Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 30-1202
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Maintenance, Logistics, and Facilities
Configuration Management, NWSPD 30-12

ENGINEERING DRAWINGS

NOTICE: This publication is available at: https://www.weather.gov/directives/.

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SUMMARY OF REVISIONS: This directive supersedes NWS 30-1202, *Engineering Drawings*, dated March 30, 2018. Revisions made include name changes, spelling, and grammar; Agile has been replaced with Document Management System (DMS). Adjusted formatting and spacing.

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Dr. William Burnett Date
Acting Director, Office of Observations

Engineering Drawings

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1 Introduction

National Weather Service Instruction (NWSI) 30-1202 establishes the Engineering Drawing/Technical Data Package (TDP) requirements and the Configuration Management (CM) responsibilities for operational systems and NWS-owned facilities.

The NWS identifies and generates engineering drawings to:

1. Establish system configuration baselines to provide a basis for Configuration Management and Change Control.
2. Support NWS equipment under CM control.
3. Provide CM control during the procurement of new NWS equipment.
4. Assist with field maintenance repair.
5. Modify NWS equipment under CM control.
6. Support the documentation of NWS-owned facilities.

2 Purpose

This policy aims to ensure that CM processes are efficient, visible, uniform, and accountable and that changes to operational equipment and facilities are controlled. This instruction also provides that an appropriate review and technical tracking level is administered during the process. This instruction is authorized by National Weather Service (NWS) Policy Directive 30-12, *Configuration and Data Management*.

3 Scope

This instruction implements National Weather Service Directive 30-12. It guides the CM process and defines requirements and responsibilities for preparing engineering drawings of the configuration baseline. This instruction also includes developing, approving, authenticating, revising, and releasing NWS engineering drawings, associated lists, and Engineering Change Notice (ECN) forms.

4 Applicability

Engineering Drawings/TDPs are collections of documents that identify a system's hardware and Software products. The engineering documentation intends to accurately reflect the product baseline so that it can be reproduced and maintained over its applicable life cycle.

This instruction applies to any program meeting any of the following criteria:

1. Hardware configuration is established to fulfill system requirements
2. Hardware procured
3. Hardware installation
4. Verification of hardware installation
5. Configuration audits of hardware are conducted
6. Hardware is subject to audit/validation
7. Establishment of contractual hardware baseline formal change control is implemented for hardware configuration
8. An inventory is maintained for hardware
9. Hardware inventories are maintained for logistics and ongoing lifecycle support.

5 Project Management Responsibilities

The Program Manager has critical roles with regard to the implementation of the CM Process. The Program Manager is responsible for acquiring new systems and facilities and working with the CM Manager to coordinate/oversee the CM process. In conjunction with the CM process, additional responsibilities for the Program Manager require coordination with the CM Manager.

The Program Manager is responsible for:

1. Including Engineering Drawings deliverables in the Statement of Work (SOW) for systems under CM control, as listed in NWS Instruction 30-1203, *Configuration Management for Operational Systems*. The SOW will define engineering drawings and associated list levels for developmental equipment and Commercial-Off-the-Shelf (COTS) equipment.
2. Including an Engineering Drawings deliverable in the SOW for NWS-owned facility construction projects that are:
    1) Over $100,000 in construction costs
    2) Will result in changes relative to the facility's operations and maintenance, especially in critical mechanical/electrical plumbing systems.
3. Coordinating or delegating SOWs specifying new or revised engineering drawings to the Office of Observations, OBS32 Configuration Management/Engineering Design Services (CM/EDS), for review and comment

before issuing the SOW. OBS32 Services Branch CM will review and provide a narrative in the SOW to ensure the engineering drawings are delivered or modified in conjunction with the appropriate level of CM control.

4. Developing the concept of operations and system requirements for the baseline TDP.

OBS32 CM will assist the Program Manager in defining The Work Breakdown Structure (WBS) elements required to implement the project's EDS are necessary to implement the project's EDS. OBS32 CM will assist in determining the EDS WBS structure for the details, as shown in Table 1.

Table 1: Work Breakdown Structure Process

Section	Functionality
Organization	Defining the work
Planning / Schedule	Creating a realistic project task timeline
Accounting	Evaluating the scope of work and associated costs
Analysis / Management Reports	The final report that will be used to determine if "Make or Buy" construction should be used on the program
Documentation	Documenting the requirements and maintenance

6 Configuration Management of Fielded Systems and Engineering Design Services Program Manager

The CM/EDS Program Manager is responsible for:

1. Managing EDS portfolio projects under CM control, i.e., Operational Surface, Upper Air Systems, Fielded Dissemination Systems, and Central Processing Systems.
2. Planning and implementing the overall CM program and approving the CM Project Plan based on assessed needs.
3. Provide an implementation Plan for the CM policies and procedures.
4. Providing the required resourcing for the CM Program.
5. Coordinating with the Program Manager for WBS element definition. Providing estimates and support to the SCPM for the tasks associated with the five sections outlined in Table 1 under the baseline package development process.
6. Assuring drafting/design services for systems under CM control where:
    1) The equipment procurement excludes engineering drawings and associated lists in the SOW.
    2) The engineering drawings must adequately disclose CM, re-procurement, and engineering support information required to sustain the equipment over its lifecycle.
    3) The Program Manager has funded the engineering design support activity within OBS CM.
7. Assist engineering, logistics, and program management with issues and advice related to engineering drawings and the technical data package.

