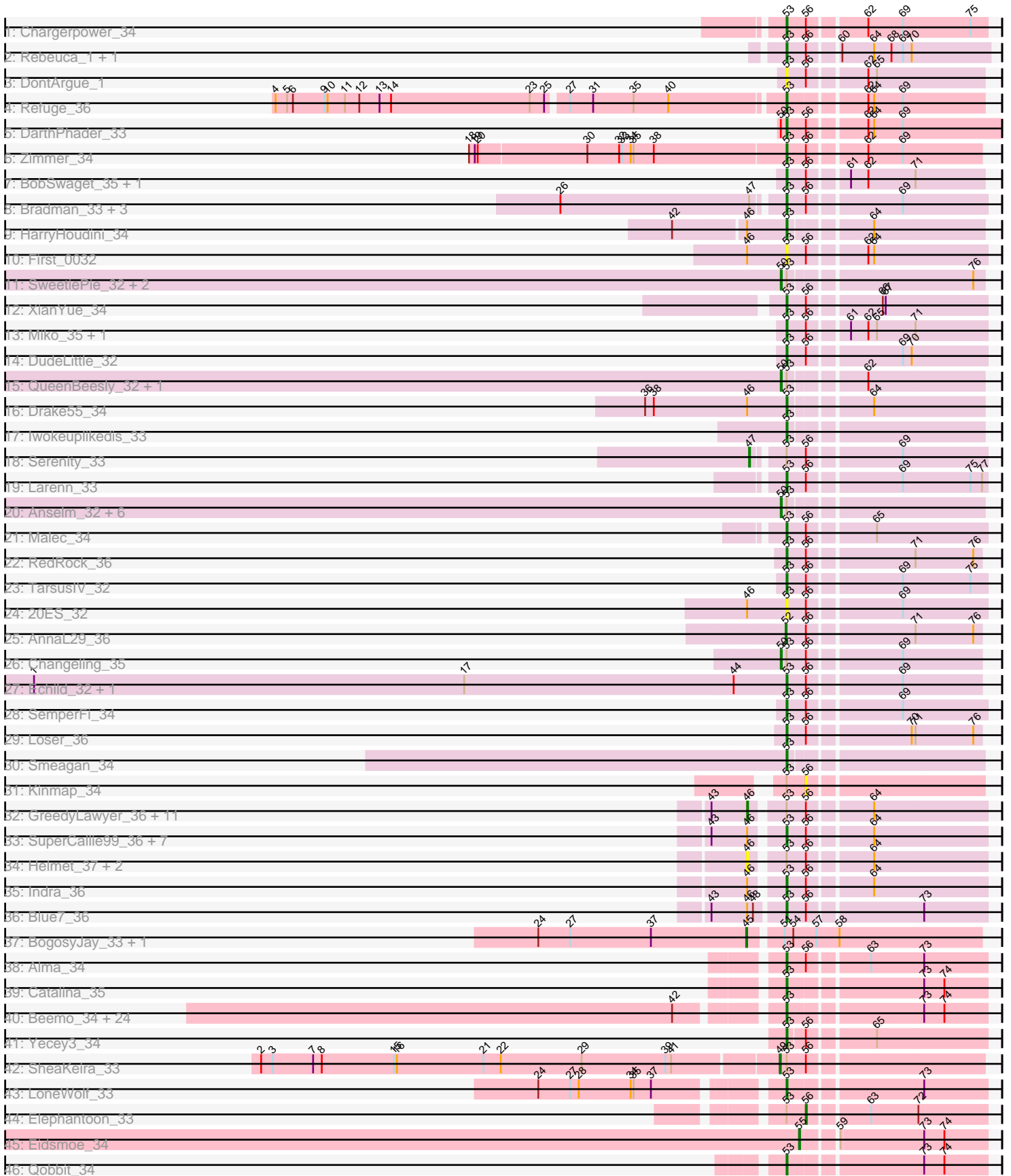


Pham 221283



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 221283 Report

This analysis was run 03/28/25 on database version 593.

Pham number 221283 has 107 members, 22 are drafts.

Phages represented in each track:

- Track 1 : Chargerpower\_34
- Track 2 : Rebeuca\_1, Kristoff\_1
- Track 3 : DontArgue\_1
- Track 4 : Refuge\_36
- Track 5 : DarthPhader\_33
- Track 6 : Zimmer\_34
- Track 7 : BobSwaget\_35, Lokk\_35
- Track 8 : Bradman\_33, Jsquared\_33, MajorMajor\_33, Quokka\_32
- Track 9 : HarryHoudini\_34
- Track 10 : First\_0032
- Track 11 : SweetiePie\_32, Crucio\_32, SnapTap\_32
- Track 12 : XianYue\_34
- Track 13 : Miko\_35, Rachaly\_35
- Track 14 : DudeLittle\_32
- Track 15 : QueenBeesly\_32, FiringLine\_32
- Track 16 : Drake55\_34
- Track 17 : Iwokeuplikedis\_33
- Track 18 : Serenity\_33
- Track 19 : Larenn\_33
- Track 20 : Anselm\_32, Fameo\_32, Retro23\_32, Power\_32, Georgie2\_33, QueenB2\_32, Dalmatian\_32
- Track 21 : Malec\_34
- Track 22 : RedRock\_36
- Track 23 : TarsusIV\_32
- Track 24 : 20ES\_32
- Track 25 : AnnaL29\_36
- Track 26 : Changeling\_35
- Track 27 : Echild\_32, Benvolio\_32
- Track 28 : SemperFi\_34
- Track 29 : Loser\_36
- Track 30 : Smeagan\_34
- Track 31 : Kinmap\_34
- Track 32 : GreedyLawyer\_36, EricB\_36, BlessJoy\_36, DaVinci\_36, Pmask\_36, Gladiator\_36, Roksolana\_36, Kazan\_36, McFly\_36, Candra\_36, SmellyB\_36, VohminGhazi\_36
- Track 33 : SuperCallie99\_36, BABullseye\_36, Chartreuse\_36, Dorothea\_36, Kipper29\_36, Polyphemos\_35, Isiphiwo\_36, Koko\_36

