OUTPUT DESCRIPTION for REGOUT

The output for HYSSR called REGOUT (Unit 12 in the HYSSR.CON file) provides a period by period detailed listing of many of the values at each project. Output to this file is controlled by the **PRN** option on record code 01 in the HYSSR.IN file (Unit 5 in the HYSSR.CON file). When PRN = 0 (zero) or the PRN option is not input and the study length is six or more years, HYSSR will not output any information to the REGOUT file. When PRN = 0 and the study length is less than six years, or PRN = 1 or 4, HYSSR writes information for each period. The following description describes the information available in REGOUT.

STUDY _____ the underlined area contains the study name input on record code 01 as option **STN**.

DEPLETION YEAR _____ the depletion year for the study input on record code 01 as option **STY**.

Natural flows are depleted to this level.

WATER YEAR the period and year for the values in this table

PROJECT INFORMATION. Each period lists a table of values for each project in the system. Information in this table is described below.

NO. the external project number. This is the project number HYSSR associates with this project for input and output.

PROJECT the name of the project (up to 12 characters available)

CODE descriptive symbol or characters providing information about the project's regulation. The symbols are described in the notes at the bottom of the table.

this project's generation is not included in the system total generation

& this project has a diversion such as Grand Coulee's irrigation pumping

+ the project has a target flow

RLB the project's regulated flow attempted to go below minimum flow (RLB) and was reset to RLB.

RUB the project's regulated flow attempted to go above maximum flow (RUB) and was reset to RUB.

SLB the project's storage content attempted to go below storage lower bounds (SLB) and was reset to SLB.

SUB the project's storage content attempted to go above storage upper bounds (SUB) and was reset to SUB.

IJC indicates that Corra Linn violated its IJC elevation and adjustments were made at Libby and Duncan to the extent allowable to eliminate or reduce the violation.

RLB indicates the RLB value in cfs for the project during this period. The RLB can come from the several sources:

- Study Characteristics file (STCHAR)
- TDDATA or TDMODS file as input using record code 98
- RLB on record code 20 in the HYSSR.IN input file to this regulation
- minimum flow set during execution to meet a downstream target flow.

FLOW, NAT is the natural flow for the project in cfs. This flow may come directly from record code 60 in either TDDATA or TDMODS, or this flow may be depleted to the level indicated by the STY option on record code 01. Depleted natural flows are based on the depletion year of the study (STY), first depletion year (DP1), and second depletion year (DP2) (options on record code 01 in HYSSR.IN). Depleting flows to the specified level requires two sets of natural flows be input into TDDATA or TDMODS, one set for each depletion year (DP1 and DP2). It is important to note that the natural flows printed in this column do **not** include any evaporations or diversions such as irrigation pumping which have been input to TDDATA or TDMODS files. These natural flow values do include depletions appropriate to the depletion level of the data.

FLOW, STOR is the amount of flow in cfs taken from or added to the project. **A positive value indicates that storage was released and a negative value indicates that water was added to storage.**

FLOW, REG is the project's regulated flow in cfs. This flow goes through the powerhouse unless it exceeds the hydraulic capacity of the powerhouse, then the excess is spilled. HYSSR will not spill a project to meet the system load or to get the project to a specific rule curve. It will spill when a project is full, when the project exceeds powerhouse capacity, or to achieve a specified target operation. A project will also spill when forced spill is required (record code 76 in TDDATA or TDMODS).

FLOW, CAP is the project's powerhouse hydraulic capacity in cfs. This value is computed each period based on the head and regulated flow. A project's hydraulic capacity changes with head and flow.

STORAGE, OPCURVE is the project's operating rule curve value (ORC) in KAF or KSFD content. When the number for the ORC is 0 (zero) the project is not operating to rule curves but is using a fixed operation such as a specified storage change (record code 85 in TDDATA or TDMODS). The alphabetic character following the number indicates the type of rule curve controlling the ORC.

M MRC - Mandatory Rule Curve (flood control)

C CRC1 - First year Critical Rule Curve

A ARC - Assured Refill Curve

V VRC - Variable Refill Curve

L LLVECC - Lower limit Variable Energy Content Curve (usually January through March or April). This value is also called LLECC.

See the rules for determining the ORC in the rule curves section of the HYSSR manual.

STORAGE, CHANGE is the project's storage change during the period in KAF or KSFD content. **A positive value indicates that the project filled during the period, and a negative value indicates that the project drafted**. The ***** symbol next to the storage change value means that the amount of change at the project was restricted. The CODE column usually contains the reason for the restriction such as SUB, SLB, RUB, or RLB. If no reason is specified in the CODE column, the project may be restricted by the hydraulic capacity or a downstream constraint.

