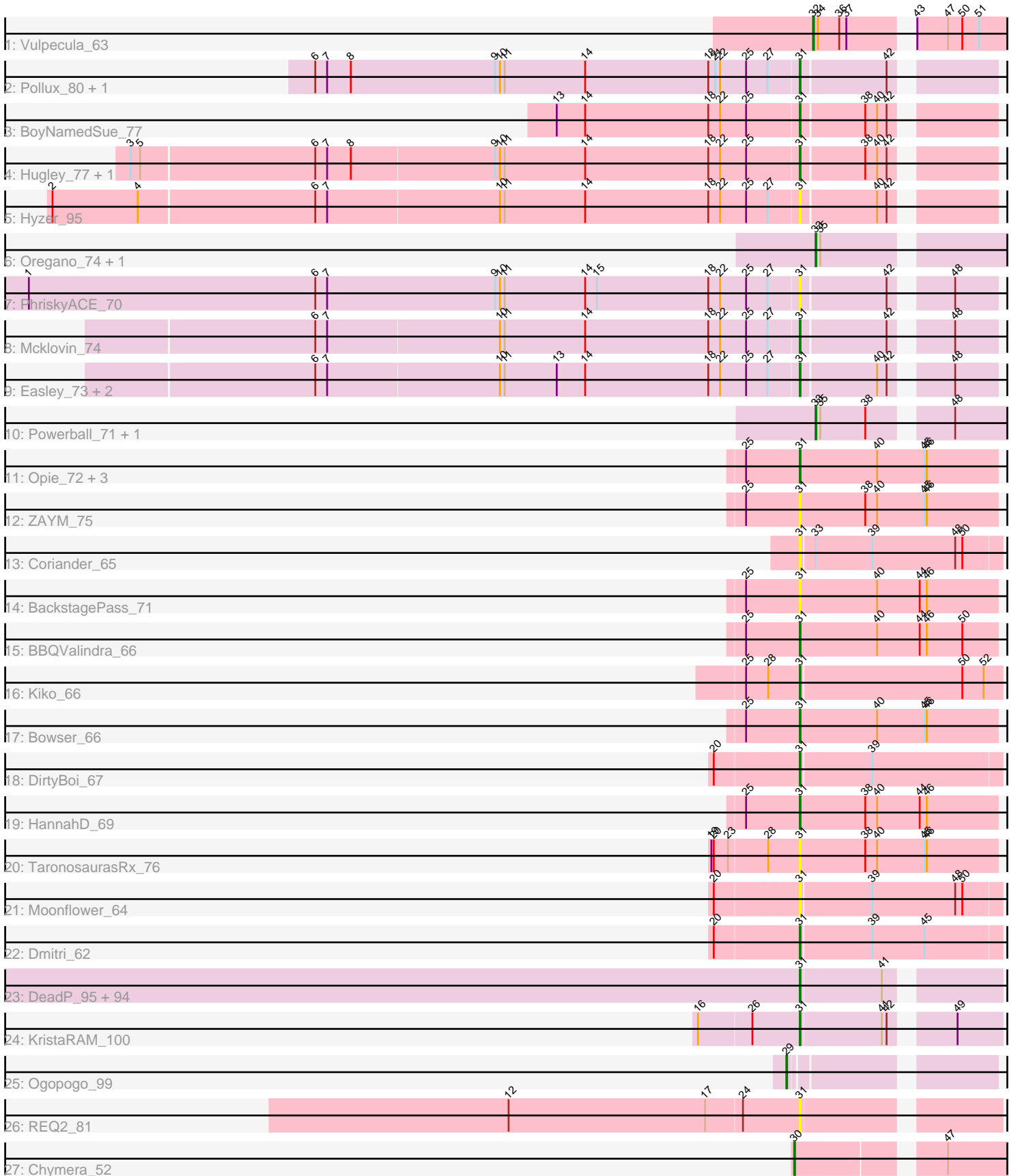


Pham 202770



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 202770 Report

This analysis was run 01/18/25 on database version 583.

Pham number 202770 has 130 members, 19 are drafts.

Phages represented in each track:

- Track 1 : Vulpecula\_63
- Track 2 : Pollux\_80, Marteena\_76
- Track 3 : BoyNamedSue\_77
- Track 4 : Hugley\_77, Nymphadora\_79
- Track 5 : Hyzer\_95
- Track 6 : Oregano\_74, Suerte\_69
- Track 7 : PhriskyACE\_70
- Track 8 : Mcklovin\_74
- Track 9 : Easley\_73, Beenie\_69, Invectra\_76
- Track 10 : Powerball\_71, Dorito\_69
- Track 11 : Opie\_72, Eyes\_64, MagicMan\_69, Schnabeltier\_70
- Track 12 : ZAYM\_75
- Track 13 : Coriander\_65
- Track 14 : BackstagePass\_71
- Track 15 : BBQValindra\_66
- Track 16 : Kiko\_66
- Track 17 : Bowser\_66
- Track 18 : DirtyBoi\_67
- Track 19 : HannahD\_69
- Track 20 : TaronosaurusRx\_76
- Track 21 : Moonflower\_64
- Track 22 : Dmitri\_62
- Track 23 : DeadP\_95, Wachhund\_92, Geralt\_87, Madiba\_93, RitaG\_93, Kenuha5\_87, BuzzLyseyear\_101, Royals2015\_97, Eish\_100, BodEinwohner17\_104, Spikelee\_95, GigiOuiOui\_89, IMpilo\_92, MulchExplorer\_98, DoRead\_101, Galactic\_95, Mahavrat\_90, WillSterrel\_92, IbOuu\_89, DaddyRickover\_96, Juice456\_93, Tweety\_95, Inventum\_92, Ms6\_96, Hamulus\_95, Phalconet\_95, Wee\_98, Ovechkin\_98, Boomer\_97, Florinda\_106, Polka14\_98, DirtMcgirt\_95, Doomphist\_99, Seagreen\_95, Squirty\_94, IrishSherpFalk\_94, Harley\_97, Empress\_94, Ardmore\_79, UncleRicky\_94, LittleShirley\_102, Fastidio\_98, KingMidas\_94, Dorothy\_95, Lorde\_97, Phatniss\_92, Deb65\_87, Emma\_99, Byougenkin\_92, Leperchaun\_96, PMC\_93, Girafales\_103, Poenanya\_98, RockyHorror\_98, Nimbo\_86, Enby\_98, Hades\_91, Vivum\_94, Sassafras\_96, Moonbeam\_97, lbhubesi\_92, Hegedechwinu\_101, RedBird\_95, Ramsey\_99, Taj\_101, MilleniumForce\_94, Scottish\_94, Juniper1\_88, JoeyJr\_97, Filuzino\_94, Kimberlium\_96, OldBen\_91, SimranZ1\_90, DLane\_94, GUmbie\_93, Starcevich\_96, DaWorst\_94, XFactor\_85, Cornucopia\_94, Daenerys\_92, Drago\_93, Rockne\_97,

