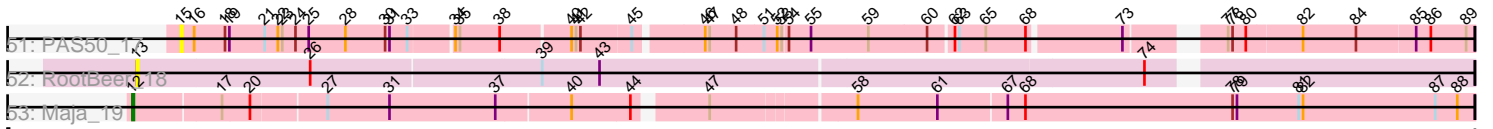




Pham 168254



Note: Tracks are now grouped by subcluster and scaled. Switching in subcluster is indicated by changes in track color. Track scale is now set by default to display the region 30 bp upstream of start 1 to 30 bp downstream of the last possible start. If this default region is judged to be packed too tightly with annotated starts, the track will be further scaled to only show that region of the ORF with annotated starts. This action will be indicated by adding "Zoomed" to the title. For starts, yellow indicates the location of called starts comprised solely of Glimmer/GeneMark auto-annotations, green indicates the location of called starts with at least 1 manual gene annotation.

## Pham 168254 Report

This analysis was run 07/09/24 on database version 566.

Pham number 168254 has 59 members, 15 are drafts.

Phages represented in each track:

- Track 1 : P107A\_17
- Track 2 : Procrass1\_17
- Track 3 : Keiki\_17, Pirate\_17
- Track 4 : Kubed\_17
- Track 5 : Attacne\_17
- Track 6 : Lauchelly\_17
- Track 7 : P106M\_17, P106L\_17, P106C\_17, P106I\_17
- Track 8 : ATCC29399BC\_17, P107C\_17
- Track 9 : Cota\_17
- Track 10 : P100.1\_17, DrParker\_17
- Track 11 : Wizzo\_17
- Track 12 : PHL071N05\_17
- Track 13 : Moyashi\_17
- Track 14 : PA6\_17
- Track 15 : PHL114L00\_17
- Track 16 : Supernova\_17
- Track 17 : P100D\_17
- Track 18 : P101A\_17
- Track 19 : Ouroboros\_17
- Track 20 : P108C\_17
- Track 21 : P1.1\_17
- Track 22 : PAD20\_17
- Track 23 : MEAK\_17
- Track 24 : Stormborn\_17
- Track 25 : PHL113M01\_17
- Track 26 : P104A\_17
- Track 27 : ATCC29399BT\_17
- Track 28 : LilBandit\_17
- Track 29 : QueenBey\_17
- Track 30 : PHL067M10\_17
- Track 31 : SKKY\_17
- Track 32 : Enochoraptor\_17
- Track 33 : Solid\_17
- Track 34 : P100A\_17
- Track 35 : Rileysaurus\_17
- Track 36 : PHL037M02\_17
- Track 37 : PHL112N00\_17

- Track 38 : P106A\_17
- Track 39 : Leviosa\_17
- Track 40 : Aquarius\_17
- Track 41 : PHL010M04\_17
- Track 42 : P9.1\_17
- Track 43 : Enoki\_17
- Track 44 : P104B\_17
- Track 45 : P105\_17
- Track 46 : BruceLethal\_17
- Track 47 : PHL060L00\_17
- Track 48 : P14.4\_17
- Track 49 : MrAK\_17
- Track 50 : PHL111M01\_17
- Track 51 : PAS50\_17
- Track 52 : RootBeer\_18
- Track 53 : Maja\_19

**Summary of Final Annotations (See graph section above for start numbers):**

The start number called the most often in the published annotations is 15, it was called in 42 of the 44 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- ATCC29399BC\_17, ATCC29399BT\_17, Aquarius\_17, Attacne\_17, BruceLethal\_17, Cota\_17, DrParker\_17, Enochoraptor\_17, Enoki\_17, Keiki\_17, Kubed\_17, Lauchelly\_17, Leviosa\_17, LilBandit\_17, MEAK\_17, Moyashi\_17, MrAK\_17, Ouroboros\_17, P100.1\_17, P100A\_17, P100D\_17, P101A\_17, P104A\_17, P104B\_17, P105\_17, P106A\_17, P106C\_17, P106I\_17, P106L\_17, P106M\_17, P107A\_17, P107C\_17, P108C\_17, P14.4\_17, P9.1\_17, PA6\_17, PAD20\_17, PAS50\_17, PHL010M04\_17, PHL037M02\_17, PHL060L00\_17, PHL067M10\_17, PHL071N05\_17, Pirate\_17, Procrass1\_17, QueenBey\_17, Rileysaurus\_17, SKKY\_17, Solid\_17, Stormborn\_17, Supernova\_17, Wizzo\_17,

Genes that have the "Most Annotated" start but do not call it:

- P1.1\_17, PHL111M01\_17, PHL112N00\_17, PHL113M01\_17, PHL114L00\_17,

Genes that do not have the "Most Annotated" start:

- Maja\_19, RootBeer\_18,

**Summary by start number:**

Start 12:

- Found in 1 of 59 ( 1.7% ) of genes in pham
- Manual Annotations of this start: 1 of 44
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Maja\_19 (FO),

Start 13:

- Found in 1 of 59 ( 1.7% ) of genes in pham
- No Manual Annotations of this start.

- Called 100.0% of time when present
- Phage (with cluster) where this start called: RootBeer\_18 (FA),

Start 14:

- Found in 23 of 59 ( 39.0% ) of genes in pham
- Manual Annotations of this start: 1 of 44
- Called 21.7% of time when present
- Phage (with cluster) where this start called: P1.1\_17 (BU), PHL111M01\_17 (BU), PHL112N00\_17 (BU), PHL113M01\_17 (BU), PHL114L00\_17 (BU),

Start 15:

- Found in 57 of 59 ( 96.6% ) of genes in pham
- Manual Annotations of this start: 42 of 44
- Called 91.2% of time when present
- Phage (with cluster) where this start called: ATCC29399BC\_17 (BU), ATCC29399BT\_17 (BU), Aquarius\_17 (BU), Attacne\_17 (BU), BruceLethal\_17 (BU), Cota\_17 (BU), DrParker\_17 (BU), Enochoraptor\_17 (BU), Enoki\_17 (BU), Keiki\_17 (BU), Kubed\_17 (BU), Lauchelly\_17 (BU), Leviosa\_17 (BU), LilBandit\_17 (BU), MEAK\_17 (BU), Moyashi\_17 (BU), MrAK\_17 (BU), Ouroboros\_17 (BU), P100.1\_17 (BU), P100A\_17 (BU), P100D\_17 (BU), P101A\_17 (BU), P104A\_17 (BU), P104B\_17 (BU), P105\_17 (BU), P106A\_17 (BU), P106C\_17 (BU), P106I\_17 (BU), P106L\_17 (BU), P106M\_17 (BU), P107A\_17 (BU), P107C\_17 (BU), P108C\_17 (BU), P14.4\_17 (BU), P9.1\_17 (BU), PA6\_17 (BU), PAD20\_17 (BU), PAS50\_17 (BU), PHL010M04\_17 (BU), PHL037M02\_17 (BU), PHL060L00\_17 (BU), PHL067M10\_17 (BU), PHL071N05\_17 (BU), Pirate\_17 (BU), Procrass1\_17 (BU), QueenBey\_17 (BU), Rileysaurus\_17 (BU), SKKY\_17 (BU), Solid\_17 (BU), Stormborn\_17 (BU), Supernova\_17 (BU), Wizzo\_17 (BU),

### Summary by clusters:

There are 3 clusters represented in this pham: BU, FO, FA,

Info for manual annotations of cluster BU:

- Start number 14 was manually annotated 1 time for cluster BU.
- Start number 15 was manually annotated 42 times for cluster BU.