7 Document and Drawing Requirements

Program Managers will procure engineering drawings and associated lists for development equipment using the military standard (MIL-STD-31000) or current industry standard definition for TDPs, and ASME Y14.100 for engineering drawing practices. Section 4.0 of the American Society of Mechanical Engineers (ASME) Y14.100 specification defines the essential, general specifications for drawing types, associated lists, and the revisions of engineering drawings.

The OBS32 CM/EDS manager supports TDP development and ensures that the minimum requirements are met with the engineering documents. TDP engineering drawing requirements comprise various data types that will define the item.

The categories of data that may be included in a TDP are but are not limited to Product Definition Data:

1. Engineering Drawings
2. Associated Lists
3. Specifications
4. Packaging Details
5. 3-Dimensional (3D) Modeling Data

In addition to the categories of data that will be included, each project will identify one or more of the following TDP types, which describe the form and format of the technical data by MIL-STD-31000:

1. Type 2D: 2-Dimensional (2D) Technical Data Package
2. Type 3D: 3D Technical Data Package. Type 3D comes in one of the following subsets:
    1) 3D models only
    2) 3D models with associated 2D drawings.

Additionally, the project's functional descriptions of data elements outlined in Table 2 will be tailored to the TDP.

Technical Data will be defined and developed using the WBS elements outlined by MIL-STD-31000 or current industry standards.

Table 2: Technical Data Elements for Engineering Drawings

Technical Data Elements for Engineering Drawings	
A	Conceptual Level
B	Developmental Level
C	As-Built Level
D	Production Level

It is recommended that Program Managers use all four types of technical data elements to meet the requirements of the Preliminary Design and Critical Design reviews, as well as the Physical

Configuration Audit (PCA) and Functional Configuration Audit (FCA) requirements when a project is in the production phase of its life cycle.

OBS32 CM/EDS will ensure the documents support the acquisition strategy, development, manufacturing development, production, engineering, and logistics throughout the item's lifecycle. In addition, OBS32 CM/EDS will also tailor the engineering design and drawing scope of the system requirements and their relationship to the project phases and contractor support.

8 Product Drawings and Associated Lists

Drawings and associated lists provide the design disclosure information necessary to enable a manufacturer of similar products to produce a similar state-of-the-art product and maintain quality control. Product drawings and related lists are required to meet the requirements of MIL-STD-31000 and conform to the needs of industry standards ASME Y14.100, Y14.5, Y14.24, and Y14.34.

Engineering drawings provide "item definition," which identifies all parameters required to define each unit, assembly, subassembly, part, or material. In addition, item definition within an engineering drawing will outline the original design's resulting physical and electrical performance characteristics.

The data for these drawings is presented in the appropriate drawing format and provided as a minimum:

1. Reflect the end product at its current level of design maturity
2. Provide the engineering data for logistics support products
3. Provide the necessary data to permit the competitive acquisition of items identical to the original design items
4. Provide details of unique processes that are not published or generally available to the industry when needed to design or manufacture
5. Include material performance ratings
6. Identify dimensional and tolerance data
7. Indicate critical manufacturing processes and assembly sequences
8. Identify input and output characteristics, including deviation tolerances
9. Identify mechanical and electrical connections
10. Indicate physical characteristics, including form and finish
11. Identify important details of material identification, including heat treatment and protective coatings
12. Provide inspection, test, and evaluation criteria
13. Provide the equipment calibration requirements and hardware marking requirements
14. Identify the requirements for reliability and maintainability of environmental conditioning shock and vibration testing and other operational and functional tests

15. Identify Vendor Item drawings in all SOWs for COTS equipment.

OBS32 CM requires all documents to conform to the National Institute of Building Sciences National Computer-aided Drafting (CAD) Standards for facilities drawings. For additional information, see Appendix C, *OBS32 Engineering Drawing Procedures for NWS-Owned Facilities*.

9 Drawing Escrow

A drawing escrow account protects the NWS and assures full design disclosure is established and maintained if the contractor can no longer support the equipment. Therefore, the Program Manager should implement a drawing escrow account whenever OBS32 CM requires full disclosure of an engineering design to maintain the equipment by the defined ILS planning. Also, Program Managers should exercise drawing escrow accounts for proprietary equipment if:

1. COTS items are critical for logistic support/provisioning.
2. There is a high risk that the contractor will need help to support the equipment over its lifetime.
3. Technological advances are expected to render the documentation obsolete, and the contractor does not maintain the documentation.
4. Technological advances are expected, but the NWS cannot upgrade the system design and is required to maintain discontinued equipment.

