

Appendix C. National Geodetic Survey OPUS Solution Reports for Bench Marks Established in the Warm Springs Area near Moapa, Nevada

This page left intentionally blank.

WSBM-1 Jones Spring Box

FILE: PJONES0370.04o 000181204 **WSBM-1 JONES SPRING BOX**

NGS OPUS SOLUTION REPORT

USER: ray.overgaard@lvvwd.com
RINEX FILE: pjon037r.04o

DATE: June 18, 2004
TIME: 17:03:39 UTC

SOFTWARE: page5 0310.28 master.pl
EPHEMERIS: igs12565.eph [precise]
NAV FILE: brdc0370.04n OBS

START: 2004/02/06 17:26:00
STOP: 2004/02/06 20:54:00
USED: 6407 / 6719 :

95%

ANT NAME: TRM39105.00

FIXED AMB: 34 / 34 :

100%

ARP HEIGHT: 2.0

OVERALL RMS: 0.012(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.1006)

X: -2140784.624(m)	0.013(m)	-2140785.306(m)	0.013(m)
Y: -4650263.659(m)	0.018(m)	-4650262.351(m)	0.018(m)
Z: 3792408.497(m)	0.013(m)	3792408.467(m)	0.013(m)

LAT: 36 42 54.57120	0.022(m)	36 42 54.58793	0.022(m)
E LON: 245 16 50.36615	0.006(m)	245 16 50.31915	0.006(m)
W LON: 114 43 9.63385	0.006(m)	114 43 9.68085	0.006(m)
EL HGT: 514.513(m)	0.009(m)	513.772(m)	0.009(m)
ORTHO HGT: 541.260(m)	0.026(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065699.133(m)	703693.822(m)	1.36393077	1.00011119
SPC(2701 NV E):	8218368.507(m)	277184.288(m)	0.51655125	0.99997337

US NATIONAL GRID DESIGNATOR: 11SQA0369465699(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AI8811	RAIL RAILROAD VALLEY CORS ARP	N381649.535	W1153953.379	192820.1
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	74796.5
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	139221.2

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1342.7
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-1 Jones Spring Box

FILE: 63371260.04o 000186248

WSBM-1 JONES SPRING BOX**NGS OPUS SOLUTION REPORT**

=====

USER: wstout@stantec.com
RINEX FILE: 6337126s.04oDATE: July 06, 2004
TIME: 13:24:32 UTCSOFTWARE: page5 0310.28 master13.pl
EPHEMERIS: igs12693.eph [precise]
NAV FILE: brdc1260.04n
ANT NAME: TRM22020.00+GP
ARP HEIGHT: 1.513START: 2004/05/05 18:39:00
STOP: 2004/05/05 21:49:00
OBS USED: 7338 / 7789 : 94%
FIXED AMB: 46 / 47 : 98%
OVERALL RMS: 0.015(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.3438)

X:	-2140784.616(m)	0.008(m)	-2140785.303(m)	0.008(m)
Y:	-4650263.643(m)	0.020(m)	-4650262.335(m)	0.020(m)
Z:	3792408.487(m)	0.016(m)	3792408.455(m)	0.016(m)

LAT:	36 42 54.57129	0.025(m)	36 42 54.58793	0.025(m)
E LON:	245 16 50.36617	0.007(m)	245 16 50.31899	0.007(m)
W LON:	114 43 9.63383	0.007(m)	114 43 9.68101	0.007(m)
EL HGT:	514.493(m)	0.010(m)	513.752(m)	0.010(m)
ORTHO HGT:	541.240(m)	0.027(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065699.136(m)	703693.822(m)	1.36393077	1.00011119
SPC(2701 NV E):	8218368.510(m)	277184.288(m)	0.51655125	0.99997337

US NATIONAL GRID DESIGNATOR: 11SQA0369465699(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	74796.5
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	139221.2
AM7015	KING KINGMAN CORS ARP	N351150.480	W1140229.275	179188.7

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1342.7
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-2 Pipeline Jones Flume

