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Proposed Thermal Marks for Brood Year 2012 Salmon in Alaska

By

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Abstract

In Alaska, mass-marking of salmon using otolith thermal marking is an effective research and management tool applicable to a variety of situations. For brood year 2012, approximately 60 million sockeye, 802 million pink salmon, 628 million chum, 9 million coho, and 7 million Chinook salmon will be marked at 23 different hatcheries using 82 thermal marks.

Introduction

In Alaska, thermal marking is used to provide information about the contribution of hatchery fish, primarily pink, chum and sockeye salmon, to commercial and cost-recovery fisheries during the summer fishing season. Because most fisheries are managed on the basis of wild stocks, fishery managers subtract the estimated hatchery catch from total catch and use that information to structure the fisheries. Hatchery operators are most interested in their own production and use thermal marking to estimate how their fish contribute to traditional fisheries and to terminal harvests. In addition, thermal marks are being used to determine the origin of juvenile and immature salmon collected during surveys in the Gulf of Alaska by the National Marine Fisheries Service and as part of the Bering Sea and Aleutian Island Salmon Investigative Study (BASIS) program.

Plan for 2012 brood year stocks

The proposed thermal marks for brood year 2012 salmon are listed in Table 1. We plan to mark approximately 60 million sockeye, 802 million pink salmon, 628 million chum, 9 million coho, and 7 million Chinook salmon at 23 different hatcheries using 82 thermal marks.

The proposed otolith plan includes scheduled changes. Some marks are on an every other year cycle, while others rotate on a three-year cycle. Thermal mark patterns are presented in both the RBr notation (Munk and Geiger 1998), as well as well as in the Uniform Hatch Code notation (Johnson et al. 2006).

References

- Johnson, W.F., R.P. Josephson, T.R. Frawley, and D.S. Oxman 2006. Revised web-based North Pacific salmon otolith mark directory. (NPAFC Doc. 971). 39p. Alaska Dept. Fish and Game, Juneau Alaska
- Munk, K.M. and Geiger, H.J. 1998. Thermal marking of otoliths: the “RBr” coding structure of thermal marks. (NPAFC Doc. 367). 19 p. Alaska Dept. of Fish and Game, Juneau Alaska.

Table 1. Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2012.

SPECIES: SOCKEYE

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK12-01	SM	2012	2013	Sockeye	Alaska	Southcentral	PWSA	Gulkana	Gulkana
AK12-02	TM	2012	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK12-03	TM	2012	2014	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK12-04	TM	2012	2014	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK12-05	TM	2012	2014	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK12-06	TM	2012	2014	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK12-07	TM	2012	2014	Sockeye	Alaska	Southcentral	PWSA	Main Bay	Main Bay
AK12-08	TM	2012	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lk
AK12-09	TM	2012	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	English Bay Lk
AK12-10	TM	2012	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	S-Tatsamenie Lk
AK12-11	TM	2012	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	S-Tahltan Lk
AK12-12	TM	2012	2014	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK12-13	TM	2012	2014	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK12-14	TM	2012	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lk
AK12-15	TM	2012	2014	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	English Bay Lk
AK12-16	TM	2012	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Shell Lake
AK12-17	TM	2012	2014	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK12-18	TM	2012	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	S-Tahltan Lk
AK12-19	TM	2012	2013	Sockeye	Alaska	Southcentral	CIAA	Trail Lakes	Hidden Lk
AK12-20	TM	2012	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	S-Tatsamenie Lk
AK12-21	TM	2012	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK12-22	TM	2012	2014	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK12-23	TM	2012	2014	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham
AK12-24	TM	2012	2013	Sockeye	Alaska	Southeast	DIPC	Snettisham	Snettisham

