Pacific Salmon Commission, Northern Fund Final Report

Northern Boundary Area Sockeye Genetic Stock Identification – Final Report for Northern Fund, Cooperative Agreement COOP-07-027

by

Glen T. Oliver

April 2008

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, Special Publications and the Division of Commercial Fisheries Regional Reports. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

PACIFIC SALMON COMMISSION, NORTHERN FUND FINAL REPORT

NORTHERN BOUNDARY AREA SOCKEYE SALMON GENETIC STOCK IDENTIFICATION – FINAL REPORT FOR NORTHERN FUND COOPERATIVE AGREEMENT COOP-07-027

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ABSTRACT

Matched sockeye salmon scale and tissue samples were collected from weekly catches in the 2006 and 2007 Alaska District 101 gillnet and District 104 purse seine fisheries. Stock identification analyses were performed using scale pattern and genetic stock identification analyses.

Key words: sockeye salmon, *Oncorhynchus nerka*, matched biological sampling, scale pattern analysis, genetic stock identification analysis, Southeast Alaska, Canada, Northern Boundary Area

INTRODUCTION

Provisions of the 1999 Pacific Salmon Treaty (Chapter 2) specify harvest sharing arrangements for Canadian Nass and Skeena River sockeye salmon caught in the Alaska District 101 gillnet and District 104 purse seine fisheries. The United States is allowed to harvest 13.8% of the Annual Allowable Harvest (AAH) of Nass River sockeye salmon in Alaska's District 101 gillnet fishery and 2.45% of the combined Nass and Skeena sockeye salmon AAH in the District 104 purse seine fishery. The AAH is calculated as the total return of each stock minus the lesser of the escapement goal or the actual escapement to the river.

Since 1982 the catch of Canadian Nass and Skeena sockeye stocks in Alaskan fisheries has been estimated using scale pattern analysis. However, this technique is labor intensive and time consuming, requires annual re-sampling of escapements to form an annual baseline against which unknown samples can be compared, and can only identify relatively large groups of stocks; i.e. Alaska, Nass, Skeena and Fraser River sockeye salmon. These, and other problems in accurately estimating stock-specific catches and total returns of sockeye salmon in the early years of the Pacific Salmon Treaty resulted in an extensive investigation by the bilateral Northern Boundary Technical Committee of the run reconstruction modeling process currently used. The Committee concluded that improved stock identification techniques capable of accurately estimating specific groups of stocks are needed to accurately evaluate effectiveness of and improve, if possible, existing run reconstruction methods.

Various types of genetic stock identification techniques, including mitochondrial and SNP analysis, have demonstrated accuracy in estimating the contribution of specific sockeye salmon stocks to mixed stock fisheries in Southeast Alaska and northern British Columbia. Canada Department of Fisheries and Oceans (DFO) started using mixed stock analysis (MSA) based on genetic markers as a marine stock identification tool in 2003. This method has been used for stock separation of Canadian Nass and Skeena in-river fisheries since 1996. DFO has a long-term plan to use MSA solely in their analysis.

PROJECT DELIVERABLES

Due to continuing delays in completing the SNP genetic baseline which is necessary before genetic analysis of the catches can be completed this report covers only the matched sampling portion of the project as performed by Alaska Fish and Game.

The objective of the Alaska Department of Fish and Game's portion of this project was to representatively sample a total of 6,000 matched scale-tissue samples from the District 101 gillnet and 104 purse seine fisheries, both of which are subject to Pacific Salmon Treaty harvest sharing agreements. A representative matched sample of 500 a week, over six weeks of catches, were to be collected from each fishery. The resulting total of about 6,000 scale samples would then be analyzed using scale pattern analysis (an existing ADF&G program and not funded by this project) and the contributions of Alaskan and Canadian Nass, Skeena and Fraser stock

groups estimated. The tissue samples matched to these scales would be sent to the National Marine Fisheries Service Auke Bay Lab where the SNP based genetic analysis would be used to estimate their stock of origin. A unique number assigned to each matched sample would allow comparison of scale and SNP estimates of both individual fish and cumulative weekly stock composition estimates.