CaptainTrips\_96, PHappiness\_94, VRedHorse\_95, Quico\_103, LunaBlu\_98, Stap\_89, DotProduct\_88, Fruitloop\_92, StAnnes\_98, Grimmer\_103, Estave1\_102, PhesterPhotato\_98, QuickMath\_95

- Track 24 : KristaRAM\_100
- Track 25 : Ogopogo\_99
- Track 26 : REQ2\_81
- Track 27 : Chymera\_52

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

The start number called the most often in the published annotations is 31, it was called in 104 of the 111 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- Ardmore\_79, BBQValindra\_66, BackstagePass\_71, Beenie\_69, BodEinwohner17\_104, Boomer\_97, Bowser\_66, BoyNamedSue\_77, BuzzLyseyear\_101, Byougenkin\_92, CaptainTrips\_96, Coriander\_65, Cornucopia\_94, DLane\_94, DaWorst\_94, DaddyRickover\_96, Daenerys\_92, DeadP\_95, Deb65\_87, DirtMcgirt\_95, DirtyBoi\_67, Dmitri\_62, DoRead\_101, Doomphist\_99, Dorothy\_95, DotProduct\_88, Drago\_93, Easley\_73, Eish\_100, Emma\_99, Empress\_94, Enby\_98, Estave1\_102, Eyes\_64, Fastidio\_98, Filuzino\_94, Florinda\_106, Fruitloop\_92, GUmbie\_93, Galactic\_95, Geralt\_87, GigiOuiOui\_89, Girafales\_103, Grimmer\_103, Hades\_91, Hamulus\_95, HannahD\_69, Harley\_97, Hegedechwinu\_101, Hugley\_77, Hyzer\_95, IMpilo\_92, IbOuu\_89, Ibhubesi\_92, Invectra\_76, Inventum\_92, IrishSherpFalk\_94, JoeyJr\_97, Juice456\_93, Juniper1\_88, Kenuha5\_87, Kiko\_66, Kimberlium\_96, KingMidas\_94, KristaRAM\_100, Leperchaun\_96, LittleShirley\_102, Lorde\_97, LunaBlu\_98, Madiba\_93, MagicMan\_69, Mahavrat\_90, Marteena\_76, Mcklovin\_74, MilleniumForce\_94, Moonbeam\_97, Moonflower\_64, Ms6\_96, MulchExplorer\_98, Nimbo\_86, Nymphadora\_79, OldBen\_91, Opie\_72, Ovechkin\_98, PHappiness\_94, PMC\_93, Phalconet\_95, Phatniss\_92, PhesterPhotato\_98, PhriskyACE\_70, Poenanya\_98, Polka14\_98, Pollux\_80, QuickMath\_95, Quico\_103, REQ2\_81, Ramsey\_99, RedBird\_95, RitaG\_93, Rockne\_97, RockyHorror\_98, Royals2015\_97, Sassafras\_96, Schnabeltier\_70, Scottish\_94, Seagreen\_95, SimranZ1\_90, Spikelee\_95, Squirty\_94, StAnnes\_98, Stap\_89, Starcevich\_96, Taj\_101, TaronosaurusRx\_76, Tweety\_95, UncleRicky\_94, VRedHorse\_95, Vivum\_94, Wachhund\_92, Wee\_98, WillSterrel\_92, XFactor\_85, ZAYM\_75,

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

- 

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

- Chymera\_52, Dorito\_69, Ogopogo\_99, Oregano\_74, Powerball\_71, Suerte\_69, Vulpecula\_63,

### **Summary by start number:**

Start 29:

- Found in 1 of 130 ( 0.8% ) of genes in pham
- Manual Annotations of this start: 1 of 111

- Called 100.0% of time when present
- Phage (with cluster) where this start called: Ogotogo\_99 (F1),

#### Start 30:

- Found in 1 of 130 ( 0.8% ) of genes in pham
- Manual Annotations of this start: 1 of 111
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Chymera\_52 (singleton),