FILE: PLJF2022.040 000197690

WSBM-2 PIPELINE JONES FLUME

NGS OPUS SOLUTION REPORT

=====

USER: harper@usgs.gov
 RINEX FILE: plj202q.040

DATE: August 06, 2004
 TIME: 23:23:16 UTC

SOFTWARE: page5 0407.16 master.pl
 EPHEMERIS: igs12802.eph [precise]
 NAV FILE: brdc2020.04n

START: 2004/07/20 16:37:00
 STOP: 2004/07/20 19:22:00
 OBS USED: 4913 / 5407 :

91%

ANT NAME: ASH701975.01B

FIXED AMB: 44 / 52 :

85%

ARP HEIGHT: 1.618994284

OVERALL RMS: 0.023(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.5512)

X:	-2140422.324(m)	0.032(m)	-2140423.016(m)	0.032(m)
Y:	-4650504.929(m)	0.093(m)	-4650503.621(m)	0.093(m)
Z:	3792297.200(m)	0.061(m)	3792297.167(m)	0.061(m)

LAT:	36 42 50.36476	0.014(m)	36 42 50.38133	0.015(m)
E LON:	245 17 7.69085	0.014(m)	245 17 7.64348	0.015(m)
W LON:	114 42 52.30915	0.014(m)	114 42 52.35652	0.015(m)
EL HGT:	502.227(m)	0.114(m)	501.487(m)	0.114(m)
ORTHO HGT:	528.987(m)	0.117(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065579.735(m)	704126.795(m)	1.36677342	1.00011337
SPC(2701 NV E):	8218242.737(m)	277615.388(m)	0.51941452	0.99997419

US NATIONAL GRID DESIGNATOR: 11SQA0412765580(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	74935.1
DG4673	NVCS CARLTON SQUARE CORS ARP	N361311.196	W1151019.335	68482.8
DG4263	NVLK A M SMITH WTF CORS ARP	N360410.758	W1144847.501	72049.9

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1278.2
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-3 Baldwin SpringFILE: BALDW0370.04o 000179255 **WSBM-3 BALDWIN SPRING**

NGS OPUS SOLUTION REPORT

=====

USER: sean.corkill@lvvwd.com
RINEX FILE: bald037r.04oDATE: June 14, 2004
TIME: 16:47:25 UTCSOFTWARE: page5 0310.28 master11.pl
EPHEMERIS: igs12565.eph [precise]
NAV FILE: brdc0370.04n OBSSTART: 2004/02/06 17:48:00
STOP: 2004/02/06 22:21:00
USED: 8527 / 8987 :

95%

ANT NAME: TRM39105.00

FIXED AMB: 38 / 38 :

100%

ARP HEIGHT: 2.0

OVERALL RMS: 0.011(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.1007)

X: -2140993.956(m)	0.011(m)	-2140994.639(m)	0.012(m)
Y: -4649779.403(m)	0.014(m)	-4649778.096(m)	0.014(m)
Z: 3792880.888(m)	0.016(m)	3792880.858(m)	0.016(m)

LAT: 36 43 13.68727	0.022(m)	36 43 13.70397	0.022(m)
E LON: 245 16 34.54462	0.005(m)	245 16 34.49760	0.006(m)
W LON: 114 43 25.45538	0.005(m)	114 43 25.50240	0.006(m)
EL HGT: 514.520(m)	0.005(m)	513.779(m)	0.005(m)
ORTHO HGT: 541.243(m)	0.025(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4066278.958(m)	703287.239(m)	1.36146974	1.00010915
SPC(2701 NV E):	8218954.202(m)	276786.380(m)	0.51398731	0.99997262

US NATIONAL GRID DESIGNATOR: 11SQA0328766279(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AI8811	RAIL RAILROAD VALLEY CORS ARP	N381649.535	W1153953.379	192119.4
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	75061.4
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	138770.8

NEAREST NGS PUBLISHED CONTROL POINT

GR0790	M 301	N364354.	W1144332.	1257.1
--------	-------	----------	-----------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-3 Baldwin Spring

