

NWC OT Cybersecurity Asset Management Procedure	Page 1 of 20
Document Type: Procedure	- August 16, 2021
Document Classification: Internal and Confidential	August 10, 2021

NWC OT Cybersecurity Asset Management Procedure		
Document Number: A01001045-PRO-AM		
Issue Date:	August 16, 2021	
Revision Number: 00		
Issued For:	Review	



NWC OT Cybersecurity Asset Management Procedure	Page 2 of 20
Document Type: Procedure	August 16, 2021
Document Classification: Internal and Confidential	August 10, 2021

Revision Details

Name	Title/Dept.	Signature	Date		
Prepared by:					
Sidrat Mehreen	Senior OT Cybersecurity Analyst		7-Aug-21		
Reviewed by:					
Sameen Ullah Khan	OT Cybersecurity Lead		9-Aug-21		
Approved by:					
Farhan Rasheed	Operations Manager		9-Aug-21		
Issued by:					
Syed Ali Raza	Planning Engineer		16-Aug-21		

PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure	Page 3 of 20
Document Type: Procedure	A
Document Classification: Internal and Confidential	August 16, 2021

History Page

Issue No.	Issue Date	Prepared By (Name)	Reviewed By (Name)	Owned By (Name)	Endorsed By (Name)	Approved By (Name)
Chang	e Description					
Change Description						
Char	nge Description					



NWC OT Cybersecurity Asset Management Procedure	Page 4 of 20
Document Type: Procedure	August 16, 2021
Document Classification: Internal and Confidential	

Reference Documents

Document Number	Document Title
ECC-1:2018	National Cybersecurity Authority
	Essential Cybersecurity Controls (NCA ECC)

Document Roles and Responsibilities

	Prepare/ Update/ Amend	Review	Approve	Publish
Owner	YES	YES		
Cybersecurity Steering Committee		YES		YES
Corporate Strategy & Performance Management VP			YES	



NWC OT Cybersecurity Asset Management Procedure Page 5 of 20 Document Type: Procedure August 16, 2021

Table of Contents

1.	Int	troduction	8
2.	Ro	oles and Responsibilities	8
3.	As	sset Management Procedure	8
	3.1	OT Asset Inventory Management Planning Phase	11
	3.2	OT Asset Discovery Phase	12
	3.3	OT Asset Identification Phase	12
	3.4	OT Asset Operate and Maintain Phase	12
	3.5	OT Asset Disposal Phase	13
4.	As	sset Management Steps	13
5.	Pro	ocess Flow Chart	17

Document Classification: Internal and Confidential



NWC OT Cybersecurity Asset Management Procedure	Page 6 of 20
Document Type: Procedure	August 16, 2021
Document Classification: Internal and Confidential	August 16, 2021

Glossary

Word or Phrase	Explanation
Asset	General support system, major application, resources, high impact program, physical plant, or a logically related group of systems
Audit	Independent review and examination of records and activities to assess the adequacy of system controls, to ensure compliance with established policies and operational procedures.
Asset Management	Process of planning and controlling the acquisition, operation, maintenance, renewal, and disposal of organizational assets.
Asset Life Cycle	Asset lifecycle is the number of stages that an organization's asset goes through during the lifespan of an asset's ownership. It is the period that an organization can effectively and efficiently utilize an asset to accomplish its business
	goals. It covers all phases of an asset's life from acquisition through maintenance and eventual disposal.
OT Asset	Those assets that are used primarily used to operate industrial sites/plants/process equipment.
Asset Register	A list of all information assets, which includes their ownership, location, description, name, and value.
Asset Owner	A person or group of people who have been identified by management as having responsibility for the maintenance of the confidentiality, availability, and

PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure Page 7 of 20 Document Type: Procedure August 16, 2021 Document Classification: Internal and Confidential

Word or Phrase	Explanation	
	integrity of that asset. The asset owner may change during the lifecycle of the asset.	
Compliance	Ensuring that a Standard or set of Guidelines is followed. A means of conforming to a rule, such as a specification, policy, standard or law.	



PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure	Page 8 of 20
Document Type: Procedure	August 16, 2021
Document Classification: Internal and Confidential	August 10, 2021

1. Introduction

This document provides the guidance and procedures to acquire, operate, maintain, upgrade/replace/renew, and dispose all assets in NWC OT environment.

This procedure is applicable to only NWC OT infrastructure.