#### Start 31:

- Found in 123 of 130 ( 94.6% ) of genes in pham
- Manual Annotations of this start: 104 of 111
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Ardmore\_79 (F1), BBQValindra\_66 (DB), BackstagePass\_71 (DB), Beenie\_69 (CZ4), BodEinwohner17\_104 (F1), Boomer\_97 (F1), Bowser\_66 (DB), BoyNamedSue\_77 (CZ1), BuzzLyseyear\_101 (F1), Byougenkin\_92 (F1), CaptainTrips\_96 (F1), Coriander\_65 (DB), Cornucopia\_94 (F1), DLane\_94 (F1), DaWorst\_94 (F1), DaddyRickover\_96 (F1), Daenerys\_92 (F1), DeadP\_95 (F1), Deb65\_87 (F1), DirtMcgirt\_95 (F1), DirtyBoi\_67 (DB), Dmitri\_62 (DB), DoRead\_101 (F1), Doomphist\_99 (F1), Dorothy\_95 (F1), DotProduct\_88 (F1), Drago\_93 (F1), Easley\_73 (CZ4), Eish\_100 (F1), Emma\_99 (F1), Empress\_94 (F1), Enby\_98 (F1), Estave1\_102 (F1), Eyes\_64 (DB), Fastidio\_98 (F1), Filuzino\_94 (F1), Florinda\_106 (F1), Fruitloop\_92 (F1), GUmbie\_93 (F1), Galactic\_95 (F1), Geralt\_87 (F1), GigiOuiOui\_89 (F1), Girafales\_103 (F1), Grimmer\_103 (F1), Hades\_91 (F1), Hamulus\_95 (F1), HannahD\_69 (DB), Harley\_97 (F1), Hegedechwinu\_101 (F1), Hugley\_77 (CZ1), Hyzer\_95 (CZ1), IMpilo\_92 (F1), IbOuu\_89 (F1), Ibhubesi\_92 (F1), Invecra\_76 (CZ4), Inventum\_92 (F1), IrishSherpFalk\_94 (F1), JoeyJr\_97 (F1), Juice456\_93 (F1), Juniper1\_88 (F1), Kenuha5\_87 (F1), Kiko\_66 (DB), Kimberlium\_96 (F1), KingMidas\_94 (F1), KristaRAM\_100 (F1), Leperchaun\_96 (F1), LittleShirley\_102 (F1), Lorde\_97 (F1), LunaBlu\_98 (F1), Madiba\_93 (F1), MagicMan\_69 (DB), Mahavrat\_90 (F1), Marteena\_76 (CY1), Mcklovin\_74 (CZ4), MilleniumForce\_94 (F1), Moonbeam\_97 (F1), Moonflower\_64 (DB), Ms6\_96 (F1), MulchExplorer\_98 (F1), Nimbo\_86 (F1), Nymphadora\_79 (CZ1), OldBen\_91 (F1), Opie\_72 (DB), Ovechkin\_98 (F1), PHappiness\_94 (F1), PMC\_93 (F1), Phalconet\_95 (F1), Phatniss\_92 (F1), PhesterPhotato\_98 (F1), PhriskyACE\_70 (CZ4), Poenanya\_98 (F1), Polka14\_98 (F1), Pollux\_80 (CY1), QuickMath\_95 (F1), Quico\_103 (F1), REQ2\_81 (singleton), Ramsey\_99 (F1), RedBird\_95 (F1), RitaG\_93 (F1), Rockne\_97 (F1), RockyHorror\_98 (F1), Royals2015\_97 (F1), Sassafra\_96 (F1), Schnabeltier\_70 (DB), Scottish\_94 (F1), Seagreen\_95 (F1), SimranZ1\_90 (F1), Spikelee\_95 (F1), Squirty\_94 (F3), StAnnes\_98 (F1), Stap\_89 (F1), Starceвич\_96 (F1), Taj\_101 (F1), TaronosaurusRx\_76 (DB), Tweety\_95 (F1), UncleRicky\_94 (F1), VRedHorse\_95 (F1), Vivum\_94 (F1), Wachhund\_92 (F1), Wee\_98 (F1), WillSterrel\_92 (F1), XFactor\_85 (F1), ZAYM\_75 (DB),

#### Start 32:

- Found in 1 of 130 ( 0.8% ) of genes in pham
- Manual Annotations of this start: 1 of 111
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Vulpecula\_63 (AS1),

#### Start 33:

- Found in 5 of 130 ( 3.8% ) of genes in pham
- Manual Annotations of this start: 4 of 111

- Called 80.0% of time when present
- Phage (with cluster) where this start called: Dorito\_69 (CZ4), Oregano\_74 (CZ4), Powerball\_71 (CZ4), Suerte\_69 (CZ4),

### **Summary by clusters:**

There are 8 clusters represented in this pham: CY1, F1, AS1, F3, CZ1, DB, singleton, CZ4,

Info for manual annotations of cluster AS1:

- Start number 32 was manually annotated 1 time for cluster AS1.

Info for manual annotations of cluster CY1:

- Start number 31 was manually annotated 2 times for cluster CY1.

Info for manual annotations of cluster CZ1:

- Start number 31 was manually annotated 2 times for cluster CZ1.

Info for manual annotations of cluster CZ4:

- Start number 31 was manually annotated 3 times for cluster CZ4.
- Start number 33 was manually annotated 4 times for cluster CZ4.

Info for manual annotations of cluster DB:

- Start number 31 was manually annotated 10 times for cluster DB.

Info for manual annotations of cluster F1:

- Start number 29 was manually annotated 1 time for cluster F1.
- Start number 31 was manually annotated 86 times for cluster F1.

Info for manual annotations of cluster F3:

- Start number 31 was manually annotated 1 time for cluster F3.

### **Gene Information:**

Gene: Ardmore\_79 Start: 47310, Stop: 47534, Start Num: 31

Candidate Starts for Ardmore\_79:

(Start: 31 @47310 has 104 MA's), (41, 47409),

Gene: BBQValindra\_66 Start: 46200, Stop: 46448, Start Num: 31

Candidate Starts for BBQValindra\_66:

(25, 46137), (Start: 31 @46200 has 104 MA's), (40, 46296), (44, 46350), (46, 46359), (50, 46404),

Gene: BackstagePass\_71 Start: 45548, Stop: 45796, Start Num: 31

Candidate Starts for BackstagePass\_71:

(25, 45485), (Start: 31 @45548 has 104 MA's), (40, 45644), (44, 45698), (46, 45707),

Gene: Beenie\_69 Start: 46326, Stop: 46541, Start Num: 31

Candidate Starts for Beenie\_69:

(6, 45720), (7, 45735), (10, 45951), (11, 45957), (13, 46023), (14, 46059), (18, 46215), (22, 46230), (25, 46263), (27, 46290), (Start: 31 @46326 has 104 MA's), (40, 46416), (42, 46428), (48, 46488),

Gene: BodEinwohner17\_104 Start: 55362, Stop: 55586, Start Num: 31  
Candidate Starts for BodEinwohner17\_104:  
(Start: 31 @55362 has 104 MA's), (41, 55461),

Gene: Boomer\_97 Start: 53595, Stop: 53819, Start Num: 31  
Candidate Starts for Boomer\_97:  
(Start: 31 @53595 has 104 MA's), (41, 53694),

Gene: Bowser\_66 Start: 45894, Stop: 46142, Start Num: 31  
Candidate Starts for Bowser\_66:  
(25, 45828), (Start: 31 @45894 has 104 MA's), (40, 45990), (45, 46050), (46, 46053),

Gene: BoyNamedSue\_77 Start: 50965, Stop: 51180, Start Num: 31  
Candidate Starts for BoyNamedSue\_77:  
(13, 50662), (14, 50698), (18, 50854), (22, 50869), (25, 50902), (Start: 31 @50965 has 104 MA's), (38, 51040), (40, 51055), (42, 51067),

Gene: BuzzLyseyear\_101 Start: 55092, Stop: 55316, Start Num: 31  
Candidate Starts for BuzzLyseyear\_101:  
(Start: 31 @55092 has 104 MA's), (41, 55191),

Gene: Byougenkin\_92 Start: 49932, Stop: 50156, Start Num: 31  
Candidate Starts for Byougenkin\_92:  
(Start: 31 @49932 has 104 MA's), (41, 50031),

Gene: CaptainTrips\_96 Start: 52498, Stop: 52722, Start Num: 31  
Candidate Starts for CaptainTrips\_96:  
(Start: 31 @52498 has 104 MA's), (41, 52597),

Gene: Chymera\_52 Start: 33565, Stop: 33825, Start Num: 30  
Candidate Starts for Chymera\_52:  
(Start: 30 @33565 has 1 MA's), (47, 33724),

Gene: Coriander\_65 Start: 43545, Stop: 43793, Start Num: 31  
Candidate Starts for Coriander\_65:  
(Start: 31 @43545 has 104 MA's), (Start: 33 @43560 has 4 MA's), (39, 43632), (48, 43737), (50, 43746),

Gene: Cornucopia\_94 Start: 50874, Stop: 51098, Start Num: 31  
Candidate Starts for Cornucopia\_94:  
(Start: 31 @50874 has 104 MA's), (41, 50973),

Gene: DLane\_94 Start: 53780, Stop: 54004, Start Num: 31  
Candidate Starts for DLane\_94:  
(Start: 31 @53780 has 104 MA's), (41, 53879),

Gene: DaWorst\_94 Start: 52690, Stop: 52914, Start Num: 31  
Candidate Starts for DaWorst\_94:  
(Start: 31 @52690 has 104 MA's), (41, 52789),

Gene: DaddyRickover\_96 Start: 53556, Stop: 53780, Start Num: 31  
Candidate Starts for DaddyRickover\_96:  
(Start: 31 @53556 has 104 MA's), (41, 53655),

Gene: Daenerys\_92 Start: 53725, Stop: 53949, Start Num: 31  
Candidate Starts for Daenerys\_92:  
(Start: 31 @53725 has 104 MA's), (41, 53824),

Gene: DeadP\_95 Start: 51561, Stop: 51785, Start Num: 31  
Candidate Starts for DeadP\_95:  
(Start: 31 @51561 has 104 MA's), (41, 51660),

Gene: Deb65\_87 Start: 51449, Stop: 51673, Start Num: 31  
Candidate Starts for Deb65\_87:  
(Start: 31 @51449 has 104 MA's), (41, 51548),

Gene: DirtMcgirt\_95 Start: 50205, Stop: 50429, Start Num: 31  
Candidate Starts for DirtMcgirt\_95:  
(Start: 31 @50205 has 104 MA's), (41, 50304),

Gene: DirtyBoi\_67 Start: 43186, Stop: 43434, Start Num: 31  
Candidate Starts for DirtyBoi\_67:  
(20, 43087), (Start: 31 @43186 has 104 MA's), (39, 43273),

Gene: Dmitri\_62 Start: 45089, Stop: 45337, Start Num: 31  
Candidate Starts for Dmitri\_62:  
(20, 44990), (Start: 31 @45089 has 104 MA's), (39, 45176), (45, 45242),

Gene: DoRead\_101 Start: 51020, Stop: 51244, Start Num: 31  
Candidate Starts for DoRead\_101:  
(Start: 31 @51020 has 104 MA's), (41, 51119),

Gene: Doomphist\_99 Start: 54376, Stop: 54600, Start Num: 31  
Candidate Starts for Doomphist\_99:  
(Start: 31 @54376 has 104 MA's), (41, 54475),

Gene: Dorito\_69 Start: 44511, Stop: 44738, Start Num: 33  
Candidate Starts for Dorito\_69:  
(Start: 33 @44511 has 4 MA's), (35, 44517), (38, 44574), (48, 44661),

Gene: Dorothy\_95 Start: 54545, Stop: 54769, Start Num: 31  
Candidate Starts for Dorothy\_95:  
(Start: 31 @54545 has 104 MA's), (41, 54644),

Gene: DotProduct\_88 Start: 50563, Stop: 50787, Start Num: 31  
Candidate Starts for DotProduct\_88:  
(Start: 31 @50563 has 104 MA's), (41, 50662),

Gene: Drago\_93 Start: 50208, Stop: 50432, Start Num: 31  
Candidate Starts for Drago\_93:  
(Start: 31 @50208 has 104 MA's), (41, 50307),