The NWS has uninhibited access to escrow TDP for audits at any point in the equipment life cycle. The Program Manager will require a Data List initially generated by the contractor to maintain the status accounting of the escrow package. Also, OBS32 CM should audit and review escrow TDP annually and keep a current data list of each escrow account's drawing numbers and revision levels.

10 Engineering Drawing Review Process

Design reviews will occur multiple times within the development cycle of the project development cycle or contract. CM/EDS validates the equipment configuration and documents for the following minimum requirements:

1. A list of engineering and manufacturing activities to be represented and their responsibilities identified.
2. As required, a data list of each subassembly and assembly for the electronic instruments or enclosures.
3. A review of the 3D model configuration structure and its conformance to MIL-STD-31000.
4. A review of the subassembly and assembly drawings and parts list configurations.
5. A review of assembly procedures and any other additional requirements.

Because multiple organizations handle configuration documentation support and there are differences in system management functions, the engineering drawing review process varies depending on the system.

The following sections provide details of two categories of review processes. The first section will describe engineering drawing review processes used within the NWS, and the second section will outline the process when NWS contractors have created engineering documents.

10.1 Configuration Branch (OBS32) Drawing Review Process

For those systems where OBS32 has CM responsibility, the Program Manager will serve as the authorization official. They will approve engineering drawings and associated lists before formal release to the OBS32 Technical Reference Library. For NWS-owned facilities, the Regional Systems Operation Division Chief of the Facilities Branch will serve as authorization official and approve facilities engineering drawings before the formal release to the OBS32 Technical Reference Library.

The formal release of the engineering drawings to the OBS32 Technical Reference Library constitutes the establishment of a system or facility baseline. Only the OBS32 Configuration Program Manager can authorize the release of engineering drawings and associated lists before establishing the system or facility baseline.

For those systems and NWS-owned facilities under OBS32 CM control, the NWS will use the Engineering Change Notice (ECN) document to modify formally released engineering drawings and associated lists. Appendix A details the OBS32 Engineering Drawing procedures for systems, including instructions for generating ECNs. Appendix C describes NWS-owned facilities' OBS32 Engineering Drawing procedures, including instructions for generating ECNs.

All ECNs will be processed using the Electronic Engineering Change Notice (E-ECN) System, accessible on the CBITS webpage. For relevant processes and scope, refer to Appendix B.

10.2 Program Branch (OBS32) Drawing Review Process

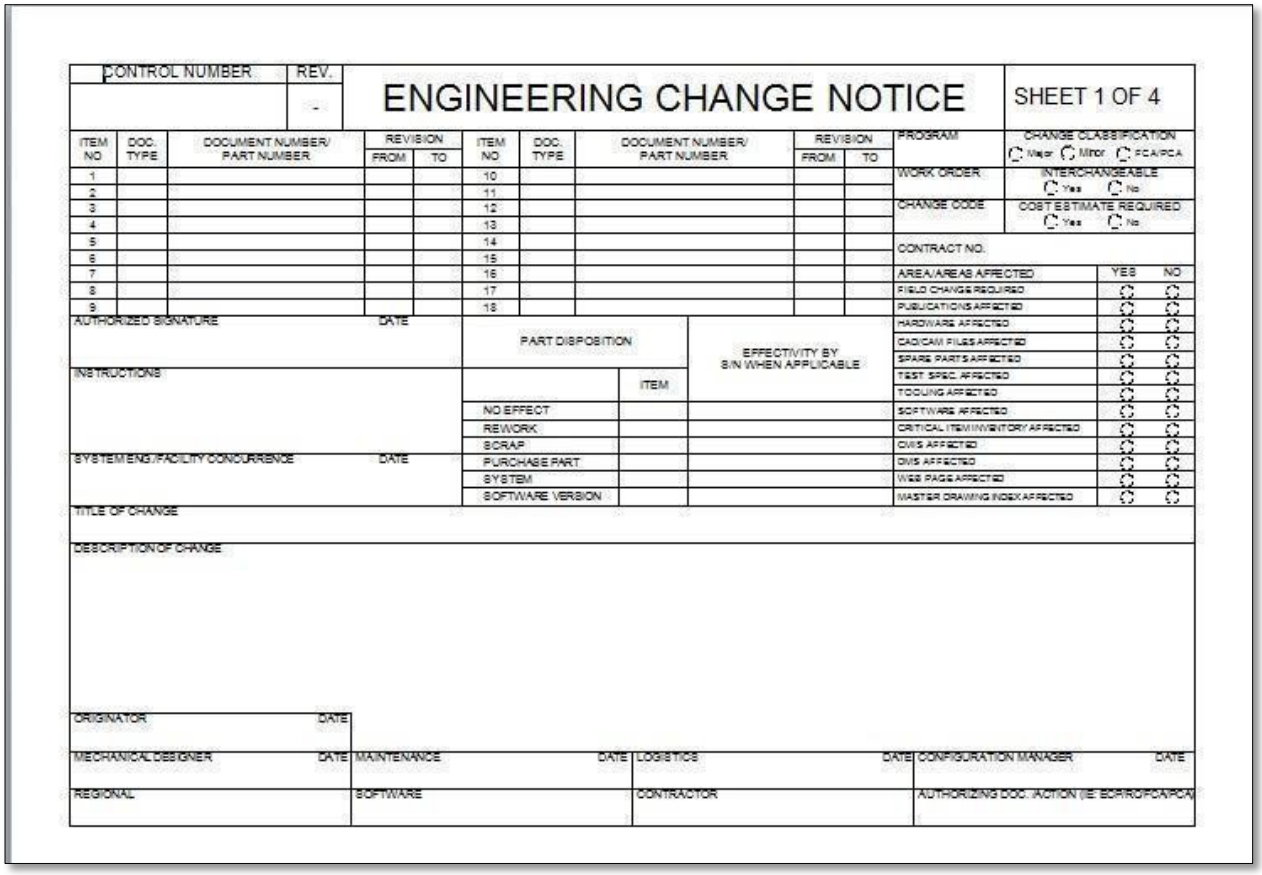
For the Weather Surveillance Radar, 1988 Doppler (WSR-88D) system where OBS32 has CM responsibility, the responsible Project Team Engineering focal point will review and approve engineering drawings and associated lists before formal release to DMS, the standard database collecting all digitally signed engineering and technical documentation.