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	PRE-HATCH GRAPHIC	POST-HATCH GRAPHIC	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK12-01	GULKANA12	Emergent Fry	22,000,000	HS1	2:1.S1			Immersion	
AK12-02	TRAILLAKES12A	Emergent Fry	2,400,000	4,2H	1:1.4,2.2			Boiler	Up
AK12-03	MAINBAY12A	Smolt	2,380,000	2,2H3	1:1.2,2.2+3.3				
AK12-04	MAINBAY12B	Smolt	2,380,000	2,2H2,2	1:1.2,2.2+3.2,4.2				
AK12-05	MAINBAY12C	Smolt	2,380,000	2,2H5	1:1.2,2.2+3.5				
AK12-06	MAINBAY12D	Smolt	2,380,000	2,2H3,3	1:1.2,2.2+3.3,4.3				
AK12-07	MAINBAY12E	Smolt	2,380,000	2,2H4,2	1:1.2,2.2+3.4,4.2				
AK12-08	PENINSULA12SOCKEYE	Emergent Fry	3,500,000	H2,2	2:1.2,2.2			Boiler	Up
AK12-09	ENGLISH BAY12	Presmolt	150,000	2,4H	1:1.2,2.4			Boiler	Up
AK12-10	TATSAMENIE12	Emergent Fry	800,000	3,3H	1:1.3,2.3			Chiller	Down
AK12-11	TUYA12	Emergent Fry	1,200,000	4n,3H	1:1.4n,2.3			Chiller	Down
AK12-12	SPEELARM12A	Smolt	8,000,000	3,2nH	1:1.3,2.2n			Chiller	Down
AK12-13	TRAILLAKES12B	Smolt	2,000,000	3,3,2H	1:1.3,2.3,3.2			Boiler	Up
AK12-14	HIDDENLAKE12	Emergent Fry	530,000	3,2,1H	1:1.3,2.2,3.1			Boiler	Up
AK12-15	ENGLISH BAY12SMOLT	Smolt	300,000	2,3,2H	1:1.2,2.3,3.2			Boiler	Up
AK12-16	SHELLLAKE12	Fry	500,000	4,2,3H	1:1.4,2.2,3.3				
AK12-17	SPEELARM12B	Smolt	1,000,000	7H	1:1.7			Chiller	Down
AK12-18	TAHLTAN12	Emergent Fry	2,000,000	1,4H	1:1.1,2.4			Chiller	Down
AK12-19	TUTKA12	Emergent Fry	530,000	3,5H	1:1.3,2.5			Boiler	Up
AK12-20	TATSAMENIE12ER	Fingerling	200,000	3n,2H	1:1.3n,2.2			Chiller	Down
AK12-21	SWEETHEART12	Emergent Fry	500,000	2,5H	1:1.2,2.5			Chiller	Down
AK12-22	SPEELARM12C	Smolt	1,000,000	4,3nH	1:1.4,2.3n			Chiller	Down
AK12-23	SPEELARM12D	Smolt	1,000,000	5n,3H	1:1.5n,2.3				
AK12-24	KINGSALMON12	Smolt	250,000	6,2H	1:1.6,2.2				

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2012.

SPECIES: PINK

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK12-25	TM	2012	2013	Pink	Alaska	Southcentral	PWSA	A F Koernig	Armin F. Koernig
AK12-26	TM	2012	2013	Pink	Alaska	Southcentral	PWSA	A F Koernig	Armin F. Koernig
AK12-27	TM	2012	2013	Pink	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK12-28	TM	2012	2013	Pink	Alaska	Southeast	KAKE	Gunnuk Creek	Gunnuk Cr
AK12-29	TM	2012	2013	Pink	Alaska	Southeast	SJ	Sheldon Jackson	Indian R
AK12-30	TM	2012	2013	Pink	Alaska	Southeast	AKI	Port Armstrong	Port Armstrong
AK12-31	TM	2012	2013	Pink	Alaska	Southcentral	VFDA	Solomon Gulch	Solomon Gulch
AK12-32	TM	2012	2013	Pink	Alaska	Southcentral	PWSA	Cannery Creek	Cannery Cr
AK12-33	TM	2012	2013	Pink	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK12-34	TM	2012	2013	Pink	Alaska	Southcentral	CIAA	Tutka Bay Hatchery	Tutka
AK12-35	TM	2012	2013	Pink	Alaska	Southcentral	CIAA	Tutka Bay Hatchery	Port Graham
AK12-36	TM	2012	2013	Pink	Alaska	Southcentral	CIAA	Tutka Bay Hatchery	Bruin Bay