- Track 34 : Helmet\_37, Garak\_37, Temprado\_37
- Track 35 : Indra\_36
- Track 36 : Blue7\_36
- Track 37 : BogosyJay\_33, Maminaiaina\_33
- Track 38 : Alma\_34
- Track 39 : Catalina\_35
- Track 40 : Beemo\_34, EdogawaKiddo\_32, Hanray\_33, Jiawan\_33, PackMan\_34, EmyBug\_34, Aliter\_34, Phaeder\_34, Ugenie5\_31, Lilleskat\_32, RyeScarlet\_35, Onglai\_33, Pioneer\_34, Fayely\_34, Conquerage\_34, Myxus\_34, Phonnegut\_34, Tubs\_34, Holes\_33, Spouty\_34, Sachima\_32, Priya\_34, HortumSL17\_34, Scherzo\_34, ExplosioNervosa\_34
- Track 41 : Yecey3\_34
- Track 42 : SheaKeira\_33
- Track 43 : LoneWolf\_33
- Track 44 : Elephantoon\_33
- Track 45 : Eidsmoe\_34
- Track 46 : Qobbit\_34

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

The start number called the most often in the published annotations is 53, it was called in 55 of the 85 non-draft genes in the pham.

Genes that call this "Most Annotated" start:

- 20ES\_32, Aliter\_34, Alma\_34, BABullseye\_36, Beemo\_34, Benvolio\_32, Blue7\_36, BobSwaget\_35, Bradman\_33, Catalina\_35, Chargerpower\_34, Chartreuse\_36, Conquerage\_34, DarthPhader\_33, DontArgue\_1, Dorothea\_36, Drake55\_34, DudeLittle\_32, Echild\_32, EdogawaKiddo\_32, EmyBug\_34, ExplosioNervosa\_34, Fayely\_34, First\_0032, Hanray\_33, HarryHoudini\_34, Holes\_33, HortumSL17\_34, Indra\_36, Isiphiwo\_36, Iwokeuplikedis\_33, Jiawan\_33, Jsquared\_33, Kipper29\_36, Koko\_36, Kristoff\_1, Larenn\_33, Lilleskat\_32, Lokk\_35, LoneWolf\_33, Loser\_36, MajorMajor\_33, Malec\_34, Miko\_35, Myxus\_34, Onglai\_33, PackMan\_34, Phaeder\_34, Phonnegut\_34, Pioneer\_34, Polyphemus\_35, Priya\_34, Qobbit\_34, Quokka\_32, Rachaly\_35, Rebeuca\_1, RedRock\_36, Refuge\_36, RyeScarlet\_35, Sachima\_32, Scherzo\_34, SemperFi\_34, Smeagan\_34, Spouty\_34, SuperCallie99\_36, TarsusIV\_32, Tubs\_34, Ugenie5\_31, XianYue\_34, Yecey3\_34, Zimmer\_34,

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

- Anselm\_32, BlessJoy\_36, Candra\_36, Changeling\_35, Crucio\_32, DaVinci\_36, Dalmatian\_32, Elephantoon\_33, EricB\_36, Fameo\_32, FiringLine\_32, Garak\_37, Georgie2\_33, Gladiator\_36, GreedyLawyer\_36, Helmet\_37, Kazan\_36, Kinmap\_34, McFly\_36, Pmask\_36, Power\_32, QueenB2\_32, QueenBeesly\_32, Retro23\_32, Roksolana\_36, Serenity\_33, SheaKeira\_33, SmellyB\_36, SnapTap\_32, SweetiePie\_32, Temprado\_37, VohminGhazi\_36,

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

- AnnaL29\_36, BogosyJay\_33, Eidsmoe\_34, Maminaiaina\_33,

**Summary by start number:**

Start 45:

- Found in 2 of 107 ( 1.9% ) of genes in pham
- Manual Annotations of this start: 2 of 85
- Called 100.0% of time when present
- Phage (with cluster) where this start called: BogosyJay\_33 (A9), Maminaiaina\_33 (A9),

Start 46:

- Found in 29 of 107 ( 27.1% ) of genes in pham
- Manual Annotations of this start: 10 of 85
- Called 51.7% of time when present
- Phage (with cluster) where this start called: BlessJoy\_36 (A6), Candra\_36 (A6), DaVinci\_36 (A6), EricB\_36 (A6), Garak\_37 (A6), Gladiator\_36 (A6), GreedyLawyer\_36 (A6), Helmet\_37 (A6), Kazan\_36 (A6), McFly\_36 (A6), Pmask\_36 (A6), Roksolana\_36 (A6), SmellyB\_36 (A6), Temprado\_37 (A6), VohminGhazi\_36 (A6),

Start 47:

- Found in 5 of 107 ( 4.7% ) of genes in pham
- Manual Annotations of this start: 1 of 85
- Called 20.0% of time when present
- Phage (with cluster) where this start called: Serenity\_33 (A2),

Start 49:

- Found in 1 of 107 ( 0.9% ) of genes in pham
- Manual Annotations of this start: 1 of 85
- Called 100.0% of time when present
- Phage (with cluster) where this start called: SheaKeira\_33 (A9),

Start 50:

- Found in 14 of 107 ( 13.1% ) of genes in pham
- Manual Annotations of this start: 13 of 85
- Called 92.9% of time when present
- Phage (with cluster) where this start called: Anselm\_32 (A2), Changeling\_35 (A2), Crucio\_32 (A2), Dalmatian\_32 (A2), Fameo\_32 (A2), FiringLine\_32 (A2), Georgie2\_33 (A2), Power\_32 (A2), QueenB2\_32 (A2), QueenBeesly\_32 (A2), Retro23\_32 (A2), SnapTap\_32 (A2), SweetiePie\_32 (A2),

Start 52:

- Found in 1 of 107 ( 0.9% ) of genes in pham
- Manual Annotations of this start: 1 of 85
- Called 100.0% of time when present
- Phage (with cluster) where this start called: AnnaL29\_36 (A2),

Start 53:

- Found in 103 of 107 ( 96.3% ) of genes in pham
- Manual Annotations of this start: 55 of 85
- Called 68.9% of time when present
- Phage (with cluster) where this start called: 20ES\_32 (A2), Aliter\_34 (A9), Alma\_34 (A9), BABullseye\_36 (A6), Beemo\_34 (A9), Benvolio\_32 (A2), Blue7\_36 (A6), BobSwaget\_35 (A2), Bradman\_33 (A2), Catalina\_35 (A9), Chargerpower\_34 (A), Chartreuse\_36 (A6), Conquerage\_34 (A9), DarthPhader\_33 (A12), DontArgue\_1

(A10), Dorothea\_36 (A6), Drake55\_34 (A2), DudeLittle\_32 (A2), Echild\_32 (A2), EdogawaKiddo\_32 (A9), EmyBug\_34 (A9), ExplosioNervosa\_34 (A9), Fayely\_34 (A9), First\_0032 (A2), Hanray\_33 (A9), HarryHoudini\_34 (A2), Horex\_33 (A9), HortumSL17\_34 (A9), Indra\_36 (A6), Isiphiwo\_36 (A6), Iwokeuplikedis\_33 (A2), Jiawan\_33 (A9), Jsquared\_33 (A2), Kipper29\_36 (A6), Koko\_36 (A6), Kristoff\_1 (A10), Larenn\_33 (A2), Lilleskat\_32 (A9), Lokk\_35 (A2), LoneWolf\_33 (A9), Loser\_36 (A2), MajorMajor\_33 (A2), Malec\_34 (A2), Miko\_35 (A2), Myxus\_34 (A9), Onglai\_33 (A9), PackMan\_34 (A9), Phaeder\_34 (A9), Phonnegut\_34 (A9), Pioneer\_34 (A9), Polyphemus\_35 (A6), Priya\_34 (A9), Qobbit\_34 (A9), Quokka\_32 (A2), Rachaly\_35 (A2), Rebeuca\_1 (A10), RedRock\_36 (A2), Refuge\_36 (A12), RyeScarlet\_35 (A9), Sachima\_32 (A9), Scherzo\_34 (A9), SemperFi\_34 (A2), Smeagan\_34 (A2), Spouty\_34 (A9), SuperCallie99\_36 (A6), TarsusIV\_32 (A2), Tubs\_34 (A9), Ugenie5\_31 (A9), XianYue\_34 (A2), Yecy3\_34 (A9), Zimmer\_34 (A12),

Start 55:

- Found in 1 of 107 ( 0.9% ) of genes in pham
- Manual Annotations of this start: 1 of 85
- Called 100.0% of time when present
- Phage (with cluster) where this start called: Eidsmoe\_34 (A9),

Start 56:

- Found in 59 of 107 ( 55.1% ) of genes in pham
- Manual Annotations of this start: 1 of 85
- Called 3.4% of time when present
- Phage (with cluster) where this start called: Elephantoon\_33 (A9), Kinmap\_34 (A21),

### Summary by clusters:

There are 7 clusters represented in this pham: A, A21, A10, A12, A2, A6, A9,

Info for manual annotations of cluster A:

- Start number 53 was manually annotated 1 time for cluster A.

Info for manual annotations of cluster A10:

- Start number 53 was manually annotated 2 times for cluster A10.

Info for manual annotations of cluster A12:

- Start number 53 was manually annotated 3 times for cluster A12.

Info for manual annotations of cluster A2:

- Start number 47 was manually annotated 1 time for cluster A2.
- Start number 50 was manually annotated 13 times for cluster A2.
- Start number 52 was manually annotated 1 time for cluster A2.
- Start number 53 was manually annotated 19 times for cluster A2.

Info for manual annotations of cluster A6:

- Start number 46 was manually annotated 10 times for cluster A6.
- Start number 53 was manually annotated 8 times for cluster A6.

Info for manual annotations of cluster A9:

- Start number 45 was manually annotated 2 times for cluster A9.
- Start number 49 was manually annotated 1 time for cluster A9.

- Start number 53 was manually annotated 22 times for cluster A9.
- Start number 55 was manually annotated 1 time for cluster A9.
- Start number 56 was manually annotated 1 time for cluster A9.

