

g|121218946|ref|NP_624725.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Streptomyces_coelicolor_A3_2_

g|27382671|ref|NP_774200.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Bradyrhizobium_diazoeficiens_USDA_110

g|496842201|ref|WP_009382368.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Staphylococcus_massiliensis

g|589607179|gb|EX178805.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Candidatus_Accumulibacter_sp._BA_92

g|291350327|gb|EFE77231.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Streptomyces_roseosporus_NRR1_15998

g|590118781|emb|CDN62837.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Burkholderia_cenocapacia_H111

g|163261276|emb|CAP43578.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Bordetella_petrii

g|697989983|emb|CD289853.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Rhodococcus_ruber

g|692345093|gb|A1S18709.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Pseudomonas_rhizospherae

g|564130235|gb|AHB77738.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Pandoraea_sp._RB_44

g|456013493|gb|EMF47142.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Planococcus_haloeryophilus_Or1

g|390127726|gb|AFL51107.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Smorhizobium_fredi_USDA_257

g|409020166|gb|AFV02197.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Dehalobacter_sp._DCA

g|387577481|gb|AF386197.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Burkholderia_sp._K006

g|338166408|gb|AEI77463.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Cupriavidus_necator_N_1

g|557677073|ref|WP_023431392.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Lutibaculum_baratgense

g|554387478|gb|ESJ19346.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Cupriavidus_sp._HPC_1_

g|546338698|gb|AGW90947.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Ralstonia_pickettii_DTP0602

g|510823052|ref|WP_016196456.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Arcticobacter_svalbardensis

g|497749207|ref|WP_010063391.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Streptomyces_globosporus

g|497569531|ref|WP_009883715.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Brevibacterium_lines

g|495772658|ref|WP_008497237.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Planococcus_haloeryophilus

g|494088400|ref|WP_007029235.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Amycolatopsis_decaplania

g|507723151|gb|EOR93514.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Arcticobacter_svalbardensis_MN12_7

g|504001150|ref|WP_014235144.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Azospira_oryzae

g|497541182|ref|WP_009855380.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Rubrivivax_benzoatilyticus

g|496114287|ref|WP_008838794.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Mesorhizobium_alhagi

g|495604483|ref|WP_008329062.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Herbaspirillum_sp._GW103

g|495157457|ref|WP_007882260.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Herbaspirillum_sp._CF444

g|4944280742|ref|WP_007161755.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Pseudomonas_psychrotolerans

g|500127041|ref|WP_011803046.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Polaromonas_naphthalenivorans

g|499785115|ref|WP_011465849.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Rhodofexa_ferreducens

g|504305608|ref|WP_01492710.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Bradyrhizobium_japonicum

g|358636275|gb|JBA123572.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Azorarcus_sp._JH32C

g|4522958176|gb|EME63532.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Amycolatopsis_decaplania_DSM_44594

g|355542197|gb|EH11362.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Mesorhizobium_amorphae_CNWGS0123

g|355534302|gb|EH103613.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Agrobacterium_tumefaciens_CNWGS0286

g|727069043|gb|KHF25047.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Solemya_velum_gill_symbiont

g|685628656|gb|KGB26342.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Acetobacter_tropicalis

g|671754675|gb|AII87550.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Planktomarina_temperata_RCA23

g|648131903|gb|AIB27995.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Brucella_suis_bv._2

g|589905579|gb|GAF61489.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Psychrobacter_sp._JCM_18903

g|586633014|gb|EW563693.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Hydrogenophaga_sp._T4

g|551360164|ref|WP_022979511.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Ideonella_sp._B508_1

g|549499367|ref|WP_022535629.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Ralstonia_pickettii

g|501317522|ref|WP_012349157.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Leptothrix_choldonii

g|495527202|ref|WP_008251847.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Umnobacter_sp._MED105

g|517201222|ref|WP_018390040.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Ancylobacter_sp._FA202

g|668957299|gb|KFC75926.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Bosea_sp._LC85

g|653099732|ref|WP_027349842.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Halotalea_alkalenta

g|648481627|ref|WP_026173378.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Marteella_mediterranea

g|497281414|ref|WP_009595631.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Paenibacillus_sp._HG5

g|661293850|ref|WP_029986926.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Lysinibacillus_fusiformis

g|655988883|ref|WP_029030581.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Salinarimonas_rosea