2. Roles and Responsibilities

Roles	NWC Representative	Responsibilities	
OT Asset Inventory Owner	Asset Management Designated Person	Designated Person who owns OT Asset Inventory List/Database and is responsible for its upkeep/update	
OT Asset Inventory Analyst	Asset Management Designated Person	Designated person who uses OT Asset Inventory List/Database for data update, analysis	
OT Asset Owner Smart Operations Team Network Team Infrastructure Team SCADA Application Team Endpoint Support Team		Smart Operations for L0-L1 Assets Network Team for OT Network Devices Infrastructure Team for OT Servers SCADA Application Team for SCADA Servers & Clients Endpoint Support Team for OT Clients	

3. Asset Management Procedure

Guidance Notes:

- NWC shall document all ICS/SCADA physical devices and systems in the OT Asset Inventory list/database
- 2. OT Asset Inventory shall be updated with following minimum information to be valuable in terms of security and risk management.
 - a. OT Asset ID: A unique code/tag that will identify each asset
 - b. OT Asset Model

PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure	Page 9 of 20
Document Type: Procedure	August 16, 2021
Document Classification: Internal and Confidential	August 10, 2021

- c. OT Asset Brand
- d. OT Asset Model
- e. OT Asset Manufacturer
- f. OT Asset Description: it must contain information about the use of the asset
- g. OT Asset Type: Classification of the asset.
- h. OT Asset Owner: Person responsible for making decisions about the asset.
- i. OT Asset Manager: Person responsible for ensuring that asset is operational and managing access to it. The manager may be the same person as owner.
- j. OT Asset Location: the place where asset is located. If it is physical asset the location will be a place, if is a logical one the location will be a physical asset.
- k. OT Asset Version: in case of physical asset, summary of the software in the device.
- I. OT Asset Evaluation: Attributes that makes it possible to evaluate its impact and criticality in the system. Different parameters can be used to make the evaluation, such as:
 - i. Availability: a qualitative or quantitative value that determines the importance of the absence of the asset.
 - ii. Integrity: a qualitative or quantitative value that determines the repercussions that unauthorized modification of the asset would have for the business.
 - iii. Confidentiality: a qualitative or quantitative value that determines the degree of confidentiality that the asset requires.
 - iv. Criticality: a value that determines the extent to which the process depends upon the asset. The greater the criticality value, the greater the consequences for the business of losing the asset.
 - v. Cost: financial value of the asset.
- 3. Every OT Asset in Asset Inventory shall have OT Asset Owner.
- 4. NWC shall update Asset Inventory at consistent and regular intervals. As an accurate OT asset inventory is critical for maintaining any cyber security program.
- 5. OT Asset Inventory shall be updated with OT Asset Owner on consistent & scheduled basis, due to personnel changes in organization, roles, and responsibilities.
- 6. NWC shall deploy technologies to monitor changes in/about OT Assets and discover new OT Assets.
- 7. OT Asset Inventory shall be updated with Authorized and Unauthorized hardware and software.



NWC OT Cybersecurity Asset Management Procedure	Page 10 of 20
Document Type: Procedure	- August 16, 2021
Document Classification: Internal and Confidential	August 10, 2021

- 8. OT Asset Inventory shall be updated with OT Hardware and OT Software relationships/dependencies or interdependency mapping, to establish the OT Asset failure impact on other OT Assets.
- 9. OT Asset Inventory shall be updated with following OT Asset Classes.
 - a. Hardware: All physical equipment used in the development of industrial process such as PLC, RTU, IED, Servers
 - b. Software: Application used to manage the process such as SCADA, DCS, Operating Systems, Drivers, Firmware, Development Tools
 - c. Staff: Staff working in the organization such as permanent, contract employees and sub-contractors
 - d. Information: Data that is generated, collected, managed, transmitted and destroyed, regardless of its format such as databases, documentation, manuals
 - e. Network: Network connectivity devices such as Router, Switches, Firewalls, Hubs, Media Converters, Radios etc.
 - f. Technology: Equipment need to manage people, the company and business such as computers, telephones, printers, wiring, etc.
 - g. Auxiliary Equipment: Assets that are not in any of the previous categories and that support the rest of the systems such as air conditioning and lighting
 - h. Facilities: Places where the company's important equipment is housed such as Offices, building, sites, plants, rooms, etc.
- 10. OT Asset Inventory shall be updated with Inter/Intra-OT Assets Communication pathways details amongst Inter/Intra-Levels.
- 11. OT Asset Inventory shall be updated with unauthorized change to a control strategy from control strategy baseline for every OT Asset.
- 12. OT Asset Inventory shall be updated with OT Asset redundancies details.
- 13. OT Asset Inventory shall be updated with OT Asset Networking details.
- 14. OT Asset Inventory shall be used to establish configuration baseline. Configuration baseline is starting point to manage OT Asset operational life. Change is constant in OT environment; thus, configuration baseline provides a known good state for a particular OT Asset.
- 15. OT Asset Inventory shall be updated with Inter/Intra-OT Assets Communication Traffic Baseline.
- 16. OT Asset Inventory shall be used to capture configuration policies. Configuration policies enables to monitor conditions outside of acceptable operational or security boundaries and provide violation alert.