### **Gene Information:**

Gene: 20ES\_32 Start: 25276, Stop: 25470, Start Num: 53

Candidate Starts for 20ES\_32:

(Start: 46 @25237 has 10 MA's), (Start: 53 @25276 has 55 MA's), (Start: 56 @25294 has 1 MA's), (69, 25384),

Gene: Aliter\_34 Start: 26137, Stop: 26331, Start Num: 53

Candidate Starts for Aliter\_34:

(42, 26044), (Start: 53 @26137 has 55 MA's), (73, 26266), (74, 26287),

Gene: Alma\_34 Start: 26253, Stop: 26447, Start Num: 53

Candidate Starts for Alma\_34:

(Start: 53 @26253 has 55 MA's), (Start: 56 @26271 has 1 MA's), (63, 26328), (73, 26382),

Gene: AnnaL29\_36 Start: 26963, Stop: 27151, Start Num: 52

Candidate Starts for AnnaL29\_36:

(Start: 52 @26963 has 1 MA's), (Start: 56 @26981 has 1 MA's), (71, 27083), (76, 27143),

Gene: Anselm\_32 Start: 25137, Stop: 25331, Start Num: 50

Candidate Starts for Anselm\_32:

(Start: 50 @25137 has 13 MA's), (Start: 53 @25143 has 55 MA's),

Gene: BABullseye\_36 Start: 24354, Stop: 24548, Start Num: 53

Candidate Starts for BABullseye\_36:

(43, 24291), (Start: 46 @24327 has 10 MA's), (Start: 53 @24354 has 55 MA's), (Start: 56 @24372 has 1 MA's), (64, 24432),

Gene: Beemo\_34 Start: 26243, Stop: 26437, Start Num: 53

Candidate Starts for Beemo\_34:

(42, 26150), (Start: 53 @26243 has 55 MA's), (73, 26372), (74, 26393),

Gene: Benvolio\_32 Start: 25256, Stop: 25444, Start Num: 53

Candidate Starts for Benvolio\_32:

(1, 24476), (17, 24923), (44, 25202), (Start: 53 @25256 has 55 MA's), (Start: 56 @25274 has 1 MA's), (69, 25364),

Gene: BlessJoy\_36 Start: 24249, Stop: 24470, Start Num: 46

Candidate Starts for BlessJoy\_36:

(43, 24213), (Start: 46 @24249 has 10 MA's), (Start: 53 @24276 has 55 MA's), (Start: 56 @24294 has 1 MA's), (64, 24354),

Gene: Blue7\_36 Start: 24271, Stop: 24465, Start Num: 53

Candidate Starts for Blue7\_36:

(43, 24202), (Start: 46 @24238 has 10 MA's), (48, 24244), (Start: 53 @24271 has 55 MA's), (Start: 56 @24289 has 1 MA's), (73, 24400),

Gene: BobSwaget\_35 Start: 26212, Stop: 26403, Start Num: 53  
Candidate Starts for BobSwaget\_35:  
(Start: 53 @26212 has 55 MA's), (Start: 56 @26230 has 1 MA's), (61, 26266), (62, 26284), (71, 26332),

Gene: BogosyJay\_33 Start: 25749, Stop: 25982, Start Num: 45  
Candidate Starts for BogosyJay\_33:  
(24, 25533), (27, 25566), (37, 25650), (Start: 45 @25749 has 2 MA's), (51, 25779), (54, 25788), (57, 25812), (58, 25836),

Gene: Bradman\_33 Start: 24295, Stop: 24489, Start Num: 53  
Candidate Starts for Bradman\_33:  
(26, 24073), (Start: 47 @24268 has 1 MA's), (Start: 53 @24295 has 55 MA's), (Start: 56 @24313 has 1 MA's), (69, 24403),

Gene: Candra\_36 Start: 24290, Stop: 24511, Start Num: 46  
Candidate Starts for Candra\_36:  
(43, 24254), (Start: 46 @24290 has 10 MA's), (Start: 53 @24317 has 55 MA's), (Start: 56 @24335 has 1 MA's), (64, 24395),

Gene: Catalina\_35 Start: 26210, Stop: 26404, Start Num: 53  
Candidate Starts for Catalina\_35:  
(Start: 53 @26210 has 55 MA's), (73, 26339), (74, 26360),

Gene: Changeling\_35 Start: 26957, Stop: 27151, Start Num: 50  
Candidate Starts for Changeling\_35:  
(Start: 50 @26957 has 13 MA's), (Start: 53 @26963 has 55 MA's), (Start: 56 @26981 has 1 MA's), (69, 27071),

Gene: Chargerpower\_34 Start: 24510, Stop: 24704, Start Num: 53  
Candidate Starts for Chargerpower\_34:  
(Start: 53 @24510 has 55 MA's), (Start: 56 @24528 has 1 MA's), (62, 24582), (69, 24618), (75, 24687),

Gene: Chartreuse\_36 Start: 24228, Stop: 24422, Start Num: 53  
Candidate Starts for Chartreuse\_36:  
(43, 24165), (Start: 46 @24201 has 10 MA's), (Start: 53 @24228 has 55 MA's), (Start: 56 @24246 has 1 MA's), (64, 24306),

Gene: Conquerage\_34 Start: 26239, Stop: 26433, Start Num: 53  
Candidate Starts for Conquerage\_34:  
(42, 26146), (Start: 53 @26239 has 55 MA's), (73, 26368), (74, 26389),

Gene: Crucio\_32 Start: 24906, Stop: 25100, Start Num: 50  
Candidate Starts for Crucio\_32:  
(Start: 50 @24906 has 13 MA's), (Start: 53 @24912 has 55 MA's), (76, 25089),

Gene: DaVinci\_36 Start: 24255, Stop: 24476, Start Num: 46  
Candidate Starts for DaVinci\_36:  
(43, 24219), (Start: 46 @24255 has 10 MA's), (Start: 53 @24282 has 55 MA's), (Start: 56 @24300 has 1 MA's), (64, 24360),

Gene: Dalmatian\_32 Start: 25113, Stop: 25307, Start Num: 50  
Candidate Starts for Dalmatian\_32:  
(Start: 50 @25113 has 13 MA's), (Start: 53 @25119 has 55 MA's),

Gene: DarthPhader\_33 Start: 26222, Stop: 26431, Start Num: 53  
Candidate Starts for DarthPhader\_33:  
(Start: 50 @26216 has 13 MA's), (Start: 53 @26222 has 55 MA's), (Start: 56 @26240 has 1 MA's), (62, 26294), (64, 26300), (69, 26330),