g|518380652|ref|WP_019550859.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Thermus_scutoductus

g|262033989|gb|IEY52455.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Vibrio_cholerae_CT_5369_93

g|557256703|emb|CDI50076.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Clostridium_tetani_12124569

g|741049189|gb|AJA87467.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Bacillus_anthraxis

g|740799068|ref|WP_038584351.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Neorhizobium_galegae

g|746720188|ref|WP_039677944.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Terrisporobacter_othinensis

g|684612519|gb|JGA120384.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Vibrio_maritimus

g|672598286|gb|AJI37261.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Flavobacterium_psychrophilum

g|672363135|gb|AJI308332.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Edwadsella_tarda_080813

g|631786171|gb|BAO77458.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Brucella_suis_bv._2

g|667707288|gb|KFA59360.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Gliomella_apicola

g|740790666|ref|WP_038759550.1|_2_haloalkanoic_acid_dehalogenase_bacteria_Ensiser_adhaerens

g|512189573|gb|EPE05339.1|_2_haloalkanoic_acid_dehalogenase_fungi_Ophiostoma_piceae_UAMH_11346

g|320585991|gb|EWF98670.1|_2_haloalkanoic_acid_dehalogenase_fungi_Grosmanina_davigera_kw1407

g|701775653|gb|KGQ12100.1|_2_haloalkanoic_acid_dehalogenase_fungi_Beauveria_bassiana_D1_5

g|596701524|ref|WP_00728649.1|_2_haloalkanoic_acid_dehalogenase_fungi_Colletotrichum_gloeosporioides_Nara_3G5

g|358373737|gb|GAA90369.1|_2_haloalkanoic_acid_dehalogenase_fungi_Aspergillus_kawachi_JFO_4308

g|594723497|gb|EXV06383.1|_2_haloalkanoic_acid_dehalogenase_fungi_Metahizium_robertsi

g|453084916|gb|EMF12960.1|_2_haloalkanoic_acid_dehalogenase_fungi_Sphaerulina_musiva_SO2202

g|514520915|ref|XP_001396971.1|_2_haloalkanoic_acid_dehalogenase_fungi_Aspergillus_niger_CB_513.88

g|742076118|gb|KIA76008.1|_2_haloalkanoic_acid_dehalogenase_fungi_Aspergillus_ustus

g|477592191|gb|ENH62511.1|_2_haloalkanoic_acid_dehalogenase_fungi_Fusarium_oxysporum_f._sp._cubense_race_1

g|528301981|emb|CCU74400.1|_2_haloalkanoic_acid_dehalogenase_fungi_Blumeria_graminis_f._sp._hordel_DH14

g|7485529462|gb|KMG40040.1|_2_haloalkanoic_acid_dehalogenase_fungi_Talaromyces_cellulolyticus

g|662529462|gb|KEQ86837.1|_2_haloalkanoic_acid_dehalogenase_fungi_Aureobasidium_pullulans_EXF_150

g|169772041|ref|XP_001820490.1|_2_haloalkanoic_acid_dehalogenase_fungi_Aspergillus_oryzae_RIB40

g|70983725|ref|XP_747389.1|_2_haloalkanoic_acid_dehalogenase_fungi_Aspergillus_fumigatus_AF293