FILE: 98511260.040 000186245

WSBM-3 BALDWIN SPRING**NGS OPUS SOLUTION REPORT**

=====

USER: wstout@stantec.com
RINEX FILE: 9851126s.040DATE: July 06, 2004
TIME: 13:20:22 UTCSOFTWARE: page5 0310.28 master10.pl
EPHEMERIS: igs12693.eph [precise]
NAV FILE: brdc1260.04n
ANT NAME: TRM22020.00+GP
ARP HEIGHT: 1.532START: 2004/05/05 18:08:00
STOP: 2004/05/05 21:37:00
OBS USED: 8091 / 8608 : 94%
FIXED AMB: 60 / 61 : 98%
OVERALL RMS: 0.013(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.3438)

X:	-2140993.957(m)	0.012(m)	-2140994.645(m)	0.012(m)
Y:	-4649779.394(m)	0.036(m)	-4649778.087(m)	0.036(m)
Z:	3792880.876(m)	0.020(m)	3792880.844(m)	0.020(m)

LAT:	36 43 13.68711	0.024(m)	36 43 13.70372	0.024(m)
E LON:	245 16 34.54444	0.005(m)	245 16 34.49723	0.005(m)
W LON:	114 43 25.45556	0.005(m)	114 43 25.50277	0.005(m)
EL HGT:	514.506(m)	0.038(m)	513.766(m)	0.038(m)
ORTHO HGT:	541.229(m)	0.045(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4066278.953(m)	703287.235(m)	1.36146971	1.00010915
SPC(2701 NV E):	8218954.197(m)	276786.375(m)	0.51398727	0.99997262

US NATIONAL GRID DESIGNATOR: 11SQA0328766279(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	75061.4
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	138770.8
AM7015	KING KINGMAN CORS ARP	N351150.480	W1140229.275	179877.2

NEAREST NGS PUBLISHED CONTROL POINT

GR0790	M 301	N364354.	W1144332.	1257.1
--------	-------	----------	-----------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-4 Warm Springs Road near Iverson Flume

FILE: 63371280.04o 000186246

WSBM-4 WARM SPRINGS ROAD NEAR IVERSON FLUME**NGS OPUS SOLUTION REPORT**USER: wstout@stantec.com
RINEX FILE: 6337128p.04o

DATE: July 06, 2004

TIME: 13:22:43 UTC

SOFTWARE: page5 0310.28 master10.pl
EPHEMERIS: igs12695.eph [precise]
NAV FILE: brdc1280.04n
ANT NAME: TRM22020.00+GP
ARP HEIGHT: 1.509START: 2004/05/07 15:10:00
STOP: 2004/05/07 19:09:00
OBS USED: 8626 / 9082 : 95%
FIXED AMB: 41 / 45 : 91%
OVERALL RMS: 0.018(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.3490)

X:	-2140193.907(m)	0.006(m)	-2140194.595(m)	0.006(m)
Y:	-4650873.598(m)	0.027(m)	-4650872.290(m)	0.026(m)
Z:	3791988.550(m)	0.030(m)	3791988.518(m)	0.029(m)

LAT:	36 42 37.69617	0.026(m)	36 42 37.71281	0.025(m)
E LON:	245 17 22.26060	0.007(m)	245 17 22.21339	0.006(m)
W LON:	114 42 37.73940	0.007(m)	114 42 37.78661	0.006(m)
EL HGT:	509.641(m)	0.027(m)	508.900(m)	0.027(m)
ORTHO HGT:	536.419(m)	0.037(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065197.918(m)	704497.654(m)	1.36908269	1.00011524
SPC(2701 NV E):	8217855.531(m)	277980.509(m)	0.52179138	0.99997489

US NATIONAL GRID DESIGNATOR: 11SQA0449865198(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	74823.8
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	139494.8
AM7015	KING KINGMAN CORS ARP	N351150.480	W1140229.275	178428.4

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1625.2
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-5 Iverson Flume

FILE: IVRF1340.02o 000181214 WSBM-5 Iverson Flume

NGS OPUS SOLUTION REPORT

=====

USER: timothy.wolf\@lvvwd.com
RINEX FILE: ivrf1340.02o
Iverson Flume

DATE: June 20, 2002
TIME: 00:45:56 UTC

SOFTWARE: page5 0203.19
EPHEMERIS: igs11662.eph [precise]
NAV FILE: brdc1340.02n
ANT NAME: TRM33429.00-GP
ARP HEIGHT: 2.064