Gene: DontArgue\_1 Start: 129, Stop: 320, Start Num: 53  
Candidate Starts for DontArgue\_1:  
(Start: 53 @129 has 55 MA's), (Start: 56 @147 has 1 MA's), (62, 201), (65, 210),

Gene: Dorothea\_36 Start: 24282, Stop: 24476, Start Num: 53  
Candidate Starts for Dorothea\_36:  
(43, 24219), (Start: 46 @24255 has 10 MA's), (Start: 53 @24282 has 55 MA's), (Start: 56 @24300 has 1 MA's), (64, 24360),

Gene: Drake55\_34 Start: 25399, Stop: 25587, Start Num: 53  
Candidate Starts for Drake55\_34:  
(36, 25255), (38, 25264), (Start: 46 @25360 has 10 MA's), (Start: 53 @25399 has 55 MA's), (64, 25474),

Gene: DudeLittle\_32 Start: 25122, Stop: 25316, Start Num: 53  
Candidate Starts for DudeLittle\_32:  
(Start: 53 @25122 has 55 MA's), (Start: 56 @25140 has 1 MA's), (69, 25230), (70, 25239),

Gene: Echild\_32 Start: 25256, Stop: 25444, Start Num: 53  
Candidate Starts for Echild\_32:  
(1, 24476), (17, 24923), (44, 25202), (Start: 53 @25256 has 55 MA's), (Start: 56 @25274 has 1 MA's), (69, 25364),

Gene: EdogawaKiddo\_32 Start: 26209, Stop: 26403, Start Num: 53  
Candidate Starts for EdogawaKiddo\_32:  
(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Eidsmoe\_34 Start: 26288, Stop: 26467, Start Num: 55  
Candidate Starts for Eidsmoe\_34:  
(Start: 55 @26288 has 1 MA's), (59, 26318), (73, 26402), (74, 26423),

Gene: Elephantoon\_33 Start: 25663, Stop: 25839, Start Num: 56  
Candidate Starts for Elephantoon\_33:  
(Start: 53 @25645 has 55 MA's), (Start: 56 @25663 has 1 MA's), (63, 25720), (72, 25768),

Gene: EmyBug\_34 Start: 26275, Stop: 26469, Start Num: 53  
Candidate Starts for EmyBug\_34:  
(42, 26182), (Start: 53 @26275 has 55 MA's), (73, 26404), (74, 26425),

Gene: EricB\_36 Start: 24247, Stop: 24468, Start Num: 46  
Candidate Starts for EricB\_36:  
(43, 24211), (Start: 46 @24247 has 10 MA's), (Start: 53 @24274 has 55 MA's), (Start: 56 @24292 has 1 MA's), (64, 24352),

Gene: ExplosioNervosa\_34 Start: 26278, Stop: 26472, Start Num: 53  
Candidate Starts for ExplosioNervosa\_34:  
(42, 26185), (Start: 53 @26278 has 55 MA's), (73, 26407), (74, 26428),



Gene: Fameo\_32 Start: 25078, Stop: 25272, Start Num: 50  
Candidate Starts for Fameo\_32:  
(Start: 50 @25078 has 13 MA's), (Start: 53 @25084 has 55 MA's),

Gene: Fayely\_34 Start: 26242, Stop: 26436, Start Num: 53  
Candidate Starts for Fayely\_34:  
(42, 26149), (Start: 53 @26242 has 55 MA's), (73, 26371), (74, 26392),

Gene: FiringLine\_32 Start: 24903, Stop: 25097, Start Num: 50  
Candidate Starts for FiringLine\_32:  
(Start: 50 @24903 has 13 MA's), (Start: 53 @24909 has 55 MA's), (62, 24978),

Gene: First\_0032 Start: 25337, Stop: 25531, Start Num: 53  
Candidate Starts for First\_0032:  
(Start: 46 @25298 has 10 MA's), (Start: 53 @25337 has 55 MA's), (Start: 56 @25355 has 1 MA's), (62, 25409), (64, 25415),

Gene: Garak\_37 Start: 24255, Stop: 24476, Start Num: 46  
Candidate Starts for Garak\_37:  
(Start: 46 @24255 has 10 MA's), (Start: 53 @24282 has 55 MA's), (Start: 56 @24300 has 1 MA's), (64, 24360),

Gene: Georgie2\_33 Start: 24948, Stop: 25142, Start Num: 50  
Candidate Starts for Georgie2\_33:  
(Start: 50 @24948 has 13 MA's), (Start: 53 @24954 has 55 MA's),

Gene: Gladiator\_36 Start: 24242, Stop: 24463, Start Num: 46  
Candidate Starts for Gladiator\_36:  
(43, 24206), (Start: 46 @24242 has 10 MA's), (Start: 53 @24269 has 55 MA's), (Start: 56 @24287 has 1 MA's), (64, 24347),

Gene: GreedyLawyer\_36 Start: 24254, Stop: 24475, Start Num: 46  
Candidate Starts for GreedyLawyer\_36:  
(43, 24218), (Start: 46 @24254 has 10 MA's), (Start: 53 @24281 has 55 MA's), (Start: 56 @24299 has 1 MA's), (64, 24359),

Gene: Hanray\_33 Start: 26213, Stop: 26407, Start Num: 53  
Candidate Starts for Hanray\_33:  
(42, 26120), (Start: 53 @26213 has 55 MA's), (73, 26342), (74, 26363),

Gene: HarryHoudini\_34 Start: 25397, Stop: 25585, Start Num: 53  
Candidate Starts for HarryHoudini\_34:  
(42, 25286), (Start: 46 @25358 has 10 MA's), (Start: 53 @25397 has 55 MA's), (64, 25472),