Info for manual annotations of cluster FO:

- Start number 12 was manually annotated 1 time for cluster FO.

### Gene Information:

Gene: ATCC29399BC\_17 Start: 13409, Stop: 14227, Start Num: 15

Candidate Starts for ATCC29399BC\_17:

(Start: 14 @13397 has 1 MA's), (Start: 15 @13409 has 42 MA's), (16, 13418), (18, 13439), (19, 13442), (21, 13466), (23, 13478), (24, 13487), (25, 13496), (30, 13547), (31, 13550), (33, 13562), (34, 13589), (35, 13592), (38, 13619), (40, 13664), (41, 13667), (42, 13670), (45, 13703), (46, 13745), (47, 13748), (48, 13766), (50, 13781), (51, 13784), (52, 13793), (53, 13796), (54, 13799), (55, 13814), (56, 13826), (59, 13853), (60, 13892), (62, 13907), (63, 13910), (65, 13928), (68, 13955), (70, 13961), (72, 13997), (73, 14015), (77, 14066), (78, 14069), (80, 14078), (82, 14114), (84, 14150), (89, 14222),

Gene: ATCC29399BT\_17 Start: 13409, Stop: 14227, Start Num: 15

Candidate Starts for ATCC29399BT\_17:

(Start: 15 @13409 has 42 MA's), (16, 13418), (18, 13439), (19, 13442), (21, 13466), (22, 13475), (23, 13478), (24, 13487), (25, 13496), (28, 13520), (30, 13547), (31, 13550), (33, 13562), (34, 13589), (35, 13592), (38, 13619), (45, 13703), (46, 13745), (47, 13748), (48, 13766), (50, 13781), (51, 13784), (52, 13793), (53, 13796), (54, 13799), (55, 13814), (56, 13826), (59, 13853), (60, 13892), (63, 13910), (65, 13928), (68, 13955), (70, 13961), (72, 13997), (73, 14015), (77, 14066), (78, 14069), (80, 14078), (82, 14114), (84, 14150), (89, 14222),

Gene: Aquarius\_17 Start: 13432, Stop: 14250, Start Num: 15

Candidate Starts for Aquarius\_17:

(Start: 14 @13420 has 1 MA's), (Start: 15 @13432 has 42 MA's), (16, 13441), (18, 13462), (19, 13465), (21, 13489), (23, 13501), (24, 13510), (25, 13519), (30, 13570), (31, 13573), (33, 13585), (34, 13612), (35, 13615), (36, 13633), (38, 13642), (45, 13726), (46, 13768), (47, 13771), (48, 13789), (52, 13816), (53, 13819), (54, 13822), (55, 13837), (56, 13849), (57, 13864), (59, 13876), (60, 13915), (62, 13930), (63, 13933), (65, 13951), (68, 13978), (72, 14020), (73, 14038), (77, 14089), (78, 14092), (80, 14101), (82, 14137), (84, 14173), (85, 14212), (89, 14245),

Gene: Attacne\_17 Start: 13412, Stop: 14230, Start Num: 15

Candidate Starts for Attacne\_17:

(Start: 14 @13400 has 1 MA's), (Start: 15 @13412 has 42 MA's), (16, 13421), (18, 13442), (19, 13445), (21, 13469), (23, 13481), (24, 13490), (25, 13499), (30, 13550), (31, 13553), (32, 13562), (33, 13565), (34, 13592), (35, 13595), (38, 13622), (45, 13706), (46, 13748), (47, 13751), (48, 13769), (50, 13784), (51, 13787), (52, 13796), (53, 13799), (54, 13802), (55, 13817), (56, 13829), (59, 13856), (60, 13895), (62, 13910), (63, 13913), (64, 13916), (65, 13931), (70, 13964), (72, 14000), (73, 14018), (77, 14069), (78, 14072), (80, 14081), (82, 14117), (85, 14192), (89, 14225),

Gene: BruceLethal\_17 Start: 13419, Stop: 14237, Start Num: 15

Candidate Starts for BruceLethal\_17:

(Start: 15 @13419 has 42 MA's), (16, 13428), (18, 13449), (19, 13452), (21, 13476), (23, 13488), (24, 13497), (25, 13506), (30, 13557), (31, 13560), (33, 13572), (34, 13599), (35, 13602), (38, 13629), (45, 13713), (46, 13755), (47, 13758), (48, 13776), (50, 13791), (51, 13794), (53, 13806), (54, 13809), (55, 13824), (56, 13836), (59, 13863), (60, 13902), (62, 13917), (63, 13920), (64, 13923), (65, 13938), (68, 13965), (70, 13971), (72, 14007), (73, 14025), (77, 14076), (78, 14079), (80, 14088), (82, 14124), (85, 14199), (86, 14208), (89, 14232),

Gene: Cota\_17 Start: 13427, Stop: 14245, Start Num: 15

Candidate Starts for Cota\_17:

(Start: 14 @13415 has 1 MA's), (Start: 15 @13427 has 42 MA's), (16, 13436), (18, 13457), (19, 13460), (21, 13484), (23, 13496), (24, 13505), (25, 13514), (30, 13565), (31, 13568), (34, 13607), (35, 13610), (38, 13637), (45, 13721), (46, 13763), (47, 13766), (48, 13784), (50, 13799), (51, 13802), (52, 13811), (53, 13814), (54, 13817), (55, 13832), (59, 13871), (60, 13910), (62, 13925), (63, 13928), (65, 13946), (68, 13973), (69, 13976), (70, 13979), (73, 14033), (77, 14084), (78, 14087), (80, 14096), (82, 14132), (85, 14207), (88, 14234), (89, 14240),

Gene: DrParker\_17 Start: 13450, Stop: 14268, Start Num: 15

Candidate Starts for DrParker\_17:

(Start: 15 @13450 has 42 MA's), (16, 13459), (18, 13480), (19, 13483), (21, 13507), (23, 13519), (24, 13528), (25, 13537), (30, 13588), (31, 13591), (34, 13630), (35, 13633), (38, 13660), (45, 13744), (46, 13786), (47, 13789), (48, 13807), (51, 13825), (52, 13834), (53, 13837), (54, 13840), (55, 13855), (59, 13894), (60, 13933), (62, 13948), (63, 13951), (65, 13969), (68, 13996), (73, 14056), (77, 14107), (78, 14110), (80, 14119), (82, 14155), (84, 14191), (85, 14230), (89, 14263),

Gene: Enochoraptor\_17 Start: 13421, Stop: 14239, Start Num: 15

Candidate Starts for Enochoraptor\_17:

(1, 13313), (2, 13325), (5, 13358), (10, 13379), (Start: 15 @13421 has 42 MA's), (16, 13430), (18, 13451), (19, 13454), (21, 13478), (23, 13490), (24, 13499), (25, 13508), (28, 13532), (30, 13559), (31, 13562), (34, 13601), (35, 13604), (38, 13631), (45, 13715), (46, 13757), (47, 13760), (48, 13778), (53, 13808), (54, 13811), (55, 13826), (56, 13838), (60, 13904), (62, 13919), (63, 13922), (65, 13940), (68, 13967), (70, 13973), (73, 14027), (77, 14078), (78, 14081), (80, 14090), (82, 14126), (84, 14162), (85, 14201), (88, 14228), (89, 14234),

