DEPARTMENT OF THE ARMY
Corps of Engineers, Northwestern Division
P.O. Box 2870
Portland, Oregon 97208-2870

CENWD-CM-O
Regulation
No. 1130-2-2 1 November 2001

Project Operation
OPERATIONS REPORTS (RCS NWDCM-125)

**History**. This regulation was previously issued as NPDR 1130-2-1 and is being revised as a Northwestern Division regulation to encompass the entire division due to restructuring.

**Summary**. This regulation has been enhanced to include the needs of the former Missouri River Region.

1. PURPOSE. This regulation provides for the reporting of power production and unit outage data as required for power operation reports, to Department of Energy (DOE), North American Electric Reliability Council (NERC), HQUSACE, Northwestern Division (NWD), Bonneville Power Administration (BPA), Southwestern Power Administration (SWPA), Western Area Power Administration (WAPA), Western System Coordinating Council (WSCC), and Northwest Power Pool (NWPP). This regulation also provides for the reporting of fish facility and navigation lock operation problems and outages. This regulation does not cover the utilization of FEMS (Facilities Equipment Management System) for recording the project equipment maintenance reports, this is covered under NWDR 1130-2-1 (Maintenance Program).

2. APPLICABILITY. This regulation is applicable to all Districts in Northwestern Division (NWD) having projects with power, fish or navigation facilities.

3. REFERENCES. Required publications.

a. AR 385-40, (Accident Reporting and Records). Cited in paragraph 6b.

b. ER 1130-2-510, (Hydroelectric Power Operations and Maintenance Policies). Cited in paragraph 6.

c. EP 1130-2-510, (Hydroelectric Power Operations and Maintenance Guidance and Procedures). Cited in paragraph 6b.

d. CECW-O Memorandum For Commanders, Major Subordinate Commands, Subject: Implementation of OMBIL for the Hydropower Function, dated 7 August 2000.

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*This regulation supersedes NPDR 1130-2-1, 15 March 1993.

4. MONTHLY POWER PRODUCTION SUMMARY. Power production data for each power project will be compiled for CENWD-CM-O by Reservoir Control Center from the project daily summary reports. A sample format is enclosed as Appendix A, Monthly Power Production Summary. Copies will be distributed by CENWD-CM-O as follows:

a. BPA, 2 copies.

b. Each District, 1 copy.

c. Each project, 1 copy.

5. DEPARTMENT OF ENERGY (DOE) MONTHLY POWER PLANT REPORT. Data required on DOE Form EIA-759 will be prepared using data obtained for all power projects by each power projects District Office from the Monthly Power Production Reports. A sample of this report is enclosed as Appendix B. Each district commander will ensure that this report is submitted to DOE prior to the 10th of each month with a copy to CECW-OM and CENWD-CM-O.

6. POWER GENERATING EQUIPMENT FAILURE REPORTS. The following reports will be made in compliance with ER 1130-2-510 and this regulation.

a. The District will make a telephone report to CECW-OM and to CENWD-CM-O no later than the next workday after a failure and provide significant details.

b. A detailed written narrative report with complete equipment identification information on the failure and resulting impacts should be submitted to CENWD-CM-O, when requested, within 30 days of failure. The 30-day report should be revised if new information becomes available. Specific guidance on the format and content of the written report can be found in Chapter 2 of EP 1130-2-510. This report should indicate whether deficiencies in design, construction, operation or maintenance, are related to the outage and also whether permanent type corrections to prevent recurrence are needed. Damages shall be described with estimated man-hour efforts, total repair costs and actual/expected outage duration to accomplish immediate repair should be included. Supporting data, such as single-line diagrams, sketches, schematic wiring diagrams and photographs will be included only if such information will clarify the cause of the interruption and assist in determining the corrective action. Equipment failures reported under this regulation are considered nonreportable under AR 385-40.