For those systems under OBS32 CM control, the NWS uses the Engineering Change Notice (ECN) document to modify formally released engineering drawings and associated lists and release engineering drawings into the baseline for the first time. Appendix B, *OBS32 Engineering Drawing Procedures for Systems*, details the OBS32 engineering drawing procedures, including instructions for generating ECNs.

APPENDIX A
OBS32 Engineering Drawing Procedures for Systems

1 Purpose of Engineering Change Notices

The Configuration Branch uses the Engineering Change Notice (ECN) as the authorizing document to update the engineering drawing and associated lists for those systems listed in Section 9 under their CM responsibility. ECNs provide steps for maintaining an orderly audit trail of baseline document changes. The CM/EDS Manager is responsible for generating the formal ECN alongside the CM/EDS engineers, red lines, and formal updates to the original documents for the ECN activity. A copy of the ECN form can be found on the main CBITS website.



CONTROL NUMBER | REV. -

ENGINEERING CHANGE NOTICE

SHEET 1 OF 4

ITEM NO	DOC. TYPE	DOCUMENT NUMBER/ PART NUMBER	REVISION FROM	REVISION TO	ITEM NO	DOC. TYPE	DOCUMENT NUMBER/ PART NUMBER	REVISION FROM	REVISION TO
1					10				
2					11				
3					12				
4					13				
5					14				
6					15				
7					16				
8					17				
9					18				

PROGRAM | CHANGE CLASSIFICATION ○ Major ○ Minor ○ FCA/PCA

WORK ORDER | INTERCHANGEABLE ○ Yes ○ No

CHANGE CODE | COST ESTIMATE REQUIRED ○ Yes ○ No

CONTRACT NO.

AUTHORIZED SIGNATURE | DATE

INSTRUCTIONS

SYSTEM ENG./FACILITY CONCURRENCE | DATE

PART DISPOSITION

	ITEM
NO EFFECT	
REWORK	
SCRAP	
PURCHASE PART	
SYSTEM	
SOFTWARE VERSION	

EFFECTIVITY BY S/N WHEN APPLICABLE

AREA/AREAS AFFECTED	YES	NO
FIELD CHANGE REQUIRED	○	○
PUBLICATIONS AFFECTED	○	○
HARDWARE AFFECTED	○	○
CAD/CAM FILES AFFECTED	○	○
SPARE PARTS AFFECTED	○	○
TEST SPEC. AFFECTED	○	○
TOOLING AFFECTED	○	○
SOFTWARE AFFECTED	○	○
CRITICAL ITEM INVENTORY AFFECTED	○	○
CWIS AFFECTED	○	○
DMS AFFECTED	○	○
WEB PAGE AFFECTED	○	○
MASTER DRAWING INDEX AFFECTED	○	○

TITLE OF CHANGE

DESCRIPTION OF CHANGE

ORIGINATOR | DATE

MECHANICAL DESIGNER | DATE | MAINTENANCE | DATE | LOGISTICS | DATE | CONFIGURATION MANAGER | DATE

REGIONAL | SOFTWARE | CONTRACTOR | AUTHORIZING DOC. /ACTION (IE ECR/RO/FCA/PCA)