Gene: Enoki\_17 Start: 13406, Stop: 14224, Start Num: 15

Candidate Starts for Enoki\_17:

(Start: 15 @13406 has 42 MA's), (16, 13415), (18, 13436), (19, 13439), (21, 13463), (23, 13475), (24, 13484), (25, 13493), (30, 13544), (31, 13547), (34, 13586), (35, 13589), (38, 13616), (45, 13700), (46, 13742), (47, 13745), (48, 13763), (50, 13778), (51, 13781), (52, 13790), (53, 13793), (54, 13796), (55, 13811), (60, 13889), (62, 13904), (63, 13907), (65, 13925), (68, 13952), (69, 13955), (70, 13958), (73, 14012), (77, 14063), (78, 14066), (80, 14075), (82, 14111), (85, 14186), (88, 14213), (89, 14219),

Gene: Keiki\_17 Start: 13426, Stop: 14244, Start Num: 15

Candidate Starts for Keiki\_17:

(Start: 14 @13414 has 1 MA's), (Start: 15 @13426 has 42 MA's), (16, 13435), (18, 13456), (19, 13459), (21, 13483), (23, 13495), (24, 13504), (25, 13513), (30, 13564), (31, 13567), (33, 13579), (34, 13606), (35, 13609), (38, 13636), (45, 13720), (46, 13762), (47, 13765), (48, 13783), (50, 13798), (51, 13801), (52, 13810), (53, 13813), (54, 13816), (55, 13831), (57, 13858), (59, 13870), (60, 13909), (62, 13924), (63, 13927), (65, 13945), (68, 13972), (69, 13975), (70, 13978), (72, 14014), (73, 14032), (77, 14083), (78, 14086), (80, 14095), (82, 14131), (85, 14206), (89, 14239),

Gene: Kubed\_17 Start: 13415, Stop: 14233, Start Num: 15

Candidate Starts for Kubed\_17:

(Start: 15 @13415 has 42 MA's), (16, 13424), (18, 13445), (19, 13448), (21, 13472), (23, 13484), (24, 13493), (28, 13526), (29, 13538), (30, 13553), (31, 13556), (33, 13568), (34, 13595), (35, 13598), (38, 13625), (40, 13670), (41, 13673), (42, 13676), (45, 13709), (46, 13751), (47, 13754), (48, 13772), (51, 13790), (52, 13799), (53, 13802), (54, 13805), (55, 13820), (56, 13832), (57, 13847), (59, 13859), (60, 13898), (62, 13913), (63, 13916), (64, 13919), (65, 13934), (68, 13961), (70, 13967), (73, 14021), (77, 14072), (78, 14075), (80, 14084), (82, 14120), (84, 14156), (85, 14195), (89, 14228),

Gene: Lauchelly\_17 Start: 13430, Stop: 14248, Start Num: 15

Candidate Starts for Lauchelly\_17:

(Start: 15 @13430 has 42 MA's), (16, 13439), (18, 13460), (19, 13463), (21, 13487), (23, 13499), (24, 13508), (25, 13517), (30, 13568), (31, 13571), (33, 13583), (34, 13610), (35, 13613), (38, 13640), (40, 13685), (41, 13688), (42, 13691), (45, 13724), (46, 13766), (47, 13769), (48, 13787), (50, 13802), (51, 13805), (52, 13814), (53, 13817), (54, 13820), (55, 13835), (57, 13862), (59, 13874), (60, 13913), (62, 13928), (63, 13931), (65, 13949), (68, 13976), (70, 13982), (72, 14018), (73, 14036), (77, 14087), (78, 14090), (80, 14099), (82, 14135), (84, 14171), (85, 14210), (88, 14237), (89, 14243),

Gene: Leviosa\_17 Start: 13441, Stop: 14259, Start Num: 15

Candidate Starts for Leviosa\_17:

(Start: 15 @13441 has 42 MA's), (16, 13450), (18, 13471), (19, 13474), (21, 13498), (23, 13510), (24, 13519), (30, 13579), (31, 13582), (33, 13594), (34, 13621), (35, 13624), (38, 13651), (45, 13735), (46, 13777), (47, 13780), (48, 13798), (50, 13813), (51, 13816), (52, 13825), (53, 13828), (54, 13831), (55, 13846), (56, 13858), (57, 13873), (59, 13885), (60, 13924), (62, 13939), (63, 13942), (65, 13960), (72, 14029), (73, 14047), (77, 14098), (78, 14101), (80, 14110), (82, 14146), (84, 14182), (85, 14221), (86, 14230), (88, 14248), (89, 14254),

Gene: LilBandit\_17 Start: 13425, Stop: 14243, Start Num: 15

Candidate Starts for LilBandit\_17:

(Start: 14 @13413 has 1 MA's), (Start: 15 @13425 has 42 MA's), (16, 13434), (18, 13455), (19, 13458), (21, 13482), (23, 13494), (24, 13503), (25, 13512), (30, 13563), (31, 13566), (34, 13605), (35, 13608), (38, 13635), (40, 13680), (41, 13683), (42, 13686), (45, 13719), (46, 13761), (47, 13764), (48, 13782), (49, 13785), (50, 13797), (51, 13800), (52, 13809), (53, 13812), (54, 13815), (55, 13830), (56, 13842), (60, 13908), (62, 13923), (63, 13926), (64, 13929), (65, 13944), (68, 13971), (69, 13974), (70, 13977), (72, 14013), (73, 14031), (77, 14082), (78, 14085), (80, 14094), (82, 14130), (85, 14205), (88, 14232), (89, 14238),

Gene: MEAK\_17 Start: 13415, Stop: 14233, Start Num: 15

Candidate Starts for MEAK\_17:

(Start: 15 @13415 has 42 MA's), (16, 13424), (18, 13445), (19, 13448), (21, 13472), (23, 13484), (24, 13493), (25, 13502), (30, 13553), (31, 13556), (32, 13565), (33, 13568), (34, 13595), (35, 13598), (38, 13625), (45, 13709), (46, 13751), (47, 13754), (48, 13772), (52, 13799), (53, 13802), (54, 13805), (59, 13859), (60, 13898), (62, 13913), (63, 13916), (65, 13934), (68, 13961), (69, 13964), (70, 13967), (73, 14021), (77, 14072), (78, 14075), (80, 14084), (82, 14120), (85, 14195), (88, 14222), (89, 14228),

Gene: Maja\_19 Start: 15817, Stop: 16689, Start Num: 12

Candidate Starts for Maja\_19:

(Start: 12 @15817 has 1 MA's), (17, 15874), (20, 15892), (27, 15940), (31, 15982), (37, 16054), (40, 16102), (44, 16141), (47, 16183), (58, 16273), (61, 16327), (67, 16372), (68, 16384), (78, 16525), (79, 16528), (81, 16570), (82, 16573), (87, 16663), (88, 16678),

Gene: Moyashi\_17 Start: 13451, Stop: 14269, Start Num: 15

Candidate Starts for Moyashi\_17:

(Start: 15 @13451 has 42 MA's), (16, 13460), (18, 13481), (19, 13484), (21, 13508), (23, 13520), (24, 13529), (25, 13538), (28, 13562), (30, 13589), (31, 13592), (32, 13601), (33, 13604), (34, 13631), (35, 13634), (38, 13661), (45, 13745), (46, 13787), (48, 13808), (50, 13823), (51, 13826), (52, 13835), (53, 13838), (54, 13841), (55, 13856), (56, 13868), (57, 13883), (59, 13895), (60, 13934), (62, 13949), (63, 13952), (64, 13955), (65, 13970), (68, 13997), (73, 14057), (77, 14108), (78, 14111), (80, 14120), (82, 14156), (84, 14192), (85, 14231), (89, 14264),