7. GENERATOR EQUIPMENT SERVICE SUMMARY REPORTS. These reports, including NERC's Generation Availability Data System (GADS) and CECW-OM's Hydropower Performance Indicators (HPIs), shall be prepared and submitted as follows:

a. Northwestern Division Districts will submit (or individual projects may directly submit) quarterly GADS breaker and event database information via electronic means (either floppy disk or cc:Mail) to CENWD-CM-WR-N within 10 days following the end of each quarter (cc:Mail Address is Vern Parry at NWD). Detailed information required and reporting instructions are enclosed as Appendix C, Generating Equipment Service Summary Report. This information will allow CENWD-CM to fulfill NERC's requirements for NWDs contribution to the GADS.

b. Hydropower. The HPI quarterly data required is number of forced outages and unit availability by project. For the fourth quarter report the full-time equivalent (FTE), Operations cost, and Maintenance cost by project is additionally required.

8. POWER APPARATUS DEFICIENCY BULLETINS. In addition to the equipment failure reporting procedure discussed in paragraph 6, Districts, upon request from CENWD-CM-O, will submit a draft bulletin briefly describing the power apparatus equipment failure. This bulletin is used to inform other Divisions who may have similar equipment. It should briefly cover the equipment identification, identify the problem and give the name and telephone number of someone who has knowledge of the problem.

9. OMBIL DATA ENTRY.

a. All power projects will enter summary data at least monthly for generation, station service, reactive power, and pumping. Summary data for status changes will also be entered at least monthly.

b. All power projects will enter outage data (both forced and scheduled) at least weekly. Any major equipment failures will be entered within 48 hours of the occurrence and the narrative will include significant details of the damages and the expected outage duration.

c. All power projects should contact the RM Division of their District Office and request that Treasury Deposit/Power Revenue and Balance Owed data be obtained from the power marketing agency on an annual basis. When this data is made available, it will be entered in OMBIL by the project.

d. All power projects should enter narrative data in the notepad module to capture and document any major or significant events as they occur at the power facility.

e. Each District Office with power projects will at least quarterly review the O&M Business Information Summaries and Business Function Reports for all power Projects within the District Data will be verified as to completeness and accuracy of the entries.

f. The Northwestern Division Hydropower Coordinator will at least quarterly review the O&M Business Information Summaries and Business Function Reports for all Districts within the Division. Data will be verified as to completeness and accuracy of the entries.

NOTE: It should be noted that once OMBIL is fully implemented, many of the above mentioned reports would no longer be required. The information will be entered once in OMBIL either manually or directly from the SCADA/DACS System and can then be accessed by or sent to other users and interested parties.

10. NAVIGATION LOCK AND FISH FACILITY EQUIPMENT REPORTING. These reports will be submitted as follows:

a. Telephone: Districts will report fish or navigation facility equipment failures that significantly affect fish passage or navigation to CENWD-CM-O by telephone within one working day following the failure. The telephone report will include:

(1) Time of failure.

(2) Nature of the failure.

(3) Effect on navigation/fish (particularly when consultation is required).

(4) Estimated time of return for temporary and for permanent operation.

b. Northwestern Division Districts will follow the reporting and consultation requirements of the current Fish Passage Plan, CENWD-CM-F. Annual fish facility reporting requirements for the Columbia and Snake Rivers are met by the Annual Fish Passage Report.

c. Districts will submit an annual (CY) out-of-service summary report, NWD Form 1130-3 (Outage Record of Navigation Locks and Fish Facilities) (RCS NWDCM 125) for both fish and navigation equipment failures to CENWD-CM by 1 February. Sample of this form and instructions are enclosed as Appendix D, Navigation Lock and Fish Facility. The Northwestern Division utilizing the GADS program will provide these reports and need not be required to separately submit this report if the information is included in the GADS electronic submittal.

d. Navigation Performance Indicators (NPIs) Electronic Report will be submitted to CENWD-CM by the 12th day (20th for 4th quarter) after the end of each quarter. Requirements description and Lotus 123 files for the reporting and format have been delivered to each District.

The Quarterly reports include: number of unscheduled closures, lock chamber availability, and delay cost to industry due to unscheduled closures by Project and by Waterway. The Fourth Quarter report will additionally include the following annual totals: Lockages, O&M FTEs, Operations Cost, and Maintenance Cost, by Project and by Waterway.

