LP Tech-Overhauls
Dave-Soptions

IP7017976

2/7/08

Outage Duration

Base - 280 days (300 days) | 35 days | Time + 42 days | 43 ~~49~~ days | 43 ~~49~~ days

repair + LSB replacement | new retrofits new | Field E 33½ Inner shell | Alstom Toshiba

Unit 1 LP Turbine Outage Repair Options Comparisons

Costs	repair A	New L-0 Hitachi B	GE C	Hitachi D
upgraded packing & rings	$467,482	$467,482		
packing & ring installation	$54,000	$54,000		
L-0 bucket replacement		$5,885,605	GE LSB	
LP Turbine uprate (3 sections)			$40,673,000	$27,300,000
diaphragm repair (15th & 16th)	$881,540	$881,540		
rotor bore US inspection	$150,000	$150,000		
packing alignment	$68,250	$68,250		
dovetail phased array insp	$61,000	$37,500		
L-0 cover removal, insp, replacement	$407,850			
Total, Maint repairs				
Outage extension	$7,560,000	$15,120,000	~~$22,680,000~~	~~$22,680,000~~
Total Costs	$9,650,122	$22,664,377	$63,353,000	$49,980,000

No Rpr

Savings

Packing + Spill Strips

Annual fuel cost savings from improved LP efficiency	$494,705	$555,954	$1,825,698	$2,084,829
Annual coal burn reduction (tons/yr)	12,760	14,340	47,090	53,774
Annual C02 reduction (tons/yr)	30,879	34,702	113,959	130,134
CO2 reduction savings ($/yr)	$0	$0	$0	$0
Total annual savings ($/yr)	$494,705	$555,954	$1,825,698	$2,084,829

State TCHR

Total

Future LSB replace

Economic Factors

PV total period savings	$4,230,410	$4,754,175	$15,612,226	$17,828,155
NPV project	-$5,419,712	-$17,910,202	-$47,740,774	-$32,151,845
Payback period (total costs)	19.51	40.77	34.70	23.97
Payback period (upgrade costs only)	1.05	11.52	22.28	13.09
Rate of return (total costs)	-8%	-17%	-15%	-11%
Rate of return (upgrade costs only)	101%	0%	-10%	-2%

Evaluation Criteria

Outage year	~~2009~~ 2010	
Escalation (%)	3.00%	
Cost of Money (%)	6.04%	
Evaluation Period (yr)	10	
NPHR (Btu/kwh)	9500	
Net Capacity Factor (%)	90%	
Replacement Energy ($/MWh)	$50.00	
Fuel Cost ($/ton)	$38.77	38.77
Fuel Cost ($/mmBtu)	$1.66	1.66
CO2 tax ($/ton)	$0.00	

FY 06-07 Production Values

Total fuel cost ($1,000's)	231,047.0
Net station generation (gwh)	14,686.0
Total coal burned (ktons)	5,959.9
Coal HHV (Btu/lb)	11,686
NPHR (Btu/kwh)	9,491
Net Capacity Factor (%)	93.1

Retro-fit reduction in future Outages

Add reduce Outage time + costs

Legend:

Option A - New packing & rings, planned steam path repairs & inspections, inspect L-0 covers
Option B - Same as Option A with replacement of L-0 buckets provided by Hitachi
Option C - New (upgraded) LP turbine steam path provided by GE
Option D - New (upgraded) LP turbine steam path provided by Hitachi 33" LSB new inner shell

Note: Upcoming Outage. Pull rotor pull Outage back 1 year

Operator Fluid - Stacks

Write a recommendation

Need Buy off on L-0/LSB are okay then basecase A

What was original LP Turb Overhaul schedule? 5 weeks
What happened / dates?
Chemical Clean @ 33 wk
get MDHA presentation

get EPRI

CO2
~ ton = 1 mw
~ ton coal → 2½ tons CO2

IP7017977

LP Turbine Maintenance Option - A

Repair Scope

L-0 bucket tip inspection
L-0, L-1, L-2 bucket root phased array US inspection
15th & 16th diaphragm major repairs (100% 15th, 50% 16th) 15 - 17 days
Replace all packing and seals with upgraded product
Rotor bore US inspection
Outage schedule - 35 days, U2 2010, U1 2011 (1 week ext based on 1999 & 2000 outages)

Savings Calculation:

Savings based on 1.4 MW increased output per LP shell (4.2 MW total LP output) listed on page 3 of Turbo Parts LLC 8/24/07 quote T07-1577

4.20	MW gross	change in full load
3.98	MW net	
0.4421%	change in net power	
42	Btu/kwh change in NPHR	
$494,705	annual savings	
$7,560,000	Additional costs - outage extension	7 days
$4,230,410	NPV of annual savings	

year	FV escalation	
	-$9,650,122	-$521,482
1	$509,546	$509,546
2	$524,833	$524,833
3	$540,578	$540,578
4	$556,795	$556,795
5	$573,499	$573,499
6	$590,704	$590,704
7	$608,425	$608,425
8	$626,678	$626,678
9	$645,478	$645,478
10	$664,842	$664,842

LP Turbine Maintenance Option - B

Repair Scope

New L-0 buckets - Hitachi supplied (GE $1.1m higher)
L-1, L-2 bucket root phased array US inspection
15th & 16th diaphragm major repairs
Replace all packing and seals with upgraded product
Rotor bore US inspection
Outage extension 14 days - 42 days total in 2010 (L-0 replacement 33-35 days)

Savings Calculation:

Savings based on 1.4 MW increased output per LP shell (4.2 MW total LP output) listed on page 3 of Turbo Parts LLC 8/24/07 quote T07-1577 from new packings and spill strips
& 0.52 MW increase for improved design L-0 buckets pg 3 10/18/07 MDA quote 70458A (0.8% stg efficiency improvement)

4.72	MW gross	change in full load
4.47	MW net	
0.4968%	change in net power	
47	Btu/kwh change in NPHR	
$555,954	annual savings	
$15,120,000	Additional costs - outage extension	14 days

$4,754,175 NPV of annual savings

year	FV escalation	
	-$22,664,377	-$6,407,087
1	$572,633	$572,633
2	$589,812	$589,812
3	$607,506	$607,506
4	$625,732	$625,732
5	$644,504	$644,504
6	$663,839	$663,839
7	$683,754	$683,754
8	$704,266	$704,266
9	$725,394	$725,394
10	$747,156	$747,156

LP Turbine Maintenance Option - C

Repair Scope

New steampath (diaphragms & rotors & inner shells) all 3 LP turbines provided by GE
Outage extension 14 days - 42 days total in 2010 (for comparison only) actual soonest install 2011

Savings Calculation:

Savings based on 15.5 MW output increase (maximum quoted by GE) stated on pg 6 of GE proposal 1-16P6455 rev. 0 issued 11/13/07

