Table 1
Williams AFB Ste012
Microbial Data

Gene	Name	Anaerobic or Aerobic?	Description	ST012-CZ20-051718	ST012-LSZ42-051718	ST012-UWBZ31-51718	ST012-LSZ10-051718	ST012-UWBZ24-51718	ST012-CZ02-051718
TOD	toluene/benzene dioxygenase	aerobic	Opens aromatic ring for toluene, benzene, and xylenes	4.9 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
PHE	phenol hydroxylase	aerobic	Adds oxygen group to the ring of benzene, toluene, xylenes	2.75 e3	<2.5 e2	<2.5 e2	7.99 e2	<2.5 e2	<2.5 e2
RDEG	toluene 2 monooxygenase / phonol hydroxylase	aerobic	Adds oxygen group to the ring of benzene, toluene, xylenes	1.38 e5	<2.5 e2	<2.5 e2	3.31 e3	<2.5 e2	<2.5 e2
RMO	toluene ring hydroylating monooxygenases	aerobic	Adds oxygen group to the ring of benzene, toluene, xylenes	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
TOL	xylene/toluene monooxygenase	aerobic	Toluene specific, adds oxygen to methyl group	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
EDO	Ethylbenzene/ isopropylbenzene dioxygenase	aerobic	Adds oxygen to ethylbenzene or isopropylbenzene	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
BPH4	Biphenyl/ isopropylbenzene dioxygenase	aerobic	Typically associated with oxygen addition to PCBs, but also associated with a single species of benzene/ isopropylbenzene biodegrading microbe	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
PM1	Methylibium petroleiphilum (PM1)	aerobic	A microbe (PM1) specifically identified with MTBE or TBA biodegradation	2.5 e5	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
TBA	TBA monooxygenase	aerobic	The TBA-specific biodegradation gene found in microbe PMI	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
NAH	Naphthalene Dioxygenase	aerobic	Gene that initiates aerobic biodegradation of naphthalene and many other PAHs	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
NiDA	Naphthalene-inducible Dioxygenase	aerobic	Napthalene specific bioattenuation	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
PHN	Phenanthrene Dioxygenase	aerobic	Associated with biodegradation of naphthalene, phenanthrene, and anthracene	<2.5 e2	<2.5 e2	<2.5 e2	1.31 e3	<2.5 e2	<2.5 e2
ALK	Alkane Monooxygenase	aerobic	N-alkane (C5-C16) biodegradation	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
ALMA	Alkane Monooxygenase	aerobic	N-alkane (C20-C32) biodegradation	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
BCR	Benzoyl Coenzyme A Reductase	anaerobic	Involved in a key step of benzene biodegradation, as well as the biodegradaiton of other aromatic compounds	4.57 e3	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
BSS	Benzylsuccinate Synthase	anaerobic	Toluene, ethylbenzene, and xylene anaerobic biodegradation	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
ABC	Benzene Carboxylase	anaerobic	The gene that initiates the only known anaerobic benzene biodegradaton pathway	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
MNSSA	Naphthylmethylsuccinate Synthase	anaerobic	Similary to BSS gene, for toluene biodegradation	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
ANC	Naphthalene Carboxylase	anaerobic	Essential step in anaerobic naphthalene biodegradation	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2
ASSA	Alkylsuccinate Synthase	anaerobic	Involved in n-alkane (C6-C18) biodegradaton under nitrate-reducing or sulfate-reducing conditions	4.2 e3	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2	<2.5 e2

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EBAC	Total Eubacteria	Bacterial population size	Total microbial population size	2.21 e7	1.6 e5	1.64 e3	5.10 e6	1.33 e6	3.82 e2
APS	Sulfate Reducing Bacteria	SRB bacterial population size	Total population size of sulfate-reducing bacteria	2.41 e6	6.09 e4	<2.5 e2	<2.5 e2	2.20 e5	<2.5 e2

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Data from iniitial qPCR Assessment

EBAC	2.21 e7	1.6 e5	1.64 e3	5.10 e6	1.33 e6	3.82 e2
APS	2.41 e6	6.09 e4	<2.5 e2	<2.5 e2	2.20 e5	<2.5 e2

The initial qPCR data is presented below the blue line, and was initially presented at the 6/28/18 BCT meeting

Quant-Array (Petroleum) assay results are presented above the blue line

This data was obtained through the use of in-situ microcosm samplers. These were initally used to obtain

Numbers in YELLOW: Cell or gene counts above the 2.5e2 threshold
Numbers in GREEN: Cell or gene counts possibly related to benzene biodegradation, which are also above
Please note that there is only one gene in this assesment that is benzene-only specific (ABC gene).