11. HOURLY AND 24-HOUR PROJECT REPORTS. The Northwestern Division will submit these reports containing hydropower and fish data for all power projects in accordance with the latest revisions to the Columbia Basin Telecommunication Network User's Manual.

12. MAJOR POWER OUTAGE REPORTS. The Western Systems Coordinating Council of which BPA is a member, has established an Information Committee to coordinate interchange and release of information on major power outages (significant interruptions of power service). If Corps facilities can in any way be considered a cause of such an outage, then it is essential that information on what happened be furnished to CENWD-CM-O as soon as practical in accordance with the procedure outlined in the enclosure Appendix E, Major Power Outage Report Procedure.

FOR THE COMMANDER:

CLIFTON P. JACKSON, JR.
Executive Assistant

5 Appendices
App A - Monthly Power Production Summary
App B - Monthly Power Plant Report
App C - Generating Equipment Service Summary Reports
App D - NW Form 1130-3, NWD Outage Record of Navigation Locks and Fish Facilities
App E - Major Power Outage Report Procedure

DISTRIBUTION
A and B

# Appendix A
## Monthly Power Production Summary Example

MONTHLY POWER PRODUCTION SUMMARY FOR: JUN 2001

| PROJECT | TOTAL GENERATION IN MWH | TOTAL STATION USE-MWH | NET GENERATION TO BPA-MWH | POWER AUX USE---MWH | NET GENERATION REPORTED TO FERC |
|---|---|---|---|---|---|
| DWORSHAK DAM | 52527 | 333 | 52194 | 333 | 52194 |
| ALBENI FALLS DAM ON | 28947 | 156 | 28791 | 156 | 28791 |
| BIG CLIFF DAM | 5621 | 30 | 5591 | 30 | 5591 |
| BONNEVILLE DAM & LAK | 341699 | 2176 | 339523 | 1632 | 340067 |
| COUGAR DAM | 5374 | 86 | 5288 | 86 | 5288 |
| DETROIT DAM | 19700 | 179 | 19521 | 179 | 19521 |
| DEXTER DAM & LAKE ON | 3563 | 21 | 3542 | 21 | 3542 |
| GREEN PETER DAM | 2478 | 29 | 2449 | 29 | 2449 |
| HILLS CREEK DAM & LA | 10498 | 38 | 10460 | 38 | 10460 |
| JOHN DAY DAM & LAKE | 644478 | 1481 | 642997 | 1037 | 643441 |
| LOOKOUT POINT DAM & | 15239 | 92 | 15147 | 92 | 15147 |
| MCNARY DAM & LAKE WA | 458859 | 2751 | 456108 | 790 | 458069 |
| THE DALLES DAM & LAK | 451146 | 1215 | 449931 | 899 | 450247 |
| CHIEF JOSEPH DAM & E | 736106 | 856 | 735250 | 856 | 735250 |
| ICE HARBOR DAM | 184522 | 2049 | 182473 | 410 | 184112 |
| LITTLE GOOSE DAM & L | 180192 | 606 | 179586 | 364 | 179828 |
| LOWER MONUMENTAL DAM | 189160 | 484 | 188676 | 290 | 188870 |
| LIBBY DAM & LAKE KOO | 60624 | 549 | 60075 | 549 | 60075 |
| LOST CREEK DAM | 20575 | 263 | 20312 | 116 | 20459 |
| LOWER GRANITE DAM & | 190489 | 1309 | 189180 | 524 | 189965 |
| FOSTER DAM | 7927 | 104 | 7823 | 104 | 7823 |
| GRAND COULEE DAM | 1356800 | 3089 | 1353711 | 3089 | 1353711 |
| HUNGRY HORSE DAM | 4894 | 0 | 4894 | 0 | 4894 |
| TOTAL | 4971418 | 17896 | 4953522 | 11623 | 4959795 |

# Appendix B
## Monthly Power Plant Report Example

U.S. Department of Energy
Energy Information Administration
Form EIA-906 (2001)