15.50	MW gross	change in full load
14.68	MW net	
1.6316%	change in net power	
155	Btu/kwh change in NPHR	
$1,825,698	annual savings	
$22,680,000	Additional costs - outage extension	21 days
$15,612,226	NPV of annual savings	

year	FV escalation	
	-$63,353,000	-$40,673,000
1	$1,880,469	$1,880,469
2	$1,936,883	$1,936,883
3	$1,994,989	$1,994,989
4	$2,054,839	$2,054,839
5	$2,116,484	$2,116,484
6	$2,179,979	$2,179,979
7	$2,245,378	$2,245,378
8	$2,312,739	$2,312,739
9	$2,382,122	$2,382,122
10	$2,453,585	$2,453,585

LP Turbine Maintenance Option - D

Repair Scope

New steampath (diaphragms & rotors) all 3 LP turbines provided by Toshiba ($8.35m x 3 = $25.05m for 30" LSB, $9.1 x 3 = $27.3m for 33" LSB

Outage extension 21 days - 49 days total in 2010 for camparison only (38-42 days for retro work)

Savings Calculation:

Savings based on 17.7 MW output increase quoted in 2/6/8 meeting with MDA for 33" LSB

17.70	MW gross	change in full load
16.77	MW net	
1.8632%	change in net power	
177	Btu/kwh change in NPHR	
$2,084,829	annual savings	
$22,680,000	Additional costs - outage extension	21 days
$17,828,155	NPV of annual savings	

year	FV escalation	
	-$49,980,000	-$27,300,000
1	$2,147,374	$2,147,374
2	$2,211,795	$2,211,795
3	$2,278,149	$2,278,149
4	$2,346,494	$2,346,494
5	$2,416,888	$2,416,888
6	$2,489,395	$2,489,395
7	$2,564,077	$2,564,077
8	$2,640,999	$2,640,999
9	$2,720,229	$2,720,229
10	$2,801,836	$2,801,836

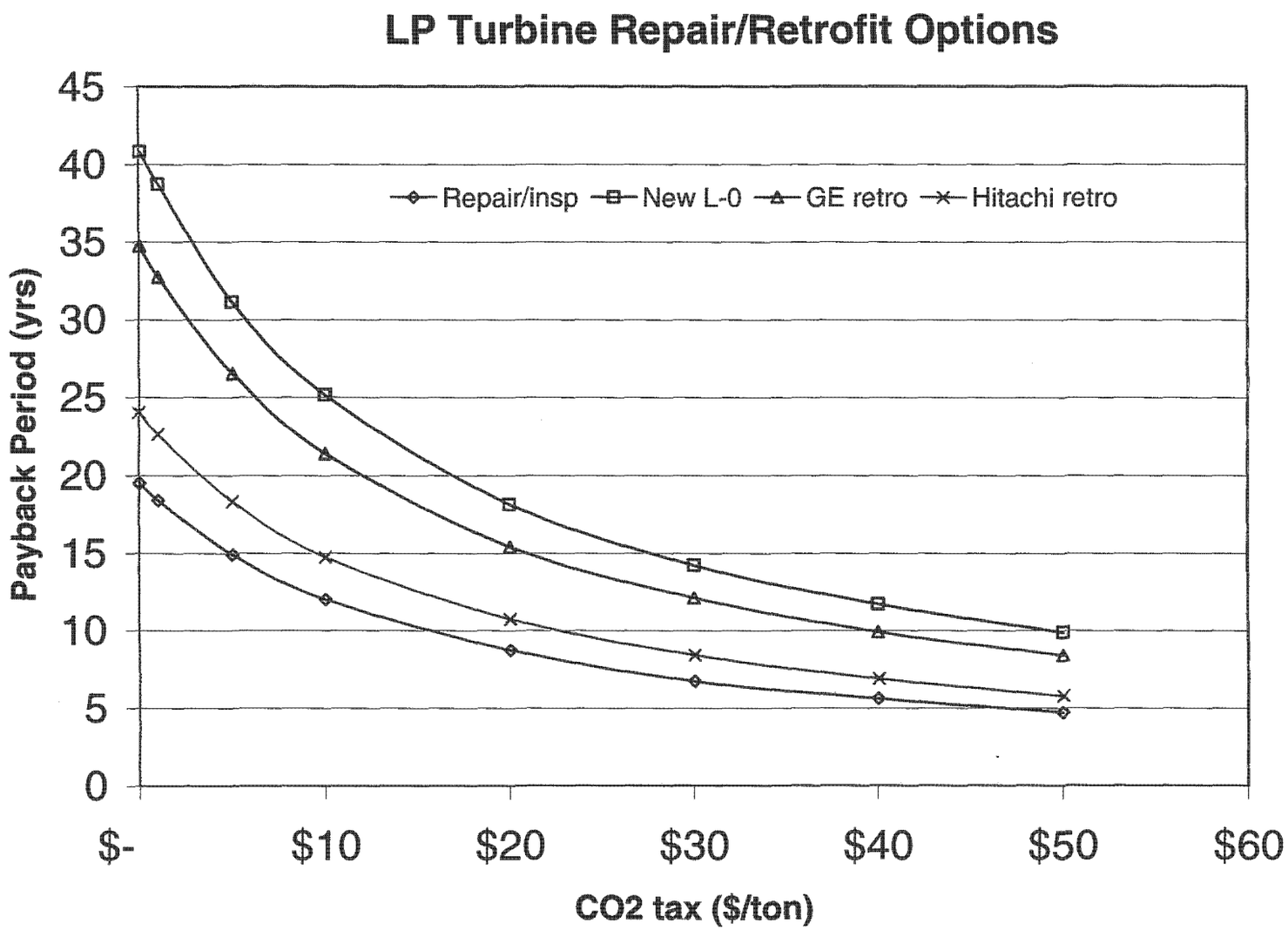
Unit 1 LP Turbine Outage Repair Options Comparisons

