

From: Priscilla Burton
To: cbenson2@osmre.gov; dosborne@osmre.gov; Mike Dunn; OGMCOAL
CC: Brinton, Peter; Campbell, Ingrid; Dana Dean; Daron Haddock; James Ow...
Date: 11/1/2010 11:31 AM
Subject: 007001 White Oak, Outgoing, White Oak coordinates
Attachments: Gregg Hunts Scofield Conversion.xls; P-Valley Coordinate Conversion.pdf; Ben Grimes Coordinate Memo 29 Jan 06.doc

Hello Mike,

Last Thursday, I spoke with Greg Hunt who has been working with Scofield area maps to put together a new mine application. He has encountered the same issues with multiple coordinate systems.

In trying to solve his mapping issues, he sought out Bruce Ware, the Carbon County Surveyor for many years. Bruce indicated that surveyors used to use "Clear Creek Coordinates" when surveying in the Pleasant Valley area (Scofield, Skyline, Clear Creek, White Oak..etc.) Bruce Ware developed a conversion for the Clear Creek Coordinates which is attached (P-Valley Coordinate Conversion).

I've attached Greg Hunt's excel spreadsheet that he created using Bruce Ware's scale, rotation and translation factors for conversion.

Greg Hunt also received advice from Ben Grimes, Surveyor, on the derivation of Modified State Plan Coordinates, attached.

I hope this is helpful to you. If so, please credit Greg Hunt and others for the information.

Thanks for you efforts Mike.

Priscilla.

>>> "Dunn, Mike" <mldunn@osmre.gov> Monday, November 01, 2010 10:27 AM >>>
I have exhausted all my skills trying to make the PSOMAS local coordinates fit with Utah State Plane coordinates.

If I'm not mistaken, the CAD file I have for active operations topography is "Whiteoak Mine Site.dwg" and the one for contracted topography last Summer is "whiteoak.dwg."

Using PSOMAS/coal company(?) coordinates, I cannot get either drawing to match:

- USGS 10-meter digital elevation model;
- USGS 1997 digital ortho quad;
- NAIP leaf-on photography for 2009
- USGS(?) 10-inch resolution photography from Feb 2006

I used the 1997 ortho quad to orient the active operations drawing and I used the 2009 photo to orient the contracted topo drawing - specifically using the 2 subsidence pits. (attached) Both are now in Utah SP83 Central Zone, US Feet

I got the "Final Map" PDF off of your permit web site - it has at least 3 points in SP27 that might be accurate.

I'm going to make it "fit" the other stuff as best I can because it shows the portals and working on both seams so you can compare with the subsidence pits.

Later!
Mike

To: Eric & Greg
From: Ben Grimes
Date: January 29, 2006
Subject: Utah State Plane Coordinates
Reference: Inverse Report below for Gregs block

Modified State Plane (modified to project elevation) as it is commonly applied by Surveyors means modifying the coordinates so they represent a more accurate projection at the average elevation, or some other elevation that is close to the project's actual elevation. This allows for calculating, or inverting between points to obtain distances that are closer to reality at the project site. The method used in common practice is simple to use and provides coordinates that are very accurate. I have used this method on dozens of projects, some as much as 15 miles north-south by 10 miles east-west. If used properly and consistently with the same CF factor, everything fits and life is good.

The common way that all Surveyors I know, and the way that I learned in practice, and in classes is to simply use the reciprocal of the combined factor (CF) and multiply it times the State Plane (at Sea Level) coordinates. In Utah this shifts the coordinates to the North and East by an amount based on the point at which the CF was calculated. This is why an average point somewhere in the middle of the project area at an average elevation of the project is chosen to use for the CF. To convert from Sea Level to project coordinates multiply the Sea Level Coordinates by the reciprocal of the CF ($1.00047927 = \text{reciprocal of } (CF .99952096 \text{ mid-point of Greg's area})$). To convert from project coordinates to Sea Level coordinates multiply the project coordinates by the CF. SEE PDFS ATTACHED.

This method was chosen by Engineers and Surveyors many years ago when the State Plane systems were invented for the following reasons:

1. It provides a simple calculation that is very easy to do. Only one conversion is needed. You do not have to worry about elevation factors, scale factors, rotation angles & etc, you simply use the combined factor.
2. It is consistent with practice by all Surveyors.
3. It more accurately represents distances at the project area.
4. It is easy to do to translate back and forth between Sea Level coordinates and Project Coordinates.
5. It is easy to convert to other coordinates systems such as UTM (Metric), and Lat/Long. This is particularly important because you will find many occasions where you need to compare maps to the Quadrangle Maps, and other published maps. These other maps are often at Sea Level, and often are at other coordinate projections. Using CORPSCON software you can convert to Lat/Long, UTM, NAD 27, & etc very easily.