**POWER PLANT REPORT**

Form Approved
OMB No. 1905-0129
Approval Expires 12/31/01

This report is mandatory under Public Law 93-275. Failure to respond may result in a criminal fine, civil penalties, and other sanctions as provid law. Data reported on Form EIA-906 on stocks end of month are considered to be confidential. All other data are not confidential. Public reporti burden for this collection of information is estimated to average 1.4 hours per response, including the time of reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding t burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Statistics and Methods Group, EI-70, 1000 Independence Avenue S.W., Forrestal Building, Washington, DC 20585-0670; and to Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503. A person is not required to respond t collection of information unless it displays a valid OMB number.

Type of Respondent: Regulated ( X ) Unregulated ( )

Please submit by the 10th working day of the month following the reporting month.
For more information: for utilities contact
Mr. Melvin Johnson
Telephone (202) 287-1754
FAX (202) 287-1585
INTERNET melvin.johnson@eia.doe.gov
For nonutilities contact Barbara Rucker
Telephone (202) 287-1365
FAX (202) 287-1943
INTERNET barbara.rucker@eia.doe.gov

**USCE-Northwestern**
Attn Operations Division
P O Box 2870
Portland OR 97208

Contact Person: **Hiroshi Eto** Date:
Title: **Energy Coordinator**
Phone: (503)808-3893 Fax: (503)808-3890
Internet e-mail address: hiroshi.eto@usace.army.mil

Report For **July** **2001**
Operator Identification Number
**1940001** Page **1**

| PLANT NAME AND IDENTIFICATION NUMBER | PRIME MOVER TYPE AND FUEL TYPE (b) | MAXIMUM GENERATOR NAMEPLATE CAPACITY (Kilowatts) (c) | NET GENERATION (Megawatthours) Check here..... if reporting gross generation (d) | ENERGY SOURCE (Nearest Short Ton, 42 Gal, Bbl, Mcf) Fuel Consumed During Month (e) | Stocks (End of Month) (f) | Useful Thermal Output (Million Btu) |
|---|---|---|---|---|---|---|
| DWORSHAK 840 HY WAT ID | Hydraulic Turbine Water | 460,000 | | | | |
| ALBENI FLS 851 HY WAT ID | Hydraulic Turbine Water | 40,000 | | | | |
| BIG CLIFF 3074 HY WAT OR | Hydraulic Turbine Water | 21,000 | | | | |
| BONNEVILLE 3075 HY WAT OR | Hydraulic Turbine Water | 1,212,000 | | | | |
| COUGAR 3076 HY WAT OR | Hydraulic Turbine Water | 29,000 | | | | |
| DETROIT 3077 HY WAT OR | Hydraulic Turbine Water | 115,000 | | | | |
| DEXTER 3078 HY WAT OR | Hydraulic Turbine Water | 17,000 | | | | |
| GREEN PETER 3080 HY WAT OR | Hydraulic Turbine Water | 92,000 | | | | |
| HILLS CREEK 3081 HY WAT OR | Hydraulic Turbine Water | 35,000 | | | | |
| JOHN DAY 3082 HY WAT OR | Hydraulic Turbine Water | 2,484,000 | | | | |
| LOOKOUT PT 3083 HY WAT OR | Hydraulic Turbine Water | 138,000 | | | | |
| MCNARY 3084 HY WAT OR | Hydraulic Turbine Water | 1,127,000 | | | | |
| DALLES DAM 3895 HY WAT OR | Hydraulic Turbine Water | 1,960,749 | | | | |
| CHF JOSEPH 3921 HY WAT WA | Hydraulic Turbine Water | 2,337,000 | | | | |

## Monthly Power Plant Report Example (continued)

**U.S. Department of Energy**
**Energy Information Administration**
**Form EIA-906 (2001)**

**POWER PLANT REPORT**

Form Approved
OMB No. 1905-0129
Approval Expires 12/31/01

This report is mandatory under Public Law 93-275. Failure to respond may result in a criminal fine, civil penalties, and other sanctions as provid law. Data reported on Form EIA-906 on stocks end of month are considered to be confidential. All other data are not confidential. Public reporti burden for this collection of information is estimated to average 1.4 hours per response, including the time of reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding t burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Energy Information Administration, Statistics and Methods Group, EI-70, 1000 Independence Avenue S.W., Forrestal Building, Washington, DC 20585-0670; and to Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503. A person is not required to respond t collection of information unless it displays a valid OMB number.