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	PRE-HATCH GRAPHIC	POST-HATCH GRAPHIC	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK12-25	AFK12A	Fed Fry	90,000,000	4H3	1:1.4+2.3				
AK12-26	AFK12B	Fed Fry	90,000,000	4H	1:1.4				
AK12-27	WNH12PINKB	Fed Fry	70,000,000	8H	1:1.8				
AK12-28	KAKE12PINK	Fed Fry	5,000,000	1,2,1H	1:1.1,2.2,3.1			Chiller	Down
AK12-29	SJ12PINK	Fed Fry	100,000	4,1H	1:1.4,2.1			Chiller	Down
AK12-30	PORTARMSTRONG12	Fed Fry	85,000,000	3H	1:1.3			Ambient & Load Bank	Up
AK12-31	SGH12	Fed Fry	200,000,000	6H	1:1.6				
AK12-32	CCH12	Fed Fry	140,000,000	3,3H	1:1.3,2.3				
AK12-33	WNH12PINKA	Fed Fry	120,000,000	8H3	1:1.8+2.3				
AK12-34	TUTKA12PINK	Fed Fry	500,000	5,3H	1:1.5,2.3				
AK12-35	PORTGRAHAM12	Fed Fry	500,000	5H3	1:1.5+2.3				
AK12-36	PAINT12	Fed Fry	500,000	5H5	1:1.5+2.5				

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2012.

SPECIES: CHUM

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK12-37	TM	2012	2013	Chum	Alaska	Southeast	SJ	Sheldon Jackson	Indian R
AK12-38	TM	2012	2013	Chum	Alaska	Southeast	KAKE	Gunnuk Creek	Gunnuk Cr
AK12-39	TM	2012	2013	Chum	Alaska	Southeast	AKI	Port Armstrong	Port Armstrong
AK12-40	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK12-41	TM	2012	2013	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK12-42	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Medvejie	Hidden Falls
AK12-43	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK12-44	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK12-45	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK12-46	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK12-47	TM	2012	2013	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK12-48	TM	2012	2013	Chum	Alaska	Southeast	DIPC	Macaulay	Macaulay
AK12-49	TM	2012	2013	Chum	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK12-50	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK12-51	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK12-52	TM	2012	2013	Chum	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK12-53	TM	2012	2013	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK12-54	TM	2012	2013	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK12-55	TM	2012	2013	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK12-56	TM	2012	2013	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK12-57	TM	2012	2013	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK12-58	TM	2012	2013	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK12-59	TM	2012	2013	Chum	Alaska	Southeast	SSRA	Neets Bay	Neets Bay
AK12-60	TM	2012	2013	Chum	Alaska	Western	NSED	Norton Sound Hatchery	Solomon R
AK12-61	TM	2012	2013	Chum	Alaska	Western	NSED	Norton Sound Hatchery	Snake R
AK12-62	TM	2012	2013	Chum	Alaska	Southeast	NSRA	17 Mi Stream Incub	Chilkat Lk
AK12-63	TM	2012	2013	Chum	Alaska	Southeast	MIC	Tamgas Creek	Carroll R
AK12-64	TM	2012	2013	Chum	Alaska	Southeast	MIC	Tamgas Creek	Carroll R