Costs	A	New L-0 B	GE C	Hitachi D
upgraded packing & rings	$467,482	$467,482		
packing & ring installation	$54,000	$54,000		
L-0 bucket replacement		$5,885,605		
LP Turbine uprate (3 sections)			$40,673,000	$27,300,000
diaphragm repair (15th & 16th)	$881,540	$881,540		
rotor bore US inspection	$150,000	$150,000		
packing alignment	$68,250	$68,250		
dovetail phased array insp	$61,000	$37,500		
L-0 cover removal, insp, replacement	$407,850			
Outage extension	$7,560,000	$15,120,000	$22,680,000	$22,680,000
Total Costs	$9,650,122	$22,664,377	$63,353,000	$49,980,000
Savings				
Annual fuel cost savings from improved LP efficiency	$494,705	$555,954	$1,825,698	$2,084,829
Annual coal burn reduction (tons/yr)	12,760	14,340	47,090	53,774
Annual C02 reduction (tons/yr)	30,879	34,702	113,959	130,134
CO2 reduction savings ($/yr)	$0	$0	$0	$0
Total annual savings ($/yr)	$494,705	$555,954	$1,825,698	$2,084,829
Economic Factors				
PV total period savings	$4,230,410	$4,754,175	$15,612,226	$17,828,155
NPV project	-$5,419,712	-$17,910,202	-$47,740,774	-$32,151,845
Payback period (total costs)	19.51	40.77	34.70	23.97
Payback period (upgrade costs only)	1.05	11.52	22.28	13.09
Rate of return (total costs)	-8%	-17%	-15%	-11%
Rate of return (upgrade costs only)	101%	0%	-10%	-2%

Evaluation Criteria		
Outage year	2009	
Escalation (%)	3.00%	
Cost of Money (%)	6.04%	
Evaluation Period (yr)	10	
NPHR (Btu/kwh)	9500	
Net Capacity Factor (%)	90%	
Replacement Energy ($/MWh)	$50.00	
Fuel Cost ($/ton)	$38.77	38.77
Fuel Cost ($/mmBtu)	$1.66	1.66
CO2 tax ($/ton)	$0.00	
FY 06-07 Production Values		
Total fuel cost ($1,000's)	231,047.0	
Net station generation (gwh)	14,686.0	
Total coal burned (ktons)	5,959.9	
Coal HHV (Btu/lb)	11,686	
NPHR (Btu/kwh)	9,491	
Net Capacity Factor (%)	93.1	

Option A - New packing & rings, planned steam path repairs & inspections, inspect L-0 covers
Option B - Same as Option A with replacement of L-0 buckets provided by Hitachi
Option C - New (upgraded) LP turbine steam path provided by GE
Option D - New (upgraded) LP turbine steam path provided by Hitachi 33" LSB new inner shell

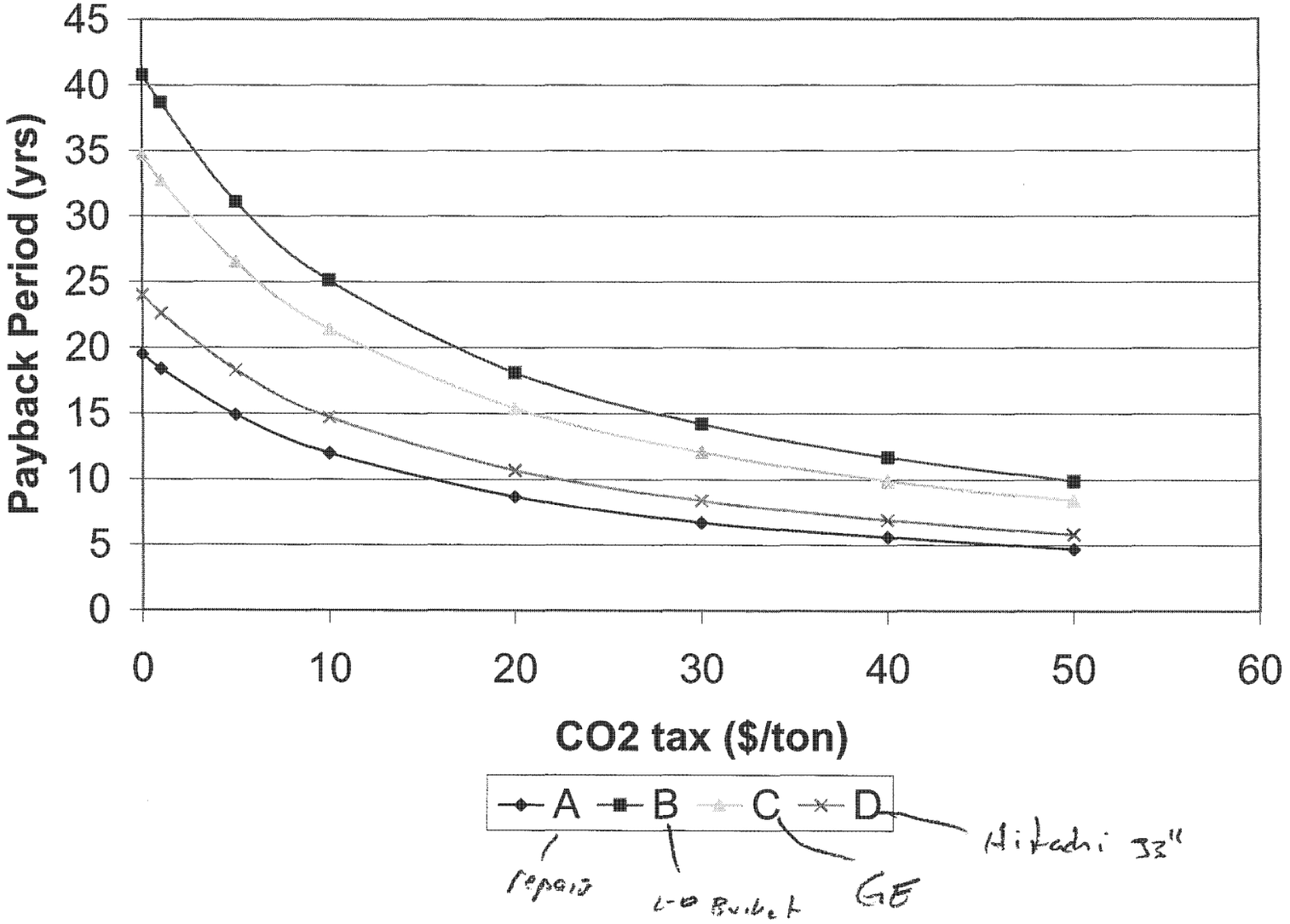
IP7017982


LP Turbine Repair/Retrofit Options
Payback Period (yrs)
45
40
35
30
25
20
15
10
5
0
Repair/insp
New L-0
GE retro
Hitachi retro
$-
$10
$20
$30
$40
$50
$60
CO2 tax ($/ton)

IP7017983

IP7017984

LP Turbine Repair Options



Unit 1 LP Turbine Outage Repair Options Comparisons

Options

Costs	A	B	C	D
upgraded packing & rings	$467,482	$467,482		
packing & ring installation	$54,000	$54,000		
L-0 bucket replacement		$5,654,400		
LP Turbine uprate (3 sections)			$40,673,000	$27,400,000
diaphragm repair (15th & 16th)	$874,750	$874,750		
rotor bore US inspection	$150,000	$150,000		
packing alignment	$68,250	$68,250		
dovetail phased array insp	$75,000	$37,500		
L-0 cover removal, insp, replacement	$357,930			
Outage extension		$7,560,000	$15,120,000	$15,120,000
Total Costs	$2,047,412	$14,866,382	$55,793,000	$42,520,000