NWC OT Cybersecurity Asset Management Procedure	Page 11 of 20
Document Type: Procedure	August 16, 2021
Document Classification: Internal and Confidential	70500110, 2021

- 17. OT Asset Inventory centered closed loop Patch Management System shall be deployed for OT Assets Patching and for regulatory compliance.
- 18. OT Asset Inventory shall be updated as consequence of Change Requests (MOC Process).
- 19. OT Asset Inventory shall be updated with Backup and Recovery strategy for every OT Asset.
- 20. OT Asset Inventory shall be updated with hardening policies applied to every OT Asset.
- 21. OT Asset Inventory shall be updated with vulnerabilities & its solution for every OT Asset.
- 22. OT Asset Inventory shall be updated with OT Asset specific service agreements, support numbers, external access requirements.
- 23. OT Asset Owner shall update Asset Inventory after capturing more details either manually or through passive scanning techniques.
- 24. OT Asset Inventory shall be updated by OT Asset Owner manually in event of changes in OT Environment.
- 25. Access to OT Asset Inventory shall be granted based on roles.
- 26. OT Asset Inventory shall be developed using following ways:
 - a. Manual: OT Asset Inventory is made by one or several designated persons with sufficient knowledge to compile data.
 - b. Automatic: OT Asset Inventory is made using tools that make it possible to speed up the data compilation tasks for each asset automatically, which is useful when number of assets in an organization is very high.
 - Examples of such tools includes, Nozomi, WireShark, Nmap, Security Nnion, OpenVAS, GRASSMARLIN, Cyberlens, Sophia, OT-Base, eyesight,
 - c. Mixed: OT Asset Inventory is made using combination of automated tools and manual techniques, to be compile most accurate data.

OT Asset Inventory Management is performed in phases:

3.1 OT Asset Inventory Management Planning Phase

- 1. OT Asset Inventory Owner shall get management support/buy-in from NWC Management to perform OT Asset Discovery activities.
- 2. OT Asset Owner shall initiate scheduled Asset Inventory update request. Update frequency to be determine based on frequency of changes, criticality of OT Assets and other mandatory attributes deemed necessary.
- 3. OT Asset Inventory Owner evaluates and approves request for OT Asset Inventory Update
- 4. OT Asset Inventory Owner Conducts Kick-off meeting and forms OT Asset Discovery Team
- 5. OT Asset Discovery Activities

PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure	Page 12 of 20
Document Type: Procedure	- August 16, 2021
Document Classification: Internal and Confidential	August 10, 2021

3.2 OT Asset Discovery Phase

- 1. Following activities are performed by OT Asset Discovery Team:
 - a. Discovery by automatic tools,
 - Discovery by manual efforts such as inspections, configuration checks, site surveys
 etc.
 - c. Discovery by monitoring tools
 - d. Discovery by documents
- 2. OT Asset Inventory Analyst updates the OT Asset Inventory