Gene: Easley\_73 Start: 45090, Stop: 45305, Start Num: 31  
Candidate Starts for Easley\_73:  
(6, 44484), (7, 44499), (10, 44715), (11, 44721), (13, 44787), (14, 44823), (18, 44979), (22, 44994),  
(25, 45027), (27, 45054), (Start: 31 @45090 has 104 MA's), (40, 45180), (42, 45192), (48, 45252),

Gene: Eish\_100 Start: 54009, Stop: 54233, Start Num: 31

Candidate Starts for Eish\_100:

(Start: 31 @54009 has 104 MA's), (41, 54108),

Gene: Emma\_99 Start: 52064, Stop: 52288, Start Num: 31

Candidate Starts for Emma\_99:

(Start: 31 @52064 has 104 MA's), (41, 52163),

Gene: Empress\_94 Start: 52639, Stop: 52863, Start Num: 31

Candidate Starts for Empress\_94:

(Start: 31 @52639 has 104 MA's), (41, 52738),

Gene: Enby\_98 Start: 50484, Stop: 50708, Start Num: 31

Candidate Starts for Enby\_98:

(Start: 31 @50484 has 104 MA's), (41, 50583),

Gene: Estave1\_102 Start: 56371, Stop: 56595, Start Num: 31

Candidate Starts for Estave1\_102:

(Start: 31 @56371 has 104 MA's), (41, 56470),

Gene: Eyes\_64 Start: 46097, Stop: 46345, Start Num: 31

Candidate Starts for Eyes\_64:

(25, 46034), (Start: 31 @46097 has 104 MA's), (40, 46193), (45, 46253), (46, 46256),

Gene: Fastidio\_98 Start: 50955, Stop: 51179, Start Num: 31

Candidate Starts for Fastidio\_98:

(Start: 31 @50955 has 104 MA's), (41, 51054),

Gene: Filuzino\_94 Start: 54475, Stop: 54699, Start Num: 31

Candidate Starts for Filuzino\_94:

(Start: 31 @54475 has 104 MA's), (41, 54574),

Gene: Florinda\_106 Start: 54860, Stop: 55084, Start Num: 31

Candidate Starts for Florinda\_106:

(Start: 31 @54860 has 104 MA's), (41, 54959),

Gene: Fruitloop\_92 Start: 53617, Stop: 53841, Start Num: 31

Candidate Starts for Fruitloop\_92:

(Start: 31 @53617 has 104 MA's), (41, 53716),

Gene: GUmbie\_93 Start: 52577, Stop: 52801, Start Num: 31

Candidate Starts for GUmbie\_93:

(Start: 31 @52577 has 104 MA's), (41, 52676),

Gene: Galactic\_95 Start: 52179, Stop: 52403, Start Num: 31

Candidate Starts for Galactic\_95:

(Start: 31 @52179 has 104 MA's), (41, 52278),

Gene: Geralt\_87 Start: 51447, Stop: 51671, Start Num: 31

Candidate Starts for Geralt\_87:

(Start: 31 @51447 has 104 MA's), (41, 51546),



Gene: GigiOuiOui\_89 Start: 51580, Stop: 51804, Start Num: 31  
Candidate Starts for GigiOuiOui\_89:  
(Start: 31 @51580 has 104 MA's), (41, 51679),

Gene: Girafales\_103 Start: 54465, Stop: 54689, Start Num: 31  
Candidate Starts for Girafales\_103:  
(Start: 31 @54465 has 104 MA's), (41, 54564),

Gene: Grimmer\_103 Start: 53161, Stop: 53385, Start Num: 31  
Candidate Starts for Grimmer\_103:  
(Start: 31 @53161 has 104 MA's), (41, 53260),

Gene: Hades\_91 Start: 50166, Stop: 50390, Start Num: 31  
Candidate Starts for Hades\_91:  
(Start: 31 @50166 has 104 MA's), (41, 50265),

Gene: Hamulus\_95 Start: 52528, Stop: 52752, Start Num: 31  
Candidate Starts for Hamulus\_95:  
(Start: 31 @52528 has 104 MA's), (41, 52627),

Gene: HannahD\_69 Start: 45420, Stop: 45668, Start Num: 31  
Candidate Starts for HannahD\_69:  
(25, 45357), (Start: 31 @45420 has 104 MA's), (38, 45501), (40, 45516), (44, 45570), (46, 45579),

Gene: Harley\_97 Start: 53710, Stop: 53934, Start Num: 31  
Candidate Starts for Harley\_97:  
(Start: 31 @53710 has 104 MA's), (41, 53809),

Gene: Hegedechwinu\_101 Start: 52838, Stop: 53062, Start Num: 31  
Candidate Starts for Hegedechwinu\_101:  
(Start: 31 @52838 has 104 MA's), (41, 52937),

Gene: Hugley\_77 Start: 52070, Stop: 52285, Start Num: 31  
Candidate Starts for Hugley\_77:  
(3, 51236), (5, 51248), (6, 51464), (7, 51479), (8, 51509), (9, 51689), (10, 51695), (11, 51701), (14, 51803), (18, 51959), (22, 51974), (25, 52007), (Start: 31 @52070 has 104 MA's), (38, 52145), (40, 52160), (42, 52172),

Gene: Hyzer\_95 Start: 58740, Stop: 58955, Start Num: 31  
Candidate Starts for Hyzer\_95:  
(2, 57807), (4, 57915), (6, 58134), (7, 58149), (10, 58365), (11, 58371), (14, 58473), (18, 58629), (22, 58644), (25, 58677), (27, 58704), (Start: 31 @58740 has 104 MA's), (40, 58830), (42, 58842),

Gene: IMpilo\_92 Start: 51182, Stop: 51406, Start Num: 31  
Candidate Starts for IMpilo\_92:  
(Start: 31 @51182 has 104 MA's), (41, 51281),