Savings

Annual fuel cost savings from improved LP efficiency	$494,705	$555,954	$1,825,698	$2,002,378
Annual coal burn reduction (tons/yr)	12,760	14,340	47,090	51,648
Annual C02 reduction (tons/yr)	30,879	34,702	113,959	124,987

Economic Factors

PV total period savings	$4,230,410	$4,754,175	$15,612,226	$17,123,087
NPV project	$2,182,998	-$10,112,207	-$40,180,774	-$25,396,913
Payback period (total costs)	4.14	26.74	30.56	21.23
Payback period (upgrade costs only)	1.05	11.11	22.28	13.68
Rate of return (total costs)	24%	-12%	-14%	-9%
Rate of return (upgrade costs only)	101%	1%	-10%	-2%

Evaluation Criteria

Outage year	2009	
Escalation (%)	3.00%	
Cost of Money (%)	6.04%	
Evaluation Period (yr)	10	
NPHR (Btu/kwh)	9500	
Net Capacity Factor (%)	90%	
Replacement Energy ($/MWh)	$50.00	
Fuel Cost ($/ton)	$38.77	38.77
Fuel Cost ($/mmBtu)	$1.66	1.66

FY 06-07 Production Values

Total fuel cost ($1,000's)	231,047.0
Net station generation (gwh)	14,686.0
Total coal burned (ktons)	5,959.9
Coal HHV (Btu/lb)	11,686
NPHR (Btu/kwh)	9,491
Net Capacity Factor (%)	93.1

Option A - New packing & rings, planned steam path repairs & inspections, inspect L-0 covers
Option B - Same as Option A with replacement of L-0 buckets provided by Hitachi
Option C - New (upgraded) LP turbine steam path provided by GE
Option D - New (upgraded) LP turbine steam path provided by Alstom (no new inner shells?)

Diaphragm - weld repair cutback 3/4"/rebuild
15th (split case) press fit → 4 pieces - 4

Inspect this Outage? How bad steam path audit
dovetail pens pushed vs drill out
→ LP balance
turbo care - L-0 repair procedure? in situ repair

MDA inspect L-0/LSB

Need inspector independent give recommendation
Ted Archibald

Orders rotors LSB

Ade3 - LP low speed balance

IP7017985

Minor/Major Planned Outages

PO

UNIT	OUTAGE TYPE	OUTAGE PERIOD	CAUSE CODE	OUTAGE CAUSE DESCRIPTION	EQUIV. HOURS		CALENDAR YEAR	# Incidents		FISCAL YEAR	# Incidents
IGS1	PO	10/31/86-11/09/86	1800	BOILER SCHEDULED OUTAGE. SYSTEM MAINTENANCE & REPAIR/COMPONENT ADJUSTMENTS.	207.78	86	207.78	1	86-87	640.09	3
IGS1	PO	01/16/87-01/19/87	1800	BLR MAINT, FLUE DAMPER ADJ. BLR INSPECTION IN PREPARATION FOR PERF TESTING.	67.13	87	777.49	3	87-88	769.85	2
IGS1	PO	05/01/87-05/17/87	1800	PLANNED MAINTENANCE OUTAGE - ALL MAJOR EQUIPMENT INSPECTED.	365.18	88	424.67	1	88-89	1455.12	3
IGS1	PO	10/31/87-11/14/87	1800	TWO WEEK SCHEDULED OUTAGE.	345.18	89	1629.47	4	89-90	374.77	2
IGS1	PO	03/18/88-04/05/88	1800	TWO WEEK SCHEDULED OUTAGE.	424.67	90	221.12	2	90-91	620.97	2
IGS1	PO	01/27/89-01/27/89	9999	UNIT TRIP DUE TO LOW DRUM LEVEL DURING BFPT A TRIP TEST RUNBACK.	0.32	91	600.27	1	91-92	389.28	1
IGS1	PO	01/28/89-03/29/89	4401	SCHEDULED MAINTENANCE OUTAGE.	1438.67	92	389.28	1	92-93	541.87	1
IGS1	PO	03/29/89-03/30/89	4460	NORMAL SHUTDOWN TO PERFORM TURB OVERSPEED TESTING AND VALVE TIGHTNESS TESTS.	16.13	93	541.87	1	93-94	686.92	1
IGS1	PO	11/10/89-11/18/89	1800	FALL PLANNED MAINTENANCE OUTAGE.	174.35	94	751.67	2	94-95	754.03	2
IGS1	PO	03/24/90-04/01/90	1810	SPRING PLANNED OUTAGE, NOTE: DAYLIGHT SAVINGS TIME CHANGE DURING EVENT.	200.42	95	689.28	1	95-96	127.80	1
IGS1	PO	10/20/90-10/21/90	4401	BI-POLE OUTAGE.	20.70	96	174.07	2	96-97	924.37	2
IGS1	PO	03/23/91-04/17/91	1800	UNIT 1 SPRING PLANNED OUTAGE - 1991.	600.27	97	878.10	1	97-98	122.88	1
IGS1	PO	04/11/92-04/27/92	1810	PLANNED OUTAGE, BURNER REPLACEMENT.	389.28	98	122.88	1	98-99	863.13	1
IGS1	PO	04/16/93-05/09/93	3412	SPRING PLANNED OUTAGE - BFPT INSPECTIONS.	541.87	99	863.13	1	99-00	183.53	1
IGS1	PO	04/08/94-05/07/94	4400	PLANNED OUTAGE - SPRING 94 HP-IP INSPECTION AND REPAIR.	686.92	00	183.53	1	00-01	720.03	1
IGS1	PO	11/29/94-12/01/94	4401	FALL 94 PLANNED OUTAGE.	64.75	01	720.03	1	01-02	175.35	1
IGS1	PO	04/07/95-05/06/95	4401	SPRING 95 PLANNED OUTAGE.	689.28	02	175.35	1	02-03	694.83	1
IGS1	PO	03/23/96-03/29/96	1800	SPRING 96 PLANNED OUTAGE.	127.80	03	694.83	1	03-04		
IGS1	PO	10/26/96-10/27/96	4520	FALL PLANNED OUTAGE - B-PHASE GENERATOR BUSHING LEAK REPAIR, RV-5 REPAIR.	46.27	04			04-05	703.89	1
IGS1	PO	04/04/97-05/11/97	4520	SPRING PLANNED OUTAGE. GENERATOR OVERHAUL	878.10	05	703.89	1	05-06	0.00	0
IGS1	PO	02/07/98-02/12/98	1800	SPRING 98 PLANNED OUTAGE start 2/20	122.88	06	0.00	0	06-07	697.32	1
IGS1	PO	02/19/99-03/27/99	4400	1999 PLANNED OUTAGE. LP TURBINES OVERHAUL. turb done 3/23 330days why? 360days	863.13	07	697.32	1			
IGS1	PO	04/29/00-05/06/00	1800	SPRING 2000 PLANNED OUTAGE.	183.53						
IGS1	PO	03/03/01-04/02/01	1800	SPRING 2001 PLANNED OUTAGE. TURBINE VALVES AND BOILER WORK.	720.03						
IGS1	PO	02/15/02-02/23/02	4261	FEB 2002 PLANNED ONE WEEK OUTAGE.	175.35						
IGS1	PO	03/01/03-03/29/03	4400	SPRING 2003 PO. NEW HP TURB, OFA AND PLATEN EXTENSION.	694.83		11446.03	28		11446.03	28
IGS1	PO	03/03/05 - 04/03/05	1810	SPRING 2005 4 WEEK PLANNED OUTAGE.	703.89						
IGS1	PO	03/30/07-04/01/07	4830	SPRING 07 SIR. GENERATOR FIELD REWIND, DCS CHANGEOUT, GENNEREX REPLACEMENT.	697.32						
					11446.03						