STORAGE, CONTENT the project's storage content in KAF or KSFD. If a project has no values in the

STORAGE OPCURVE, STORAGE CHANGE, and STORAGE CONTENT columns then the project is being treated as a run-of-river project.

STORAGE, ELEV the project's pool elevation in feet.

GENERATION, REG the project's generation in MW. The generation is computed based on the project's regulated flow, head, and efficiency factors.

GENERATION, SPILL the project's spill in MW. The spill in terms of MW is computed based on the flow exceeding the powerhouse hydraulic capacity, head, and efficiency factors. An **@** symbol next to the spill value indicates that the spill was required by record code 76 in the TDDATA or TDMODS file.

GENERATION, CAP the project's powerhouse hydraulic capacity in MW. The capacity is computed based on the powerhouse hydraulic capacity in cfs, head, and efficiency factors.

PRJ, H/K the project's H/K value. This value is computed by multiplying the project generation in MW by 1000 and then dividing by the project regulated flow in CFS. **H/K = GEN x 1000.0 / FLOW**

SYSTEM, MW/KAF the number of MW the system would generate due to the release of 1 KAF by this project.

TOTALS Totals are provided for STORAGE OPCURVE, STORAGE CHANGE, STORAGE CONTENT, GENERATION REG, GENERATION SPILL, and GENERATION CAP. The amount of usable storage, in KAF or KSFD, is also found at the bottom of project table.

SYSTEM INFORMATION. After data for each project has been listed, system information is listed. This includes totals of the columns relating to storage and generation. REGOUT lists the load information for the system.

PRIMARY LOADthe load in MW input on record code 70 into TDDATA or TDMODS

SECONDARY LOAD the secondary or surplus load in MW input on record code 71 into TDDATA or TDMODS

THERMAL DECREMENT amount of load in MW supplied by thermal generation so it is not part of the hydro load. This value is input on record code 01 in the HYSSR.IN file and the same decrement is applied to all periods.

LOAD ADJUSTMENT amount of load in MW added to or subtracted from the primary load. This value is input on record code 75 into TDDATA or TDMODS.

FIRM HYDRO LOAD the load in MW to be met by the hydro system during this year and period.

SYSTEM GENERATION the actual generation in MW produced by the hydro system.

SURPLUS ENERGY the difference in MW between the system generation and the firm hydro load. Negative surplus indicates the amount of firm hydro load not generated by the system. Positive surplus indicates the amount of extra energy generated above the firm hydro load. Normally the system has a tolerance of 10 MW when it meets the load. This tolerance may be adjusted by the **TOL** option on record code 01 in the HYSSR.IN input file.

RULE CURVE indicates the numeric value of the rule curve used at all projects to meet the load.

= 1.0 projects are storing water above their ORC up to flood control (MRC)

= 2.0 projects are operating on their ORC

= 3.0 projects are operating to their CRC1

= 4.0 projects are operating to their CRC2

= 5.0 projects are operating to their CRC3

= 6.0 projects are operating to their CRC4

= 7.0 projects are empty

values between 2.0 and 7.0 indicate that the projects are being proportionally drafted to meet the firm hydro load.

TOTAL UNREGULATED GENERATION total system generation in MW developed using unregulated flows rather than regulated flows.

TOTAL USABLE GENERATION total system generation in MW developed by using the usable storage at each project.

CODE and NOTE explains the meaning of the symbols found in the CODE columns for this period.

NET INFLOW - DIVERSION details the projects with water diverted from the available natural flow by listing the project number and name and the amount of the diversion in CFS. This section is not available if there were no diversions.

Date at the bottom of each period's information is the program execution date for this study.