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INTERNET barbara.rucker@eia.doe.gov

**USCE-Northwestern**
Attn Operations Division
P O Box 2870
Portland OR 97208

Contact Person: **Hiroshi Eto** Date:
Title: **Energy Coordinator**
Phone: (503)808-3893 Fax: (503)808-3890
Internet e-mail address: hiroshi.eto@usace.army.mil

Report For **July** **2001**
Operator Identification Number
**1940001** Page **2**

| PLANT NAME AND IDENTIFICATION NUMBER | PRIME MOVER TYPE AND FUEL TYPE (b) | MAXIMUM GENERATOR NAMEPLATE CAPACITY (Kilowatts) (c) | NET GENERATION (Megawatthours) Check here.... if reporting gross generation (d) | ENERGY SOURCE (Nearest Short Ton, 42 Gal, Bbl, Mcf) Fuel Consumed During Month (e) | Stocks (End of Month) (f) | Useful Thermal Output (Million Btu) |
|---|---|---|---|---|---|---|
| ICE HARBOR WA 3925 HY WAT | Hydraulic Turbine Water | 693,000 | | | | |
| LITLE GOOSE WA 3926 HY WAT | Hydraulic Turbine Water | 932,000 | | | | |
| MONUMENTAL WA 3927 HY WAT | Hydraulic Turbine Water | 932,000 | | | | |
| LIBBY MT 6172 HY WAT | Hydraulic Turbine Water | 603,750 | | | | |
| LOST CREEK OR 6174 HY WAT | Hydraulic Turbine Water | 48,000 | | | | |
| LWR GRANITE WA 6175 HY WAT | Hydraulic Turbine Water | 932,000 | | | | |
| FOSTER OR 6552 HY WAT | Hydraulic Turbine Water | 23,000 | | | | |
| | | | | | | |

* Do Not Leave Fields Blank. Use Zeroes where applicable.

** Notes: If there are any unusual values, explain in this section.

# APPENDIX C

## NORTHWESTERN DIVISION GENERATING EQUIPMENT SERVICE SUMMARY REPORTS

1. The Power Plant Outage Report. The data in this report is required for CENWD-CM-O to report to HQUSACE annually (CY) and to North American Electric Reliability Council (NERC) quarterly. CENWD-CM-O has provided a PC based computer program and documentation (version 3.0 and updates as available) that provides a method of inputting the data from each project. It is called the Generation Availability Data System (GADS) computer program. Only the following data items are required:

a. Project Identification shall use the 3 digit abbreviation used in the Columbia River teletype system as on the hourly and daily reports. (Built into the PC program, one time entry by each Project.)

b. Unit Number is the identifying number for the particular main generator, using digit(s) for Main Units and Letter "F" or "O" preceding fish or station service units. (PC program automatically converts individual project designations into unique NERC unit designations for GADS report.)

c. Event Number. Each outage will be assigned a unique number beginning with 0001 in the beginning of each calendar year (CY). The early numbers will be first used on outages that are continuing past the end of the previous year with the oldest outage getting the first i.e., 0001, etc. Event numbers will be sequential. (Automatically assigned by PC program).

d. Number of Starts. Each attempt to synchronize a Unit, i.e. breaker close or failure to close. Logbook Data Entry of circuit breaker activity automatically reports the number of attempted starts. (Don't record or report test operations of Unit Breaker.)

e. Monthly per Unit Power Production. Gross power produced by each Unit for each month.

f. Report Revision will be used to indicate a revision in originally reported event data. Zero (0) is used for each original report with 1 to 9 being used as revisions occur. Only use revision numbers 1 - 9 if the quarterly report to CENWD-CM-O is being revised.

g. Event Type. Select one of the following that best describes the type of outage:

(1) PO - Planned Outage. Such an outage is scheduled well in advance and generally is of predetermined duration. It is used for routine preventative maintenance type work such as annuals, semiannual and unit overhauls. It is also used for additions, modifications, rehabs, etc., for unit performance improvement. It is not used for an outage where the primary purpose is to make specific repairs (trouble reports, component failures, etc.).