Gene: MrAK\_17 Start: 13462, Stop: 14280, Start Num: 15

Candidate Starts for MrAK\_17:

(Start: 15 @13462 has 42 MA's), (16, 13471), (18, 13492), (19, 13495), (21, 13519), (23, 13531), (24, 13540), (30, 13600), (31, 13603), (33, 13615), (34, 13642), (35, 13645), (38, 13672), (40, 13717), (41, 13720), (42, 13723), (45, 13756), (46, 13798), (47, 13801), (48, 13819), (50, 13834), (51, 13837), (52, 13846), (53, 13849), (54, 13852), (55, 13867), (56, 13879), (57, 13894), (59, 13906), (60, 13945), (62, 13960), (63, 13963), (65, 13981), (68, 14008), (73, 14068), (77, 14119), (78, 14122), (80, 14131), (82, 14167), (84, 14203), (85, 14242), (89, 14275),

Gene: Ouroboros\_17 Start: 13416, Stop: 14234, Start Num: 15

Candidate Starts for Ouroboros\_17:

(6, 13350), (8, 13353), (11, 13371), (Start: 15 @13416 has 42 MA's), (16, 13425), (18, 13446), (19, 13449), (21, 13473), (23, 13485), (24, 13494), (30, 13554), (31, 13557), (34, 13596), (35, 13599), (38, 13626), (45, 13710), (46, 13752), (47, 13755), (48, 13773), (50, 13788), (52, 13800), (53, 13803), (54, 13806), (55, 13821), (56, 13833), (57, 13848), (59, 13860), (60, 13899), (62, 13914), (63, 13917), (65, 13935), (68, 13962), (70, 13968), (73, 14022), (77, 14073), (78, 14076), (80, 14085), (82, 14121), (85, 14196), (88, 14223), (89, 14229),

Gene: P1.1\_17 Start: 13407, Stop: 14237, Start Num: 14

Candidate Starts for P1.1\_17:



(Start: 14 @13407 has 1 MA's), (Start: 15 @13419 has 42 MA's), (16, 13428), (18, 13449), (19, 13452), (21, 13476), (23, 13488), (24, 13497), (25, 13506), (28, 13530), (30, 13557), (31, 13560), (33, 13572), (34, 13599), (35, 13602), (40, 13674), (41, 13677), (42, 13680), (45, 13713), (46, 13755), (47, 13758), (48, 13776), (51, 13794), (52, 13803), (53, 13806), (54, 13809), (55, 13824), (59, 13863), (60, 13902), (62, 13917), (63, 13920), (65, 13938), (68, 13965), (69, 13968), (70, 13971), (72, 14007), (73, 14025), (77, 14076), (78, 14079), (80, 14088), (82, 14124), (83, 14139), (84, 14160), (85, 14199), (86, 14208), (89, 14232),

Gene: P100.1\_17 Start: 13423, Stop: 14241, Start Num: 15

Candidate Starts for P100.1\_17:

(Start: 15 @13423 has 42 MA's), (16, 13432), (18, 13453), (19, 13456), (21, 13480), (23, 13492), (24, 13501), (25, 13510), (30, 13561), (31, 13564), (34, 13603), (35, 13606), (38, 13633), (45, 13717), (46, 13759), (47, 13762), (48, 13780), (51, 13798), (52, 13807), (53, 13810), (54, 13813), (55, 13828), (59, 13867), (60, 13906), (62, 13921), (63, 13924), (65, 13942), (68, 13969), (73, 14029), (77, 14080), (78, 14083), (80, 14092), (82, 14128), (84, 14164), (85, 14203), (89, 14236),

Gene: P100A\_17 Start: 13433, Stop: 14251, Start Num: 15

Candidate Starts for P100A\_17:

(Start: 14 @13421 has 1 MA's), (Start: 15 @13433 has 42 MA's), (16, 13442), (18, 13463), (19, 13466), (21, 13490), (23, 13502), (24, 13511), (25, 13520), (30, 13571), (31, 13574), (34, 13613), (35, 13616), (36, 13634), (38, 13643), (40, 13688), (41, 13691), (42, 13694), (45, 13727), (46, 13769), (47, 13772), (48, 13790), (51, 13808), (53, 13820), (54, 13823), (55, 13838), (59, 13877), (60, 13916), (62, 13931), (63, 13934), (65, 13952), (68, 13979), (70, 13985), (72, 14021), (73, 14039), (77, 14090), (78, 14093), (80, 14102), (82, 14138), (84, 14174), (85, 14213), (88, 14240), (89, 14246),

Gene: P100D\_17 Start: 13422, Stop: 14240, Start Num: 15

Candidate Starts for P100D\_17:

(Start: 14 @13410 has 1 MA's), (Start: 15 @13422 has 42 MA's), (16, 13431), (18, 13452), (19, 13455), (21, 13479), (23, 13491), (24, 13500), (25, 13509), (30, 13560), (31, 13563), (33, 13575), (34, 13602), (35, 13605), (38, 13632), (40, 13677), (41, 13680), (42, 13683), (45, 13716), (46, 13758), (47, 13761), (48, 13779), (52, 13806), (53, 13809), (54, 13812), (55, 13827), (59, 13866), (60, 13905), (62, 13920), (63, 13923), (65, 13941), (68, 13968), (72, 14010), (73, 14028), (77, 14079), (78, 14082), (80, 14091), (82, 14127), (85, 14202), (86, 14211), (89, 14235),

Gene: P101A\_17 Start: 13431, Stop: 14249, Start Num: 15

Candidate Starts for P101A\_17:

(Start: 15 @13431 has 42 MA's), (16, 13440), (18, 13461), (19, 13464), (21, 13488), (23, 13500), (24, 13509), (25, 13518), (30, 13569), (31, 13572), (34, 13611), (35, 13614), (36, 13632), (38, 13641), (45, 13725), (46, 13767), (47, 13770), (48, 13788), (51, 13806), (52, 13815), (53, 13818), (54, 13821), (55, 13836), (59, 13875), (62, 13929), (63, 13932), (64, 13935), (65, 13950), (68, 13977), (73, 14037), (77, 14088), (78, 14091), (80, 14100), (82, 14136), (84, 14172), (85, 14211), (89, 14244),

Gene: P104A\_17 Start: 13409, Stop: 14227, Start Num: 15

Candidate Starts for P104A\_17:

(Start: 14 @13397 has 1 MA's), (Start: 15 @13409 has 42 MA's), (16, 13418), (18, 13439), (19, 13442), (21, 13466), (23, 13478), (24, 13487), (25, 13496), (30, 13547), (31, 13550), (34, 13589), (35, 13592), (38, 13619), (40, 13664), (41, 13667), (42, 13670), (45, 13703), (46, 13745), (47, 13748), (48, 13766), (51, 13784), (52, 13793), (53, 13796), (54, 13799), (55, 13814), (59, 13853), (60, 13892), (62, 13907), (63, 13910), (64, 13913), (65, 13928), (68, 13955), (69, 13958), (70, 13961), (72, 13997), (73, 14015), (77, 14066), (78, 14069), (80, 14078), (82, 14114), (85, 14189), (88, 14216), (89, 14222),

Gene: P104B\_17 Start: 13428, Stop: 14246, Start Num: 15

Candidate Starts for P104B\_17:

(Start: 14 @13416 has 1 MA's), (Start: 15 @13428 has 42 MA's), (16, 13437), (18, 13458), (19, 13461), (21, 13485), (23, 13497), (24, 13506), (25, 13515), (30, 13566), (31, 13569), (33, 13581), (34, 13608), (35, 13611), (38, 13638), (45, 13722), (46, 13764), (47, 13767), (48, 13785), (51, 13803), (52, 13812), (53, 13815), (54, 13818), (55, 13833), (56, 13845), (57, 13860), (60, 13911), (62, 13926), (63, 13929), (65, 13947), (68, 13974), (69, 13977), (70, 13980), (72, 14016), (73, 14034), (77, 14085), (78, 14088), (80, 14097), (82, 14133), (83, 14148), (84, 14169), (85, 14208), (86, 14217), (89, 14241),

Gene: P105\_17 Start: 13332, Stop: 14150, Start Num: 15

Candidate Starts for P105\_17:

(Start: 15 @13332 has 42 MA's), (16, 13341), (18, 13362), (19, 13365), (21, 13389), (23, 13401), (24, 13410), (25, 13419), (30, 13470), (31, 13473), (33, 13485), (34, 13512), (35, 13515), (37, 13539), (38, 13542), (40, 13587), (41, 13590), (42, 13593), (45, 13626), (46, 13668), (47, 13671), (48, 13689), (52, 13716), (53, 13719), (54, 13722), (55, 13737), (60, 13815), (62, 13830), (63, 13833), (64, 13836), (65, 13851), (68, 13878), (69, 13881), (70, 13884), (73, 13938), (76, 13986), (77, 13989), (78, 13992), (80, 14001), (82, 14037), (84, 14073), (85, 14112), (86, 14121), (89, 14145),

Gene: P106A\_17 Start: 13456, Stop: 14274, Start Num: 15

Candidate Starts for P106A\_17:

(2, 13357), (5, 13390), (7, 13393), (10, 13411), (Start: 15 @13456 has 42 MA's), (16, 13465), (18, 13486), (19, 13489), (21, 13513), (23, 13525), (24, 13534), (25, 13543), (30, 13594), (31, 13597), (33, 13609), (34, 13636), (35, 13639), (38, 13666), (45, 13750), (46, 13792), (47, 13795), (48, 13813), (51, 13831), (52, 13840), (53, 13843), (54, 13846), (55, 13861), (59, 13900), (60, 13939), (62, 13954), (63, 13957), (65, 13975), (68, 14002), (73, 14062), (77, 14113), (78, 14116), (80, 14125), (82, 14161), (84, 14197), (85, 14236), (89, 14269),

Gene: P106C\_17 Start: 13456, Stop: 14274, Start Num: 15

Candidate Starts for P106C\_17:

(1, 13345), (2, 13357), (5, 13390), (10, 13411), (Start: 15 @13456 has 42 MA's), (16, 13465), (18, 13486), (19, 13489), (21, 13513), (23, 13525), (24, 13534), (25, 13543), (28, 13567), (30, 13594), (31, 13597), (34, 13636), (35, 13639), (38, 13666), (40, 13711), (41, 13714), (42, 13717), (45, 13750), (46, 13792), (47, 13795), (48, 13813), (51, 13831), (52, 13840), (53, 13843), (54, 13846), (55, 13861), (60, 13939), (62, 13954), (63, 13957), (65, 13975), (68, 14002), (69, 14005), (70, 14008), (72, 14044), (73, 14062), (77, 14113), (78, 14116), (80, 14125), (82, 14161), (85, 14236), (89, 14269),

Gene: P106I\_17 Start: 13456, Stop: 14274, Start Num: 15

Candidate Starts for P106I\_17:

(1, 13345), (2, 13357), (5, 13390), (10, 13411), (Start: 15 @13456 has 42 MA's), (16, 13465), (18, 13486), (19, 13489), (21, 13513), (23, 13525), (24, 13534), (25, 13543), (28, 13567), (30, 13594), (31, 13597), (34, 13636), (35, 13639), (38, 13666), (40, 13711), (41, 13714), (42, 13717), (45, 13750), (46, 13792), (47, 13795), (48, 13813), (51, 13831), (52, 13840), (53, 13843), (54, 13846), (55, 13861), (60, 13939), (62, 13954), (63, 13957), (65, 13975), (68, 14002), (69, 14005), (70, 14008), (72, 14044), (73, 14062), (77, 14113), (78, 14116), (80, 14125), (82, 14161), (85, 14236), (89, 14269),

Gene: P106L\_17 Start: 13456, Stop: 14274, Start Num: 15

Candidate Starts for P106L\_17:

(1, 13345), (2, 13357), (5, 13390), (10, 13411), (Start: 15 @13456 has 42 MA's), (16, 13465), (18, 13486), (19, 13489), (21, 13513), (23, 13525), (24, 13534), (25, 13543), (28, 13567), (30, 13594), (31, 13597), (34, 13636), (35, 13639), (38, 13666), (40, 13711), (41, 13714), (42, 13717), (45, 13750), (46, 13792), (47, 13795), (48, 13813), (51, 13831), (52, 13840), (53, 13843), (54, 13846), (55, 13861), (60, 13939), (62, 13954), (63, 13957), (65, 13975), (68, 14002), (69, 14005), (70, 14008), (72, 14044), (73, 14062), (77, 14113), (78, 14116), (80, 14125), (82, 14161), (85, 14236), (89, 14269),

Gene: P106M\_17 Start: 13456, Stop: 14274, Start Num: 15

Candidate Starts for P106M\_17:

(1, 13345), (2, 13357), (5, 13390), (10, 13411), (Start: 15 @13456 has 42 MA's), (16, 13465), (18, 13486), (19, 13489), (21, 13513), (23, 13525), (24, 13534), (25, 13543), (28, 13567), (30, 13594), (31, 13597), (34, 13636), (35, 13639), (38, 13666), (40, 13711), (41, 13714), (42, 13717), (45, 13750), (46, 13792), (47, 13795), (48, 13813), (51, 13831), (52, 13840), (53, 13843), (54, 13846), (55, 13861), (60, 13939), (62, 13954), (63, 13957), (65, 13975), (68, 14002), (69, 14005), (70, 14008), (72, 14044), (73, 14062), (77, 14113), (78, 14116), (80, 14125), (82, 14161), (85, 14236), (89, 14269),

Gene: P107A\_17 Start: 13430, Stop: 14248, Start Num: 15

Candidate Starts for P107A\_17:

(Start: 14 @13418 has 1 MA's), (Start: 15 @13430 has 42 MA's), (16, 13439), (18, 13460), (19, 13463), (21, 13487), (23, 13499), (24, 13508), (25, 13517), (30, 13568), (31, 13571), (34, 13610), (35, 13613), (38, 13640), (40, 13685), (41, 13688), (45, 13724), (46, 13766), (47, 13769), (48, 13787), (52, 13814), (53, 13817), (54, 13820), (55, 13835), (56, 13847), (59, 13874), (60, 13913), (62, 13928), (63, 13931), (65, 13949), (68, 13976), (69, 13979), (70, 13982), (72, 14018), (73, 14036), (77, 14087), (78, 14090), (80, 14099), (82, 14135), (85, 14210), (88, 14237), (89, 14243),

Gene: P107C\_17 Start: 13409, Stop: 14227, Start Num: 15

Candidate Starts for P107C\_17:

(Start: 14 @13397 has 1 MA's), (Start: 15 @13409 has 42 MA's), (16, 13418), (18, 13439), (19, 13442), (21, 13466), (23, 13478), (24, 13487), (25, 13496), (30, 13547), (31, 13550), (33, 13562), (34, 13589), (35, 13592), (38, 13619), (40, 13664), (41, 13667), (42, 13670), (45, 13703), (46, 13745), (47, 13748), (48, 13766), (50, 13781), (51, 13784), (52, 13793), (53, 13796), (54, 13799), (55, 13814), (56, 13826), (59, 13853), (60, 13892), (62, 13907), (63, 13910), (65, 13928), (68, 13955), (70, 13961), (72, 13997), (73, 14015), (77, 14066), (78, 14069), (80, 14078), (82, 14114), (84, 14150), (89, 14222),

Gene: P108C\_17 Start: 13417, Stop: 14235, Start Num: 15

Candidate Starts for P108C\_17:

(2, 13318), (5, 13351), (10, 13372), (Start: 15 @13417 has 42 MA's), (16, 13426), (18, 13447), (19, 13450), (21, 13474), (23, 13486), (24, 13495), (25, 13504), (30, 13555), (31, 13558), (34, 13597), (35, 13600), (38, 13627), (45, 13711), (46, 13753), (47, 13756), (48, 13774), (51, 13792), (52, 13801), (53, 13804), (54, 13807), (55, 13822), (60, 13900), (62, 13915), (63, 13918), (64, 13921), (65, 13936), (68, 13963), (69, 13966), (70, 13969), (71, 13981), (73, 14023), (77, 14074), (78, 14077), (80, 14086), (82, 14122), (84, 14158), (85, 14197), (89, 14230),

Gene: P14.4\_17 Start: 13421, Stop: 14239, Start Num: 15

Candidate Starts for P14.4\_17:

(Start: 15 @13421 has 42 MA's), (16, 13430), (18, 13451), (19, 13454), (21, 13478), (23, 13490), (24, 13499), (25, 13508), (30, 13559), (31, 13562), (34, 13601), (35, 13604), (38, 13631), (40, 13676), (41, 13679), (42, 13682), (45, 13715), (46, 13757), (47, 13760), (48, 13778), (50, 13793), (51, 13796), (52, 13805), (53, 13808), (54, 13811), (55, 13826), (57, 13853), (59, 13865), (60, 13904), (62, 13919), (63, 13922), (64, 13925), (65, 13940), (68, 13967), (69, 13970), (70, 13973), (72, 14009), (73, 14027), (77, 14078), (78, 14081), (80, 14090), (82, 14126), (85, 14201), (89, 14234),

Gene: P9.1\_17 Start: 13416, Stop: 14234, Start Num: 15

Candidate Starts for P9.1\_17:

(Start: 15 @13416 has 42 MA's), (16, 13425), (18, 13446), (19, 13449), (21, 13473), (23, 13485), (24, 13494), (25, 13503), (30, 13554), (31, 13557), (33, 13569), (34, 13596), (35, 13599), (38, 13626), (40, 13671), (41, 13674), (45, 13710), (46, 13752), (47, 13755), (48, 13773), (50, 13788), (51, 13791), (52, 13800), (53, 13803), (54, 13806), (55, 13821), (59, 13860), (60, 13899), (62, 13914), (63, 13917), (64, 13920), (65, 13935), (68, 13962), (69, 13965), (70, 13968), (72, 14004), (73, 14022), (77, 14073), (78, 14076), (80, 14085), (82, 14121), (85, 14196), (89, 14229),

Gene: PA6\_17 Start: 13444, Stop: 14262, Start Num: 15

Candidate Starts for PA6\_17:

(Start: 15 @13444 has 42 MA's), (16, 13453), (18, 13474), (19, 13477), (21, 13501), (23, 13513), (24, 13522), (25, 13531), (30, 13582), (31, 13585), (34, 13624), (35, 13627), (38, 13654), (45, 13738), (46, 13780), (47, 13783), (48, 13801), (50, 13816), (51, 13819), (52, 13828), (53, 13831), (54, 13834), (55, 13849), (59, 13888), (60, 13927), (62, 13942), (63, 13945), (64, 13948), (65, 13963), (66, 13966), (68, 13990), (70, 13996), (72, 14032), (73, 14050), (77, 14101), (78, 14104), (80, 14113), (82, 14149), (83, 14164), (84, 14185), (85, 14224), (86, 14233), (89, 14257),

Gene: PAD20\_17 Start: 13413, Stop: 14231, Start Num: 15

Candidate Starts for PAD20\_17:

(Start: 14 @13401 has 1 MA's), (Start: 15 @13413 has 42 MA's), (16, 13422), (18, 13443), (19, 13446), (21, 13470), (23, 13482), (24, 13491), (25, 13500), (30, 13551), (31, 13554), (34, 13593), (35, 13596), (38, 13623), (40, 13668), (41, 13671), (42, 13674), (45, 13707), (46, 13749), (47, 13752), (48, 13770), (50, 13785), (51, 13788), (52, 13797), (53, 13800), (54, 13803), (55, 13818), (56, 13830), (60, 13896), (62, 13911), (63, 13914), (65, 13932), (68, 13959), (73, 14019), (75, 14061), (77, 14070), (78, 14073), (80, 14082), (82, 14118), (84, 14154), (86, 14202), (89, 14226),

Gene: PAS50\_17 Start: 13421, Stop: 14239, Start Num: 15

Candidate Starts for PAS50\_17:

(Start: 15 @13421 has 42 MA's), (16, 13430), (18, 13451), (19, 13454), (21, 13478), (22, 13487), (23, 13490), (24, 13499), (25, 13508), (28, 13532), (30, 13559), (31, 13562), (33, 13574), (34, 13601), (35, 13604), (38, 13631), (40, 13676), (41, 13679), (42, 13682), (45, 13715), (46, 13757), (47, 13760), (48, 13778), (51, 13796), (52, 13805), (53, 13808), (54, 13811), (55, 13826), (59, 13865), (60, 13904), (62, 13919), (63, 13922), (65, 13940), (68, 13967), (73, 14027), (77, 14078), (78, 14081), (80, 14090), (82, 14126), (84, 14162), (85, 14201), (86, 14210), (89, 14234),

Gene: PHL010M04\_17 Start: 13417, Stop: 14235, Start Num: 15

Candidate Starts for PHL010M04\_17:

(Start: 15 @13417 has 42 MA's), (16, 13426), (18, 13447), (19, 13450), (21, 13474), (23, 13486), (24, 13495), (30, 13555), (31, 13558), (33, 13570), (34, 13597), (35, 13600), (36, 13618), (38, 13627), (40, 13672), (41, 13675), (42, 13678), (45, 13711), (46, 13753), (47, 13756), (48, 13774), (50, 13789), (51, 13792), (52, 13801), (53, 13804), (54, 13807), (55, 13822), (56, 13834), (57, 13849), (59, 13861), (60, 13900), (62, 13915), (63, 13918), (65, 13936), (68, 13963), (69, 13966), (70, 13969), (72, 14005), (73, 14023), (77, 14074), (78, 14077), (80, 14086), (82, 14122), (84, 14158), (85, 14197), (88, 14224), (89, 14230),

Gene: PHL037M02\_17 Start: 13423, Stop: 14241, Start Num: 15

Candidate Starts for PHL037M02\_17:

(1, 13315), (2, 13327), (5, 13360), (10, 13381), (Start: 15 @13423 has 42 MA's), (16, 13432), (18, 13453), (19, 13456), (21, 13480), (23, 13492), (24, 13501), (28, 13534), (30, 13561), (31, 13564), (33, 13576), (34, 13603), (35, 13606), (38, 13633), (40, 13678), (41, 13681), (42, 13684), (45, 13717), (46, 13759), (47, 13762), (48, 13780), (50, 13795), (51, 13798), (52, 13807), (53, 13810), (54, 13813), (55, 13828), (56, 13840), (57, 13855), (60, 13906), (62, 13921), (63, 13924), (65, 13942), (68, 13969), (69, 13972), (70, 13975), (72, 14011), (73, 14029), (77, 14080), (78, 14083), (80, 14092), (82, 14128), (83, 14143), (84, 14164), (85, 14203), (89, 14236),