START: 2002/05/14 18:19:00
STOP: 2002/05/14 21:32:00
OBS USED: 6548 / 8503 : 77%
FIXED AMB: 56 / 88 : 64%
OVERALL RMS: 0.031(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2002.3667)

X:	-2140100.670(m)	0.040(m)	-2140101.316(m)	0.039(m)
Y:	-4650849.449(m)	0.039(m)	-4650848.146(m)	0.039(m)
Z:	3792063.111(m)	0.035(m)	3792063.095(m)	0.035(m)

LAT:	36 42 40.81624	0.043(m)	36 42 40.83353	0.044(m)
E LON:	245 17 25.26635	0.045(m)	245 17 25.22076	0.056(m)
W LON:	114 42 34.73365	0.045(m)	114 42 34.77924	0.056(m)
EL HGT:	505.380(m)	0.020(m)	504.638(m)	0.020(m)
ORTHO HGT:	532.232(m)	0.032(m)	[Geoid99 NAVD88]	

UTM: Zone 11
NORTHING: 4065295.862(m)
EASTING: 704569.942(m)

SPC: Zone 2701(NV)
NORTHING: 8217952.382(m)
EASTING: 278054.227(m)

BASE STATIONS USED

PID	DESIGNATION		LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	lvwd LAS VEGAS VALLEY	CORS ARP	N360934	W1151128	74945
AI8817	echo ECHO CANYON S.P.	CORS ARP	N375455	W1141551	139381
AM7015	king KINGMAN	CORS ARP	N351150	W1140229	178493

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330	W1144235	1521
--------	-------	---------	----------	------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-6 Pederson Spring

FILE: 98511270.04o 000186254

WSBM-6 PEDERSON SPRING**NGS OPUS SOLUTION REPORT**

=====

USER: wstout@stantec.com
RINEX FILE: 9851127r.04o

DATE: July 06, 2004

TIME: 13:28:22 UTC

SOFTWARE: page5 0310.28 master16.pl
EPHEMERIS: igs12694.eph [precise]
NAV FILE: brdc1270.04n
ANT NAME: TRM22020.00+GP
ARP HEIGHT: 1.352START: 2004/05/06 17:05:00
STOP: 2004/05/06 19:18:00
OBS USED: 5013 / 5505 : 91%
FIXED AMB: 38 / 39 : 97%
OVERALL RMS: 0.014(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.3463)

X:	-2140635.851(m)	0.021(m)	-2140636.539(m)	0.021(m)
Y:	-4650789.717(m)	0.050(m)	-4650788.409(m)	0.050(m)
Z:	3791874.611(m)	0.033(m)	3791874.579(m)	0.033(m)

LAT:	36 42 32.62813	0.023(m)	36 42 32.64476	0.022(m)
E LON:	245 17 4.67332	0.006(m)	245 17 4.62611	0.006(m)
W LON:	114 42 55.32668	0.006(m)	114 42 55.37389	0.006(m)
EL HGT:	528.567(m)	0.057(m)	527.826(m)	0.057(m)
ORTHO HGT:	555.339(m)	0.062(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065031.300(m)	704064.957(m)	1.36611433	1.00011306
SPC(2701 NV E):	8217695.352(m)	277545.456(m)	0.51885352	0.99997406

US NATIONAL GRID DESIGNATOR: 11SQA0406565031(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	74444.4
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	139768.1
AM7015	KING KINGMAN CORS ARP	N351150.480	W1140229.275	178431.5

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1828.5
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-7 Warm Spring West

FILE: 63371270.04o 000186256

WSBM-7 WARM SPRINGS WEST**NGS OPUS SOLUTION REPORT**

=====

USER: wstout@stantec.com
RINEX FILE: 6337127q.04o

DATE: July 06, 2004

TIME: 13:30:09 UTC

SOFTWARE: page5 0310.28 master12.pl
EPHEMERIS: igs12694.eph [precise]
NAV FILE: brdc1270.04n
ANT NAME: TRM22020.00+GP
ARP HEIGHT: 1.489START: 2004/05/06 16:35:00
STOP: 2004/05/06 20:44:00
OBS USED: 9299 / 10186 : 91%
FIXED AMB: 76 / 77 : 99%
OVERALL RMS: 0.018(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.3464)