3.3 OT Asset Identification Phase

1. OT Asset Inventory Analyst provides list of changed OT Asset to OT Asset Owners for following update of asset attributes such as OT Asset ID, OT Asset Owner, OT Asset Function, OT Asset Location as per Purdue Level, OT Asset Manufacturer, OT Asset Model, OT Asset Part Number, OT Asset Classification, OT Asset Operation System, OT Asset Firmware, OT Asset IP Configuration, OT Asset MAC Addresses, OT Asset Communication Protocols, OT Asset Licensing, OT Asset in Network Architecture, OT Asset in Logical Architecture, OT Asset Integration, OT Asset Patching Information, OT Asset Criticality (high, medium, or low), Inter/Intra-OT Assets Traffic Baseline, OT Asset dependence on other OT Assets/Devices, OT Asset Information deviation from baseline (such as changes in IP Addresses, MAC Addresses, New Connections, Protocols, Operating Systems, Firmware, Software Versions, Application Versions, Configuration Versions, etc.), OT Asset Access Logs, OT Asset Traffic deviation from baseline, OT Asset Known Vulnerability notified from Vendors, OT Asset Current Life Cycle Phase, OT Asset Spare Inventory, OT Asset Local Maintenance/Repair History, Tools used, OT Users involved, OT Asset Remote Maintenance/Repair History, tools used, OT Users involved, OT Asset Known Unresolved Issues, OT Asset Upgrade/Replacement Justification, OT Asset Upgrade/Replacement Impact, OT Asset Upgrade/Replacement, OT Asset Vulnerabilities & Solutions, OT Asset Performance Baseline, OT Asset Inventory Analyst publish Asset Inventory Report to OT Asset Owner for accuracy.

3.4 OT Asset Operate and Maintain Phase

- 1. OT Asset Owner shall submit request to change, add/delete OT Asset & its attributes to reflect OT Asset during its operational life cycle
- 2. OT Asset Inventory Owner will evaluate and approve changes, addition/deletion.

PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure	Page 13 of 20
Document Type: Procedure	- August 16, 2021
Document Classification: Internal and Confidential	August 10, 2021

- 3. OT Asset Inventory Analyst will perform OT attributes validation to ensure correctness of data.
- 4. Information Security OT Security Operation Center may raise OT incident if OT Asset is discovered using Nozomi Appliances that may consequently result in changes, addition, or deletion of reported OT Asset in OT Asset Inventory.
- 5. OT Asset Inventory Owner will evaluate and approve changes, addition/deletion.
- 6. OT Asset Inventory Analyst will perform OT attributes validation to ensure correctness of data.

3.5 OT Asset Disposal Phase

- 7. OT Asset Owner shall initiate request for decommissioning and disposal of an OT Asset.
- 8. OT Asset Owner shall prepare decommissioning and disposal procedure for an OT Asset and submit to CAB (Change Approval Board) for approval.
- 9. OT Asset Owner shall decommission and dispose OT Asset as per approved procedure.
- 10. OT Asset Owner shall update OT Asset Inventory.

4. Asset Management Steps

	Activity	Responsible	Description
OT A	sset Inventory Managemen	t Planning Phase	
1.1	Management Buy- In/Support for continuous, consistent update of OT Asset Inventory	OT Asset Inventory Owner	OT Asset Inventory Owner seeks management support to engage OT Asset Owners consistently and continuously from different NWC departments to keep OT Asset Inventory up to date.
1.2	Initiate OT Asset Inventory update request	OT Asset Owner OT Asset Inventory Owner Information Security	Request is raised to formally initiate OT Asset Inventory update for a site/plant/sub-site/remote site, main BU Office, BU offices where OT Assets

PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure Page 14 of 20 Document Type: Procedure August 16, 2021 Document Classification: Internal and Confidential

1.3	Request Approval	OT Asset Inventory Owner OT Asset Owner Information Security	Request is evaluated and approved by OT Asset Inventory Owner, OT Asset Owner and Information Security.
1.4	Conduct OT Asset Inventory Update Kick off Meeting	OT Asset Inventory Owner	OT Asset Inventory Owner develops Scope of OT Asset Inventory Update it includes Sites, Plants, Sub-Sites, BU Main Office, BU Offices, relevant Stakeholders, and level of details to be collected
			OT Asset Inventory Owner engages relevant stakeholder mandatory to achieve the OT Asset Inventory Update
			OT Asset Inventory Owner forms OT Asset Inventory Update Team
OT As	sset Discovery Phase		
1.5	Conduct OT Asset Discovery Activities	OT Asset Inventory Update Team	
1.6	Update OT Asset Inventory	OT Asset Inventory Analyst	
1.7	OT Assets attributes update	OT Asset Owner	OT Analyst submits OT Asset List to OT Asset Owner for update of OT Asset attributes
1.8	Update of OT Asset Attributes		

PROPRIETARY NOTICE



NWC OT Cybersecurity Asset Management Procedure	Page 15 of 20
Document Type: Procedure	August 16, 2021
Document Classification: Internal and Confidential	August 16, 2021