lookup - Events Summary

Why Outages - 5 weeks?
turbine

IP7017986

Minor/Major Planned Outages

PO

UNIT	OUTAGE TYPE	OUTAGE PERIOD	CAUSE CODE	OUTAGE CAUSE DESCRIPTION	Equiv. Hrs		Calendar Year	# Incidents		Fiscal Year	# Incidents
IGS2	PO	11/28/87-12/13/87	1800	SCHEDULED TWO WEEK OUTAGE.	361.47	86	0.00	0	86-87	0.00	0
IGS2	PO	04/16/88-04/28/88	1800	SCHEDULED MAINTENANCE OUTAGE.	293.68	87	361.47	1	87-88	655.15	2
IGS2	PO	09/30/88-12/05/88	4400	SCHEDULED OUTAGE 9 WEEK MAJOR OVERHAUL.	1578.33	88	1929.89	8	88-89	1733.43	8
IGS2	PO	12/05/88-12/06/88	4420	NORM SHUTDOWN INSTALL BALANCE SHOTS ON MAIN TURB BRNGS 10 & 11 VIB INDICATION 9 MILS.	8.08	89	281.30	2	89-90	340.36	2
IGS2	PO	12/06/88-12/06/88	4420	HIGH VIBRATION TRIP ON BEARING #5 AT 10 MILS.	3.78	90	287.63	3	90-91	307.87	3
IGS2	PO	12/07/88-12/07/88	4420	NORM SHUTDOWN PLACE BAL SHOT MN TURB & PERF BOST, MOST, TRIP ANT & VLV TIGHT TESTS.	12.72	91	761.44	2	91-92	667.75	2
IGS2	PO	12/09/88-12/09/88	4420	MANUAL TRIP DUE HI VIB #4 BRNG IND 7 MILS - PLACED BALANCE SHOTS BOTH ENDS OF IP TURB.	7.15	92	670.23	2	92-93	587.40	1
IGS2	PO	12/10/88-12/10/88	4420	NORMAL SHUTDOWN TO INSTALL BALANCE SHOTS ON MAIN TURB.	17.02	93	651.28	1	93-94	651.28	1
IGS2	PO	12/11/88-12/11/88	4420	NORMAL SHUTDOWN TO INSTALL BALANCE SHOTS ON MAIN TURB.	9.13	94	524.60	1	94-95	524.60	1
IGS2	PO	04/21/89-04/26/89	1800	SPRING PLANNED OUTAGE.	97.22	95	101.53	1	95-96	820.38	2
IGS2	PO	11/24/89-12/02/89	1800	FALL PLANNED MAINTENANCE OUTAGE.	184.08	96	718.85	1	96-97	0.00	0
IGS2	PO	04/07/90-04/13/90	1810	SPRING PLANNED OUTAGE.	156.28	97	0.00	0	97-98	701.52	1
IGS2	PO	10/05/90-10/10/90	1800	SCHEDULED MAINTENANCE OUTAGE.	109.38	98	701.52	1	98-99	0.00	0
IGS2	PO	10/20/90-10/21/90	4401	PLANNED BI-POLE OUTAGE.	21.97	99	0.00	0	99-00	850.97	1
IGS2	PO	02/08/91-02/16/91	1800	SPRING PLANNED MAINTENANCE OUTAGE.	176.52	00	1009.07	2	00-01	158.10	1
IGS2	PO	10/25/91-10/31/91	1810	PLANNED 91 FALL OUTAGE.	145.92	01	0.00	0	01-02	709.92	1
IGS2	PO	11/01/91-11/19/91	1810	CONTINUATION OF PLANNED 91 FALL OUTAGE.	439.00	02	709.92	1	02-03	223.40	1
IGS2	PO	03/28/92-03/31/92	1810	SPRING PLANNED OUTAGE, BURNER INSPECTIONS.	82.83	03	223.40	1	03-04	751.99	2
IGS2	PO	10/30/92-11/24/92	3412	PLANNED 92 OUTAGE, BFPT INSPECTIONS.	587.40	04	751.99	2	04-05	173.80	1
IGS2	PO	10/29/93-11/26/93	4400	PLANNED OUTAGE. HP & IP TURB INSPECTION & REPAIR.	651.28	05	173.80	1	05-06	688.21	1
IGS2	PO	10/29/94-11/19/94	4401	FALL 94 PLANNED OUTAGE.	524.60	06	688.21	1	06-07	0.00	0
IGS2	PO	11/12/95-11/16/95	1590	FALL 95 PLANNED OUTAGE. STACK DRAIN WORK.	101.53						
IGS2	PO	04/06/96-05/06/96	4840	SPRING 96 PLANNED OUTAGE. GENERATOR WORK.	718.85		10546.13	31		10546.13	31
IGS2	PO	03/20/98-04/19/98	4401	SPRING 98 PLANNED OUTAGE.	701.52						
IGS2	PO	02/25/00-04/01/00	4400	SPRING 2000 PLANNED OUTAGE. OVERHAUL LP TURBINES.	850.97	35days					
IGS2	PO	12/01/00-12/08/00	4401	PLANNED OUTAGE	158.10						
IGS2	PO	03/01/02-03/31/02	4400	SPRING 2002 HP ALSTOM TURBINE CHANGEOUT AND IP OVERHAUL.	709.92						
IGS2	PO	02/07/03-02/17/03	1810	SPRING 2003 PLANNED OUTAGE. CT TIE IN.	223.40						
IGS2	PO	02/27/04-03/28/04	1800	SIR 2004 BLR PLATENS, OFA, NEW BURNERS, SAH BASKETS, ETC.	698.96						
IGS2	PO	04/03/04-04/05/04	4099	SCHEDULED OUTAGE FOR TURB STARTUP SCREENS REMOVAL. (TIME CHANGE DURING OUTAGE)	53.03						
IGS2	PO	02/12/05 - 02/19/05	1810	SPRING 2005 SHORT PLANNED OUTAGE.	173.80						
IGS2	PO	03/31/06-04/1/06	1810	SPRING 06 PLANNED OUTAGE. DCS AND EXCITATION CHANGEOUT.	688.21						