220	230	240	250	260	270	280	290	300	310	320																																																																						
R L V - - V L G L S N A S H - - - T A V P R I A A Y - - - A - - - - - G L R - - W H G - - A L S G E T - - - - - - - - V R A Y - - P A P E V Y - - R L A V D T A - - - - - G C P P D - - - R V L M V A A H A W - - - L R	Q - - - - L A I L S N G S P - - - D M L N G L V R N - - - T - - - - - K L D R L L D A - - T I S V D A - - - - - - - - K K V F - - P S P A A Y - - E L I G E V L - - - - - G T A P D - - - E V L F V S S N P W - - - V A	D Y A - - - I L S N G T D - - - H M L D Q L A Y N - - - K - - - - - E V D Q H F K Y - - I I S V D Q - - - - - - - - I R Q F - - P S P A A Y - - R L I L N K S - - - - - K L K R E - - - D I L Y V S S N S W - - - I N	K F W - - L A P C S N G N I - - - S L M V D L A R R - - - - - - - - N G F L W D A - - I L G A E V - - - - - - - - A R A Y - - P Q A I V Y - - L S A A A F - - - - - D L A P Q - - - Q T M M V A A H S S - - - L A	R F P - - L I G L S N A S R - - T A L L E L N A H - - - - - - - - A G L R W H Q - - A L S A E D - - - - - - - - A R T Y - - P D P E V Y - - R L A V T V A - - - - - G V P P E - - - R L L M V A A H A W - - - L R	R Y I - I A P L S N G N I - - R L M V D V A K H - - - G - - - - - G L - - P W D A - - I L G A E V - - - - - - - - A R A Y - - P S P A V Y - - T E A V E I L - - - - - G L A P A - - - E L C L V A A H N G - - - L A	R Y I - I A P L S N G N I - - R L M L D M A K R - - - A - - - - - G L P - - W D A - - I L G A E V - - - - - - - - A Q A Y - - P M P Q A Y - - L R T A E V L - - - - - G L S P S - - - Q V C M V A A H N G - - - L A	R F V - - V A P L S N G N I - - G M M V D I A K R - - - - - - - - A G L P W D A - - V L G A E V - - - - - - - - A R A Y - - P M P E A Y - - L R T A E V L - - - - - G L E P G - - - E V C M C A A H N E - - - L A	H F K - - L V A T T N S Q I - - W A L N H M A K T - - - - - - - - L D E P F D V - - R V T V D D - - - - - - - - V R F E - - P D P Q F Y - - A Y T R G V L - - A T Q G I V F E - - E I L H V A Q S Q Y H - - I G	G L G - - L G V L S N G D P - - R M L D V G L K S - - - G - - - - - G I L E L F D H - - V L S V D A - - - - - - - - V R K F - - T A P E A Y - - L Q G P D A F - - - - - G V S A G - - - A I V F V S S N G W - - - V A	N - - - - L V I F S N G S H - - D M L D P L V K N - - - A - - - - - G L D E L F D Q - - I L S I D D - - - - - - - - V K Q F - - P T P A S Y - - Q Y A L E Q L - - - - - G I E S H - - - E V L F M S S N G W - - - V S	H Y K - - I V I L S N V D N - - E S F A S N E K - - - - - - - - L Q V G F D A - - I Y T A E D - - - - - - - - C G S Y - - P S D R N F - - Y E M I K K L - - K T L G I Q K H - - - - - E V L H T A E S M F H - - - D G	K - - - - L A I L S N G N I - - W M L N E L A K N - - - T - - - - - T L N K Y L D D - - I I S V D A - - - - - - - - F K V Y - - P E P D A Y - - R L A A Q R L - - - - - G F N K E - - - E I F F V S S N D W - - - V A	E P R P A L A I L S N G N P - - D M L D I A Y K S - - - A - - - - - G M A G L F D R - - V L S A D T - - - - - - - - V R A Y - - P S P L A M - - A L G T A A F - - - - - G A Q P R - - - E L V F V S S N A W - - - V A	R L P - - L G I L S N G N A - - E M L D I S V K S - - - S - - - - - G M H G L F D H - - V L S V D A - - - - - - - - V R Q Y - - T A P A T A M - - G L Q A F - - - - - G L P A E - - - E M L F V S S N G W - - - V A	H F K - - L V I L S N V D N - - R S F W A S Q K Q - - - - - - - - L G V F E D A - - I Y T A E D - - - - - - - - A G S Y - - P S D R N F - - Y M L K N L - - A R V