Gene: PHL060L00\_17 Start: 13431, Stop: 14249, Start Num: 15

Candidate Starts for PHL060L00\_17:

(Start: 15 @13431 has 42 MA's), (16, 13440), (18, 13461), (19, 13464), (21, 13488), (23, 13500), (24, 13509), (25, 13518), (30, 13569), (31, 13572), (34, 13611), (35, 13614), (38, 13641), (45, 13725), (46, 13767), (47, 13770), (48, 13788), (52, 13815), (53, 13818), (54, 13821), (55, 13836), (59, 13875), (60, 13914), (62, 13929), (63, 13932), (65, 13950), (68, 13977), (69, 13980), (70, 13983), (72, 14019), (73,

14037), (77, 14088), (78, 14091), (80, 14100), (82, 14136), (83, 14151), (84, 14172), (85, 14211), (86, 14220), (89, 14244),

Gene: PHL067M10\_17 Start: 13395, Stop: 14213, Start Num: 15

Candidate Starts for PHL067M10\_17:

(Start: 15 @13395 has 42 MA's), (16, 13404), (18, 13425), (19, 13428), (21, 13452), (23, 13464), (24, 13473), (30, 13533), (31, 13536), (34, 13575), (35, 13578), (38, 13605), (45, 13689), (46, 13731), (47, 13734), (48, 13752), (52, 13779), (53, 13782), (54, 13785), (55, 13800), (59, 13839), (60, 13878), (62, 13893), (63, 13896), (65, 13914), (70, 13947), (72, 13983), (77, 14052), (78, 14055), (80, 14064), (82, 14100), (84, 14136), (86, 14184), (89, 14208),

Gene: PHL071N05\_17 Start: 13420, Stop: 14238, Start Num: 15

Candidate Starts for PHL071N05\_17:

(1, 13312), (2, 13324), (5, 13357), (10, 13378), (Start: 15 @13420 has 42 MA's), (16, 13429), (18, 13450), (19, 13453), (21, 13477), (23, 13489), (24, 13498), (28, 13531), (30, 13558), (31, 13561), (34, 13600), (35, 13603), (38, 13630), (40, 13675), (41, 13678), (42, 13681), (45, 13714), (46, 13756), (47, 13759), (48, 13777), (50, 13792), (51, 13795), (52, 13804), (53, 13807), (54, 13810), (55, 13825), (56, 13837), (57, 13852), (60, 13903), (62, 13918), (63, 13921), (65, 13939), (68, 13966), (69, 13969), (70, 13972), (72, 14008), (73, 14026), (77, 14077), (78, 14080), (80, 14089), (82, 14125), (83, 14140), (84, 14161), (85, 14200), (89, 14233),

Gene: PHL111M01\_17 Start: 13406, Stop: 14236, Start Num: 14

Candidate Starts for PHL111M01\_17:

(Start: 14 @13406 has 1 MA's), (Start: 15 @13418 has 42 MA's), (16, 13427), (18, 13448), (19, 13451), (21, 13475), (23, 13487), (24, 13496), (25, 13505), (30, 13556), (31, 13559), (34, 13598), (35, 13601), (38, 13628), (45, 13712), (46, 13754), (47, 13757), (48, 13775), (50, 13790), (52, 13802), (53, 13805), (54, 13808), (55, 13823), (57, 13850), (59, 13862), (60, 13901), (62, 13916), (63, 13919), (65, 13937), (68, 13964), (72, 14006), (73, 14024), (77, 14075), (78, 14078), (80, 14087), (82, 14123), (85, 14198), (89, 14231),

Gene: PHL112N00\_17 Start: 13404, Stop: 14234, Start Num: 14

Candidate Starts for PHL112N00\_17:

(Start: 14 @13404 has 1 MA's), (Start: 15 @13416 has 42 MA's), (16, 13425), (18, 13446), (19, 13449), (21, 13473), (23, 13485), (24, 13494), (30, 13554), (31, 13557), (34, 13596), (35, 13599), (38, 13626), (40, 13671), (41, 13674), (42, 13677), (45, 13710), (46, 13752), (47, 13755), (48, 13773), (51, 13791), (52, 13800), (53, 13803), (54, 13806), (55, 13821), (56, 13833), (60, 13899), (62, 13914), (63, 13917), (64, 13920), (65, 13935), (68, 13962), (70, 13968), (72, 14004), (73, 14022), (77, 14073), (78, 14076), (80, 14085), (82, 14121), (85, 14196), (88, 14223), (89, 14229),

Gene: PHL113M01\_17 Start: 13425, Stop: 14255, Start Num: 14

Candidate Starts for PHL113M01\_17:

(Start: 14 @13425 has 1 MA's), (Start: 15 @13437 has 42 MA's), (16, 13446), (18, 13467), (19, 13470), (21, 13494), (23, 13506), (24, 13515), (30, 13575), (31, 13578), (33, 13590), (34, 13617), (35, 13620), (38, 13647), (40, 13692), (41, 13695), (42, 13698), (45, 13731), (46, 13773), (47, 13776), (48, 13794), (50, 13809), (51, 13812), (52, 13821), (53, 13824), (54, 13827), (55, 13842), (56, 13854), (60, 13920), (62, 13935), (63, 13938), (65, 13956), (68, 13983), (69, 13986), (70, 13989), (72, 14025), (73, 14043), (76, 14091), (77, 14094), (78, 14097), (80, 14106), (82, 14142), (84, 14178), (85, 14217), (89, 14250),

Gene: PHL114L00\_17 Start: 13406, Stop: 14236, Start Num: 14

Candidate Starts for PHL114L00\_17:

(Start: 14 @13406 has 1 MA's), (Start: 15 @13418 has 42 MA's), (16, 13427), (18, 13448), (19, 13451), (21, 13475), (23, 13487), (24, 13496), (25, 13505), (28, 13529), (30, 13556), (31, 13559), (34,

13598), (35, 13601), (38, 13628), (40, 13673), (45, 13712), (46, 13754), (47, 13757), (48, 13775), (51, 13793), (52, 13802), (53, 13805), (54, 13808), (55, 13823), (56, 13835), (59, 13862), (60, 13901), (62, 13916), (63, 13919), (65, 13937), (68, 13964), (70, 13970), (72, 14006), (73, 14024), (77, 14075), (78, 14078), (80, 14087), (82, 14123), (84, 14159), (85, 14198), (89, 14231),

Gene: Pirate\_17 Start: 13411, Stop: 14229, Start Num: 15

Candidate Starts for Pirate\_17:

(Start: 14 @13399 has 1 MA's), (Start: 15 @13411 has 42 MA's), (16, 13420), (18, 13441), (19, 13444), (21, 13468), (23, 13480), (24, 13489), (25, 13498), (30, 13549), (31, 13552), (33, 13564), (34, 13591), (35, 13594), (38, 13621), (45, 13705), (46, 13747), (47, 13750), (48, 13768), (50, 13783), (51, 13786), (52, 13795), (53, 13798), (54, 13801), (55, 13816), (57, 13843), (59, 13855), (60, 13894), (62, 13909), (63, 13912), (65, 13930), (68, 13957), (69, 13960), (70, 13963), (72, 13999), (73, 14017), (77, 14068), (78, 14071), (80, 14080), (82, 14116), (85, 14191), (89, 14224),