In actuality a total of 8,200 matched samples were collected: 5,700 samples from 14 weeks of the District 101 gillnet fishery and another 2,500 from 8 weeks of the District 104 purse seine fishery (Tables 1 and 2). Weekly sampling goals of 500 were sometimes not achieved due to low catches or catches from different fisheries being mixed onboard tenders before being delivered to processors. Sex and mid-eye-to-fork length were recorded for all fish sampled. Scales were taken from the preferred area above the lateral line on the left side of the fish on a diagonal downward from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin.

Table 1.–Weekly matched scale-tissue samples collected and digitized for scale pattern analysis from Alaska's District 101 gillnet fishery.

Week Ending	Stat. Week	Sockeye Catch	# samples collected	# scales digitized
24-Jun-06	25	8,280	520	428
July 1, 2006	26	7,230	520	442
July 8, 2006	27	14,002	480	398
July 15, 2006	28	7,273	360	305
July 22, 2006	29	8,098	600	478
July 29, 2006	30	4,382	480	409
August 5, 2006	31	4,415	520	417
August 12, 2006	32	3,690	520	418
August 19, 2006	33	1,675	480	389
August 26, 2006	34	747	120	100
September 2, 2006	35	1,536	300	251
September 9, 2006	36	890	212	157
September 16, 2006	37	482	125	95
June 23, 2007	25	15,635	520	379
June 30, 2007	26	5,885	520	401
Total		84,220	5,757	4,639

Table 2.–Weekly matched scale-tissue samples collected and digitized for scale pattern analysis from Alaska's District 104 purse seine fishery.

Week Ending	Stat. Week	Sockeye Catch	# Samples Collected	# Scales Digitized
July 8, 2006	27	1,000	147	110
July 15, 2006	28	3,898	75	66
July 22, 2006	29	18,564	280	227
July 29, 2006	30	66,153	400	313
August 5, 2006	31	82,770	500	396
August 12, 2006	32	43,878	420	313
August 19, 2006	33	13,028	260	231
August 26, 2006	34	12,743	380	310
Total		242,034	2,462	1,966

Analytical results of the matched sample analyses can be correlated using a unique number assigned to each sample. This unique number is listed for each scale sample on the Age-Weight-Length mark-sense sampling form and that number is also on the vial containing the matching tissue sample. After the season an electronic version of these forms is produced and the age and scale digitizing results for each sample are added. Since all scales cannot be digitized, this spreadsheet, which also references digitized scale results, can be used both to identify which tissues should be analyzed and to compare both individual and pooled stock identification estimates generated by the two techniques.

The scale pattern analyses of these samples have been completed and are presented in Tables 3 and 4. By bilateral agreement the SNP tissue analysis was postponed until additional escapement baseline samples from stocks which contribute significantly to the fisheries were obtained. These additional baseline samples were collected in 2006 and 2007 and will be analyzed in the spring of 2008, after which the SNP analysis of the catches will be completed and the stock composition estimates of the two techniques compared.

Table 3.–Scale pattern analysis based estimates of sockeye salmon stock composition in the 2006 Alaska District 101 gillnet fishery.