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UNIT	OUTAGE TYPE	OUTAGE PERIOD	CAUSE CODE	OUTAGE CAUSE DESCRIPTION	EQUIV. HOURS		Calendar Year	# Incidents		FISCAL YEAR	# Incidents
IGS1	PD	09/27/86-09/28/86	3619	MAINTENANCE ON MICROWAVE SYSTEM AT CONVERTER STATION.	6.15	86	6.15	1	86-87	6.15	1
IGS1	PD	03/29/89-03/29/89	4499	PD FOR ON-LINE BALANCING AND TESTING.	7.25	87	0.00	0	87-88	0.00	0
IGS1	PD	03/30/89-03/30/89	4499	PD FOR ON-LINE BALANCING AND TESTING.	1.01	88	0.00	0	88-89	16.26	3
IGS1	PD	03/30/89-03/31/89	4499	PD FOR ON-LINE BALANCING AND TESTING.	8.00	89	18.34	4	89-90	25.43	5
IGS1	PD	08/28/89-08/29/89	3170	CONDENSER INSPECTION COATINGS & CATHODIC PROTECTION ON B UPPER PASS, A & C INNER PASS.	2.08	90	26.25	6	90-91	2.90	2
IGS1	PD	03/10/90-03/11/90	3659	POLE 2 SIR.	9.23	91	9.25	1	91-92	33.99	2
IGS1	PD	03/17/90-03/18/90	3659	POLE 1 SIR.	9.07	92	32.39	2	92-93	7.65	1
IGS1	PD	04/01/90-04/01/90	3659	STS POLE 2 SIR.	3.97	93	0.00	0	93-94	12.98	1
IGS1	PD	04/05/90-04/06/90	3410	1B BFPT EXTRACTION LEAK.	1.08	94	29.97	3	94-95	52.21	3
IGS1	PD	07/15/90-07/16/90	3210	A CWP REPLACEMENT.	2.47	95	35.22	1	95-96	25.73	2
IGS1	PD	08/29/90-08/30/90	3414	REPLACED POSITION #2 CARD IN SPEED CONTROL CABINET.	0.43	96	25.73	2	96-97	5.90	1
IGS1	PD	10/26/91-10/26/91	3659	BI-POLE OUTAGE, POWER SENT NTS.	9.25	97	5.90	1	97-98	28.61	4
IGS1	PD	03/29/92-03/30/92	3659	BI-POLE OUTAGE.	24.74	98	28.87	6	98-99	20.89	3
IGS1	PD	11/14/92-11/14/92	3659	BI-POLE OUTAGE.	7.65	99	20.63	1	99-00	21.50	1
IGS1	PD	05/07/94-05/08/94	4460	STARTUP ACTIVITIES UNTIL RELEASE TO ECC.	12.98	00	21.50	1	00-01	13.69	1
IGS1	PD	09/18/94-09/18/94	3659	DC POLES O/S TO REPAIR INSULATORS.	5.91	01	13.69	1	01-02	19.39	2
IGS1	PD	12/01/94-12/02/94	4460	STARTUP ACTIVITIES FOLLOWING PLANNED OUTAGE.	11.08	02	19.39	2	02-03	29.80	1
IGS1	PD	05/06/95-05/08/95	4460	STARTUP ACTIVITIES AND POST SIR TESTING.	35.22	03	29.80	1	03-04	23.39	3
IGS1	PD	03/07/96-03/07/96	3659	POLE 2 O/S FOR SCHEDULED WORK AT ADELANTO.	0.56	04	23.39	3	04-05	0.00	0
IGS1	PD	04/13/96-04/14/96	3659	POLE 1&2 O/S. PLANNED SIR.	25.17	05	0.00	0	05-06	0.00	0
IGS1	PD	05/11/97-05/12/97	4520	PLANNED DERATE FOR STARTUP ACTIVITIES FOLLOWING PLANNED OUTAGE.	5.90	06	0.00	0	06-07	48.08	1
IGS1	PD	03/28/98-03/28/98	3659	BI-POLE PLANNED OUTAGE. LOAD SET BY ECC.	10.68	07	48.08	1			
IGS1	PD	03/29/98-03/29/98	3659	BI-POLE PLANNED OUTAGE. LOAD SET BY ECC.	10.68						
IGS1	PD	04/12/98-04/12/98	3659	BI-POLE PLANNED OUTAGE. LOAD SET BY ECC.	6.85		394.55	37		394.55	37
IGS1	PD	04/18/98-04/18/98	3659	BI-POLE PLANNED OUTAGE. LOAD SET BY ECC.	0.40						
IGS1	PD	10/03/98-10/03/98	4305	REPLACE SERVO ON #2 CONTROL VALVE.	0.11						
IGS1	PD	11/06/98-11/06/98	4305	REPLACE #3 CONTROL VALVE SERVO FILTER.	0.15						
IGS1	PD	03/27/99-03/29/99	4460	STARTUP ACTIVITIES AND TESTING FOLLOWING A PLANNED OUTAGE.	20.63						
IGS1	PD	05/06/00-05/07/00	4460	PD FOR TURBINE OVERSPEED TESTING AND WATER CHEMISTRY FOLLOWING PO TO RELEASE TO ECC.	21.50						
IGS1	PD	04/02/01-04/02/01	4460	PO TO RELEASE TO ECC FOR FULL LOAD, INCLUDES UNIT OFF 3.03 HRS FOR TURBINE TESTS.	13.69						
IGS1	PD	03/23/02-03/23/02	3659	BIDDED BI-POLE OUTAGE TO REPAIR METALLIC RETURN, WASH INSULATORS & PM DISCONNECTS.	10.09						
IGS1	PD	03/24/02-03/24/02	3659	BIDDED BI-POLE OUTAGE CONTINUED.	9.30						
IGS1	PD	03/29/03-03/31/03	4460	STARTUP ACTIVITIES AND TESTING FOLLOWING A PLANNED OUTAGE.	29.80						
IGS1	PD	03/20/04-03/20/04	3659	BI-POLE OUTAGE/LINE WORK.	8.25						
IGS1	PD	03/21/04-03/21/04	3659	BI-POLE OUTAGE/LINE WORK.	7.40						