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	PRE-HATCH GRAPHIC	POST-HATCH GRAPHIC	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK12-37	SJ12CHUM	Fed Fry	100,000	4,2n,1H	1:1.4,2.2n,3.1			Heater	Up
AK12-38	KAKE12	Fed Fry	25,000,000	4H	1:1.4			Chiller	Down
AK12-39	PORTARMSTRONG12CHUM	Fed Fry	30,000,000	3H4	1:1.3+2.4			Ambient and Load Bank	Up
AK12-40	DEEPINLETMV12	Fed Fry	28,000,000	3,1,3H	1:1.3,2.1,3.3				
AK12-41	WNNH12	Fed Fry	75,000,000	4,3nH	1:1.4,2.3n				
AK12-42	DEEPINLETHF12	Fed Fry	22,000,000	3n,2,2nH	1:1.3n,2.2,3.2n			Lake Intakes	Up
AK12-43	HIDDENFALLS12	Fed Fry	33,000,000	1,2,3H	1:1.1,2.2,3.3			Lake Intakes	Up
AK12-44	HIDDENFALLS12LL	Fed Fry	9,000,000	3,3,2H	1:1.3,2.3,3.2			Lake Intakes	
AK12-45	BEARCOVE12	Fed Fry	14,000,000	4,2,1H	1:1.4,2.2,3.1			Heater	Up(5-9)
AK12-46	BEARCOVE12LL	Fed Fry	6,000,000	3n,5H	1:1.3n,2.5				
AK12-47	WNNH-AFK12	Fed Fry	15,000,000	1,4H	1:1.1,2.4				
AK12-48	DIPAC12	Fed Fry	100,000,000	1,3H	1:1.1,2.3			Boiler	Up
AK12-49	PORTCHALMERS12	Fed Fry	40,000,000	1,3n,2H	1:1.1,2.3n,3.2				
AK12-50	TAKATZ12	Fed Fry	33,000,000	5n,2H	1:1.5n,2.2			Lake Intakes	Up
AK12-51	TAKATZ12LL	Fed Fry	18,000,000	5n,4H	1:1.5n,2.4			Lake Intakes	Up
AK12-52	SECOVE12	Fed Fry	10,000,000	8H	1:1.8			Lake Intakes	
AK12-53	ANITABAY12	Fed Fry	22,000,000	1,6H	1:1.1,2.6			Boiler	Up
AK12-54	KENDRICK12	Fed Fry	2,000,000	4n,4H	1:1.4n,2.4			Boiler	Up
AK12-55	NEETSBBAY12SUM	Fed Fry	60,000,000	4,4H	1:1.4,2.4			Boiler	Up
AK12-56	NEETSBBAY12FALL	Fed Fry	20,000,000	4,2,2H	1:1.4,2.2,3.2			Boiler	Up
AK12-57	NAKATINLET12SUM	Fed Fry	8,000,000	3,1,4H	1:1.3,2.1,3.4			Boiler	Up
AK12-58	KENDRICKLL12	Fed Fry	28,000,000	5,3H	1:1.5,2.3			Boiler	Up
AK12-59	NAKATINLET12FALL	Fed Fry	8,000,000	3,4,1H	1:1.3,2.4,3.1			Boiler	Up
AK12-60	NORTON12CHUMA	Eyed Egg	140,000	1,2,2nH	1:1.1,2.2,3.2n			Moist Air	
AK12-61	NORTON12CHUMB	Eyed Egg	250,000	3n,2H	1:1.3n,2.2			Moist Air	
AK12-62	CHILKAT12	Fed Fry	1,212,003	4n,3H	1:1.4n,2.3				
AK12-63	TAMGAS12SUM	Fed Fry	10,000,000	4H3	1:1.4+2.3				
AK12-64	TAMGAS12FALL	Fed Fry	10,000,000	4,2H	1:1.4,2.2				

Table 1 (continued). Summary of thermal mark codes to be applied to Alaska hatchery salmon in brood year 2012.

SPECIES: COHO

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK12-65	TM	2012	2013	Coho	Alaska	Southcentral	PWSA	Wally Noerenberg	Wally H. Noerenberg
AK12-66	TM	2012	2013	Coho	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK12-67	TM	2012	2014	Coho	Alaska	Southcentral	CIAA	Trail Lakes	Bear Lk
AK12-68	TM	2012	2014	Coho	Alaska	Southcentral	ADFG	William Jack Hernandez	Ship Cr
AK12-69	TM	2012	2014	Coho	Alaska	Southcentral	VFDA	Solomon Gulch	Solomon Gulch
AK12-70	TM	2012	2014	Coho	Alaska	Southcentral	ADFG	William Jack Hernandez	Bear Lk
AK12-71	TM	2012	2014	Coho	Alaska	Southeast	NSRA	Medvejie	Salmon Lk
AK12-72	TM	2012	2014	Coho	Alaska	Sotheast	PWHA	Klawock	Klawock Lk
AK12-73	TM	2012	2013	Coho	Alaska	Western	NSED	Norton Sound Hatchery	Snake R