		Catch By Age Class							Standar	90% Confidence Interval	
Dates	**Stock**	**1.2**	**1.3**	**2.2**	**2.3**	**Othe**	**Total**	**Percen**	**Error**	**Lower**	**Upper**
Week 25	**Alaska**	0	274	41	0	8	322	3.9	40.9	255	390
6/18-6/24	**Nass**	1,534	1,111	1,641	3,345	192	7,824	94.5	57.5	7,729	7,918
	Skeena	0	131	0	0	3	134	1.6	28.3	88	181
	Total	1,534	1,516	1,682	3,345	203	8,280	—	—	—	—
Week 26	**Alaska**	216	136	23	1	4	379	5.2	45.7	304	454
6/25-7/01	**Nass**	1,488	1,039	1,616	2,457	74	6,674	92.3	57.9	6,578	6,769
	Skeena	0	175	0	0	2	177	2.5	29.2	129	225
	Total	1,703	1,350	1,639	2,458	80	7,230				
Week 27	**Alaska**	205	321	0	210	7	744	5.3	81.7	609	878
7/02-7/08	**Nass**	2,978	1,404	3,333	4,651	122	12,48	89.2	149.9	12,241	12,735
	Skeena	0	672	91	0	8	770	5.5	110.5	589	952
	Total	3,184	2,396	3,423	4,861	137	14,00	—	—	—	—
Week 28	**Alaska**	414	240	128	28	16	826	11.4	58.2	730	922
7/09-7/15	**Nass**	1,153	1,053	1,509	2,146	115	5,977	82.2	86.1	5,836	6,119
	Skeena	187	274	0	0	9	470	6.5	48.1	390	549
	Total	1,754	1,567	1,637	2,175	140	7,273	—	—	—	—
Week 29	**Alaska**	565	355	71	121	9	1,121	13.8	67.3	1,010	1,232
7/16-7/22	**Nass**	1,053	1,185	1,808	2,207	52	6,305	77.9	98.0	6,143	6,466
	Skeena	162	505	0	0	6	672	8.3	58.5	576	769
	Total	1,779	2,045	1,879	2,328	67	8,098	—	—	—	—
Week 30	**Alaska**	284	107	78	0	3	472	10.8	32.5	419	526
7/23-7/29	**Nass**	404	696	566	1,091	20	2,778	63.4	72.1	2,659	2,896
	Skeena	505	570	0	49	8	1,132	25.8	57.1	1,038	1,226
	Total	1,193	1,373	644	1,140	32	4,382	—	—	—	—
Week 31	**Alaska**	594	529	121	94	3	1,341	30.4	46.3	1,265	1,418
7/30-8/05	**Nass**	298	592	543	611	5	2,049	46.4	74.0	1,927	2,171
	Skeena	334	688	0	0	2	1,025	23.2	51.4	940	1,109
	Total	1,226	1,809	664	705	10	4,415	—	—	—	—
Week 32	**Alaska**	406	414	91	148	5	1,064	28.8	36.7	1,004	1,125
8/06-8/12	**Nass**	96	339	707	571	8	1,721	46.6	68.7	1,608	1,834
	Skeena	375	523	0	1	4	905	24.5	47.2	827	982
	Total	877	1,276	799	721	17	3,690	—	—	—	—
Week 33	**Alaska**	117	149	48	60	0	374	22.3	13.8	352	397
8/13-8/19	**Nass**	142	202	197	212	0	753	44.9	27.4	708	798
	Skeena	172	361	4	11	0	548	32.7	24.4	508	588
	Total	430	713	249	283	0	1,675	—	—	—	—
Week 34	**Alaska**	9	63	10	33	0	116	15.5	7.0	104	127
8/20-8/26	**Nass**	61	167	78	219	0	526	70.5	15.1	501	551
	Skeena	3	88	0	14	0	105	14.1	11.6	86	124
	Total	74	318	89	266	0	747	—	—	—	—
Week 35	**Alaska**	165	209	87	59	2	522	34.0	15.7	496	547
8/27-9/02	**Nass**	82	144	96	217	2	541	35.2	26.9	497	585
	Skeena	149	304	0	20	2	473	30.8	22.9	436	511
	Total	396	656	183	295	6	1,536	—	—	—	—
Week 36	**Alaska**	26	158	48	79	0	312	35.0	10.7	294	329
9/03-9/09	**Nass**	0	16	50	248	0	314	35.2	25.5	271	356
	Skeena	47	198	9	11	0	265	29.8	20.2	232	298
	Total	73	372	107	338	0	890	—	—	—	—
Week 37	**Alaska**	3	112	6	53	2	176	36.5	6.5	165	187
9/10-9/16	**Nass**	19	40	14	93	2	168	34.8	13.4	146	190
	Skeena	8	124	5	0	1	138	28.7	11.1	120	157
	Total	30	276	25	146	5	482	—	—	—	—
Week 38-	**Alaska**	0	16	1	8	0	26	36.5	0.9	24	27
9/17-10/14	**Nass**	3	6	2	13	0	24	34.8	1.9	21	28
	Skeena	1	18	1	0	0	20	28.7	1.6	17	23
	Total	4	40	4	21	1	70	—	—	—	—
Season	**Alaska**	3,004	3,082	754	895	60	7,795	12.4	153	7,542	8,047
Totals	**Nass**	9,311	7,994	12,16	18,08	592	48,14	76.7	253	47,725	48,556
	Skeena	1,943	4,630	110	106	46	6,835	10.9	171	6,553	7,117
	Total	14,25	15,70	13,02	19,08	698	62,77	—	—	—	—

