18-2	For any application log or transaction record(s) that contains data classified as Top Secret , the controls required for that classification of data must be enforced.

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19	Log Integrity and Security
Objective	To maintain a mechanism capable of detecting modification of security event logs to show they have maintained original integrity.
Risk Implication	If security event logs are able to be modified without a means to detect that modification, a malicious user could hide their own malicious activity within the information and technology asset. In such case, if an investigation were to occur based on the malicious user's actions, there would be no evidence to prosecute the user and MCS's claims against the malicious user would not be defensible. Further, if log integrity is compromised, they may not be admissible in court proceedings.
Requirements	
19-1	Rate limiting must be configured to prevent <i>denial of service</i> attacks for the logging system. Additionally, it must be configured to a reasonable threshold.
20	Logging Resources
Objective	To avoid losing logs to storage overwriting.
Risk Implication	Failure to configure log storage space with sufficient log capacity for maximum thresholds could result in log overwriting, and MCS could lose valuable data. In such case, sensitive logs could be deleted entirely and MCS would not be able to rely on these logs in case of a lawsuit or investigation, which could impact its business.
Requirements	

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20-1	Sufficient resources (e.g., system resources, data storage, and network bandwidth) must be provided to accommodate prescribed logging activities. Log storage devices must have sufficient log storage for collecting logs.	
21	Logging Configuration Changes	
Objective	To limit the chance that unauthorized or malicious changes will be made to logging being performed on system components.	
Risk Implication	If no limitations are in place for who, where, and when log settings can be changed, a malicious user could turn off logging on sensitive machines to facilitate an unnoticed attack.	
Requirements		
21-1	Security event log configuration changes, including scope and monitoring frequency, must be restricted to authorized users.	
22	Use of Monitoring Devices	
Objective	To prevent overexposure of sensitive data and impact on MCS's network (such as exhaustion of network resources or introduction of compromised/malicious tools into the environment).	
Risk Implication	If MCS's cybersecurity function does not authorize and approve the use of monitoring and scanning devices/tools to specific personnel, a tool used could be harmful to the environment and would increase the risk of a data compromise or security incident.	
Requirements	Requirements	
22-1	The use of monitoring and scanning devices or tools must be limited to authorized users.	
22-2	The results of all monitoring and scanning activities must be classified as	

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5 ROLES AND RESPONSIBILITIES

- 1- **Standard Owner:** Cybersecurity Manager
- 2- Standard Review and Update: Cybersecurity Department
- 3- Standard Implementation and Execution: Information Technology Department
- 4- Standard Compliance Measurement: Cybersecurity Department

6 UPDATE AND REVIEW

The Cybersecurity Department must review the standard at least once a year or in case any changes happen to the infrastructure, policy or the regulatory procedures in MCS or the relevant regulatory requirements.

7 COMPLIANCE

- 1- Cybersecurity Manager will ensure the compliance of MCS with this standard on a regular basis.
- 2- All personnel of MCS must comply with this standard.
- 3- Any violation of this standard may be subject to disciplinary action according to MCS's procedures.

8 REFERENCES

• ECC – 2: 2024 2-12-1 Cybersecurity Event Logs and Monitoring Management