X:	-2140471.493(m)	0.017(m)	-2140472.180(m)	0.017(m)
Y:	-4650688.064(m)	0.041(m)	-4650686.756(m)	0.041(m)
Z:	3792067.647(m)	0.025(m)	3792067.615(m)	0.025(m)

LAT:	36 42 40.77093	0.024(m)	36 42 40.78757	0.024(m)
E LON:	245 17 8.97619	0.006(m)	245 17 8.92901	0.006(m)
W LON:	114 42 51.02381	0.006(m)	114 42 51.07099	0.006(m)
EL HGT:	514.841(m)	0.041(m)	514.100(m)	0.041(m)
ORTHO HGT:	541.609(m)	0.048(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065284.811(m)	704165.745(m)	1.36690186	1.00011356
SPC(2701 NV E):	8217947.310(m)	277649.968(m)	0.51959559	0.99997426

US NATIONAL GRID DESIGNATOR: 11SQA0416665285(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	74711.2
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	139497.0
AM7015	KING KINGMAN CORS ARP	N351150.480	W1140229.275	178630.4

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1559.9
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-8 Plummer Springs

FILE: lowerspg.04o 000186250

WSBM-8 PLUMMER SPRINGS**NGS OPUS SOLUTION REPORT**

=====

USER: wstout@stantec.com
RINEX FILE: lowe127r.04o

DATE: July 06, 2004

TIME: 13:26:19 UTC

SOFTWARE: page5 0310.28 master11.pl
EPHEMERIS: igs12694.eph [precise]
NAV FILE: brdc1270.04n
ANT NAME: TRM22020.00+GP
ARP HEIGHT: 1.497START: 2004/05/06 17:44:00
STOP: 2004/05/06 21:10:00
OBS USED: 6437 / 8167 : 79%
FIXED AMB: 59 / 62 : 95%
OVERALL RMS: 0.018(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.3465)

X:	-2140333.281(m)	0.025(m)	-2140333.969(m)	0.025(m)
Y:	-4650782.745(m)	0.059(m)	-4650781.438(m)	0.059(m)
Z:	3792016.409(m)	0.035(m)	3792016.377(m)	0.035(m)

LAT:	36 42 38.89120	0.025(m)	36 42 38.90782	0.025(m)
E LON:	245 17 15.62940	0.008(m)	245 17 15.58221	0.008(m)
W LON:	114 42 44.37060	0.008(m)	114 42 44.41779	0.008(m)
EL HGT:	506.840(m)	0.064(m)	506.099(m)	0.064(m)
ORTHO HGT:	533.613(m)	0.068(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065230.818(m)	704332.224(m)	1.36799107	1.00011440
SPC(2701 NV E):	8217890.869(m)	277815.607(m)	0.52069416	0.99997458

US NATIONAL GRID DESIGNATOR: 11SQA0433265231(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	74758.8
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	139505.8
AM7015	KING KINGMAN CORS ARP	N351150.480	W1140229.275	178519.3

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1594.2
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-9 Moapa Gage

FILE: moapa.04o 000186252

WSBM-9 MOAPA GAGE

NGS OPUS SOLUTION REPORT

USER: wstout@stantec.com
 RINEX FILE: moap128o.04o

DATE: July 06, 2004
 TIME: 13:28:36 UTC

SOFTWARE: page5 0310.28 master13.pl
 EPHEMERIS: igs12695.eph [precise]
 NAV FILE: brdc1280.04n
 ANT NAME: TRM22020.00+GP
 ARP HEIGHT: 1.482

START: 2004/05/07 14:43:00
 STOP: 2004/05/07 19:16:00
 OBS USED: 9839 / 10565 : 93%
 # FIXED AMB: 55 / 60 : 92%
 OVERALL RMS: 0.018(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.3489)