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INTERMOUNTAIN POWER FACILITY

MONTHLY EVENT REPORT
FEBRUARY, 2000

DATE, TIME- START DATE, TIME- END	DESCRIPTION	EVENT TYPE	OUTAGE DURATION HOURS	DERATE DURATION HRS	DERATE DURATION EQ HRS	CAPABILITY LOSS MW net	MAX AVAIL CAPACITY UNIT	MAX AVAIL CAPACITY STATION	TOTAL CAPACITY LOSS (MWH)
UNIT 1									
2/4/2000 23:58 2/5/2000 1:25	UNIT TRIP B-BFPT trip during emergency governor overspeed testing.	Forced	1.45			830	0	830	1,204
2/16/2000 21:20 2/16/2000 22:39	FORCED DERATE Pole #2 block. Converter station @ Adelanto flashover.	Forced		1.32	0.39	245	585	1,170	323
TOTAL (for Unit 1)		2	1.45	1.32	0.39				1,526
UNIT 2									
2/16/2000 21:20 2/16/2000 22:39	FORCED DERATE Pole #2 block. Converter station @ Adelanto flashover.	Forced		1.32	0.39	245	585	1,170	323
2/25/2000 22:35 3/1/2000 0:00	PLANNED OUTAGE Spring 2000 planned outage. LP turbines overhaul.	Planned	97.42			830	0	830	80,856
TOTAL (for Unit 2)		2	97.42	1.32	0.39				81,178
TOTAL (FOR IGS)		4	98.87	2.63	0.78				82,705

* - Incidents not charged against IPSC Performance Incentive Program.

INTERMOUNTAIN POWER FACILITY

MONTHLY EVENT REPORT
MARCH, 2000

DATE, TIME- START DATE, TIME- END	DESCRIPTION	EVENT TYPE	OUTAGE DURATION HOURS	DERATE DURATION HRS	DERATE DURATION EQ HRS	CAPABILITY LOSS MW net	MAX AVAIL CAPACITY UNIT	MAX AVAIL CAPACITY STATION	TOTAL CAPACITY LOSS (MWH)
UNIT 1									
	No incidents in the month.								
TOTAL (for Unit 1)		0	0.00	0.00	0.00				0
UNIT 2									
3/1/2000 0:00	PLANNED OUTAGE	Planned	744.00			830	0	830	617,520
4/1/2000 0:00	Spring 2000 planned outage. LP turbines overhaul.								
TOTAL (for Unit 2)		1	744.00	0.00	0.00				617,520
TOTAL (FOR IGS)		1	744.00	0.00	0.00				617,520

* - Incidents not charged against IPSC Performance Incentive Program.

INTERMOUNTAIN POWER FACILITY

MONTHLY EVENT REPORT
APRIL, 2000

DATE, TIME- START DATE, TIME- END	DESCRIPTION	EVENT TYPE	OUTAGE DURATION HOURS	DERATE DURATION HRS	DERATE DURATION EQ HRS	CAPABILITY LOSS MW net	MAX AVAIL CAPACITY UNIT	MAX AVAIL CAPACITY STATION	TOTAL CAPACITY LOSS (MWH)
UNIT 1									
4/1/2000 12:15 4/1/2000 13:08	FORCED DERATE 5 pulv operation due to C & D pulv tripping w/E o/s maint.	Forced		0.88	0.02	23	807	1,637	20
4/29/2000 0:03 5/1/2000 0:00	PLANNED OUTAGE Spring 2000 planned outage.	Planned	47.95			830	0	830	39,799
TOTAL (for Unit 1)		2	47.95	0.88	0.02				39,819
UNIT 2									
4/1/2000 0:00 4/1/2000 9:33	PLANNED OUTAGE Spring 2000 planned outage. LP turbines overhaul.	Planned	8.55			830	0	830	7,097
4/1/2000 9:33 4/7/2000 11:26	PLANNED DERATE PD for vibration testing and balancing following PO to release to ECC.	Planned		145.88	118.64	675	155	985	98,471
TOTAL (for Unit 2)		2	8.55	145.88	118.64				105,568
TOTAL (FOR IGS)		4	56.50	146.77	118.66				145,387

* - Incidents not charged against IPSC Performance Incentive Program.

INTERMOUNTAIN POWER FACILITY

MONTHLY EVENT REPORT
FEBRUARY, 1999

DATE, TIME- START DATE, TIME- END	DESCRIPTION	EVENT TYPE	OUTAGE DURATION HOURS	DERATE DURATION HRS	DERATE DURATION EQ HRS	CAPABILITY LOSS MW net	MAX AVAIL CAPACITY UNIT	MAX AVAIL CAPACITY STATION	TOTAL CAPACITY LOSS (MWH)
UNIT 1									
2/12/1999 7:35 2/12/1999 18:28	U1-FORCED DERATE (D2) Repair A & C phase transformer bushing hot spots @ Adelanto.	Forced		10.88	3.34	255	575.0	1,405	2,775
2/19/1999 23:17 3/1/1999 0:00	U1-PLANNED OUTAGE (PO) 1999 Planned outage. LP turbines major overhaul.	Planned	216.72 +646.42			830	0	830	179,875
TOTAL (for Unit 1)		2	216.72	10.88	3.34				182,650
UNIT 2									
2/12/1999 7:35 2/12/1999 18:28	U2-FORCED DERATE (D2) Repair A & C phase transformer bushing hot spots @ Adelanto.	Forced		10.88	3.34	255	575.0	1,405	2,775
2/12/1999 23:17 2/14/1999 6:06	U2-MAINT OUTAGE (MO) Repair leaking lower convection pass hdr drain line.	Maint	30.82			830	0	830	25,578
TOTAL (for Unit 2)		2	30.82	10.88	3.34				28,353
TOTAL (FOR IGS)		4	247.53	21.77	6.69				211,003

* - Trips not charged against IPSC Performance Incentive Program.