Figure 1: ECN Form

2 Configuration Control/Revision Authorization Procedures

The configuration control/revision authorization procedures consist of two document release methods; those methods are:

1. Pre-Release (release sequence 0 – 100……)
   1.S100-93001, Rev 0 (Pre-Release) Production Release (Initial release use "– "; after that, the revisions use letters starting with "A" after that.
   1.S100-93001, Rev - (Production Release)

3 Engineering Change Proposal (ECP)/ECNs Data Field Descriptions

All engineering change notices (ECNs) must identify the following critical items: Change Classification, Effectively, Configurations Changes, Lead Time, and Production timing. Additional data fields are:

1. **Originator name and address:** Name and address of the activity submitting the Notice of Reference (NOR).
2. **ECP number IF APPLICABLE:** The number of the ECP describing the engineering change that necessitates the document revision covered by the NOR.
3. **Document Revision Letter:** The current revision of the document that the proposed NOR will revise.
4. **Document Commercial and Government Entity (CAGE) code:** The CAGE code of the original design activity that appears on the document to which the revision applies. If the original design activity is not the current design activity, enter the CAGE code of the recent design activity.
5. **Title of Document:** Title of the document to which the NOR applies.
6. **Description of Change:** Exact wording of sentences or paragraphs to be added or to replace designated sentences or sections of the current document. State the dimensions, tolerances, and other quantitative requirements to replace existing requirements. Attach a marked print when necessary to clearly explain the desired revision. For text documents, use a "From -To" format or a word processor revision markup in the description of the change.

4 ECN Responsibilities

The following paragraphs detail the roles and responsibilities in the OBS32 ECN process. Section 5 lists specific organizations for each system, designated with their responsibilities and established baseline documentation.

1. **CM/EDS Manager**. The CM/EDS Manager determines the appropriate level of review for the ECN, coordinates the review of all ECNs, convenes the ECN Review Meeting as required, provides CM impact analysis at the ECN Review Meeting, and ensures ECN status accounting.
2. **Technical Reference Librarian**. The Technical Reference Librarian issues the ECN number and enters the approved ECN into the baseline document repository.

3. **Design/Drafting Technician**. The Design/Drafting Technician is responsible for drafting activities related to the Engineering Drawings. The Design/Drafting Technician originates and assigns drawing numbers and ECN numbers, contacts the Technical Reference Librarian for the ECN number(s), completes all necessary information on the ECN (redlines and document updates), signs, and attends the ECN Review Meetings.

4. **Design/Drafting Checker**. The Design/Drafting Checker is responsible for design and drafting verification activities related to the Engineering Drawings. The Design/Drafting Checker verifies engineering drawings, ECNs, documents, and associated lists. The Design/Drafting Checker ensures the documents and design features are clear and defines NWS equipment, systems, and system components per specified industry standards. The Design/Drafting Checker attends all Preliminary Design (PDR) and Critical Design Review (CDR) meetings.

5. **ECN Authorizing Maintenance Focal Point**. The Maintenance Focal Point reviews the ECN and attends the ECN Review Meeting to provide maintenance impact analysis regarding the changes.

6. **Logistics Focal Point**. If applicable, the Logistics Focal Point reviews the ECN and attends the ECN Review Meeting to provide a logistics impact analysis regarding the change.

7. **Authorization Official**. The Authorization Official certifies that the engineering drawing change has been executed properly. The Authorizing Official reviews the ECN and attends the ECN Review Meeting to provide overall approval of the change.

5 Signatures

The following section details the signature process.

1 **Design/Drafting Technician (Mandatory)**. The Drafting Technician responsible for incorporating the ECN changes indicates concurrence by signing the appropriate ECN block.

2 **Design/Drafting Checker (Mandatory)**. The Design/Drafting Checker, responsible for checking the ECN changes, indicates concurrence by signing the appropriate ECN block.

3 **Configuration Program Manager (Mandatory)**. The Configuration Manager indicates CM impact and concurrence by signing the appropriate ECN block. The configuration Program Manager will ensure the correct signatures appear on each ECN.

4 **Maintenance Focal Point (When applicable)**. The Maintenance Focal Point indicates concurrence by signing the appropriate ECN block.

5 **Logistics Focal Point (When applicable)**. The Logistics Focal Point indicates concurrence by signing the appropriate ECN block.

6 **Authorization Signature (Mandatory)**. The ECN Authorizing Official signs and dates the appropriate ECN block. If necessary, the Authorizing Official

7 enters special instructions in the "Instruction" block. The Authorization Signature indicates completion of the ECN. The Authorization Official returns the approved ECN to the Technical Reference Librarian.