(2) MO - Maintenance Outage. This type outage is for the purpose of making specific repairs which cannot be scheduled well in advance but which can be deferred beyond the end of the next weekend. Such repairs may consist of a relay repair to the repair or scheduled replacement of a failed generator winding of a unit operated beyond the unplanned outage delay period. Rewind of all units in a rehab or uprate program are Planned Outages.

(3) U1 - Unplanned Outage is an outage that requires immediate removal of a unit from service such as automatic generator trips and operator initiated trips/shutdowns in response to unit alarms, etc. Inadvertent unit trips are also included (Operator or maintenance error).

(4) U2 - Unplanned Outage - Delayed. This is an outage, which does not require immediate removal from service but requires that a unit be removed within the next maintenance working day after the trouble awareness.

(5) U3 - Unplanned Outage - Postponed. This is an outage which can be postponed beyond the first working day after trouble awareness, but which requires the unit to be removed from service before the end of the next weekend.

h. Start of Event is the date and time, in minutes, of start of the outage.

i. End of Event is the date and time, in minutes, of end of the outage. This is the time when the unit is synchronized to the system or is declared available. Events extending through multiple quarters require that "End of Event" remain blank in the quarterly reports except the 4th of the CY. Events extending from one year to the next require an artificial entry in the "End of Event" space of the CY 4th quarter report and one in the "Start of Event" space of the first quarter of the next calendar year. The fourth quarter entry is 123124xx and the first quarter entry is 010100xx. The Event Number of the carried-over outage may require a different one for the new calendar year. Carried-over outages should be given the smaller event numbers. Carried over events must have the same cause code.

j. Sys/Comp Cause Code is a 4 digit numerical code to identify the major reason for the outage. Codes used by CENWD are listed at the end of this Appendix.

k. Narrative Description is a supplemental explanation to the cause code. Do not repeat the Cause Code description if possible. Provide as concisely as possible the identification of the failed equipment/component, how failure occurred, and expected repair. A second line can be used as necessary. The following adjectives may help describe a failure, the contributing factors and corrective actions:

| Type of Failure | Typical Failure Modes |
|---|---|
| Erosion | Leak |
| Corrosion | Crack |
| Electric | Collapse |
| Electronic | Fracture/Break |
| Mechanical | Won't Start/Move |
| Hydraulic | Won't Stop |
| Instruments | Won't Close |
| Operational | |
| Out of limits | |
| Out of Adjustment | |
| Spurious Operation | |
| False Response | |

| Typical Contributing Factors | Corrective Actions |
|---|---|
| Normal Wear | Recalibrate |
| Abnormal Wear | Adjust |
| Lubrication | Temporary Repair |
| Weld | Temporary Bypass |
| Insulation Breakdown | Redesign |
| Short/Grounded | Modify |
| Open Circuit | Repair Parts |
| Contacts Burned/Pitted/Corroded | Replace Parts |
| Connection Defective | Reseal |
| Circuit Defective | Repack |
| Burned/Burned Out | |
| Material Defect | |
| Excess Vibration | |
| Fire/Explosive | |
| Cyclic Fatigue | |