G F A K - - - - - D I L H T A E S L F H - - - V A	G L P - - L G I L S N G N P - - E M L D I S V K S - - - A - - - - - G M Q G L F D H - - V L S V D A - - - - - - - - V R Q Y - - T A P A A Y - - A L G P A A F - - - - - G V P A H - - - E M L F V S S N G W - - - V A	G L P - - L G I L S N G N A - - E M L D I S V K S - - - A - - - - - G M A G L F D H - - V L S V D A - - - - - - - - V R Q Y - - T A P A A Y - - A L G P L A F - - - - - G L D A Q - - - E M L F V S S N G W - - - V A	D Y K - - M Y S L T N S S N - - R G V E T Q F K N - - - A - - - - - G L T D L F D E - - R L S I E D - - - - - - - - I G K Y - - P A S D V Y - - D W A A R K M - - - - - G V Q P N - - - E C M M I A A H G W - - - V A	H F P - - L I G L S N A S R - - T A L L E L N A H - - - A - - - - - G L R - - W H Q - - A L S A E D - - - - - - - - A R T Y - - P D P A V Y - - R L A V T V A - - - - - G L P P E - - - R L L M V A A H A W - - - L R	D M I - - V G G L S N A S H - - Q V L S A L V E A - - - S - - - - - G M R - - W H L - - T L S A E D - - - - - - - - A N T Y - - P A S A I Y - - Q L A L A A A - - - - - P A G S G - - - P P Y L V A A H A W - - - L R	N - - - L V I F S N G S H - - D M L D P L V K N - - - A - - - - - G L D E L F D Q - - I L S I D D - - - - - - - - V K Q F - - P T P A S Y - - Q Y A L E Q L - - - - - G I E S H - - - E V L F M S S N G W - - - V S	Q C P - - L I G L S N A S R - - T S L L R I N A H - - - A - - - - - G L R - - W H Q - - A L S A E E - - - - - - - - A Q T Y - - P D P A V Y - - E L A V K V S - - - - - G A P P E - - - R L L M V A A H A W - - - L R	D Y K - - M Y S L T N S S N - - R G V E T Q F K N - - - A - - - - - G L T D L F D E - - R L S I E D - - - - - - - - I G K Y - - P A S D V Y - - D W A A R K M - - - - - G V Q P N - - - E C M M I A A H G W - - - V A	G L P - - L A I L S N G T R - - A M L D I A Y K S - - - S - - - - - G M G G I F D H - - V L S V E M - - - - - - - - V K Q F - - T D P E V Y - - L Q G P D A F - - - - - D L P A R - - - E I L F V S A N S W - - - V A	G V P - - A A I L S N G D P - - E M L A V A Y R S - - - A - - - - - G F A P A L L Q H - - V I S E P - - - - - - - - A Q R Y - - T D P A A Y - - A L A P A T L - - - - - G V A A R - - - E I L F V S S N G W - - - V A	H F R - - L V A M T N A D R - - V A F S A Y S H T - - - - - - - - L G N P F D H - - A V T M D D - - - - - - - - A R C A - - P D P R F Y - - S H N L G R Q - - S A F G Y R Q E - - - - - D I L H V A Q S Q Y H - - I G	H F K - - L V T M T N A Q T - - W A L Q H F A R T - - - - - - - - L G E P F D L - - L L S C D D - - - - - - - - A L C E - - P D P Q Y Y - - A Y A R G R F - - G Q W G Y R Q A - - - - - D N L H V A Q S Q Y H - I G	H F K - - L V T M T N A Q S - - W A L K H F S A T - - - - - - - - L G E P F D M - - L L S C D D - - - - - - - - A L C E - - P D P R Y Y - - A Y A R G R F - - G A W G Y L Q A - - - - - D N L H V A Q S Q Y H - I G	H F K - - L V A M T N A Q R - - W A L D F M A K T - - - - - - - - L D S P F D Y - - E F T I D D - - - - - - - - S R Y E - - P D P Q Y Y - - A F V R G A L - - S A D G I L F E - - - - - D I I H T A Q S Q Y H - I G	G V V - - T G I L S N G D P - - A M L A V A Y K S - - - A - - - - - G L G D L L D H - - V I S V D A - - - - - - - - I R K Y - - T H P D A Y - - Q L G L Q A T - - - - - G L P A R - - - Q I A F V S S N S W - - - D A L	G I P - - T G I L S N G D A - - P M L H A A Y Q S - - - A - - - - - G F A G A L D H - - V I S V D P - - - - - - - - I R L Y - - T D P Q A Y - - A L G E A Q T - - - - - G F K A E - - - Q I V F V S S N A W - - - D