X:	-2138947.267(m)	0.011(m)	-2138947.955(m)	0.011(m)
Y:	-4651393.485(m)	0.031(m)	-4651392.178(m)	0.030(m)
Z:	3792031.313(m)	0.014(m)	3792031.281(m)	0.014(m)

LAT:	36 42 39.75208	0.020(m)	36 42 39.76870	0.020(m)
E LON:	245 18 16.64346	0.005(m)	245 18 16.59627	0.005(m)
W LON:	114 41 43.35654	0.005(m)	114 41 43.40373	0.005(m)
EL HGT:	496.181(m)	0.030(m)	495.441(m)	0.030(m)
ORTHO HGT:	522.985(m)	0.039(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4065293.640(m)	705845.624(m)	1.37814070	1.00012205
SPC(2701 NV E):	8217931.299(m)	279329.556(m)	0.53083001	0.99997751

US NATIONAL GRID DESIGNATOR: 11SQA0584665294(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	75663.6
AI8817	ECHO ECHO CANYON S.P. CORS ARP	N375455.904	W1141551.242	139059.9
AM7015	KING KINGMAN CORS ARP	N351150.480	W1140229.275	178031.7

NEAREST NGS PUBLISHED CONTROL POINT

GR0789	K 301	N364305.	W1144136.	801.7
--------	-------	----------	-----------	-------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-10 L.D.S. East WellFILE: LDSE1360.020 000181207 **WSBM-10 L.D.S. EAST WELL**

NGS OPUS SOLUTION REPORT

=====

USER: timothy.wolf\@lvvwd.com
 RINEX FILE: ldse1360.020
 LDS East

DATE: June 20, 2002
 TIME: 00:49:18 UTC

SOFTWARE: page5 0203.19
 EPHEMERIS: igs11664.eph [precise]
 NAV FILE: brdc1360.02n
 ANT NAME: TRM39105.00
 ARP HEIGHT: 2.045

START: 2002/05/16 16:39:00
 STOP: 2002/05/16 18:48:00
 OBS USED: 4462 / 4699 : 95%
 # FIXED AMB: 29 / 31 : 94%
 OVERALL RMS: 0.020(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2002.3719)

X:	-2139830.827(m)	0.012(m)	-2139831.473(m)	0.011(m)
Y:	-4650119.731(m)	0.041(m)	-4650118.428(m)	0.041(m)
Z:	3793106.491(m)	0.028(m)	3793106.474(m)	0.028(m)

LAT:	36 43 22.98995	0.028(m)	36 43 23.00722	0.028(m)
E LON:	245 17 22.85263	0.007(m)	245 17 22.80702	0.009(m)
W LON:	114 42 37.14737	0.007(m)	114 42 37.19298	0.009(m)
EL HGT:	507.381(m)	0.045(m)	506.639(m)	0.045(m)
ORTHO HGT:	534.195(m)	0.051(m)	[Geoid99 NAVD88]	

UTM: Zone 11
 NORTHING: 4066594.241(m)
 EASTING: 704478.975(m)

SPC: Zone 2701(NV)
 NORTHING: 8219251.782(m)
 EASTING: 277982.483(m)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	lvwd LAS VEGAS VALLEY CORS ARP	N360934	W1151128	75976
AI8817	echo ECHO CANYON S.P. CORS ARP	N375455	W1141551	138151
AM7015	king KINGMAN CORS ARP	N351150	W1140229	179736

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330	W1144238	218
--------	-------	---------	----------	-----

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-11 L.D.S. GageFILE: LDSG1340.020 000181206 **WSBM-11 L.D.S. GAGE**

NGS OPUS SOLUTION REPORT

=====

USER: timothy.wolf\@lvvwd.com
 RINEX FILE: ldsg1340.020
 LDS Gage

DATE: June 20, 2002
 TIME: 00:44:33 UTC

SOFTWARE: page5 0203.19
 EPHEMERIS: igs11662.eph [precise]
 NAV FILE: brdc1340.02n
 ANT NAME: TRM39105.00
 ARP HEIGHT: 2.045

