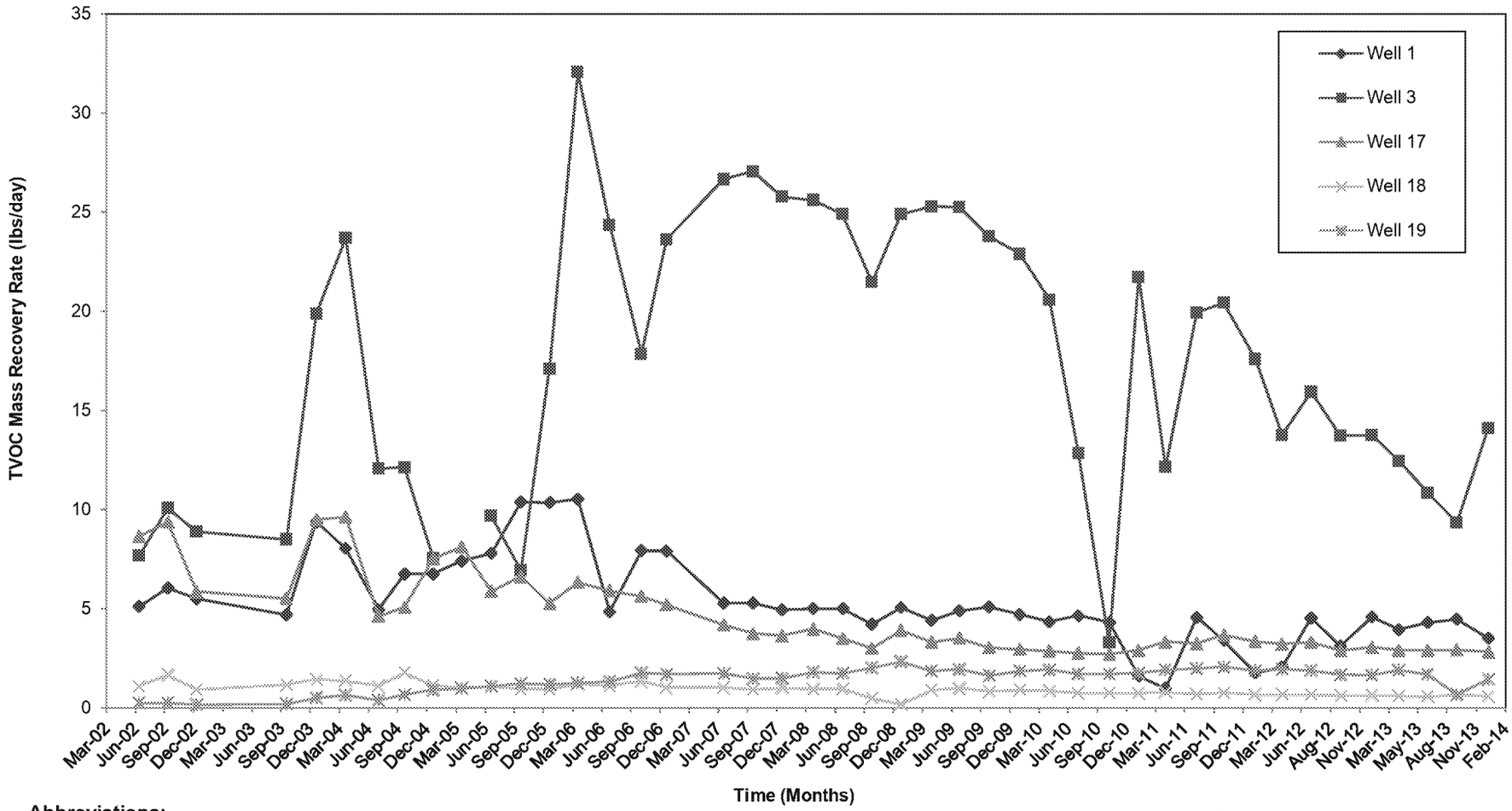
VOC MASS RECOVERY RATES and CUMULATIVE VOC MASS REMOVED