6 Assignment of OBS32 Drawing Numbers

All **Engineering Drawings under OBS32 CM control have a drawing number defined in the SOW for drawings generated by the prime contractor. NWS Program Managers will request a block of drawing numbers from OBS32 to be used in engineering drawings during the acquisition of new equipment from vendors building equipment providing support outside of NWS/EDS. OBS32 CM will designate drawing block suffixes. For example:**

1. 30000 = Interconnect, Schematics, and Block Diagrams
2. 40000 = Assembly Drawings
3. 45000 = Cable Assemblies
4. 50000 = Mechanical Details
5. 90000 = Vendor Item Drawings

OBS32 will designate the prefix of the Program identifier defined by OBS. For example:

1 J700 = Radiosonde Replacement System/Telemetry Receiver System
S100 = Automated Surface Observing System (ASOS)

OBS 32CM will use the following drawing number scheme:

Project ID

XXXXX-XXXXX Drawing Type – Document Title

7 CM Dash Numbering System

Program managers should ensure that new equipment contracts use the standard OBS32 dash numbering system for items and assemblies when generating engineering drawings. The following sections describe this numbering system.

1. **Detailed Item Dash Numbers**. Use sequential dash numbers on all defined detail items. Because they are reserved for assemblies, do not use dash numbers ending in "0".

Table 3 demonstrates this numbering system.

Table 3: Detail Parts Numbering System

Detail Parts
-01
-02

-03
-04
-05
-06
-07
-08
-09 (do not use dash numbers ending in 0)
-11
Etc.

2. **Assembly Dash Numbers**. Use dash numbers beginning with a digit(s) (1-9) in multiples of 10 and ending with “0" for all defined assemblies.

Table 4 demonstrates this numbering system.

Table 4: Assemblies Numbering System

Assemblies
-10
-20
-30
-40
-50
Etc.

8 OBS32 CM Drawing Requirements Manual (DRM)

The Drafting Technician Staff or Contractors can use the following Drawing Requirements Manual (DRM) to prepare or to make changes to system engineering drawings under its responsibility:

Drawing Requirements Manual
Ninth Edition (or later)
Global Engineering Documents
15 Inverness Way East
Englewood, CO 80112 USA
800-854-7179

9 ECN Support Responsibility

Organizations within ECN with responsibility for a system under OBS32 CM will provide the following:

1. Drafting/Design Technician
2. Configuration Manager
3. Technical Reference Librarian Support

4. Engineering Focal Point
5.
6. Maintenance Focal Point
7. Logistics Focal Point

The OBS32 CM/EDS organization generates all ECNs.

APPENDIX B
OBS32 Engineering Drawing Procedures for Systems

1 Purpose of Engineering Change Notice

The CM Team uses the Engineering Change Order (ECN) as the authorizing document to update the baseline documentation, including engineering drawings and their associated parts lists for those systems listed in Section 6 under their CM responsibility. ECNs provide steps for maintaining an orderly audit trail of baseline document changes.

The OBS32 Engineering Drawing process is performed using a team approach and conducted electronically using the Document Management System (DMS) within the OBS32 Technical Reference Library (TRL). After a configuration change, a Project Team determines logistics, maintenance, software, system documentation, and engineering drawing impacts. The team meets periodically to discuss progress. ECNs and new engineering drawings are routed for comments and approval electronically using Electronic Engineering Change Notice (E-ECN) System, which records the team member's comments and is therefore used as an electronic signature.

2 ECO Responsibilities

The following paragraphs detail the participating organizations' roles in the OBS32 ECO process.

1. **Project Team Engineer**. The OBS32 Project Team Engineer is responsible for preparing ECOs to generate new drawings and change existing drawings. This includes manual and automated rough sketches, electronics diagrams for initial drawings, redlines to existing drawings and Bill of Materials (BOMs), and producing initial part lists for new drawings. The Project Team Engineer is the WSR-88D Engineering Change Proposals (ECPs) team leader. The Project Team Engineer calls team meetings and coordinates ECP project-related tasks.
2. **Configuration Management Team (CMT)**. The OBS32 CMT member is responsible for reviewing and approving ECOs and new drawings and releasing them in DMS; ensuring the drawing meets the requirements of the Baseline Specifications, Configuration Change Requests, and Engineering Change Proposals that defined them; and providing CM impact analysis.
3. **Documentation Team**. The OBS32 Documentation Team member reviews and approves ECOs and new drawings, ensuring they concur with the Technical Manual Suite and maintenance philosophies.
4. **Retrofit Management Team (RMT)**. The OBS32 RMT member is responsible for reviewing and approving ECOs and new drawings , ensuring the items are procurable, and providing logistics and maintenance impact analysis regarding the change.
5. **Drafting**. The OBS32 The drafter is responsible for assigning drawings, parts, and ECO numbers and creating the object for documents. Parts, BOMS, and ECNs in DMS; creating the original drawing and attaching and incorporating it into DMS; updating drawings from ECOs and redline drawings; and routing new drawings and ECOs for approval.