INTERMOUNTAIN POWER FACILITY

MONTHLY EVENT REPORT
MARCH, 1999

DATE, TIME- START DATE, TIME- END	DESCRIPTION	EVENT TYPE	OUTAGE DURATION HOURS	DERATE DURATION HRS	DERATE DURATION EQ HRS	CAPABILITY LOSS MW net	MAX AVAIL CAPACITY UNIT	MAX AVAIL CAPACITY STATION	TOTAL CAPACITY LOSS (MWH)
UNIT 1									
			+ 216.72						
3/1/1999 0:00 3/27/1999 22:25	U1-PLANNED OUTAGE (PO) 1999 Planned outage. LP turbines major overhaul.	Planned	646.42			830	0	830	536,526
3/27/1999 22:25 3/29/1999 6:58	U1-PLANNED DERATE (PD) Startup activites and testing following a planned outage.	Planned		32.55	20.61	525.6	304.4	1,134	17,108
3/30/1999 8:07 4/1/1999 0:00	U1 - FORCED OUTAGE(U2) Tube leak repair in SSH outlet bank.	Forced	39.88			830	0	830	33,103
TOTAL (for Unit 1)		3	686.30	32.55	20.61				586,737
UNIT 2									
3/13/1999 5:32 3/13/1999 23:10	U2-PLANNED DERATE (PD) Planned bi-pole outage. Load set by ECC.	Planned		17.63	6.48	305	525.0	1,355	5,378
3/14/1999 5:40 3/14/1999 14:12	U2-PLANNED DERATE (PD) Planned bi-pole outage. Load set by ECC.	Planned		8.53	3.14	305	525.0	1,355	2,603
3/14/1999 14:12 3/14/1999 16:45	*U2-TRIP (U1) Relay testing on Unit Protection System. Relay failure.	Forced	2.55			830	0	830	2,116
3/14/1999 16:45 3/14/1999 21:06	U2-RESERVE SHUTDOWN (RS) Unit kept off-line by ECC till bi-pole outage completed.	Reserve	4.35			830	0	830	3,611
3/21/1999 6:19 3/21/1999 9:52	U2-PLANNED DERATE (PD) Planned bi-pole outage for line patrol to replace line spacers. Load set by ECC.	Planned		3.55	1.09	255	575.0	1,405	905
TOTAL (for Unit 2)		5	6.90	29.72	10.71				14,613
TOTAL (FOR IGS)		8	693.20	62.27	31.32				601,350

* - Trips not charged against IPSC Performance Incentive Program.

INTERMOUNTAIN POWER FACILITY

MAJOR CAUSES OF MEGAWATT HOUR LOSS BY OUTAGE CLASSIFICATION

FISCAL YEAR TO DATE (7/1/99 - 06/30/00)

DESCRIPTION	START DATE	TIME DURATION EQUIV HOURS UNIT 1	TIME DURATION EQUIV HOURS UNIT 2	MW HRS LOST UNIT 1	MW HRS LOST UNIT 2
PLANNED OUTAGES					
Spring 2000 overhaul of LP turbines.	2/25/2000		850.97		706,303
Spring 2000 one week outage.	4/29/2000	182.53		151,503	
SUBTOTAL	2	182.53	850.97	151,503	706,303
MAINTENANCE OUTAGES (UNPLANNED)					
SUBTOTAL	0	0.00	0.00	0	0
FORCED OUTAGE (UNIT TRIPS)					
SSH outlet tube leak.	8/12/1999	61.25		50,225	
PSH inlet tube leak.	8/25/1999		43.40		35,588
Generator phase unbalance trip. Malfunction exciter protection.	8/28/1999		13.72		11,248
Steam leak repair on the hot reheat drain line.	9/13/1999		14.02		11,494
Low furnace press trip caused by PA Fan problems.	10/16/1999	3.60		2,988	
Manual trip for boiler protection from low PH excursion.	11/22/1999	4.78		3,970	
Low turbine lube oil pressure trip while testing S/B start function.	12/3/1999	2.13		1,771	
B-BFPT trip during emergency governor overspeed testing.	2/4/2000	1.45		1,204	
SUBTOTAL	8	73.21	71.14	60,158	58,330
RESERVE SHUTDOWN (UNIT OFFLINE)					
SUBTOTAL	0	0.00	0.00	0	0
TOTAL OFF-LINE	10	255.74	922.11	211,661	764,633

NOTES: * Trips not charged against IPSC Performance Incentive Program

INTERMOUNTAIN POWER FACILITY

MAJOR CAUSES OF MEGAWATT HOUR LOSS BY OUTAGE CLASSIFICATION

FISCAL YEAR TO DATE (7/1/99 - 06/30/00)

DESCRIPTION	START DATE	TIME DURATION EQUIV HOURS UNIT 1	UNIT 2	MW HRS LOST UNIT 1	UNIT 2
FORCED DERATES					
SAH 1A trip.	7/1/1999	0.65		535	
SAH 1A failed bearing repair.	7/29/1999	4.47		3,669	
B FD Fan PMCS trip. CPU board replaced.	8/2/1999		0.10		84
B FD Fan PMCS trip. CPU board replaced.	9/29/1999		0.08		63
B PA Fan trip. PMCS failure. Replaced CPU board.	10/8/1999	0.59		488	
A-BFPT tripped during overspeed testing. No problem found.	10/16/1999	0.35		289	
2A PA Fan trip. PMCS failure caused by water in I/O cabinet.	10/16/1999	0.32		267	
G pulv trip and 2B PA Fan vane problems.	10/16/1999	0.36		295	
2B PA Fan vane problems. Jordan amplifier replaced.	10/16/1999	0.06		53	
ID Fan trip. Load lowered due to bottom ash problems.	10/19/1999		1.30		1,080
Load reduction for mill inspections and bottom ash clinker work.	10/21/1999		5.28		4,381
#1 CV control problem on startup of unit. Servo checked out.	12/4/1999	1.17		968	
Pole #2 block. Converter Station @ Adelanto flashover.	2/16/2000	0.39	0.39	323	323
5 pulv operation due to C & D pulv tripping w/E o/s maint.	4/1/2000	0.02		20	
PMCS on PA Fan 2B. Replaced CPU card.	6/15/2000	0.26		214	
PA Fan 2A tripped PMCS trouble. Water in I/O cabinet.	6/20/2000	0.28		230	
Total Forced Derates	16	8.92	7.15	7,351	5,931

INTERMOUNTAIN POWER FACILITY

MAJOR CAUSES OF MEGAWATT HOUR LOSS BY OUTAGE CLASSIFICATION

FISCAL YEAR TO DATE (7/1/99 - 06/30/00)

DESCRIPTION	START DATE	TIME DURATION EQUIV HOURS UNIT 1	UNIT 2	MW HRS LOST UNIT 1	UNIT 2
MAINTENANCE DERATES					
A BFPT emergency governor repairs.	9/6/1999	0.35		291	
1A BFPT emergency governor lock-out repairs.	11/20/1999	0.18		150	
Unit on bid for cond tube leak on C Condenser repair.	12/18/1999	2.98		2,470	
Total Maintenance Derates	3	3.51	0.00	2,911	0
PLANNED DERATES					
U2 vibration testing & balancing following PO to release ECC.	4/1/2000	50.05	117.65		97,651
U1 turbine overspeed testing and water chemistry to release ECC.	5/6/2000	21.5		17845	
Total Planned Derates	2	21.50	117.65	17,845	97,651
TOTAL DERATES	21	33.93	124.80	28,107	103,582

NOTES: ** Derates not charged against IPSC Performance Incentive Program

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