Gene: Helmet\_37 Start: 24255, Stop: 24476, Start Num: 46  
Candidate Starts for Helmet\_37:  
(Start: 46 @24255 has 10 MA's), (Start: 53 @24282 has 55 MA's), (Start: 56 @24300 has 1 MA's), (64, 24360),

Gene: Horex\_33 Start: 26213, Stop: 26407, Start Num: 53  
Candidate Starts for Horex\_33:  
(42, 26120), (Start: 53 @26213 has 55 MA's), (73, 26342), (74, 26363),

Gene: HortumSL17\_34 Start: 26209, Stop: 26403, Start Num: 53  
Candidate Starts for HortumSL17\_34:  
(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Indra\_36 Start: 24283, Stop: 24477, Start Num: 53  
Candidate Starts for Indra\_36:  
(Start: 46 @24256 has 10 MA's), (Start: 53 @24283 has 55 MA's), (Start: 56 @24301 has 1 MA's), (64, 24361),

Gene: Isiphiwo\_36 Start: 24352, Stop: 24546, Start Num: 53  
Candidate Starts for Isiphiwo\_36:  
(43, 24289), (Start: 46 @24325 has 10 MA's), (Start: 53 @24352 has 55 MA's), (Start: 56 @24370 has 1 MA's), (64, 24430),

Gene: Iwokeuplikedis\_33 Start: 24875, Stop: 25063, Start Num: 53  
Candidate Starts for Iwokeuplikedis\_33:  
(Start: 53 @24875 has 55 MA's),

Gene: Jiawan\_33 Start: 26245, Stop: 26439, Start Num: 53  
Candidate Starts for Jiawan\_33:  
(42, 26152), (Start: 53 @26245 has 55 MA's), (73, 26374), (74, 26395),

Gene: Jsquared\_33 Start: 24368, Stop: 24562, Start Num: 53  
Candidate Starts for Jsquared\_33:  
(26, 24146), (Start: 47 @24341 has 1 MA's), (Start: 53 @24368 has 55 MA's), (Start: 56 @24386 has 1 MA's), (69, 24476),

Gene: Kazan\_36 Start: 24260, Stop: 24481, Start Num: 46  
Candidate Starts for Kazan\_36:  
(43, 24224), (Start: 46 @24260 has 10 MA's), (Start: 53 @24287 has 55 MA's), (Start: 56 @24305 has 1 MA's), (64, 24365),

Gene: Kinmap\_34 Start: 24981, Stop: 25154, Start Num: 56  
Candidate Starts for Kinmap\_34:  
(Start: 53 @24963 has 55 MA's), (Start: 56 @24981 has 1 MA's),

Gene: Kipper29\_36 Start: 24281, Stop: 24475, Start Num: 53  
Candidate Starts for Kipper29\_36:  
(43, 24218), (Start: 46 @24254 has 10 MA's), (Start: 53 @24281 has 55 MA's), (Start: 56 @24299 has 1 MA's), (64, 24359),

Gene: Koko\_36 Start: 24619, Stop: 24813, Start Num: 53  
Candidate Starts for Koko\_36:  
(43, 24556), (Start: 46 @24592 has 10 MA's), (Start: 53 @24619 has 55 MA's), (Start: 56 @24637 has 1 MA's), (64, 24697),

Gene: Kristoff\_1 Start: 130, Stop: 327, Start Num: 53  
Candidate Starts for Kristoff\_1:  
(Start: 53 @130 has 55 MA's), (Start: 56 @148 has 1 MA's), (60, 175), (64, 208), (68, 226), (69, 238), (70, 247),

Gene: Larenn\_33 Start: 25342, Stop: 25536, Start Num: 53

Candidate Starts for Larenn\_33:

(Start: 53 @25342 has 55 MA's), (Start: 56 @25360 has 1 MA's), (69, 25450), (75, 25519), (77, 25531),

Gene: Lilleskat\_32 Start: 26209, Stop: 26403, Start Num: 53

Candidate Starts for Lilleskat\_32:

(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Lokk\_35 Start: 26231, Stop: 26431, Start Num: 53

Candidate Starts for Lokk\_35:

(Start: 53 @26231 has 55 MA's), (Start: 56 @26249 has 1 MA's), (61, 26285), (62, 26303), (71, 26351),

Gene: LoneWolf\_33 Start: 25798, Stop: 25992, Start Num: 53

Candidate Starts for LoneWolf\_33:

(24, 25570), (27, 25603), (28, 25612), (34, 25666), (35, 25669), (37, 25687), (Start: 53 @25798 has 55 MA's), (73, 25927),

Gene: Loser\_36 Start: 26885, Stop: 27073, Start Num: 53

Candidate Starts for Loser\_36:

(Start: 53 @26885 has 55 MA's), (Start: 56 @26903 has 1 MA's), (70, 27002), (71, 27005), (76, 27065),

Gene: MajorMajor\_33 Start: 24295, Stop: 24489, Start Num: 53

Candidate Starts for MajorMajor\_33:

(26, 24073), (Start: 47 @24268 has 1 MA's), (Start: 53 @24295 has 55 MA's), (Start: 56 @24313 has 1 MA's), (69, 24403),

Gene: Malec\_34 Start: 25875, Stop: 26069, Start Num: 53

Candidate Starts for Malec\_34:

(Start: 53 @25875 has 55 MA's), (Start: 56 @25893 has 1 MA's), (65, 25956),

Gene: Maminiaina\_33 Start: 25731, Stop: 25964, Start Num: 45

Candidate Starts for Maminiaina\_33:

(24, 25515), (27, 25548), (37, 25632), (Start: 45 @25731 has 2 MA's), (51, 25761), (54, 25770), (57, 25794), (58, 25818),

Gene: McFly\_36 Start: 24254, Stop: 24475, Start Num: 46

Candidate Starts for McFly\_36:

(43, 24218), (Start: 46 @24254 has 10 MA's), (Start: 53 @24281 has 55 MA's), (Start: 56 @24299 has 1 MA's), (64, 24359),

Gene: Miko\_35 Start: 26351, Stop: 26545, Start Num: 53

Candidate Starts for Miko\_35:

(Start: 53 @26351 has 55 MA's), (Start: 56 @26369 has 1 MA's), (61, 26405), (62, 26423), (65, 26432), (71, 26471),

Gene: Myxus\_34 Start: 26209, Stop: 26403, Start Num: 53

Candidate Starts for Myxus\_34:

(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Onglai\_33 Start: 24543, Stop: 24737, Start Num: 53

Candidate Starts for Onglai\_33:

(42, 24450), (Start: 53 @24543 has 55 MA's), (73, 24672), (74, 24693),

Gene: PackMan\_34 Start: 26209, Stop: 26403, Start Num: 53

Candidate Starts for PackMan\_34:

(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Phaeder\_34 Start: 26209, Stop: 26403, Start Num: 53

Candidate Starts for Phaeder\_34:

(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Phonnegut\_34 Start: 26242, Stop: 26436, Start Num: 53

Candidate Starts for Phonnegut\_34:

(42, 26149), (Start: 53 @26242 has 55 MA's), (73, 26371), (74, 26392),

Gene: Pioneer\_34 Start: 26242, Stop: 26436, Start Num: 53

Candidate Starts for Pioneer\_34:

(42, 26149), (Start: 53 @26242 has 55 MA's), (73, 26371), (74, 26392),

Gene: Pmask\_36 Start: 24248, Stop: 24469, Start Num: 46

Candidate Starts for Pmask\_36:

(43, 24212), (Start: 46 @24248 has 10 MA's), (Start: 53 @24275 has 55 MA's), (Start: 56 @24293 has 1 MA's), (64, 24353),

Gene: Polyphemus\_35 Start: 24273, Stop: 24467, Start Num: 53

Candidate Starts for Polyphemus\_35:

(43, 24210), (Start: 46 @24246 has 10 MA's), (Start: 53 @24273 has 55 MA's), (Start: 56 @24291 has 1 MA's), (64, 24351),

Gene: Power\_32 Start: 24957, Stop: 25151, Start Num: 50

Candidate Starts for Power\_32:

(Start: 50 @24957 has 13 MA's), (Start: 53 @24963 has 55 MA's),

Gene: Priya\_34 Start: 26276, Stop: 26470, Start Num: 53

Candidate Starts for Priya\_34:

(42, 26183), (Start: 53 @26276 has 55 MA's), (73, 26405), (74, 26426),

Gene: Qobbit\_34 Start: 26238, Stop: 26432, Start Num: 53

Candidate Starts for Qobbit\_34:

(Start: 53 @26238 has 55 MA's), (73, 26367), (74, 26388),

Gene: QueenB2\_32 Start: 25018, Stop: 25212, Start Num: 50

Candidate Starts for QueenB2\_32:

(Start: 50 @25018 has 13 MA's), (Start: 53 @25024 has 55 MA's),

Gene: QueenBeesly\_32 Start: 24903, Stop: 25097, Start Num: 50

Candidate Starts for QueenBeesly\_32:

(Start: 50 @24903 has 13 MA's), (Start: 53 @24909 has 55 MA's), (62, 24978),

Gene: Quokka\_32 Start: 24295, Stop: 24489, Start Num: 53

Candidate Starts for Quokka\_32:

(26, 24073), (Start: 47 @24268 has 1 MA's), (Start: 53 @24295 has 55 MA's), (Start: 56 @24313 has 1 MA's), (69, 24403),

Gene: Rachaly\_35 Start: 26226, Stop: 26420, Start Num: 53

Candidate Starts for Rachaly\_35:

(Start: 53 @26226 has 55 MA's), (Start: 56 @26244 has 1 MA's), (61, 26280), (62, 26298), (65, 26307), (71, 26346),

Gene: Rebeuca\_1 Start: 130, Stop: 327, Start Num: 53

Candidate Starts for Rebeuca\_1:

(Start: 53 @130 has 55 MA's), (Start: 56 @148 has 1 MA's), (60, 175), (64, 208), (68, 226), (69, 238), (70, 247),

Gene: RedRock\_36 Start: 27043, Stop: 27231, Start Num: 53

Candidate Starts for RedRock\_36:

(Start: 53 @27043 has 55 MA's), (Start: 56 @27061 has 1 MA's), (71, 27163), (76, 27223),

Gene: Refuge\_36 Start: 28084, Stop: 28275, Start Num: 53

Candidate Starts for Refuge\_36:

(4, 27574), (5, 27586), (6, 27592), (9, 27625), (10, 27628), (11, 27646), (12, 27661), (13, 27682), (14, 27694), (23, 27838), (25, 27853), (27, 27871), (31, 27895), (35, 27937), (40, 27973), (Start: 53 @28084 has 55 MA's), (62, 28156), (64, 28162), (69, 28192),

Gene: Retro23\_32 Start: 25108, Stop: 25302, Start Num: 50

Candidate Starts for Retro23\_32:

(Start: 50 @25108 has 13 MA's), (Start: 53 @25114 has 55 MA's),

Gene: Roksolana\_36 Start: 24268, Stop: 24489, Start Num: 46

Candidate Starts for Roksolana\_36:

(43, 24232), (Start: 46 @24268 has 10 MA's), (Start: 53 @24295 has 55 MA's), (Start: 56 @24313 has 1 MA's), (64, 24373),

Gene: RyeScarlet\_35 Start: 26213, Stop: 26407, Start Num: 53

Candidate Starts for RyeScarlet\_35:

(42, 26120), (Start: 53 @26213 has 55 MA's), (73, 26342), (74, 26363),

Gene: Sachima\_32 Start: 26209, Stop: 26403, Start Num: 53

Candidate Starts for Sachima\_32:

(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Scherzo\_34 Start: 26242, Stop: 26436, Start Num: 53

Candidate Starts for Scherzo\_34:

(42, 26149), (Start: 53 @26242 has 55 MA's), (73, 26371), (74, 26392),

Gene: SemperFi\_34 Start: 25337, Stop: 25531, Start Num: 53

Candidate Starts for SemperFi\_34:

(Start: 53 @25337 has 55 MA's), (Start: 56 @25355 has 1 MA's), (69, 25445),

Gene: Serenity\_33 Start: 24393, Stop: 24614, Start Num: 47

Candidate Starts for Serenity\_33:

(Start: 47 @24393 has 1 MA's), (Start: 53 @24420 has 55 MA's), (Start: 56 @24438 has 1 MA's), (69, 24528),

Gene: SheaKeira\_33 Start: 24739, Stop: 24936, Start Num: 49

Candidate Starts for SheaKeira\_33:

(2, 24208), (3, 24220), (7, 24262), (8, 24271), (15, 24346), (16, 24349), (21, 24439), (22, 24457), (29, 24541), (39, 24628), (41, 24634), (Start: 49 @24739 has 1 MA's), (Start: 53 @24745 has 55 MA's), (Start: 56 @24763 has 1 MA's),

Gene: Smeagan\_34 Start: 25425, Stop: 25613, Start Num: 53  
Candidate Starts for Smeagan\_34:  
(Start: 53 @25425 has 55 MA's),

Gene: SmellyB\_36 Start: 24254, Stop: 24475, Start Num: 46  
Candidate Starts for SmellyB\_36:  
(43, 24218), (Start: 46 @24254 has 10 MA's), (Start: 53 @24281 has 55 MA's), (Start: 56 @24299 has 1 MA's), (64, 24359),

Gene: SnapTap\_32 Start: 24966, Stop: 25160, Start Num: 50  
Candidate Starts for SnapTap\_32:  
(Start: 50 @24966 has 13 MA's), (Start: 53 @24972 has 55 MA's), (76, 25149),

Gene: Spouty\_34 Start: 26275, Stop: 26469, Start Num: 53  
Candidate Starts for Spouty\_34:  
(42, 26182), (Start: 53 @26275 has 55 MA's), (73, 26404), (74, 26425),

Gene: SuperCallie99\_36 Start: 24273, Stop: 24467, Start Num: 53  
Candidate Starts for SuperCallie99\_36:  
(43, 24210), (Start: 46 @24246 has 10 MA's), (Start: 53 @24273 has 55 MA's), (Start: 56 @24291 has 1 MA's), (64, 24351),

Gene: SweetiePie\_32 Start: 24966, Stop: 25160, Start Num: 50  
Candidate Starts for SweetiePie\_32:  
(Start: 50 @24966 has 13 MA's), (Start: 53 @24972 has 55 MA's), (76, 25149),

Gene: TarsusIV\_32 Start: 25105, Stop: 25299, Start Num: 53  
Candidate Starts for TarsusIV\_32:  
(Start: 53 @25105 has 55 MA's), (Start: 56 @25123 has 1 MA's), (69, 25213), (75, 25282),

Gene: Temprado\_37 Start: 24255, Stop: 24476, Start Num: 46  
Candidate Starts for Temprado\_37:  
(Start: 46 @24255 has 10 MA's), (Start: 53 @24282 has 55 MA's), (Start: 56 @24300 has 1 MA's), (64, 24360),

Gene: Tubs\_34 Start: 26209, Stop: 26403, Start Num: 53  
Candidate Starts for Tubs\_34:  
(42, 26116), (Start: 53 @26209 has 55 MA's), (73, 26338), (74, 26359),

Gene: Ugenie5\_31 Start: 26242, Stop: 26436, Start Num: 53  
Candidate Starts for Ugenie5\_31:  
(42, 26149), (Start: 53 @26242 has 55 MA's), (73, 26371), (74, 26392),

Gene: VohminGhazi\_36 Start: 24254, Stop: 24475, Start Num: 46  
Candidate Starts for VohminGhazi\_36:  
(43, 24218), (Start: 46 @24254 has 10 MA's), (Start: 53 @24281 has 55 MA's), (Start: 56 @24299 has 1 MA's), (64, 24359),

Gene: XianYue\_34 Start: 25327, Stop: 25521, Start Num: 53  
Candidate Starts for XianYue\_34:  
(Start: 53 @25327 has 55 MA's), (Start: 56 @25345 has 1 MA's), (66, 25414), (67, 25417),

Gene: Yecey3\_34 Start: 25012, Stop: 25203, Start Num: 53

Candidate Starts for Yecey3\_34:

(Start: 53 @25012 has 55 MA's), (Start: 56 @25027 has 1 MA's), (65, 25090),

Gene: Zimmer\_34 Start: 26872, Stop: 27060, Start Num: 53

Candidate Starts for Zimmer\_34:

(18, 26548), (19, 26554), (20, 26557), (30, 26668), (32, 26701), (33, 26704), (34, 26713), (35, 26716),  
(38, 26737), (Start: 53 @26872 has 55 MA's), (Start: 56 @26890 has 1 MA's), (62, 26944), (69,  
26980),