6. **Software Engineering**. If applicable, the OBS32 The software Engineer is responsible for reviewing the ECO and new engineering drawings and providing software development impact analysis regarding the change.
7. **Hotline**. If applicable, the OBS32 The hotline member is responsible for reviewing the ECO and new engineering drawings and providing a troubleshooting impact analysis regarding the change.

3 ECN Authorizing Signatures

The following paragraphs detail the signature process.

1. **Project Team Engineer (Mandatory)**. The Project Team Engineer assures the clarity of the change, certifies that proper drafting standards have been incorporated into the document, and indicates concurrence by sending approval in E-ECN. The Project Team Engineer is the only authority required to approve formerly released engineering drawings.
2. **Configuration Management Team (CMT) (Mandatory)**. The CMT member indicates concurrence by sending approval in E-ECN. The CMT member will approve ECOs for both formerly released engineering drawings (approving the redline drawings and BOMs) and new engineering drawings.
3 **Documentation Team (Mandatory)**. The Documentation Team member indicates concurrence by sending approval in E-ECN. The Documentation Team member will approve ECOs for both formerly released engineering drawings (approving the redline drawings and BOMs) and new engineering drawings.
4 **Drafting (Mandatory on New Engineering Drawings)**. The Drafter does not approve the engineering drawings; however, the Drafter's name will appear in the "DWN" box in the title block on all new engineering drawings. After approval of the engineering drawing in DMS, the Drafter will add all of the Project Team members' names and dates to the title block of the new engineering drawings. The Drafter will add the Project Team Engineers' names and dates to the revision history block on formerly released engineering drawings.

4. OBS32 Drawing Numbers

All engineering drawings under OBS32 CM control has a drawing number. ROC Design Practice Instruction DPI-5 assigns all OBS32 engineering drawing numbers. All OBS32 engineering drawing numbers consist of seven numbers that uniquely identify drawings, associated lists, and referenced documents. OBS32 engineering drawing numbers begin with the number 2, and the second and third digits describe the document type and the fourth through the seventh are sequenced unique identifiers.

OBS32 will use the following drawing number scheme:

Drawing Type
[2XXXXXX]
Sequenced Unique Identifier

Examples of Drawing Type codes are:

1. 00 = Interconnection Diagram
2. 01 = Schematic Diagram
3. 10 = Detail Drawing
4. 20 = Vendor Item Drawing
5. 21 = Source Control Drawing
6. 30 = Assembly Drawing
7. 32 = Cable Assembly Drawing

Example Engineering Drawing numbers are:

1. 2000000 = Interconnection Diagram
2. 2010000 = Schematic Diagram
3. 2100000 = Detail Drawings
4. 2200000 = Vendor Item Drawings
5. 2210000 = Source Control Drawing
6. 2300000 = Assembly Drawings
7. 2320000 = Cable Assembly Drawing

5 OBS32 Dash Numbering System

OBS32 uses a three-digit dash numbering system. The dash numbers represent different configurations of the same item and are also considered the PIN (Part Identifying Number).

1. **Reference Item Dash Numbers**. Dash numbers for reference items are always 000, and when specified on a drawing or a parts list, the dash numbers (000) are not specified. Reference items do not represent parts and therefore do not have dash numbers. Examples of reference items would be a Schematic Diagram or Interconnection Diagram.
2. **Detailed Item Dash Numbers**. Dash numbers for detail parts are assigned sequentially, starting with 101 and ending with 199. When dashes are numerous enough to exhaust 199, the following sequence will be 800 through 899.
3. **Purchase Item Dash Numbers**. Dash numbers for purchased parts are assigned sequentially, starting with 201 and ending with 299. When dashes are numerous enough to exhaust 299, the following sequence will be 400 through 499 and the next 600 through 699.
4. **Assembly Dash Numbers**. Dash numbers for assemblies are assigned sequentially, starting with 301 and ending with 399. When dashes are numerous enough to exhaust 399, the following sequence will be 500 through 599 and the next 700 through 799.

Examples of Engineering Drawing dash numbers are:

1. 2000000-000 = Interconnection Diagram
2. 2010000-000 = Schematic Diagram

3.
4. 2100000-101 = Detail Drawings
5. 2200000-201 = Vendor Item Drawings
6. 2210000-201 = Source Control Drawing
7. 2300000-301 = Assembly Drawings
8. 2320000-301 = Cable Assembly Drawing

6 OBS32 Engineering Drawing Procedures

1. Drawing Requirements Manual (DRM). OBS32 Drafting Staff uses the following DRM to prepare or revise engineering drawings or to make changes to engineering drawings under its responsibility:

Drawing Requirements Manual
Ninth Edition (or later)
Global Engineering Documents
15 Inverness Way East
Englewood, CO 80112 USA
800-854-7179

Design Practice Instruction (DPI) and Work Practice Instruction (WPI). In addition to the above-listed DRM, OBS32 maintains a series of Design and Work Practices Instructions.