A L	K F R - - L V A M T N A D R - - V A L S C Y A H A - - - - - - - - L G N P F D D - - T V C A D D - - - - - - - - T G V A - - P N P E F Y - - A Y N K G R Q - - S A F G Y K Q S - - - - - D I L H V A Q S Q Y H - I G	G V P - - M A I L S N G T P - - E M L G V A I R S - - - A - - - - - G M S G L F A H - - V L S V D A - - - - - - - - V R Q Y - - T A D A A Y - - Q L G P D A F - - - - - G C P A R - - - E I L F V S S N G W - - - D A A	Q C P - - L I G L S N A S R - - T S L L R I N A H - - - A - - - - - G L R - - W H Q - - A L S A E E - - - - - - - - A Q T Y - - P D P A V Y - - E L A V K V S - - - - - G A P P E - - - R L L M V A A H A W - - - L R	H Y K - - L I I L S N V D N - - K S F S F S N R K - - - - - - - - L G V D F D A - - I Y T A E D - - - - - - - - I G S Y - - P S D R N F - - D Y M L E K L - - G T I G V E K Q - - - - - Q I L H T A E S M F H - - H D T	H Y K - - L V I L S N V D N - - E S F A S N E K - - - - - - - - L Q V E F D A - - I Y T A E D - - - - - - - - V G S Y - - P S D R N F - - Y E M I K K L - - E T L G I Q K H - - - - - E I L H T A E S M F H - - H G	G Y A - - L Y A F S N G T A - - D A Y E G L L A A - - - A - - - - - G I D A L F D G - - V V S V N D - - - - - - - - Q Q T F - - P S P D Y Y - - R H L L D T T - - - - - N A S A S - - - E T W L I S S N P F - - - V I	H F K - - L V I L S N V D A - - R S F S G S N A R - - - - - - - - L N V V F D G - - I Y T A E D - - - - - - - - I G S Y - - P S M R N F - - K Y M L E Y L - - S D I G L E P S - - - - - N V L H T A E S L F H - - H M	G L N - - T A I L S N G S P - - D M L E G A V Y S - - - A - - - - - G L S D R L D A - - V L S V E S - - - - - - - - V K I F - - P D R R Y Y - - D L V G S H F - - - - - G C G A G - - - E V L F V S S N G W - - - D A A	G A R - - L A I L S N G S P - - A M L E A A Y R S - - - A - - - - - A L D V L L D D - - V I S V M - - - - - - - - V G G Y - - P L S L A Y - - E L I A V Q W - - - - - R L Y P S - - - E C M M I A A H N W - - - V A	G F R - - L V T L T N S A N - - S A S P T P L E K - - - A - - - - - G I S H F F E Q - - H F S V E T - - - - - - - - V G K F - - P A P E T Y - - Q M V A H A L - - - - - S V D V S - - - D I C L V A C H L W - - - D T I	G M T - - T A I L S N G N P - - E M L A S A Y R S - - - A - - - - - G M A D L L D H - - V I S V D G - - - - - - - - V R Q F - - I L P V A Y - - G E V A R H I - - - - - V A E K A - - - D V L F V S S N A W - - - V A	G V R - - A G I L S N G D P - - E M L A I A Y R S - - - A - - - - - G F G G L L D P - - V L S V H E - - - - - - - - T R R F - - T D P A A Y - - Q V G L D A L - - - - - Q L P A R - - - E I L F V S S N G W - - - V A	G L P - - L G I L S N G N A - - E M L D I S V K S - - - A - - - - - G M A G L F D H - - V L S V D A - - - - - - - - V R Q Y - - T A P A A Y - - A L G P L A F - - - - - G L D A Q - - - E M L F V S S N G W - - - V A	G V P - - T G I L S N G D P - - A M L G I A Y R S - - - A - - - - - G L E S L L D H - - V I S V E P - - - - - - - - V R A F - - T D A R A Y - - A L G P Q T L - - - - - G L A A R - - - Q I L F V S S N G W - - - D A I	G I K - - T A I L S N G N T - - E M L N V A Y R G - - - A - - - - - N F Q D L L D A - - V L S V D S - - - - - - - - L Q T F - - I H S S V Y - - Q M G L N H F - - - - - G V T A A - - - E T L F V S S N C W - - - V A	N F R - - L V A M T N A D R - - T A F S A Y S A T - - - - - - - - L G N P F D H - - S V T C D E - - - - - - - - T G C A - - P D P R F Y - - A Y N K G R Q - - S A L G Q Q Q - - - - - E I L H V A Q S Q Y H - I G	H F R - - L V A M T N A D R - - S T F