Table 4.–Scale pattern analysis based estimated sockeye salmon stock composition in the 2006 Alaska District 104 purse seine fishery.

		Catch By Age Class						Standard	90% Confidence Interval	
Dates	Stock Group	1.2	1.3	2.2	2.3	Other	Total	Percent	Error	Lower	Upper
Week 27	Alaska	141	98	44	53	0	336	33.6	16.9	308	364
7/02–7/08	Nass	187	114	82	103	0	487	48.7	23.5	448	526
	Skeena	124	40	13	0	0	177	17.7	18.5	147	208
	South Migrating [1]	0	0	0	0	0	0	0.0	0.0	NA	NA
	Total	452	252	139	157	0	1,000	—	—	—	—
Week 28	Alaska	191	323	49	0	0	563	14.5	82.4	428	699
7/09–7/15	Nass	804	0	179	281	0	1,265	32.4	148.9	1,020	1,510
	Skeena	1,385	213	0	5	0	1,602	41.1	110.1	1,421	1,783
	South Migrating	309	150	0	0	9	468	12.0	65.6	360	576
	Total	2,688	686	229	286	9	3,898	—	—	—	—
Week 29	Alaska	686	534	967	251	11	2,449	13.2	241.7	2,051	2,846
7/16–7/22	Nass	183	0	976	545	7	1,712	9.2	406.2	1,044	2,380
	Skeena	9,979	3,027	446	0	58	13,509	72.8	468.9	12,738	14,281
	South Migrating	855	22	0	0	17	894	4.8	228.3	518	1,270
	Total	11,704	3,583	2,388	796	93	18,564	—	—	—	—
Week 30	Alaska	5,886	3,227	2,520	125	73	11,830	17.9	809.9	10,498	13,163
7/23–7/29	Nass	13,861	0	2,318	1,931	112	18,222	27.5	1,573.0	15,634	20,809
	Skeena	22,961	10,522	453	183	211	34,330	51.9	1,399.2	32,028	36,631
	South Migrating	633	1,105	0	0	34	1,771	2.7	902.3	287	3,256
	Total	43,340	14,854	5,290	2,239	430	66,153	—	—	—	—
Week 31	Alaska	3,997	2,090	1,017	612	19	7,735	9.3	804.2	6,412	9,057
7/30–8/05	Nass	19,194	1,394	2,846	809	60	24,303	29.4	2,135.9	20,789	27,817
	Skeena	21,603	16,704	827	618	98	39,851	48.1	1,783.9	36,916	42,785
	South Migrating	10,673	0	0	2	207	10,882	13.1	1,312.5	8,723	13,041
	Total	55,466	20,188	4,690	2,041	384	82,770	—	—	—	—
Week 32	Alaska	2,416	1,516	439	0	0	4,371	10.0	419.8	3,680	5,061
8/06–8/12	Nass	2,542	517	1,243	1,035	0	5,337	12.2	1,066.3	3,583	7,091
	Skeena	10,420	9,806	0	0	0	20,225	46.1	1,048.8	18,500	21,951
	South Migrating	12,446	1,232	0	3	265	13,945	31.8	931.3	12,413	15,477
	Total	27,823	13,070	1,682	1,038	265	43,878	—	—	—	—
Week 33	Alaska	650	117	258	46	0	1,071	8.2	137.5	845	1,297
8/13–8/19	Nass	674	1,097	266	228	0	2,265	17.4	328.4	1,725	2,805
	Skeena	1,380	2,738	78	0	0	4,196	32.2	334.6	3,646	4,747
	South Migrating	4,798	593	0	1	104	5,496	42.2	337.4	4,941	6,051
	Total	7,502	4,545	602	275	104	13,028	—	—	—	—
Week 34	Alaska	599	146	274	149	0	1,168	9.2	128.7	957	1,380
8/20–8/26	Nass	1,623	0	222	466	0	2,311	18.1	255.1	1,891	2,731
	Skeena	2,387	4,268	96	173	0	6,924	54.3	322.0	6,394	7,454
	South Migrating	2,253	42	0	0	44	2,340	18.4	251.4	1,926	2,753
	Total	6,862	4,456	592	789	44	12,743	—	—	—	—
Season	Alaska	14,565	8,051	5,568	1,236	102	29,523	12.2	1,257	27,455	31,590
Totals	Nass	39,068	3,123	8,132	5,399	179	55,901	23.1	2,921	51,096	60,707
	Skeena	70,239	47,317	1,913	979	368	120,815	49.9	2,586	116,560	125,069
	South Migrating	31,965	3,143	0	7	680	35,796	14.8	1,907	32,658	38,933
	Total	155,837	61,634	15,613	7,621	1,330	242,034	—	—	—	—