Gene: Procrass1\_17 Start: 13418, Stop: 14236, Start Num: 15

Candidate Starts for Procrass1\_17:

(Start: 15 @13418 has 42 MA's), (16, 13427), (18, 13448), (19, 13451), (21, 13475), (23, 13487), (24, 13496), (25, 13505), (30, 13556), (31, 13559), (35, 13601), (38, 13628), (40, 13673), (41, 13676), (42, 13679), (45, 13712), (46, 13754), (47, 13757), (48, 13775), (50, 13790), (52, 13802), (53, 13805), (54, 13808), (55, 13823), (60, 13901), (62, 13916), (63, 13919), (65, 13937), (68, 13964), (69, 13967), (70, 13970), (72, 14006), (73, 14024), (75, 14066), (77, 14075), (78, 14078), (80, 14087), (82, 14123), (84, 14159), (85, 14198), (89, 14231),

Gene: QueenBey\_17 Start: 13418, Stop: 14236, Start Num: 15

Candidate Starts for QueenBey\_17:

(Start: 15 @13418 has 42 MA's), (16, 13427), (18, 13448), (19, 13451), (21, 13475), (23, 13487), (24, 13496), (28, 13529), (30, 13556), (31, 13559), (33, 13571), (34, 13598), (35, 13601), (38, 13628), (40, 13673), (45, 13712), (46, 13754), (47, 13757), (48, 13775), (50, 13790), (51, 13793), (52, 13802), (53, 13805), (54, 13808), (55, 13823), (56, 13835), (57, 13850), (59, 13862), (60, 13901), (62, 13916), (63, 13919), (65, 13937), (68, 13964), (70, 13970), (72, 14006), (73, 14024), (77, 14075), (78, 14078), (80, 14087), (82, 14123), (84, 14159), (85, 14198), (88, 14225), (89, 14231),

Gene: Rileysaurus\_17 Start: 13415, Stop: 14233, Start Num: 15

Candidate Starts for Rileysaurus\_17:

(Start: 14 @13403 has 1 MA's), (Start: 15 @13415 has 42 MA's), (16, 13424), (18, 13445), (19, 13448), (21, 13472), (23, 13484), (24, 13493), (25, 13502), (30, 13553), (31, 13556), (33, 13568), (34, 13595), (35, 13598), (38, 13625), (45, 13709), (46, 13751), (47, 13754), (48, 13772), (50, 13787), (51, 13790), (53, 13802), (54, 13805), (55, 13820), (59, 13859), (60, 13898), (62, 13913), (63, 13916), (65, 13934), (70, 13967), (72, 14003), (73, 14021), (77, 14072), (78, 14075), (80, 14084), (82, 14120), (85, 14195), (88, 14222), (89, 14228),

Gene: RootBeer\_18 Start: 15296, Stop: 16174, Start Num: 13

Candidate Starts for RootBeer\_18:

(13, 15296), (26, 15413), (39, 15566), (43, 15605), (74, 15968),

Gene: SKKY\_17 Start: 13456, Stop: 14274, Start Num: 15

Candidate Starts for SKKY\_17:

(Start: 15 @13456 has 42 MA's), (16, 13465), (18, 13486), (19, 13489), (21, 13513), (23, 13525), (24, 13534), (25, 13543), (30, 13594), (31, 13597), (34, 13636), (35, 13639), (38, 13666), (45, 13750), (46, 13792), (48, 13813), (50, 13828), (51, 13831), (52, 13840), (53, 13843), (54, 13846), (55, 13861), (56, 13873), (57, 13888), (59, 13900), (60, 13939), (62, 13954), (63, 13957), (65, 13975), (68, 14002), (69, 14005), (70, 14008), (73, 14062), (76, 14110), (77, 14113), (78, 14116), (80, 14125), (82, 14161), (84, 14197), (85, 14236), (86, 14245), (89, 14269),

Gene: Solid\_17 Start: 13409, Stop: 14227, Start Num: 15

Candidate Starts for Solid\_17:

(Start: 14 @13397 has 1 MA's), (Start: 15 @13409 has 42 MA's), (16, 13418), (18, 13439), (19, 13442), (21, 13466), (23, 13478), (24, 13487), (25, 13496), (30, 13547), (31, 13550), (34, 13589), (35, 13592), (38, 13619), (40, 13664), (41, 13667), (42, 13670), (45, 13703), (46, 13745), (47, 13748), (48, 13766), (50, 13781), (52, 13793), (53, 13796), (54, 13799), (55, 13814), (59, 13853), (60, 13892), (62, 13907), (63, 13910), (65, 13928), (68, 13955), (69, 13958), (70, 13961), (73, 14015), (77, 14066), (78, 14069), (80, 14078), (82, 14114), (85, 14189), (89, 14222),

Gene: Stormborn\_17 Start: 13437, Stop: 14255, Start Num: 15

Candidate Starts for Stormborn\_17:

(3, 13365), (4, 13368), (9, 13386), (Start: 14 @13425 has 1 MA's), (Start: 15 @13437 has 42 MA's), (16, 13446), (18, 13467), (19, 13470), (21, 13494), (23, 13506), (24, 13515), (25, 13524), (30, 13575), (31, 13578), (34, 13617), (35, 13620), (36, 13638), (38, 13647), (40, 13692), (41, 13695), (45, 13731), (46, 13773), (47, 13776), (48, 13794), (50, 13809), (51, 13812), (52, 13821), (53, 13824), (54, 13827), (55, 13842), (59, 13881), (60, 13920), (62, 13935), (63, 13938), (65, 13956), (68, 13983), (69, 13986), (70, 13989), (73, 14043), (78, 14097), (80, 14106), (82, 14142), (84, 14178), (85, 14217), (89, 14250),

Gene: Supernova\_17 Start: 13428, Stop: 14246, Start Num: 15

Candidate Starts for Supernova\_17:

(Start: 15 @13428 has 42 MA's), (16, 13437), (18, 13458), (19, 13461), (21, 13485), (23, 13497), (24, 13506), (25, 13515), (30, 13566), (31, 13569), (33, 13581), (34, 13608), (35, 13611), (38, 13638), (45, 13722), (46, 13764), (47, 13767), (48, 13785), (52, 13812), (53, 13815), (54, 13818), (55, 13833), (59, 13872), (60, 13911), (62, 13926), (63, 13929), (65, 13947), (66, 13950), (68, 13974), (69, 13977), (70, 13980), (73, 14034), (77, 14085), (78, 14088), (80, 14097), (85, 14208), (89, 14241),

Gene: Wizzo\_17 Start: 13442, Stop: 14260, Start Num: 15

Candidate Starts for Wizzo\_17:

(Start: 14 @13430 has 1 MA's), (Start: 15 @13442 has 42 MA's), (16, 13451), (18, 13472), (19, 13475), (21, 13499), (23, 13511), (24, 13520), (25, 13529), (30, 13580), (31, 13583), (33, 13595), (34, 13622), (35, 13625), (38, 13652), (40, 13697), (41, 13700), (42, 13703), (45, 13736), (46, 13778), (47, 13781), (48, 13799), (50, 13814), (51, 13817), (52, 13826), (53, 13829), (54, 13832), (55, 13847), (56, 13859), (57, 13874), (59, 13886), (60, 13925), (62, 13940), (63, 13943), (64, 13946), (65, 13961), (68, 13988), (72, 14030), (73, 14048), (77, 14099), (78, 14102), (80, 14111), (82, 14147), (84, 14183), (86, 14231), (89, 14255),