Year				2002				2003		2004				2005				2006				2007			2008				2009				2010			
Quarter				1Q	2Q	3Q	4Q	1Q + 2Q + 3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q + 2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
System Operation	Start Date	Start Date		-	3/28/2002	6/27/2002	9/24/2002	12/23/2002	9/30/2003	1/1/2004	4/1/2004	7/13/2004	10/1/2004	12/31/2004	3/30/2005	6/30/2005	9/30/2005	12/29/2005	3/27/2006	7/5/2006	10/12/2006	12/29/2006	6/26/2007	9/25/2007	12/24/2007	4/1/2008	7/1/2008	9/30/2008	12/30/2008	4/5/2009	6/30/2009	10/1/2009	1/5/2010	4/7/2010	7/7/2010	10/12/2010
	Finish Date	Finish Date		-	6/26/2002	9/23/2002	12/22/2002	9/29/2003	12/31/2003	3/31/2004	7/12/2004	10/1/2004	12/30/2004	3/29/2005	6/29/2005	9/29/2005	12/28/2005	3/26/2006	7/4/2006	10/11/2006	12/28/2006	6/25/2007	9/24/2007	12/23/2007	3/31/2008	6/30/2008	9/29/2008	12/29/2008	4/4/2009	6/29/2009	9/30/2009	1/4/2010	4/6/2010	7/6/2010	10/11/2010	1/10/2011
Days				--	91	89	90	281	93	91	103	81	91	89	92	92	90	88	100	99	78	179	91	90	99	91	91	91	96	86	93	96	92	91	97	91
TVOC Mass Removed (lbs)	Well 1 (GP-1)	Well 1		--	466	538	494	1316	872	732	511	547	615	659	717	955	932	927	485	785	617	947	481	445	495	455	384	460	423	420	473	452	399	423	418	145
	Well 3 (GP-3)	Well 3		--	698	896	799	2387	1848	2156	1243	983	686		890	636	1538	2822	2436	1768	1843	4774	2463	2320	2536	2266	1954	2267	2428	2172	2212	2198	1894	1167	319	1978
		Well 3R		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Well 17 (ONCT-1)	Well 17		--	787	834	527	1549	883	875	475	411	684	723	540	609	474	556	590	557	405	749	341	327	393	318	273	355	317	302	281	283	263	250	262	264
	Well 18 (ONCT-2)	Well 18		--	100	146	83	325	134	122	113	142	101	91	100	86	85	103	113	131	79	182	84	90	93	87	42	15	86	85	76	85	78	68	72	67
	Well 19 (ONCT-3)	Well 19		--	22	22	14	50	46	58	40	54	82	87	100	113	106	110	132	174	132	311	133	134	177	157	184	211	178	167	151	178	176	155	166	159
		TVOCs			2073	2436	1917	5627	3783	3943	2382	2137	2168	1560	2347	2399	3135	4518	3756	3415	3076	6963	3502	3316	3694	3283	2837	3308	3432	3146	3193	3196	2810	2063	1237	2613
TVOC Mass Recovery rates (lbs/day)	Well 1 (GP-1)	Well 1		--	5.1	6.0	5.5	4.7	9.4	8.0	5.0	6.8	6.8	7.4	7.8	10.4	10.4	10.5	4.9	7.9	7.9	5.3	5.3	4.9	5.0	5.0	4.2	5.1	4.4	4.9	5.1	4.7	4.3	4.6	4.3	1.6
	Well 3 (GP-3)	Well 3		--	7.7	10.1	8.9	8.5	19.9	23.7	12.1	12.1	7.5		9.7	6.9	17.1	32.1	24.4	17.9	23.6	26.7	27.1	25.8	25.6	24.9	21.5	24.9	25.3	25.3	23.8	22.9	20.6	12.8	3.3	21.7
		Well 3R		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Well 17 (ONCT-1)	Well 17		--	8.6	9.4	5.9	5.5	9.5	9.6	4.6	5.1	7.5	8.1	5.9	6.6	5.3	6.3	5.9	5.6	5.2	4.2	3.7	3.6	4.0	3.5	3.0	3.9	3.3	3.5	3.0	2.9	2.9	2.7	2.7	2.9
	Well 18 (ONCT-2)	Well 18		--	1.1	1.6	0.9	1.2	1.4	1.3	1.1	1.8	1.1	1.0	1.1	0.9	0.9	1.2	1.1	1.3	1.0	1.0	0.9	1.0	0.9	1.0	0.5	0.2	0.9	1.0	0.8	0.9	0.8	0.7	0.7	0.7
	Well 19 (ONCT-3)	Well 19		--	0.2	0.2	0.2	0.2	0.5	0.6	0.4	0.7	0.9	1.0	1.1	1.2	1.2	1.3	1.3	1.8	1.7	1.7	1.5	1.5	1.8	1.7	2.0	2.3	1.9	1.9	1.6	1.9	1.9	1.7	1.7	1.7
Cumulative TVOC Mass Removed (lbs)	Well 1 (GP-1)	Well 1	####	--	14,016	14,554	15,048	16,364	17,236	17,968	18,479	19,026	19,641	20,300	21,017	21,972	22,904	23,831	24,316	25,101	25,718	26,665	27,146	27,591	28,086	28,541	28,925	29,385	29,808	30,228	30,701	31,153	31,552	31,975	32,393	32,538
	Well 3 (GP-3)	Well 3	####	--	11,465	12,361	13,160	15,547	17,395	19,551	20,794	21,777	22,463	22,463	23,353	23,989	25,527	28,349	30,785	32,553	34,396	39,170	41,633	43,953	46,489	48,755	50,709	52,976	55,404	57,576	59,788	61,986	63,880	65,047	65,366	67,344
		Well 3R		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Well 17 (ONCT-	Well 17	####	--	30,822	31,656	32,183	33,732	34,615	35,490	35,965	36,376	37,060	37,783	38,323	38,932	39,406	39,962	40,552	41,109	41,514	42,263	42,604	42,931	43,324	43,642	43,915	44,270	44,587	44,889	45,170	45,453	45,716	45,966	46,228	46,492
	Well 18 (ONCT-	Well 18	1549	--	1,649	1,795	1,878	2,203	2,337	2,459	2,572	2,714	2,815	2,906	3,006	3,092	3,177	3,280	3,393	3,524	3,603	3,785	3,869	3,959	4,052	4,139	4,181	4,196	4,282	4,367	4,443	4,528	4,606	4,674	4,746	4,813
	Well 19 (ONCT-	Well 19	469	--	491	513	527	577	623	681	721	775	857	944	1,044	1,157	1,263	1,373	1,505	1,679	1,811	2,122	2,255	2,389	2,566	2,723	2,907	3,118	3,296	3,463	3,614	3,792	3,968	4,123	4,289	4,448
		TVOCs	####	--	58,443	60,879	62,796	68,423	72,206	76,149	78,531	80,668	82,836	84,396	86,743	89,142	92,277	96,795	100,551	103,966	107,042	114,005	117,507	120,823	124,517	127,800	130,637	133,945	137,377	140,523	143,716	146,912	149,722	151,785	153,022	155,635