OT As	OT Asset Operate and Maintain Phase		
1.9	Request to Change or add/delete OT Asset or its attributes	OT Asset Owner	OT Asset Owner will raise request for change, addition or deletion of OT Asset or its attributes
1.10	Request Approval	OT Asset Inventory Owner	OT Asset Inventory Owner will evaluate and approve request.
1.11	Change, add/delete OT Asset, or attributes validation	OT Asset Inventory Analyst	OT Asset Inventory Analyst validates changes and make finalize changes in OT Asset Inventory
1.12	Request to Change, add/delete OT Asset or attributes as consequence of Cyber Incident Report	Information Security	Information Security may initiate request to change, add/delete OT Asset or its attributes based on Cyber Incident Report
1.12	Request Approval	OT Asset Inventory Owner	OT Asset Inventory Owner will evaluate and approve request.
1.13	Change, add/delete OT Asset, or attributes validation	OT Asset Inventory Analyst	OT Asset Inventory Analyst validates changes and make finalize changes in OT Asset Inventory
OT As	OT Asset Disposal Phase		
1.14	Initiate Disposal Request	OT Asset Owner	OT Asset Owner initiate request to decommission and dispose OT Asset
1.15	Submit Decommissioning and Disposal Method Statement for Approval	OT Asset Owner	OT Asset Owner prepares and submits decommissioning and disposal method statement for approval

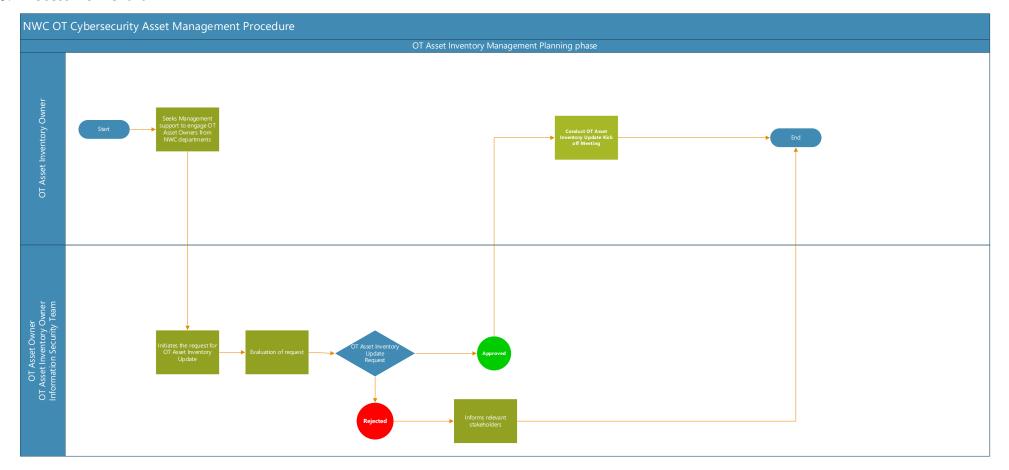


NWC OT Cybersecurity Asset Management Procedure Page 16 of 20 Document Type: Procedure August 16, 2021 Document Classification: Internal and Confidential

1.16	Change Approval Board Approval	Change Approval Board CAB reviews and approves disposa request as part of change request		
1.17	Decommissioning and Disposal of OT Asset	OT Asset Owner	OT Asset Owner performs decommissioning and disposal activities	
1.18	Request to Change or add/delete OT Asset or its attributes	OT Asset Owner	OT Asset Owner will raise request for change, addition or deletion of OT Asset or its attributes	
1.19	Request Approval	OT Asset Inventory Owner	OT Asset Inventory Owner will evaluate and approve request.	
1.20	Change, add/delete OT Asset, or attributes validation	OT Asset Inventory Analyst	OT Asset Inventory Analyst validates changes and make finalize changes in OT Asset Inventory	

	NWC OT Cybersecurity Asset Management Procedure	Page 17 of 20
	Document Type: Procedure	August 16, 2021
العباه الوطنية	Document Classification: Internal and Confidential	

5. Process Flow Chart



PROPRIETARY NOTICE

	NWC OT Cybersecurity Asset Management Procedure	Page 18 of 20
	Document Type: Procedure	August 16, 2021
المياه الوطنية	Document Classification: Internal and Confidential	August 16, 2021