# OUTAGE CAUSE CODE IDENTIFICATION

POWERHOUSE

Electrical

3600 Switchyard transformer and cooling system (115kV & above)
3611 Switchyard circuit breakers (not unit breakers) (115kV & above)
3612 Switchyard protection devices (lightning arrests) (115kV & above)
3619 Other Switchyard equip (disc. switches, etc.) (115kV & above)
3620 Unit transformer including cooling systems (115kV & above)
3622 Station service main transformer
3623 Station service generators (not diesel)
3629 Other switchyard or high voltage problems (115kV & above)
3630 480-volt transformers
3631 480-volt circuit breakers
3632 480-volt conductors and buses
3633 480-volt insulators
3634 480-volt protection devices
3639 Other 480-volt problems
3640 AC instrument power transformers (C.T.'s & P.T.'s)
3641 Circuit Breakers (120 volt AC)
3642 Conductors and buses (below 5000 volts)
3643 Inverters
3644 Protection devices
3649 Other instrument AC power problems
3651 DC circuit breakers
3652 DC conductors and buses
3653 DC protection devices
3659 Other DC power problems
3660 4160-volt transformers
3661 4160-volt circuit breakers
3662 4160-volt conductors and buses
3663 4160-volt insulators
3664 4160-volt protection devices
3669 Other 4160-volt problems
3670 13kV transformers
3671 13kV circuit breakers (use 4810 for unit breaker)
3672 13kV conductors and buses
3673 13kV insulators
3674 13kV protection devices
3679 Other 13kV problems

AUXILIARY SYSTEMS

Domestic Water Systems

3810 Service water pumps and motors
3811 Service water piping
3812 Service water valves
3819 Other service water problems

Cooling Water Systems
(Excludes Gen., Transf, and Gen.-Turb. Bearings)

3820 Cooling water pumps
3821 Cooling water piping
3822 Cooling water valves
3823 Cooling water heat exchangers
3829 Other cooling water system problems

Service Air
(Excludes Circuit Breakers, Governors, etc.)

3840 Service air compressors
3841 Service air piping
3842 Service air valves
3843 Service air dryers
3849 Other service air problems

Fire Protection System
(Water & $CO^2$)

3860 Fire protection system pumps
3861 Fire protection system piping
3862 Fire protection system valves
3869 Other fire protection system problems

Miscellaneous

3899 Other auxiliary system problems
3950 Process computer (includes addition, replacement, repair, etc.)
3999 Other plant problems

GENERATOR

4500 Rotor windings (including damper windings and fan blades)
4510 Rotor collector rings
4520 Stator windings, bushings, terminals, rewedging, rewinding, etc.
4530 Stator core iron
4540 Brushes and brush rigging (collector ring)
4550 Generator bearings and oil systems
4555 Bearing cooling system
4560 Generator vibration (not vibration due failed bearing.)
4570 Generator housing
4590 Generator brakes

Exciter

4600 Amplidyne
4601 Exciter field rheostat
4602 Exciter commutator and brushes
4603 Solid state exciter element
4609 Other exciter problems

Generator Cooling System

4620 Air cooling system
4630 Liquid cooling system
4650 Other cooling system problems

Generator Controls

4700 Generator voltage control
4710 Generator metering devices
4720 Generator synchronization equipment
4730 Generator current and potential transformers
4750 Other generator controls, relaying protection, and metering problems

Miscellaneous Generator Codes

4800 Generator main leads (to terminals)
4810 Generator output breaker (includes breaker air system)
4840 Generator inspection (use for annual maintenance)
4850 Core monitor alarm (temperature)
4899 Other generator problems

HYDRO TURBINE

7000 Turbine shaft
7001 Turbine shaft packing
7003 Lube oil system (report bearing failures due to lube oil problems in Code 7007)
7007 Bearings
7008 Bearing cooling system
7010 Cavitation damage (use for unit overhaul)
7011 Other runner problems (includes blade break)
7014 Blade or bucket cracking (exclude loss of blade)
7030 Vibration (only for unbalance, report bearing failure, etc., in appropriate category)
7040 Turbine repair/replacement (requiring turbine removal)
7050 Turbine governor (includes governor oil and air systems)
7052 Other turbine controls. (report specific wicket gate controls, etc. using the code for the appropriate equipment item.)
7099 Other turbine problems(Includes Kaplan mechanism)