START: 2002/05/14 17:58:00
 STOP: 2002/05/14 21:24:00
 OBS USED: 7792 / 8875 : 88%
 # FIXED AMB: 51 / 54 : 94%
 OVERALL RMS: 0.020(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2002.3666)

X:	-2140313.027(m)	0.013(m)	-2140313.673(m)	0.013(m)
Y:	-4650051.452(m)	0.025(m)	-4650050.149(m)	0.025(m)
Z:	3792916.802(m)	0.002(m)	3792916.786(m)	0.003(m)

LAT:	36 43 15.35091	0.019(m)	36 43 15.36821	0.019(m)
E LON:	245 17 4.05180	0.005(m)	245 17 4.00620	0.006(m)
W LON:	114 42 55.94820	0.005(m)	114 42 55.99380	0.006(m)
EL HGT:	505.831(m)	0.021(m)	505.089(m)	0.021(m)
ORTHO HGT:	532.642(m)	0.033(m)	[Geoid99 NAVD88]	

UTM: Zone 11
 NORTHING: 4066347.663(m)
 EASTING: 704018.131(m)

SPC: Zone 2701(NV)
 NORTHING: 8219012.081(m)
 EASTING: 277518.107(m)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	lvwd LAS VEGAS VALLEY CORS ARP	N360934	W1151128	75517
AI8817	echo ECHO CANYON S.P. CORS ARP	N375455	W1141551	138510
AM7015	king KINGMAN CORS ARP	N351150	W1140229	179674

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330	W1144238	635
--------	-------	---------	----------	-----

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-11 L.D.S. Gage

FILE: LDS11541.040 000184850

WSBM-11 L.D.S. GAGE

NGS OPUS SOLUTION REPORT

=====

USER: harper@usgs.gov
RINEX FILE: lds1154r.040DATE: June 30, 2004
TIME: 21:09:39 UTCSOFTWARE: page5 0310.28 master6.pl
EPHEMERIS: igs12733.eph [precise]
NAV FILE: brdc1540.04nSTART: 2004/06/02 17:36:00
STOP: 2004/06/03 16:02:00
OBS USED: 35159 / 37598 :

94%

ANT NAME: ASH701975.01B

FIXED AMB: 164 / 192 :

85%

ARP HEIGHT: 1.49675615

OVERALL RMS: 0.022(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.4214)

X:	-2140313.037(m)	0.001(m)	-2140313.726(m)	0.001(m)
Y:	-4650051.484(m)	0.008(m)	-4650050.176(m)	0.008(m)
Z:	3792916.800(m)	0.006(m)	3792916.767(m)	0.006(m)

LAT:	36 43 15.35021	0.003(m)	36 43 15.36681	0.003(m)
E LON:	245 17 4.05198	0.004(m)	245 17 4.00472	0.004(m)
W LON:	114 42 55.94802	0.004(m)	114 42 55.99528	0.004(m)
EL HGT:	505.856(m)	0.009(m)	505.115(m)	0.008(m)
ORTHO HGT:	532.593(m)	0.026(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4066347.642(m)	704018.136(m)	1.36639033	1.00011282
SPC(2701 NV E):	8219012.059(m)	277518.111(m)	0.51889441	0.99997401

US NATIONAL GRID DESIGNATOR: 11SQA0401866348(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	75516.6
DG4673	NVCS CARLTON SQUARE CORS ARP	N361311.196	W1151019.335	69046.4
DG4263	NVLK A M SMITH WTF CORS ARP	N360410.758	W1144847.501	72803.4

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	627.6
--------	-------	-------------	--------------	-------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-12 Baldwin Flume

FILE: BF011551.040 000184853

WSBM-12 BALDWIN FLUME**NGS OPUS SOLUTION REPORT**

=====

USER: harper@usgs.gov
RINEX FILE: bf01155q.040DATE: June 30, 2004
TIME: 21:10:27 UTCSOFTWARE: page5 0310.28 master16.pl
EPHEMERIS: igs12734.eph [precise]
NAV FILE: brdc1550.04n
99%
ANT NAME: ASH701975.01B
99%
ARP HEIGHT: 1.571906808START: 2004/06/03 16:19:00
STOP: 2004/06/04 16:18:00
OBS USED: 50723 / 51143 :
FIXED AMB: 157 / 158 :
OVERALL RMS: 0.015(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.4240)