Year			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TVOC Mass Removed (lbs)	Well 1 (GP-1)	Well 1		2188	2405	3263	2814	1873	1794	1768	1385	985	1318	1472	1774	2771	2749
	Well 3 (GP-3)	Well 3		4235	5068	3064	8869	9557	9023	9010	5358	6416	5203	4265	--	--	--
		Well 3R		--	--	--	--	--	--	--	--	--	--	--	1243	2369	2340
	Well 17 (ONCT-1)	Well 17		2432	2445	2346	2108	1417	1339	1183	1039	1232	1131	1050	936	900	721
	Well 18 (ONCT-2)	Well 18		459	478	362	426	356	237	332	285	261	231	216	188	189	259
	Well 19 (ONCT-3)	Well 19		96	234	406	548	578	729	674	656	712	646	514	555	555	532
		TVOCs		9410	10630	9441	14765	13781	13122	12967	8723	9606	8529	7517	4696	6784	6601

2011				2012				2013				2014				2015				2016			
1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
1/11/2011	4/5/2011	7/12/2011	10/4/2011	1/10/2012	4/3/2012	7/3/2012	10/2/2012	1/8/2013	4/2/2013	7/2/2013	10/1/2013	1/7/2014	4/8/2014	6/30/2014	9/30/2014	1/5/2015	4/6/2015	7/6/2015	10/5/2015	1/5/2016	4/6/2016	7/6/2016	
4/4/2011	7/11/2011	10/3/2011	1/9/2012	4/2/2012	7/2/2012	10/1/2012	1/7/2013	4/1/2013	7/1/2013	9/30/2013	1/6/2014	4/8/2014	6/30/2014	9/30/2014	1/5/2015	4/6/2015	7/6/2015	10/5/2015	1/1/2016	4/6/2016	7/6/2016	10/4/2016	
84	98	84	98	84	91	91	98	84	91	91	98	92	84	93	98	92	92	92	89	93	92	91	
81	447	285	172	172	413	284	449	331	391	406	344	350	438	299	687	658	669	760	684	738	559	765	
1021	1954	1716	1725	1156	1450	1249	1348	1046	987	849	1383	--	--	--	--	--	--	--	--	--	--	--	
--	--	--	--	--	--	--	--	--	--	--	--	135	145	395	568	635	579	603	552	568	543	644	
279	318	308	327	270	301	262	298	244	264	266	276	262	216	240	218	244	235	228	193	195	167	179	
65	67	64	65	55	60	56	60	51	51	59	55	51	35	48	54	50	44	54	41	51	64	79	
160	195	173	184	163	171	151	161	160	152	61	141	103	113	164	175	154	150	136	115	136	130	133	
1606	2981	2546	2473	1816	2395	2002	2316	1832	1845	1641	2199	901	947	1146	1702	1741	1677	1781	1585	1688	1463	1800	
1.0	4.6	3.4	1.8	2.0	4.5	3.1	4.6	3.9	4.3	4.5	3.5	3.8	5.2	3.2	7.0	7.2	7.3	8.3	7.7	7.9	6.1	8.4	
12.2	19.9	20.4	17.6	13.8	15.9	13.7	13.8	12.5	10.8	9.3	14.1	--	--	--	--	--	--	--	--	--	--	--	
--	--	--	--	--	--	--	--	--	--	--	--	1.5	1.7	4.2	5.8	6.9	6.3	6.6	6.2	6.1	5.9	7.1	
3.3	3.2	3.7	3.3	3.2	3.3	2.9	3.0	2.9	2.9	2.9	2.8	2.8	2.6	2.6	2.2	2.7	2.6	2.5	2.2	2.1	1.8	2.0	
0.8	0.7	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.4	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.7	0.9	
1.9	2.0	2.1	1.9	1.9	1.9	1.7	1.6	1.9	1.7	0.7	1.4	1.1	1.3	1.8	1.8	1.7	1.6	1.5	1.3	1.5	1.4	1.5	
32,619	33,066	33,351	33,523	33,695	34,108	34,392	34,841	35,172	35,563	35,969	36,313	36,663	37,101	37,400	38,087	38,745	39,414	40,174	40,858	41,596	42,155	42,920	
68,365	70,319	72,035	73,760	74,916	76,366	77,615	78,963	80,009	80,996	81,845	83,228	--	--	--	--	--	--	--	--	--	--	--	
--	--	--	--	--	--	--	--	--	--	--	--	135	280	675	1,243	1,878	2,457	3,060	3,612	4,180	4,723	5,367	
46,771	47,089	47,397	47,724	47,994	48,295	48,557	48,855	49,099	49,363	49,629	49,905	50,167	50,383	50,623	50,841	51,085	51,320	51,548	51,741	51,936	52,103	52,282	
4,878	4,945	5,009	5,074	5,129	5,189	5,245	5,305	5,356	5,407	5,466	5,521	5,572	5,607	5,655	5,709	5,759	5,803	5,857	5,898	5,949	6,013	6,092	
4,608	4,803	4,976	5,160	5,323	5,494	5,645	5,806	5,966	6,118	6,179	6,320	6,423	6,536	6,700	6,875	7,029	7,179	7,315	7,430	7,566	7,696	7,829	
157,241	160,222	162,768	165,241	167,057	169,452	171,454	173,770	175,602	177,447	179,088	181,287	182,188	183,135	184,281	185,983	187,724	189,401	191,182	192,767	194,455	195,918	197,718	