Water Supply/Discharge

7110 Intake channel (including trash racks and trash removal)
7111 Intake tunnel (fish bypass system, screens, etc.)
7120 Headgates
7121 Shutoff valves, include butterfly valve and assembly
7123 Shutoff valves bypass line and valve
7124 Penstock
7130 Spiral case
7140 Wicket gate assembly
7141 Wicket gate operating mechanism or positioner
7142 Wicket gate shear pin

Water Supply/Discharge

7150 Stay vanes
7160 Pressure regulating valve
7161 Pressure regulating value operator or positioner
7162 Relief valve and vacuum breakers
7170 Draft tube
7180 Tailrace
7181 Tailwater depressing equipment
7190 Dewatering and rewatering equipment
7191 Equalizing line
7199 Other water supply/discharge problems (equipment related)

Miscellaneous Turbine Codes

7200 Turbine replacement (turbine or blade replacement)
7201 Turbine inspection (inspection only - no work)
7220 Unit out of service due to common penstock (with unit under repair)
7299 Other hydro problems. (use generator, plant electrical & auxiliary codes as appropriate.)

EXTERNAL CAUSES AFFECTING POWERHOUSE EQUIPMENT

Catastrophe

9000 Flood
9010 Fire, not related to a specific component
9020 Lightning
9030 Earthquake
9040 Other catastrophe

Regulatory

9510 Plant modifications strictly for compliance with new or changed fish requirements
9696 Other miscellaneous operational environmental limits (Corps equipment caused like ozone, etc.)

Safety

9700 OSHA related retrofit or inspection
9720 Other safety problems
9900 Operator error
9910 Maintenance error
9920 Contractor error

Performance

9999 Total unit performance testing (for individual component testing see appropriate component cause code)

# APPENDIX D

## OUTAGE RECORD OF NAVIGATION LOCKS AND FISH FACILITY

The NWD Form 1130-3, NWD Outage Record of Navigation Locks and Fish Facilities (RCS NWDCM-125) attached, will be used to annually report all types of outages of two hours or more duration on a project-by-project basis. Information from these reports will be used by CENWD-CM-O to compute outage rates. Instructions for the use of this form are as follows:

Facility: Enter Navigation or Fish

Date and Time for Outage: Use month and day numbers.
EXAMPLE: 9/17/89 2130

Type: Enter N (MO for Northwestern Division reports utilizing GADS) for all navigation facilities outages where advance (90 days) scheduling with navigation interests was not possible. Enter S (PO for Northwestern Division reports utilizing GADS) for all others.

Enter F (MO for Northwestern Division reports utilizing GADS) for any fish facility operation that is below normal criteria and occurs in the times of day and year that fish passage can be considered to be affected. Enter S (PO for Northwestern Division reports utilizing GADS) for all others.

The GADS PC Program at each Project has the provision for entering, storing and reporting this data electronically (the attached form was generated via the GADS program).

**NORTHWESTERN DIVISION**
**OUTAGE RECORD OF NAVIGATION LOCKS AND FISH FACILITIES**
*(See NWDR 1130-2-2 for completion of this form.)*

RCS NWDCM-125

**PROJECT:**

PERIOD (DATES): FROM TO

| FACILITY | DATE & TIME OF OUTAGE | | | | | | NO. OF HOURS OUT | TYPE | EXPLANATION OF OUTAGE |
|---|---|---|---|---|---|---|---|---|---|
| | START | | | END | | | | | |
| | DATE | | TIME | DATE | | TIME | | | |
| | MO | DAY | (HOUR) | MO | DAY | (HOUR) | | | |
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**For Illustration Purposes Only**

NWD FORM 1130-3, Sep 2001 (V1.00) *Previously NPD Form 1130-2-320a-2 which is no longer usable.* CEWWD-CM-OC

# APPENDIX E

## MAJOR POWER OUTAGE REPORT PROCEDURE

1. In the event of an unscheduled loss in power generation at a Corps plant resulting in a significant impact on the Bonneville Power Administration (BPA) power supply needs, a description will be reported within one hour of occurrence to the first available NWD Operations Division Crisis Management Team (CMT) member.

2. The remaining CMT members, the NWD Executive Office and the Water Management Division will be advised immediately by the CMT person who receives the report.