[1] "South Migrating" sockeye are thought to be mostly Fraser River in origin but since the baseline used in scale analysis for this stock comes from the marine waters of Johnstone Strait there may be other southern British Columbia or Washington State stocks included.

PROJECT SCHEDULE

The District 104 purse seine fishery does not begin until the first Sunday in July so there are only samples from 2006 for that fishery. The District 101 gillnet fishery begins in mid June so samples were also taken from this period in 2007. Samples were collected from weekly catches throughout the duration of the fisheries. Prior or subsequent projects provided continuity in sampling over several years.

DISCUSSION

Progress in achieving sampling goals, sample quality control, and the quality of recordkeeping necessary to match stock composition estimates, were monitored on a daily basis by port sampling supervisors in Ketchikan and Petersburg and on a weekly basis by the regional data coordinator and project supervisor in Juneau. Representative sampling of the landed catch was assured by: 1) sampling landings in both Petersburg and Ketchikan; 2) collecting no more than 40 samples from individual fishing boat deliveries or 200 from individual tender deliveries; 3) sampling throughout the duration of each weekly opening; and 4) interviewing vessel personnel to assure that all fish onboard were caught in the targeted fishery.

All matched scale-tissue sampling goals were met or exceeded and the scales collected have been analyzed to produce stock identification estimates. However, delays in completing the genetic analysis baseline, which was not part of this project, have delayed processing of the tissue sample portion of the matched catch samples. Therefore, we are submitting this final report for Alaska Department of Fish and Game's portion of the project and the National Marine Fisheries Service Auke Bay Laboratory will submit results of the genetic analysis when these are complete.

TANGIBLE BENEFITS

Replacement of scale pattern analysis with an accurate, genetically based, stock identification technique will facilitate: 1) reduced sampling costs since the annual baseline escapement samples needed for scale analysis will no longer be needed; 2) much finer resolution of individual stocks allowing stock specific migratory routing and timing studies; 3) inseason stock identification analyses which cannot be done with scale analysis because the baseline samples required cannot be collected until early fall; 4) stock specific spawner-recruit analyses; and 5) providing managers with the ability to shift time and area openings to access surplus stocks or avoid weak stocks.

The negotiated percentage of the annual allowable harvest of Nass and Skeena sockeye that can be taken in Alaska's District 101 gillnet and 104 purse seine fisheries are based on average interception rates in these fisheries estimated by scale pattern analyses between 1985 and 1997. Having matched scale-tissue samples will allow direct comparison of the two techniques which will allow researchers to determine if any apparent changes in interception rates are real or are due to differences in estimates produced by the two techniques.