Gene: IbOuu\_89 Start: 50477, Stop: 50701, Start Num: 31  
Candidate Starts for IbOuu\_89:  
(Start: 31 @50477 has 104 MA's), (41, 50576),

Gene: Ibhubesi\_92 Start: 50579, Stop: 50803, Start Num: 31  
Candidate Starts for Ibhubesi\_92:

(Start: 31 @50579 has 104 MA's), (41, 50678),

Gene: Invecetra\_76 Start: 47662, Stop: 47877, Start Num: 31

Candidate Starts for Invecetra\_76:

(6, 47056), (7, 47071), (10, 47287), (11, 47293), (13, 47359), (14, 47395), (18, 47551), (22, 47566), (25, 47599), (27, 47626), (Start: 31 @47662 has 104 MA's), (40, 47752), (42, 47764), (48, 47824),

Gene: Inventum\_92 Start: 52733, Stop: 52957, Start Num: 31

Candidate Starts for Inventum\_92:

(Start: 31 @52733 has 104 MA's), (41, 52832),

Gene: IrishSherpFalk\_94 Start: 53004, Stop: 53228, Start Num: 31

Candidate Starts for IrishSherpFalk\_94:

(Start: 31 @53004 has 104 MA's), (41, 53103),

Gene: JoeyJr\_97 Start: 54641, Stop: 54865, Start Num: 31

Candidate Starts for JoeyJr\_97:

(Start: 31 @54641 has 104 MA's), (41, 54740),

Gene: Juice456\_93 Start: 52353, Stop: 52577, Start Num: 31

Candidate Starts for Juice456\_93:

(Start: 31 @52353 has 104 MA's), (41, 52452),

Gene: Juniper1\_88 Start: 51701, Stop: 51925, Start Num: 31

Candidate Starts for Juniper1\_88:

(Start: 31 @51701 has 104 MA's), (41, 51800),

Gene: Kenuha5\_87 Start: 52359, Stop: 52583, Start Num: 31

Candidate Starts for Kenuha5\_87:

(Start: 31 @52359 has 104 MA's), (41, 52458),

Gene: Kiko\_66 Start: 43613, Stop: 43864, Start Num: 31

Candidate Starts for Kiko\_66:

(25, 43550), (28, 43577), (Start: 31 @43613 has 104 MA's), (50, 43814), (52, 43841),

Gene: Kimberlium\_96 Start: 52453, Stop: 52677, Start Num: 31

Candidate Starts for Kimberlium\_96:

(Start: 31 @52453 has 104 MA's), (41, 52552),

Gene: KingMidas\_94 Start: 52870, Stop: 53094, Start Num: 31

Candidate Starts for KingMidas\_94:

(Start: 31 @52870 has 104 MA's), (41, 52969),

Gene: KristaRAM\_100 Start: 53831, Stop: 54055, Start Num: 31

Candidate Starts for KristaRAM\_100:

(16, 53708), (26, 53774), (Start: 31 @53831 has 104 MA's), (41, 53930), (42, 53936), (49, 53999),

Gene: Leperchaun\_96 Start: 53875, Stop: 54099, Start Num: 31

Candidate Starts for Leperchaun\_96:

(Start: 31 @53875 has 104 MA's), (41, 53974),

Gene: LittleShirley\_102 Start: 54183, Stop: 54407, Start Num: 31

Candidate Starts for LittleShirley\_102:

(Start: 31 @54183 has 104 MA's), (41, 54282),

Gene: Lorde\_97 Start: 49649, Stop: 49873, Start Num: 31

Candidate Starts for Lorde\_97:

(Start: 31 @49649 has 104 MA's), (41, 49748),

Gene: LunaBlu\_98 Start: 53665, Stop: 53889, Start Num: 31

Candidate Starts for LunaBlu\_98:

(Start: 31 @53665 has 104 MA's), (41, 53764),

Gene: Madiba\_93 Start: 52090, Stop: 52314, Start Num: 31

Candidate Starts for Madiba\_93:

(Start: 31 @52090 has 104 MA's), (41, 52189),

Gene: MagicMan\_69 Start: 46923, Stop: 47171, Start Num: 31

Candidate Starts for MagicMan\_69:

(25, 46860), (Start: 31 @46923 has 104 MA's), (40, 47019), (45, 47079), (46, 47082),

Gene: Mahavrat\_90 Start: 50730, Stop: 50954, Start Num: 31

Candidate Starts for Mahavrat\_90:

(Start: 31 @50730 has 104 MA's), (41, 50829),

Gene: Marteena\_76 Start: 49557, Stop: 49772, Start Num: 31

Candidate Starts for Marteena\_76:

(6, 48948), (7, 48963), (8, 48993), (9, 49176), (10, 49182), (11, 49188), (14, 49290), (18, 49446), (21, 49455), (22, 49461), (25, 49494), (27, 49521), (Start: 31 @49557 has 104 MA's), (42, 49659),

Gene: Mcklovin\_74 Start: 51595, Stop: 51810, Start Num: 31

Candidate Starts for Mcklovin\_74:

(6, 50989), (7, 51004), (10, 51220), (11, 51226), (14, 51328), (18, 51484), (22, 51499), (25, 51532), (27, 51559), (Start: 31 @51595 has 104 MA's), (42, 51697), (48, 51757),

Gene: MilleniumForce\_94 Start: 53252, Stop: 53476, Start Num: 31

Candidate Starts for MilleniumForce\_94:

(Start: 31 @53252 has 104 MA's), (41, 53351),

Gene: Moonbeam\_97 Start: 53630, Stop: 53854, Start Num: 31

Candidate Starts for Moonbeam\_97:

(Start: 31 @53630 has 104 MA's), (41, 53729),

Gene: Moonflower\_64 Start: 44641, Stop: 44889, Start Num: 31

Candidate Starts for Moonflower\_64:

(20, 44542), (Start: 31 @44641 has 104 MA's), (39, 44728), (48, 44833), (50, 44842),

Gene: Ms6\_96 Start: 49416, Stop: 49640, Start Num: 31

Candidate Starts for Ms6\_96:

(Start: 31 @49416 has 104 MA's), (41, 49515),

Gene: MulchExplorer\_98 Start: 52124, Stop: 52348, Start Num: 31

Candidate Starts for MulchExplorer\_98:

(Start: 31 @52124 has 104 MA's), (41, 52223),

Gene: Nimbo\_86 Start: 51449, Stop: 51673, Start Num: 31

Candidate Starts for Nimbo\_86:  
(Start: 31 @51449 has 104 MA's), (41, 51548),

Gene: Nymphadora\_79 Start: 51695, Stop: 51910, Start Num: 31  
Candidate Starts for Nymphadora\_79:  
(3, 50861), (5, 50873), (6, 51089), (7, 51104), (8, 51134), (9, 51314), (10, 51320), (11, 51326), (14, 51428), (18, 51584), (22, 51599), (25, 51632), (Start: 31 @51695 has 104 MA's), (38, 51770), (40, 51785), (42, 51797),

Gene: Ogotogo\_99 Start: 52090, Stop: 52314, Start Num: 29  
Candidate Starts for Ogotogo\_99:  
(Start: 29 @52090 has 1 MA's),

Gene: OldBen\_91 Start: 52841, Stop: 53065, Start Num: 31  
Candidate Starts for OldBen\_91:  
(Start: 31 @52841 has 104 MA's), (41, 52940),

Gene: Opie\_72 Start: 47038, Stop: 47286, Start Num: 31  
Candidate Starts for Opie\_72:  
(25, 46975), (Start: 31 @47038 has 104 MA's), (40, 47134), (45, 47194), (46, 47197),

Gene: Oregano\_74 Start: 45625, Stop: 45852, Start Num: 33  
Candidate Starts for Oregano\_74:  
(Start: 33 @45625 has 4 MA's), (35, 45631),

Gene: Ovechkin\_98 Start: 53678, Stop: 53902, Start Num: 31  
Candidate Starts for Ovechkin\_98:  
(Start: 31 @53678 has 104 MA's), (41, 53777),

Gene: PHappiness\_94 Start: 53670, Stop: 53894, Start Num: 31  
Candidate Starts for PHappiness\_94:  
(Start: 31 @53670 has 104 MA's), (41, 53769),

Gene: PMC\_93 Start: 51819, Stop: 52043, Start Num: 31  
Candidate Starts for PMC\_93:  
(Start: 31 @51819 has 104 MA's), (41, 51918),

Gene: Phalconet\_95 Start: 52818, Stop: 53042, Start Num: 31  
Candidate Starts for Phalconet\_95:  
(Start: 31 @52818 has 104 MA's), (41, 52917),

Gene: Phatniss\_92 Start: 52150, Stop: 52374, Start Num: 31  
Candidate Starts for Phatniss\_92:  
(Start: 31 @52150 has 104 MA's), (41, 52249),

Gene: PhesterPhotato\_98 Start: 52792, Stop: 53016, Start Num: 31  
Candidate Starts for PhesterPhotato\_98:  
(Start: 31 @52792 has 104 MA's), (41, 52891),

Gene: PhriskyACE\_70 Start: 45620, Stop: 45835, Start Num: 31  
Candidate Starts for PhriskyACE\_70:  
(1, 44648), (6, 45011), (7, 45026), (9, 45239), (10, 45245), (11, 45251), (14, 45353), (15, 45368), (18, 45509), (22, 45524), (25, 45557), (27, 45584), (Start: 31 @45620 has 104 MA's), (42, 45722), (48,

45782),

Gene: Poenanya\_98 Start: 54376, Stop: 54600, Start Num: 31  
Candidate Starts for Poenanya\_98:  
(Start: 31 @54376 has 104 MA's), (41, 54475),

Gene: Polka14\_98 Start: 54437, Stop: 54661, Start Num: 31  
Candidate Starts for Polka14\_98:  
(Start: 31 @54437 has 104 MA's), (41, 54536),

Gene: Pollux\_80 Start: 51514, Stop: 51729, Start Num: 31  
Candidate Starts for Pollux\_80:  
(6, 50905), (7, 50920), (8, 50950), (9, 51133), (10, 51139), (11, 51145), (14, 51247), (18, 51403), (21, 51412), (22, 51418), (25, 51451), (27, 51478), (Start: 31 @51514 has 104 MA's), (42, 51616),

Gene: Powerball\_71 Start: 45724, Stop: 45951, Start Num: 33  
Candidate Starts for Powerball\_71:  
(Start: 33 @45724 has 4 MA's), (35, 45730), (38, 45787), (48, 45874),

Gene: QuickMath\_95 Start: 52705, Stop: 52929, Start Num: 31  
Candidate Starts for QuickMath\_95:  
(Start: 31 @52705 has 104 MA's), (41, 52804),

Gene: Quico\_103 Start: 54680, Stop: 54904, Start Num: 31  
Candidate Starts for Quico\_103:  
(Start: 31 @54680 has 104 MA's), (41, 54779),

Gene: REQ2\_81 Start: 47996, Stop: 48220, Start Num: 31  
Candidate Starts for REQ2\_81:  
(12, 47633), (17, 47882), (24, 47927), (Start: 31 @47996 has 104 MA's),

Gene: Ramsey\_99 Start: 54678, Stop: 54902, Start Num: 31  
Candidate Starts for Ramsey\_99:  
(Start: 31 @54678 has 104 MA's), (41, 54777),

Gene: RedBird\_95 Start: 54415, Stop: 54639, Start Num: 31  
Candidate Starts for RedBird\_95:  
(Start: 31 @54415 has 104 MA's), (41, 54514),