S F Y S H A - - - - - - - - L G N P F D H - - S V T A E D - - - - - - - - A V H P - - P D P L F Y - - A F N R G R Q - - A A F G Y K Q D - - - - - E I L H V A Q S Q Y H - I G	H F K - - L V A M T N A R H - - W A L D H M A R T - - - - - - - - L D Q P F D D - - K I S V D D - - - - - - - - V R F E - - P D P Q F Y - - A Y A R G R L - - S T Q G I V F E - - - - - Q I L H V A Q S Q Y H - I G	R F R - - L V A M T N G D R - - T S F T A Y D H R - - - - - - - - L G W P F D H - - S V T Y D D - - - - - - - - A K C A - - P D P R F Y - - S H N L G R Q - - S A F G F K Q D - - - - - E I L H V A Q S Q Y H - I G	Q Q R - - M A I I T N G I K - - E V Q F N R I S R - - - S - - - - - A L C D S F E C - - I V S E D - - - - - - - - A G S Q - - P H E G I F - - D Y A F D K L - - - - - N H P D K - - S E V L I V G D S L T S - - I Q	K Q Q K V G G I T I N G S L - - E R Q K A K I A Y - - - T - - - - - N I L D R C F D M - - V I S E E - - - - - - - - V G W S - - P D K R I Y - - E M A L K R L - - - - - D V N P E - - E T L F V G D L E K I - - D A	G E P - - I Y A I T N F S R - - E K W A E A Q D R - - - F - - - - - P I L T R F A G - - V V S S A H - - - - - - - - E G L V - - P D P A I Y - - R T L L D R Y - - - - - R L E A G - - - R C L F I D D S E K - - V A	R Y P - - L A L V S D T G L - - G R L L R E H L K R - - - Q - - - - - G L D V F Q A F - - S F S - D E - - - - - - - - T G F V - - P R P E A Y - - R V A L E A L - - - - - G V A P E - - E A L H V G D L P Q T - - I K	K V P - - L T A I T N G N V - - - - - Q I E K I - - - - - - - - G L S G Y F T - - V L R A G P - - - - - - - - D G R A - - P Y P D L Y - - A Q A A Q Q L - - - - - Q L E P R - - - S I L H V G D H L P Q T - - I K	G K K - - I Y S A S N G V Y - - S T Q I K R L S N - - - A - - - - - G I D L F D G - - H F I S D K - - - - - - - - I K Y E - - P S P Y F F - - D F C I K N I - - - - - G V P D S - - - S I I M V G D S P T S - - V Q	K - - - - L G I I T N G Y T - - K V Q Q S R I G N - - - S - - - - - P L R N F F E H - - I I S E E - - - - - - - - V G H Q - - P A R E I Y - - D Y A F E K C - - - - - G I T D K - - S V L M V G D S L T S - - M R	G R D - - V T M L T N F A A - - D T F V Q A R Q I - - - - - - - - P F F L N R P R G V T V S G E - - - - - - - - I G L I - - P D V A I Y - - E K H A R D F - - - - - G L T P E - - A S I F I D D S Q A - - V E	K Y T - - L V I V T N G L T - - V V Q E K R I K Q - - - S - - - - - S I A K Y F K D - - I V I S E N - - - - - - - - V G S V - - P N P G T Y - - E Y T L K D M - - - T - - D I S K N - - - E V L M I G D S L S S - - I Q	R Y R - - L T A I T N G D L - - - - - C I R E S - - - - - - - - G L H M Y F E Q - - C F S A G I - - - - - - - - H G L P - - P H P D L Y - - E K A A R Y L - - - - - K V D K D - - K I L H V G D S L D V D Y - - I K	N Y K - - F L L S T N T N E - - H I E K F E H M L G A - - - - - T F T R D F H M L G A - - - - - - - - I G V C - - P D P Q A Y - - D I I R K H - - - - - N L L A K - - - N T L F I D D K K E - - N T D	R L P - - L A A I T N G N A - - - - - D P A R C - - - - - - - - G L G A Y F R F - - V L R A G P - - - - - - - - D G R A - - P Y S D M Y - - L A A A Q Q L - - - - - G L T P G - - Q I L H V G D D L T T V A - - I K	Q K G - - L G I I T N G R V - - K T Q S A K L K S - - - L - - - - - G I E H L F D H - - I V I S E A - - - - - - - - L G S E - - P N E V N K M I - - T E S T L - - - - - S G K - - - V Y Y I A D D I K K - - F I	K I P - - L A V I T N G N V - - - - - D I N Q I - - - - - - - - G L S H Y F F - - S L R G G A - - - - - - - - N G R S - - P P P E T Y - - E L A V R Q L - - - - - K V P A P - - Q L T H I G D N L F L T D - - V A	R F R - - V T M L T N F A S - - D T F R E A L Q L - - - Y - - - - - P L T L P R G - - V T V S G D - - - - - - - - V G L I - - P D V A I Y - - E T H A R N F - - - - - D L D P P - - A T L F I D D S M P - - V E	G F T - - V W C L T A G D L - - A R Y G G Y F K L - - - A - - - - - G V D M P A E N - - L L S C D T - - - - - - - - T G A P - - P Q P D A Y - - M P I L L K L - - - - - S A S G A - - - T P W F A A A H M W - - - V S	G F T - - V W A F T S G D A - - T R Y Q G Y L A A - - - N - - - - - G I D I P A A H - - F V T C D S - - - - - - - - L Q V G - - P T P E A Y - - R H V L N Q F - - - - - A G A T - - - E T W F A A A H M W - - - D T M	G C K - - L G V Y T N C S K - - K L G E M A A A Q - - - A A R S P S G E Q I A F D A - - V T A E E - - - - - - - - S G F Y - - P V K Q A Y - - G D I L E A M - - - - - G V S A S - - - E A L F V A G S A G - - V Q	G G T - - V W C F T A G D I - - A R Y G G Y F R - - - G - - - - - G V D M P V E N - - L L S C D S - - - - - - - - S G L A - - P T P E A Y - - A P I L K K L - - - - - S E N G - - - K P W F A A A H L W - - - A S	G F T - - V W A L T S G D T - - S R V A G Y L A E - - - G - - - - - G V K P E E N - - F V S C D T - - - - - - - - I G V G - - P A P E S Y - - Q Y L L E F - - - - - K G E S - - - L A W F A A A H M W - - - A S	S L K - - P Y I F S N G T M - - A M I T S S L K T S P S - - A - - - - - K S G T F T F S E N I V S V D P - - - - - - - - L G V F - - P D P R T Y - - R H M A E M A - - - - - G L T H Q - - - K V W L V S S N P F - - A A	G F T - - I W A L T S G D A - - E R Y K E Y L G R - - - N - - - - - E I P L D E E N - - F I A C E D - - - - - - - - I G K M - - P A P E V Y - - C Y V R R L - - - - - E D A E - - - E M W F A A C H M W - - - A S	G F T - - V W A L T S G D T - - S R V A G Y L A E - - - G - - - - - G V K P E E N - - F V S C D T - - - - - - - - I G V G - - P A P E S Y - - R Y L L E F - - - - - E G E S - - - L A W F A A A H M W - - - A S	G F T - - I W C L T G D L - - A R Y R G Y F E Q - - - G - - - - - N V E M P L E N - - I I S C D S - - - - - - - - K G V A - - P A L A A Y - - P Y V F E Q F - - - - - A P G D - - - D K W F A A A H M W - - - V S	S I D - - P Y I F S N G T K - - A M M T S S L D T C P T - - S - - - - - R V S N I F P H E K V Y S I D P - - - - - - - - L K V F - - P H P R T Y - - E F M A E T A - - - - - G M K S Q - - - K V W L V S S N P F - - V T	G F T - - V W A L T S G D V - - E R Y R G Y F I R - - - G - - - - - G V E M P M A N - - F I S C D S - - - - - - - - L S V G - - P H P E V Y - - R H A L E Q I - - - - - Q S S E - - - K P W F A A A H T W - - - V G	G F T - - I W C L T G D T - - E R Y G G Y F K R - - - A - - - - - G F D M P A D K - - L V S C H E F L P R D S S P S G A A L S A M S - - - - - P M S M S - - K P M L D K F - - - - - A P E D - - - Q K W F A A A H M W - - - V S	G F T - - V W C L T G D V - - E R V H G Y F T R - - - G - - - - - G V D P F I E N - - F R S C D G - - - - - - - - L G V A - - P A L A A Y - - K P L Y E S F - - - - - G E E - - - E K W F A A A H Y W - - - V S	G F T - - V W C L T G D T - - K R V R G Y F E R - - - A - - - - - G V D M P L E N - - F I S C D S - - - - - - - - Q G V A - - P T L A A Y - - P A M G K F - - - - - A E E D - - - V K W F A A A H M W - - - V S	G F E - - V W C L T G D V - - E R Y R G Y F T R - - - A - - - - - G V E M P V E R - - V L S C D G - - - - - - - - L R V A - - P A P A G A - - R A A I E T I - - - - - G S G E - - - D E K W F A A A H L W - - - D T M