While the SNP baseline results are not complete preliminary comparisons of matched samples collected from 2004 and 2005 catches suggest that scale based and SNP based analyses produce similar stock composition estimates.

BUDGET SUMMARY

The budget allocation for both ADF&G's and NMFS's portions of this project was as follows:

Salary for ADF&G port samplers: 8 samplers x 7.5/hr/day x 22 days x $26.36/hr	$34,795
Two contract employees for ABL for DNA isolation: 2 x 40 days x 8 hrs. x $15/hr	$9,600
SNP Analysis: 6,000 samples x $12/sample	$72,000
ADF&G Overhead: $34,795 x 13%	$4,523
TOTAL	$120,918

Total direct project expenditures by Alaska Fish and Game totaled $34,641.41, All project expenditures by Alaska Fish and Game were personnel costs related to matched sample collection in Ketchikan and Petersburg plus a small amount for project supervision in Juneau. ADF&G personnel coded to this project included: 1) Vera Goudima, Petersburg port sampling; 2) Andrew Leitz, Ketchikan port sampling; 3) Debra Meusel, Ketchikan port sampling, 4) Jill Walker, Ketchikan port sampling; 4) Michael Kelley, Juneau project supervision. A detailed breakdown of project costs from the State of Alaska ETS accounting system is presented below.

Alaska Department of Fish and Game

*Audit Trail Report FY - **2007** Ledger Code - **11311269***
4/2/08

Vendor Name	Description	Invoice #	Inv Date	Trans	D Type	/Number	Acct	Amount	Verified	Rec Nu
GOUDIMA,VERA J	PP21		10/31/06	310	PAY		71000	$2,715.14	1106	2224416
HOLIDAY LEAVE ADJUSTM	NOVEMBER	112906	11/29/06	310	PAY		71975	$450.73	1106	475091
GOUDIMA,VERA J	PP20		10/15/06	310	PAY		71000	$1,922.80	1006	2222467
MEUSEL,DEBRA A	PP20		10/15/06	310	PAY		71000	$629.08	1006	2222488
GOUDIMA,VERA J	PP13		6/30/07	310	PAY		71000	$3,693.77	0707	2261975
HOLIDAY LEAVE ADJUSTM	OCTOBER	103106	10/31/06	310	PAY		71975	$677.55	1006	473779
GOUDIMA PP13	FROM 11311269 TO 113112		6/30/07	310	AJE	2038414	71970	($648.14)	070	483688
LEITZ,ANDREW J	PP19		9/30/06	310	PAY		71000	$3,255.39	1006	2220485
MEUSEL,DEBRA A	PP16 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$1,746.01	1106	473435
WALKER, JILL	PP16 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$1,217.51	1106	473437
LEITZ, ANDREW	PP16 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$2,516.42	1106	473439
KELLEY, MICHAEL	PP16 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$599.05	1106	473441
AUGUST L/H	PP16 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71975	$333.72	1106	473443
MEUSEL, DEBRA	PP17 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$2,375.62	1106	473445
MEUSEL,DEBRA A	PP19		9/30/06	310	PAY		71000	$2,878.46	1006	2220513
LEITZ, ANDREW	PP17 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$3,070.14	1106	473447
WALKER, JILL	PP17 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$2,008.91	1106	473449
MEUSEL, DEBRA	PP18 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$1,624.90	1106	473451
LEITZ, ANDREW	PP18 FROM 11110104 TO 1		8/15/06	310	AJE	1970733	71970	$2,230.63	1106	473453
SEPT L/H	FROM 11110104 TO 11311		9/27/06	310	AJE	1970733	71975	$1,185.70	1106	473455
JUNE 30	LEAVE AND HOLIDAY		7/13/07	310	PAY		71975	$158.02	0707	483632

Subtotal for Line Item 1 $34,641.41