Cell: R29
Comment: KDuffy:
TVOC removal for 2016 estimated based on 1Q and 2Q 2016



Abbreviations:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

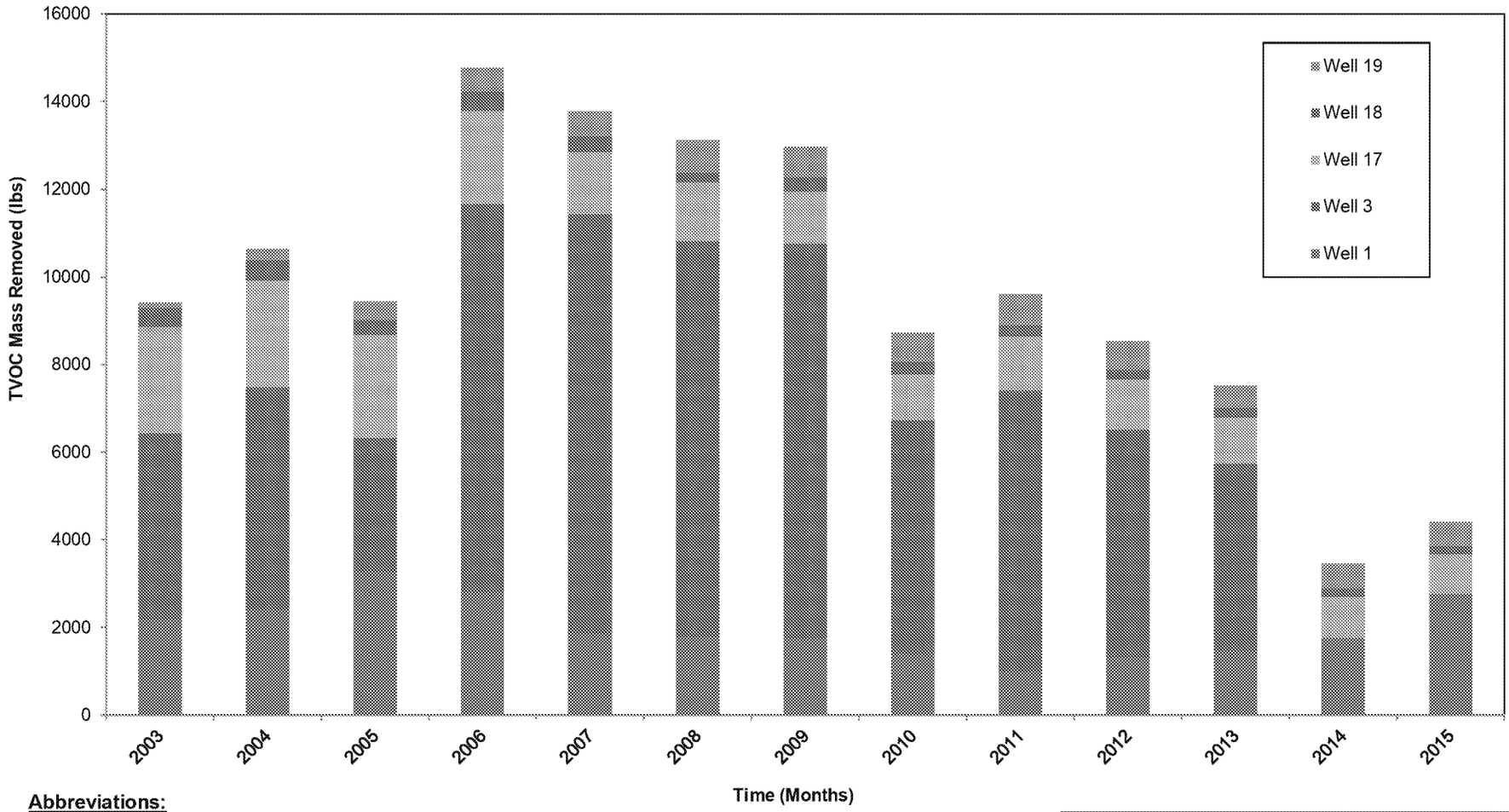
TVOCs = Sum of VOCs detected

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OU2 ON-SITE GROUNDWATER REMEDY

REMEDIAL WELLS TOTAL VOC MASS RECOVERY RATES

ARCADIS

FIGURE 6



Abbreviations:

VOC = Volatile organic compound

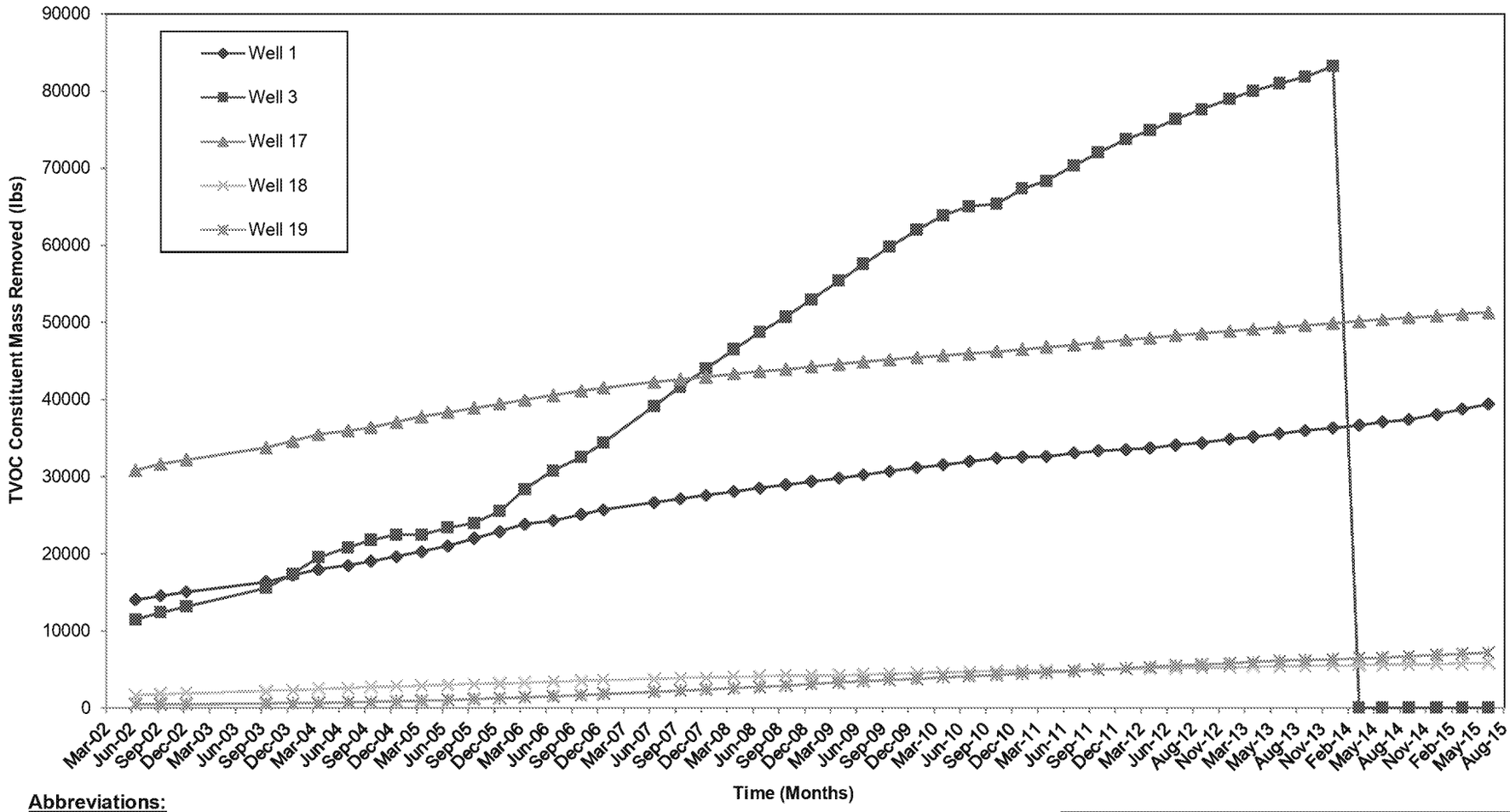
lbs = Pounds

TVOCs = Sum of VOCs detected

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OU2 ON-SITE GROUNDWATER REMEDY
REMEDIAL WELLS TEAREL TOTAL VOC MASS REMOVED THROUGH

ARCADIS

FIGURE 7



Abbreviations:

VOC = Volatile organic compound

lbs = Pounds

TVOCs = Sum of VOCs detected

ONCT = On-Site Containment

Notes:

NORTHROP GRUMMAN SYSTEMS CORPORATION

BETHPAGE, NEW YORK

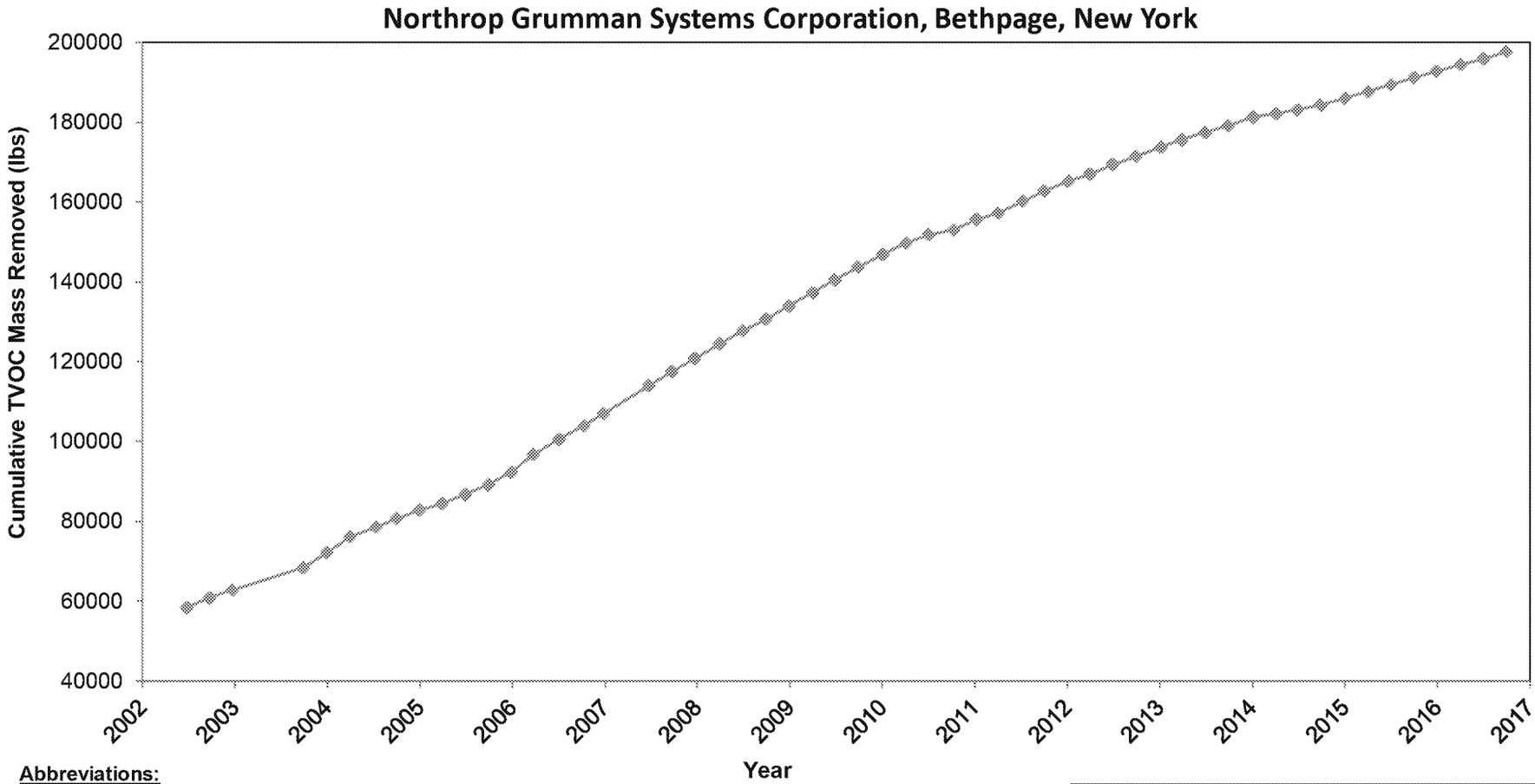
OU2 ON-SITE GROUNDWATER REMEDY

REMEDIAL WELLS CUMULATIVE TOTAL VOC MASS REMOVED

ARCADIS

FIGURE

8



Abbreviations:

VOC = Volatile organic compound

lbs = Pounds

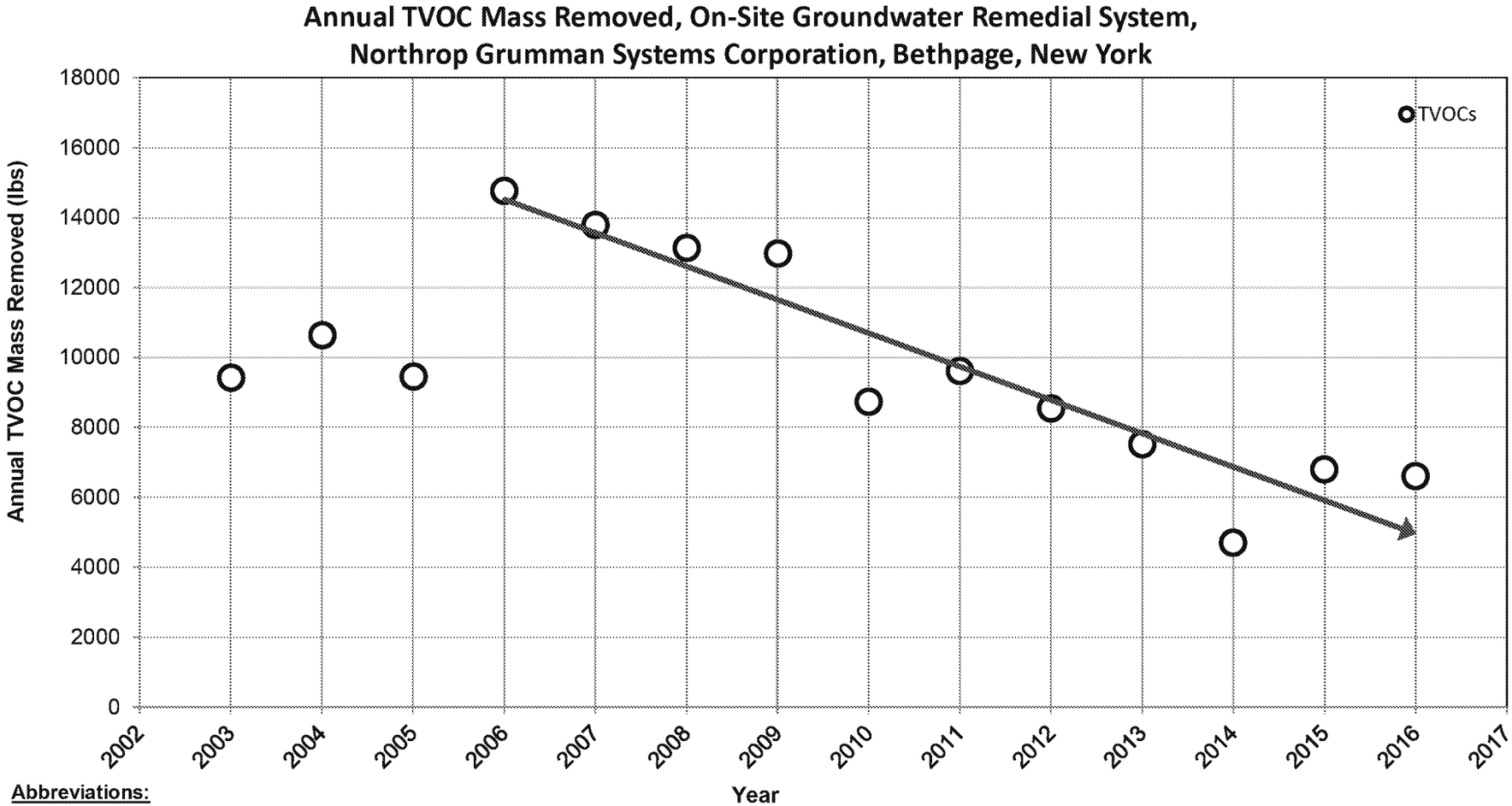
TVOCs = Sum of VOCs detected

ONCT = On-Site Containment

Notes:

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OU2 ON-SITE GROUNDWATER REMEDY
OU2 ONCT CUMULATIVE TVOC MASS REMOVED THROUGH OCTOBER 2016

ARCADIS



Abbreviations:

VOC = Volatile organic compound

lbs = Pounds

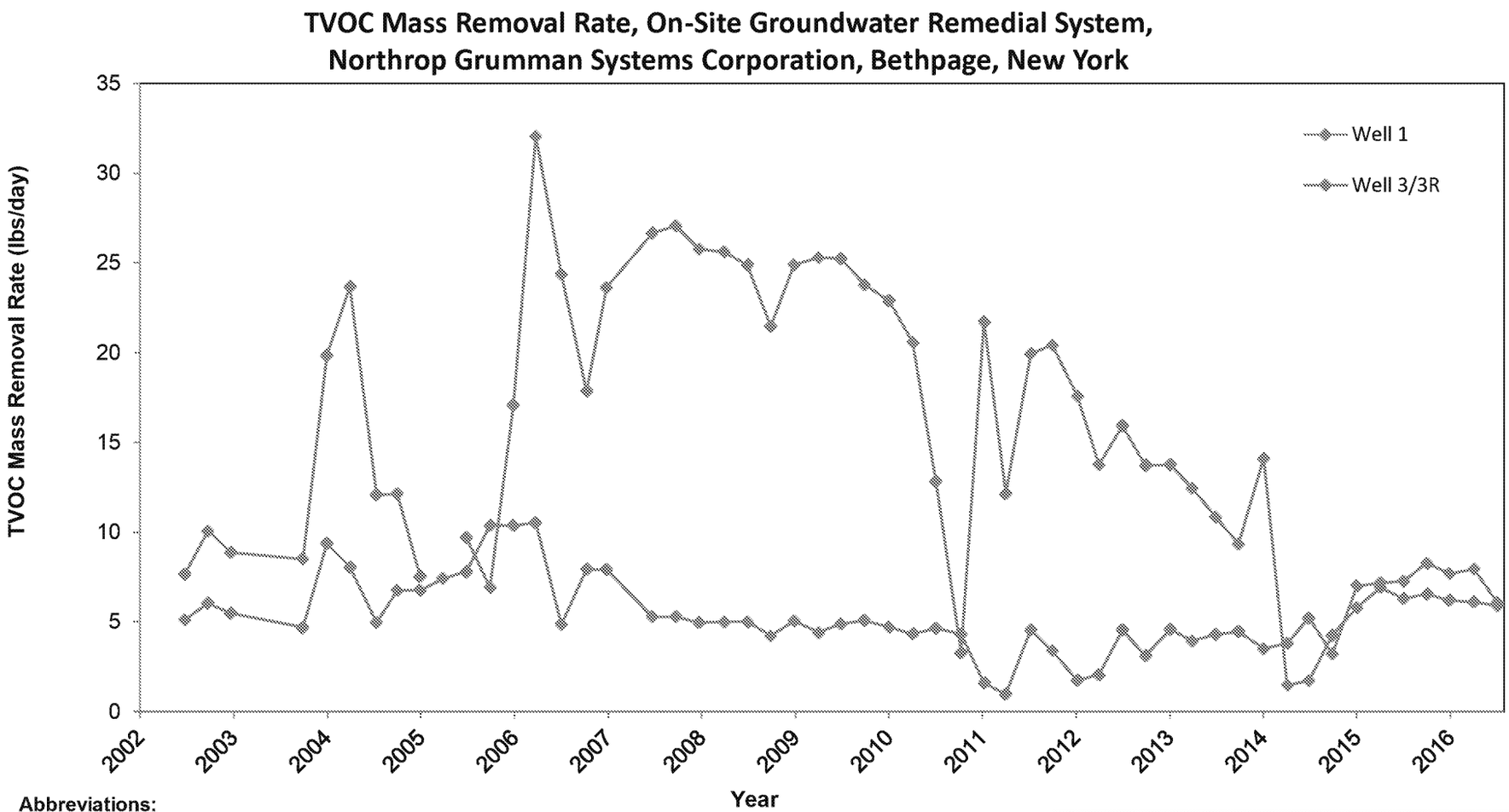
TVOCs = Sum of VOCs detected

ONCT = On-Site Containment

Notes:

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OU2 ON-SITE GROUNDWATER REMEDY
OU2 ONCT ANNUAL TVOC MASS REMOVAL

ARCADIS



Abbreviations:

VOC = Volatile organic compound

lbs = Pounds

TVOCs = Sum of VOCs detected

ONCT = On-Site Containment

Notes:

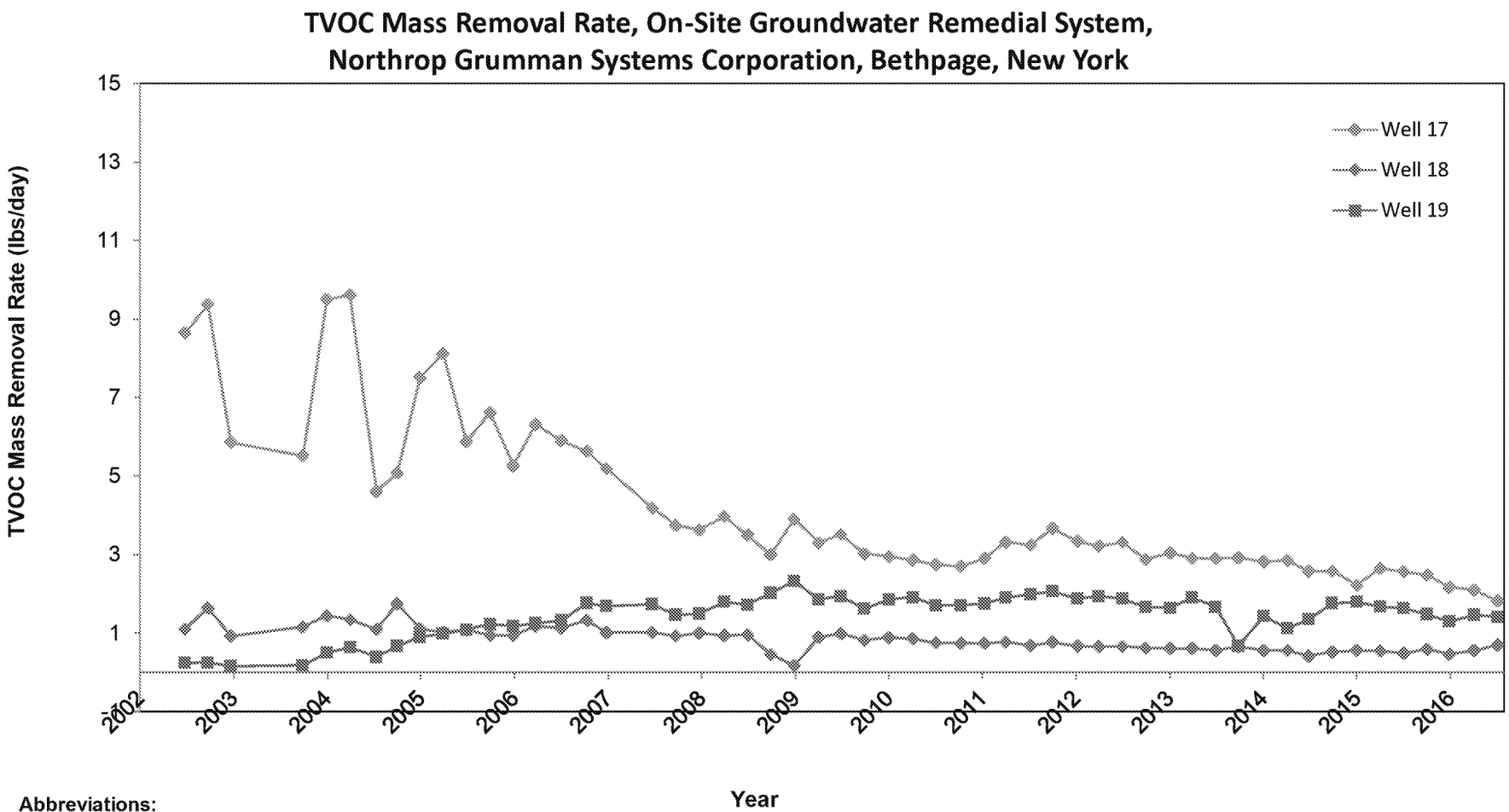
NORTHROP GRUMMAN SYSTEMS CORPORATION

BETHPAGE, NEW YORK

OU2 ON-SITE GROUNDWATER REMEDY

OU2 ONCT CUMULATIVE TVOC MASS REMOVED THROUGH JULY 2016

ARCADIS



Abbreviations:

VOC = Volatile organic compound

lbs = Pounds

TVOCs = Sum of VOCs detected

ONCT = On-Site Containment

Notes:

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OU2 ON-SITE GROUNDWATER REMEDY
OU2 ONCT CUMULATIVE TVOC MASS REMOVED THROUGH JULY 2016

ARCADIS

Well 3 added to system

x1	x2	y1	y2
10/28/2004	10/28/2004	0	20000

Well 3 replaced by Well 3R

x1	x2	y1	y2
10/28/2004	10/28/2004	0	20000