These instructions are designed to define unique OBS32 procedures, such as assigning engineering drawing numbers and adding the drawing numbers to DMS. The following table compiles a complete list of the current DPIs and WPIs:

Table 5: Current DPIs and WPIs

DPI0001	DRAFTING PRACTICES
DPI0002	TYPES OF DRAWINGS
DPI0003	DRAWING SHEET SIZE AND FORMAT
DPI0005	DRAWING AND PART NUMBERING SYSTEM
DPI0006	DRAWING TITLES
DPI0007	DRAWING NOTES
DPI0010	REVISION OF ENGINEERING DRAWINGS
DPI0014	DMS – ENTERING NEW DOCUMENTS AND PARTS
DPI0015	E-ECN – ENTERING, SUBMITTING, SENDING, AND RELEASING ECOs, (DRAFTING/HWCM FUNCTIONS)
DPI0016	DMS – ENTERING NEW HANDBOOKS, FIGURES, AND ARTWORK
DPI0017	ENGINEERING DRAWING DEVELOPMENT/UPDATE PROCESS
WPI0009	E-ECN – REDLINING ATTACHMENTS IN E-ECN
WPI0010	E-ECN – ENGINEERING ECO ORIGINATOR INSTRUCTION

7 OBS32 Engineering Drawing Procedures for NWS-Owned Facilities

1 Purpose of Engineering Change Notices

The Configuration Branch uses the Engineering Change Notice (ECN) as the authorizing document to update NWS-owned facilities drawings. ECNs provide steps for maintaining an orderly audit trail of baseline document changes. A copy of the ECN form can be found on the leading CM website.

2 ECN Responsibilities

The following paragraphs detail the roles and responsibilities in the OBS32 ECN process. Section 6 lists specific organizations designated with these responsibilities for each system with established baseline documentation.

1. **CM/EDS Senior Engineer**. The Senior Engineer is responsible for collecting information regarding technical solutions that impact Technical Data Packages and produce red lines against the existing baseline. Responsible for guiding engineering resources in the incorporation of approved ECN red lines.
2. **Program Engineering Focal Point**. The Program Management Branch assigns the Engineering Focal Point and assists OBS32 in developing ECNs. Critical in providing the CM Section with technical solutions and ensuring a comprehensive ECN is achieved against the beeline.
3. **Logistics Focal Point**. Assess impact with logistics, maintenance focal point, and associated databases, including WLIS and CLS.
4. **Maintenance Focal Point**. Assess impact with Maintenance, logistics focal point, and associated databases, including WLIS and CLS. Responsible for ensuring drawings effected by ECN are reflected in installation and modification notes.
5. **CM/EDS Program Manager**. Review changes to ensure CM protocol for revision and Technical Data Package standards are met.
6. **Program Manager**. Serve as the final Authority for changes against the baseline over their specific program. Responsible for establishing monitor and controls over focal points identified by the Program Management Branch to support their program.

3 ECN Authorizing Signatures

ECN Authorizing Signatures are as outlined by the position described in Section 2, ECN Responsibilities.

If urgent or fast-tracked ECN approval is required, the Program Manager may bypass authorizing signatures above the CM/EDS Senior Engineering level.

4 OBS32 Drawing Numbers

All Facility Drawings under OBS32 CM control have a drawing number. Program Managers should request a block of drawing numbers from OBS32 to be used in engineering drawings during the construction and modification of a facility before issuing the SOW.

OBS32 will designate the prefix of the facility drawing to be the Site Identifier (SID) listed in the NWS Location Identifier System (NWSLI). For example:

ABR = Aberdeen, SD WFO Facility

OBS32 will designate drawing block suffixes in accordance with the National Institute of Building Sciences National CAD Standard.

OBS32 will use the following drawing number scheme:

WFO ID

XXX-X(XX)XX

- Numbering Series
- Drawing Type Code

5 National CAD Standard

Facilities Engineers, Drafting Technicians, or contractors must use the following National CAD Standard to prepare or revise Facility Engineering Drawings under its responsibility:

The National CAD Standard
National Institute of Building Sciences
1090 Vermont Avenue, NW, Suite 700
Washington, DC 20005-4905
Phone: (202) 289-7800; Fax: (202) 289-1092
www.nationalcadstandard.org

6 Branch Signature Responsibilities

The following table lists organizations with ECN responsibilities for Facilities Engineering Drawings.

Table 6: Organizations with ECN Responsibilities

ECN Responsibility	Organization
Drafting/Design Technician	OBS32 or Region Staff
Configuration Program Manager	OBS32
Technical Reference Librarian	OBS32
Facilities Engineer	Region or Office of Facilities (OF)
Authorization Signature	Region System Operation Division Chief or Office of Facilities (OF) Branch Chief