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	PRE-HATCH GRAPHIC	POST-HATCH GRAPHIC	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK12-65	WNNH12COHO	Smolt	1,000,000	3H	1:1.3				
AK12-66	TRAILLAKES12SMCOHO	Emergent Fry	555,000	4,3H	1:1.4,2.3			Boiler	Up
AK12-67	BEARLAKECOHO12	Smolt	555,000	3,2H	1:1.3,2.2				
AK12-68	COOKINLET12COHO	Smolt	800,000	1,5H	1:1.1,2.5			Boiler	Up
AK12-69	SGH12COHO	Smolt	1,500,000	6H	1:1.6				
AK12-70	RESURRECTION12COHO	Smolt	240,000	2,4H	1:1.2,2.4			Boiler	Up
AK12-71	DEEPINLET12COHO	Smolt	225,000	4H	1:1.4				
AK12-72	KLAWOCK12COHO	Smolt	4000000	4,2H	1:1.4,2.2				
AK12-73	NORTON12COHO	Eyed Egg	200,000	2,3H	1:1.2,2.3			Moist Air	

SPECIES: CHINOOK

ID#	MARK TYPE	BROOD YEAR	RELEASE YEAR	SPECIES	STATE/ PROVINCE	REGION RELEASE	AGENCY	FACILITY	STOCK
AK12-74	TM	2012	2013	Chinook	Alaska	Southcentral	CVTC	Chickaloon Village CIF	Moose Cr
AK12-75	TM	2012	2014	Chinook	Alaska	Southeast	NSRA	Hidden Falls	Hidden Falls
AK12-76	TM	2012	2014	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK12-77	TM	2012	2014	Chinook	Alaska	Southeast	SSRA	Whitman Lake	Whitman Lk
AK12-78	TM	2012	2014	Chinook	Alaska	Southeast	NSRA	Medvejie	Medvejie
AK12-79	TM	2012	2014	Chinook	Alaska	Southcentral	ADFG	William Jack Hernandez	Cook Inlet
AK12-80	TM	2012	2014	Chinook	Alaska	Southcentral	ADFG	William Jack Hernandez	Deception Cr Stock
AK12-81	TM	2012	2014	Chinook	Alaska	Southcentral	ADFG	William Jack Hernandez	Crooked Cr 221-60
AK12-82	TM	2012	2012	Chinook	Alaska	Western	NSED	Norton Sound Hatchery	Unalakleet R & Old Woman R

ID#	MARK NAME	STAGE	ESIMATED RELEASE	HATCH CODE	RBr CODE	PRE-HATCH GRAPHIC	POST-HATCH GRAPHIC	MARKING SYSTEM	TEMP SHIFT DIRECTION
AK12-74	CHICKALOON12	Eyed Egg	100,000	3,2H	1:1.3,2.2			Moist Air	
AK12-75	HIDDENFALLS12CHIN	Smolt	650,000	4,2H	1:1.4,2.2			Lake Intakes	Up
AK12-76	GREENLAKE12CHIN	Smolt	2,500,000	3,4H	1:1.3,2.4				
AK12-77	WHITMAN12CHIN	Smolt	1,475,000	1,5H	1:1.1,2.5			Boiler	Up
AK12-78	MEDVEJIE12CHIN	Smolt	550,000	2,3nH	1:1.2,2.3n				
AK12-79	COOKINLET12CHIN	Smolt	1,085,000	2,3H	1:1.2,2.3			Boiler	Up
AK12-80	PWS12CHIN	Smolt	315,000	2,4H	1:1.2,2.4			Boiler	Up
AK12-81	RESURRECTION12CHIN	Smolt	240,000	2,5H	1:1.2,2.5			Boiler	Up
AK12-82	SOUTHRIVER12	Eyed Egg	240,000	3,1H	1:1.3,2.1			Moist Air	