STUDY REFILL 0 DEPLETION YEAR 1990 WATER YEAR 15 AUG 1935

NO.	PROJECT	CODE	FLOW - CFS RLB	NAT	STOR	REG	CAP	OPCURVE	STORAGE - 1000AF CHANGE	CONTENT	ELEV	GENERATION - MW REG	SPILL	CAP	PRJ H/K	SYSTEM MW/KAF
167	WHITE RIVER	SUB	0	1110	0	1110	1709	47C	0.0	46.6	543.0	42	0	64	37.5	1.26
166	TIMOTHY	SUB	10	82	0	82	0	62C	0.0	61.7	3190.0	0	0	0	0.0	1.50
165	CLACKAMAS		0	895	0	895	3816				655.0	40	0	170	44.6	1.50
153	UPPER BAKER	SUB	0	1530	0	1530	4714	221C	0.0	220.6	724.0	33	0	102	21.8	1.38
154	LOWER BAKER	SUB	80	1669	0	1669	3705	142C	0.0	142.4	438.6	32	0	71	19.3	0.65
150	ROSS	SUB	821	2463	0	2463	15025	1052C	0.0	1052.2	1602.5	74	0	450	30.1	2.73
151	DIABLO		0	3472	0	3472	6776				1205.0	87	0	159	25.1	1.72
152	GORGE		2000	3642	0	3642	6887				875.0	95	0	175	26.1	0.88
157	CUSHMAN NO 1		100	193	43	236	2355	368M	-1.3	368.0	737.0	5	0	47	20.0	1.87
158	CUSHMAN NO 2		0	193	43	236	2590				470.0	8	0	88	35.6	1.20
155	ALDER	RLB	575	564	11	575	2542	180C	-0.3*	161.9	1201.0	12	0	52	20.5	1.71
156	LA GRANDE		0	564	11	575	2096				935.0	18	0	64	30.5	1.03
3	LIBBY	RUB	4000	12369	5495	17864	24741	4949C	-163.5*	5705.9	2455.4	436	0	604	24.4	3.60
400	BONNERS FERY		0	13696	5495	19191	0				2000.0	0	0	0	0.0	2.78
5	DUNCAN	SUB	100	7180	0	7180	0	0C	0.0	1424.9	1892.0	0	0	0	0.0	2.78
6	CORRA LINN	#IJC	5000	29415	9496	11911	11154	570M	-119.0*	596.2	1743.3	45	3	45	0.0	2.78
49	KOOTENAY PLT	#	0	29415	-17504	11911	10292				1702.0	159	25	159	0.0	2.78
169	CANAL PLANT	#	27000	29415	0	27000	27229				1738.0	524	0	529	19.4	2.78
50	BRILLIANT	#	0	33312	9496	42808	17463				1477.0	120	174	120	0.0	2.78
1	MICA	#SUB	10000	48698	-10558	38140	41414	0C	314.1	7000.0	2469.8	1612	0	1740	42.3	2.78
41	REVELSTOKE	#	0	63251	-10558	52693	84737				1880.0	1303	0	1979	24.7	2.78
2	ARROW	SUB	5000	79481	-10558	68923	0	0C	0.0	7327.3	1444.0	0	0	0	0.0	2.78
10	HUNGRY HORSE		145	1085	5033	6118	12091	2832C	-149.7	2832.1	3550.0	209	0	408	34.1	6.00
11	KERR	SUB	3200	5162	5033	10195	14645	1792C	0.0	1792.0	2893.0	135	0	185	13.2	4.85
54	THOMPSON FLS		0	8553	5033	13586	21100				2392.7	57	0	85	4.2	4.41
38	NOXON	SUB	0	7999	5033	13032	52203	496C	0.0	496.0	2331.0	144	0	538	11.1	4.27
56	CABINET GRGE		0	9600	5033	14633	35806				2174.4	100	0	230	6.8	3.89
16	ALBENI FALLS	SUB	4000	10566	5033	15599	19088	1540C	0.0	1540.0	2062.5	70	0	49	4.5	3.66
57	BOX CANYON		0	12589	5033	17622	29617				2030.5	49	0	78	2.8	3.51
58	BOUNDARY		0	12586	5033	17619	44954				1989.0	335	0	804	19.0	3.42
46	SEVEN MILE	#	0	13202	5033	18235	44040				1710.0	253	0	577	13.9	2.78
59	WANETA	#	0	13202	5033	18235	26618				1513.0	273	0	380	15.0	2.78
18	POST FALLS	SUB	300	695	0	695	3726	235C	0.0	235.0	2128.0	3	0	15	4.0	3.97
61	UPPER FALLS		0	1391	0	1391	2351				1870.5	6	0	10	4.4	3.84
62	MONROE ST		0	1391	0	1391	3132				1806.0	7	0	15	4.8	3.69
63	NINE MILE		0	1740	0	1740	4319				1599.0	7	0	18	4.2	3.53
64	LONG LAKE		0	2089	10	2099	5968	104M	-0.3	104.0	1535.9	26	0	73	12.6	3.39
65	LITTLE FALLS		0	2089	10	2099	6872				1359.0	11	0	36	5.4	2.96
19	GRAND COULEE	&	30000	131073	29894	151318	291765	8336C	-771.0	8336.4	1280.1	3622	0	6773	23.9	2.78
66	CHIEF JOSEPH		0	131043	29895	151288	225404				953.2	1849	0	2539	12.2	1.98
67	WELLS		0	133634	29895	153879	197989				780.2	697	19@	840	4.7	1.57
20	CHELAN	SUB	50	1692	0	1692	2029	1676C	0.0	1676.0	1100.0	45	0	53	26.5	2.30
68	ROCKY REACH		0	135776	29895	156021	211622				704.8	939	42@	1242	6.3	1.41
69	ROCK ISLAND		0	139640	29895	159885	226977				613.0	422	0	530	2.6	1.20
70	WANAPUM		0	139699	29895	159944	183919				570.0	694	195@	986	5.5	1.11
71	PRIEST RAPDS		0	139964	29895	160209	185844				486.0	671	187@	905	5.3	0.92
21	BROWNLEE	#RLB	7600	8967	-1367	7600	36252	0C	40.7*	1245.3	2064.0	140	0	675	18.4	1.68
72	OXBOW	#	0	8967	-1367	7600	26365				1802.7	62	0	202	8.2	1.68
84	HELLS CANYON	#	0	8990	-1367	7623	31470				1686.8	117	0	450	15.4	1.68
31	DWORSHAK	RLB	34411	1380	33030	34411	10599	2228C	-982.7*	2279.6	1523.1	460	1052	460	0.0	1.68
76	LOWR GRANITE	+ RLB	50000	16940	33055	49995	136782	0C	-41.4*	446.2	733.0	351	0	932	7.0	1.68
77	LITTLE GOOSE		0	16920	34694	51614	138354	0C	-48.8	516.8	633.0	355	0	919	6.9	1.45