Gene: RitaG\_93 Start: 53472, Stop: 53696, Start Num: 31  
Candidate Starts for RitaG\_93:  
(Start: 31 @53472 has 104 MA's), (41, 53571),

Gene: Rockne\_97 Start: 51831, Stop: 52055, Start Num: 31  
Candidate Starts for Rockne\_97:  
(Start: 31 @51831 has 104 MA's), (41, 51930),

Gene: RockyHorror\_98 Start: 52582, Stop: 52806, Start Num: 31  
Candidate Starts for RockyHorror\_98:  
(Start: 31 @52582 has 104 MA's), (41, 52681),

Gene: Royals2015\_97 Start: 51702, Stop: 51926, Start Num: 31  
Candidate Starts for Royals2015\_97:

(Start: 31 @51702 has 104 MA's), (41, 51801),

Gene: Sassafras\_96 Start: 52732, Stop: 52956, Start Num: 31

Candidate Starts for Sassafras\_96:

(Start: 31 @52732 has 104 MA's), (41, 52831),

Gene: Schnabeltier\_70 Start: 46220, Stop: 46468, Start Num: 31

Candidate Starts for Schnabeltier\_70:

(25, 46157), (Start: 31 @46220 has 104 MA's), (40, 46316), (45, 46376), (46, 46379),

Gene: Scottish\_94 Start: 52309, Stop: 52533, Start Num: 31

Candidate Starts for Scottish\_94:

(Start: 31 @52309 has 104 MA's), (41, 52408),

Gene: Seagreen\_95 Start: 53324, Stop: 53548, Start Num: 31

Candidate Starts for Seagreen\_95:

(Start: 31 @53324 has 104 MA's), (41, 53423),

Gene: SimranZ1\_90 Start: 51204, Stop: 51428, Start Num: 31

Candidate Starts for SimranZ1\_90:

(Start: 31 @51204 has 104 MA's), (41, 51303),

Gene: Spikelee\_95 Start: 54476, Stop: 54700, Start Num: 31

Candidate Starts for Spikelee\_95:

(Start: 31 @54476 has 104 MA's), (41, 54575),

Gene: Squirty\_94 Start: 56513, Stop: 56737, Start Num: 31

Candidate Starts for Squirty\_94:

(Start: 31 @56513 has 104 MA's), (41, 56612),

Gene: StAnnes\_98 Start: 54237, Stop: 54461, Start Num: 31

Candidate Starts for StAnnes\_98:

(Start: 31 @54237 has 104 MA's), (41, 54336),

Gene: Stap\_89 Start: 49963, Stop: 50187, Start Num: 31

Candidate Starts for Stap\_89:

(Start: 31 @49963 has 104 MA's), (41, 50062),

Gene: Starcevich\_96 Start: 54084, Stop: 54308, Start Num: 31

Candidate Starts for Starcevich\_96:

(Start: 31 @54084 has 104 MA's), (41, 54183),

Gene: Suerte\_69 Start: 45335, Stop: 45562, Start Num: 33

Candidate Starts for Suerte\_69:

(Start: 33 @45335 has 4 MA's), (35, 45341),

Gene: Taj\_101 Start: 54398, Stop: 54622, Start Num: 31

Candidate Starts for Taj\_101:

(Start: 31 @54398 has 104 MA's), (41, 54497),

Gene: TaronosaurusRx\_76 Start: 46596, Stop: 46844, Start Num: 31

Candidate Starts for TaronosaurusRx\_76:

(19, 46488), (20, 46491), (23, 46509), (28, 46557), (Start: 31 @46596 has 104 MA's), (38, 46677), (40, 46692), (45, 46752), (46, 46755),

Gene: Tweety\_95 Start: 53662, Stop: 53886, Start Num: 31  
Candidate Starts for Tweety\_95:  
(Start: 31 @53662 has 104 MA's), (41, 53761),

Gene: UncleRicky\_94 Start: 51705, Stop: 51929, Start Num: 31  
Candidate Starts for UncleRicky\_94:  
(Start: 31 @51705 has 104 MA's), (41, 51804),

Gene: VRedHorse\_95 Start: 50521, Stop: 50745, Start Num: 31  
Candidate Starts for VRedHorse\_95:  
(Start: 31 @50521 has 104 MA's), (41, 50620),

Gene: Vivum\_94 Start: 54308, Stop: 54532, Start Num: 31  
Candidate Starts for Vivum\_94:  
(Start: 31 @54308 has 104 MA's), (41, 54407),

Gene: Vulpecula\_63 Start: 36929, Stop: 37147, Start Num: 32  
Candidate Starts for Vulpecula\_63:  
(Start: 32 @36929 has 1 MA's), (34, 36935), (36, 36962), (37, 36971), (43, 37034), (47, 37073), (50, 37091), (51, 37112),

Gene: Wachhund\_92 Start: 49757, Stop: 49981, Start Num: 31  
Candidate Starts for Wachhund\_92:  
(Start: 31 @49757 has 104 MA's), (41, 49856),

Gene: Wee\_98 Start: 54474, Stop: 54698, Start Num: 31  
Candidate Starts for Wee\_98:  
(Start: 31 @54474 has 104 MA's), (41, 54573),

Gene: WillSterrel\_92 Start: 53037, Stop: 53261, Start Num: 31  
Candidate Starts for WillSterrel\_92:  
(Start: 31 @53037 has 104 MA's), (41, 53136),

Gene: XFactor\_85 Start: 50787, Stop: 51011, Start Num: 31  
Candidate Starts for XFactor\_85:  
(Start: 31 @50787 has 104 MA's), (41, 50886),

Gene: ZAYM\_75 Start: 46437, Stop: 46685, Start Num: 31  
Candidate Starts for ZAYM\_75:  
(25, 46371), (Start: 31 @46437 has 104 MA's), (38, 46518), (40, 46533), (45, 46593), (46, 46596),