X:	-2140792.871(m)	0.009(m)	-2140793.561(m)	0.009(m)
Y:	-4649818.555(m)	0.010(m)	-4649817.248(m)	0.010(m)
Z:	3792942.552(m)	0.004(m)	3792942.519(m)	0.003(m)

LAT:	36 43 16.23194	0.009(m)	36 43 16.24851	0.009(m)
E LON:	245 16 42.56429	0.008(m)	245 16 42.51701	0.008(m)
W LON:	114 43 17.43571	0.008(m)	114 43 17.48299	0.008(m)
EL HGT:	512.486(m)	0.006(m)	511.746(m)	0.006(m)
ORTHO HGT:	539.212(m)	0.026(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4066362.117(m)	703484.353(m)	1.36282560	1.00011014
SPC(2701 NV E):	8219034.425(m)	276984.675(m)	0.51532798	0.99997299

US NATIONAL GRID DESIGNATOR: 11SQA0348466362(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	75238.1
DG4673	NVCS CARLTON SQUARE CORS ARP	N361311.196	W1151019.335	68752.7
DG4263	NVLK A M SMITH WTF CORS ARP	N360410.758	W1144847.501	72768.0

NEAREST NGS PUBLISHED CONTROL POINT

GR1414	L 301	N364330.247	W1144238.752	1052.2
--------	-------	-------------	--------------	--------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

WSBM-13 M-10

FILE: M10A1552.040 000184851

WSBM-13 M-10

NGS OPUS SOLUTION REPORT

=====

USER: harper@usgs.gov
RINEX FILE: m10a155v.040DATE: June 30, 2004
TIME: 21:07:21 UTCSOFTWARE: page5 0310.28 master18.pl
EPHEMERIS: igs12734.eph [precise]
NAV FILE: brdc1550.04n
94%
ANT NAME: ASH701975.01B
87%
ARP HEIGHT: 1.555131722START: 2004/06/03 21:25:00
STOP: 2004/06/04 16:06:00
OBS USED: 32800 / 34914 :
FIXED AMB: 180 / 206 :
OVERALL RMS: 0.025(m)

REF FRAME: NAD83(CORS96)(EPOCH:2002.0000)

ITRF00 (EPOCH:2004.4243)

X:	-2141146.056(m)	0.008(m)	-2141146.745(m)	0.008(m)
Y:	-4649330.864(m)	0.015(m)	-4649329.556(m)	0.015(m)
Z:	3793353.766(m)	0.006(m)	3793353.734(m)	0.005(m)

LAT:	36 43 32.65049	0.005(m)	36 43 32.66711	0.006(m)
E LON:	245 16 21.41777	0.005(m)	245 16 21.37050	0.005(m)
W LON:	114 43 38.58223	0.005(m)	114 43 38.62950	0.005(m)
EL HGT:	521.710(m)	0.017(m)	520.970(m)	0.016(m)
ORTHO HGT:	548.411(m)	0.030(m)	[Geoid03 NAVD88]	

PLANE COORDINATES	North(Y)	East(X)	Convergence (deg)	Point Scale
UTM(Zone 11):	4066855.676(m)	702947.675(m)	1.35945477	1.00010745
SPC(2701 NV E):	8219535.800(m)	276455.428(m)	0.51186987	0.99997199

US NATIONAL GRID DESIGNATOR: 11SQA0294866856(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
AJ1826	LVWD LAS VEGAS VALLEY CORS ARP	N360934.026	W1151128.797	75365.3
DG4673	NVCS CARLTON SQUARE CORS ARP	N361311.196	W1151019.335	68856.3
DG4263	NVLK A M SMITH WTF CORS ARP	N360410.758	W1144847.501	73213.6

NEAREST NGS PUBLISHED CONTROL POINT

GR0790	M 301	N364354.	W1144332.	680.0
--------	-------	----------	-----------	-------

This position was computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.