78	LOWR MONMNTL		0	16390	35334	51724	138575	0C	-19.0	358.0	537.0	365	0	925	7.1	1.21
79	ICE HARBOR		0	16370	36097	52467	103270	0C	-22.7	383.6	437.0	227	140@	693	6.9	0.98
80	MC NARY		0	171481	65992	227823	230487				338.8	1131	0	1127	5.0	0.74
81	JOHN DAY		0	173830	57480	221660	368256	0C	253.3	2243.1	262.5	1523	43@	2464	7.1	0.58
40	ROUND BUTTE	SUB	2890	3396	0	3396	12534	524C	0.0	524.0	1945.0	85	0	291	25.2	1.55
95	PELTON		0	3608	0	3608	11960				1577.5	39	0	124	10.9	0.71
82	THE DALLES		0	177747	57480	225577	343247				158.6	535	832@	1895	6.0	0.34
83	BONNEVILLE		0	181639	57480	229469	298891				75.2	586	381@	1074	4.1	0.14
159	SWIFT NO 1		0	996	3	999	9085	447M	-0.1	447.0	1000.0	29	0	268	29.5	2.32
160	SWIFT NO 2		0	996	3	999	7070				604.0	8	0	53	7.6	1.33
161	YALE	SUB	0	1149	-196	953	7222	190C	5.9	189.6	490.0	18	0	134	18.6	1.08
162	MERWIN	RLB	1200	1240	-40	1200	10892	184C	-4.7*	160.8	233.7	16	0	142	13.5	0.45
163	MOSSYROCK	RLB	1905	1969	-64	1905	14686	1298C	1.9*	1236.6	773.1	50	0	384	26.2	1.34
164	MAYFIELD		0	2064	-64	2000	12642				425.0	27	0	168	13.7	0.46
	TOTALS							29472	-1708.6	51149.9		16785	2891	30511		

USABLE STORAGE 39197.0KAF

PRIMARY LOAD	10415 MW	SECONDARY LOAD	0 MW	TOTAL UNREGULATED GENERATION	13602 MW
THERMAL DECREMENT	0 MW			TOTAL USABLE GENERATION	37366 MW
LOAD ADJUSTMENT	0 MW				
FIRM HYDRO LOAD	10415 MW				
SYSTEM GENERATION	16785 MW	RULE CURVE	2.00		
SURPLUS ENERGY	6370 MW				

CODE	NOTE
#	GENERATION FROM THIS PROJECT IS NOT INCLUDED IN THE SYSTEM GENERATION
+	THIS PROJECT HAS A TARGET FLOW
@	THIS PROJECT HAS FORCED SPILL
&	THIS PROJECT HAS A DIVERSION

NET INFLOW-DIVERSIONS

PROJECT NO.	PROJECT NAME	CFS
19	GRAND COULEE	-9650.

NPDEN-WM
09/19/96