It is for the above reasons I suggest using the standard practice method of translating from Sea Level to Project projection. In reality, we are only trying to come up with an estimated location for things as near to perfect location as possible on an irregular surface. In addition, we are projecting the irregular surface of the earth to a plane surface with a small enough distortion to be insignificant. This is why the State Plane systems were invented. It provides a way to accomplish these goals. The Utah State Plane system was established with the east-west distance to cover the state. It was also divided into 3 zones north-south to reduce the distortion in that direction.

Scofield to State Plane Coordinates Converter

SCALE FACTOR	ROTATION FACTOR	TRANSLATION FACTORS
0.999542253	0.471077728 (in degrees)	478544.0273 2097749.754

Point ID	Scofield Coordinates		SCALE		ROTATION		State Plane Coordinates		Measured		Errors	
	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing	Easting
	*** control points ***											
P	3,700.00	-12,700.00	3,698.31	-12,694.19	3,593.81	-12,724.16	482,137.84	2,085,025.59	482137.84	2085025.59	0.00	0.00
B	-1,415.58	-10,715.18	-1,414.93	-10,710.28	-1,502.94	-10,698.28	477,041.09	2,087,051.47	477,040.93	2,087,051.59	-0.16	0.12
1	-2,741.97	-13,272.01	-2,740.71	-13,265.93	-2,849.69	-13,242.95	475,694.34	2,084,506.80	475694.29	2084506.94	-0.05	0.14
2	-2,746.45	-13,883.31	-2,745.19	-13,876.95	-2,859.19	-13,853.92	475,684.83	2,083,895.84	475,684.82	2,083,895.96	-0.01	0.12
3	-2,879.25	-15,423.34	-2,877.93	-15,416.28	-3,004.58	-15,392.10	475,539.44	2,082,357.66	475,539.37	2,082,357.83	-0.07	0.17
	*** grid corners ***											
	30,500.00	-1,500.00	30,486.04	-1,499.31	30,472.68	-1,749.91	509,016.71	2,095,999.84				
	30,500.00	-1,000.00	30,486.04	-999.54	30,476.79	-1,250.16	509,020.82	2,096,499.60				
	30,500.00	-500.00	30,486.04	-499.77	30,480.90	-750.40	509,024.93	2,096,999.35				
	30,500.00	0.00	30,486.04	0.00	30,485.01	-250.65	509,029.04	2,097,499.11				
	30,500.00	500.00	30,486.04	499.77	30,489.12	249.11	509,033.14	2,097,998.86				
	31,000.00	-1,500.00	30,985.81	-1,499.31	30,972.44	-1,754.02	509,516.46	2,095,995.73				
	31,000.00	-1,000.00	30,985.81	-999.54	30,976.54	-1,254.27	509,520.57	2,096,495.49				
	31,000.00	-500.00	30,985.81	-499.77	30,980.65	-754.51	509,524.68	2,096,995.24				
	31,000.00	0.00	30,985.81	0.00	30,984.76	-254.76	509,528.79	2,097,495.00				
	31,000.00	500.00	30,985.81	499.77	30,988.87	245.00	509,532.90	2,097,994.75				
	31,500.00	-1,500.00	31,485.58	-1,499.31	31,472.19	-1,758.13	510,016.22	2,095,991.62				
	31,500.00	-1,000.00	31,485.58	-999.54	31,476.30	-1,258.38	510,020.33	2,096,491.38				
	31,500.00	-500.00	31,485.58	-499.77	31,480.41	-758.62	510,024.44	2,096,991.13				
	31,500.00	0.00	31,485.58	0.00	31,484.52	-258.87	510,028.54	2,097,490.89				
	31,500.00	500.00	31,485.58	499.77	31,488.63	240.89	510,032.65	2,097,990.64				
	32,000.00	-1,500.00	31,985.35	-1,499.31	31,971.94	-1,762.24	510,515.97	2,095,987.52				
	32,000.00	-1,000.00	31,985.35	-999.54	31,976.05	-1,262.48	510,520.08	2,096,487.27				
	32,000.00	-500.00	31,985.35	-499.77	31,980.16	-762.73	510,524.19	2,096,987.02				
	32,000.00	0.00	31,985.35	0.00	31,984.27	-262.98	510,528.30	2,097,486.78				
	32,000.00	500.00	31,985.35	499.77	31,988.38	236.78	510,532.41	2,097,986.53				

Projected max error at Kinney (based on error/dist ratio).
0.88 ft

Bruce T. S. Ware

REGISTERED LAND SURVEYOR
HELPER, UTAH 84526

Phone 637-2620

March 27, 2000

Lodestar Energy, Inc.

Attn: Kit Pappas

Scotfield Route

RD 35 Box 370

Helper, UT 84526

Post/Hr Fax Note	7671	Date	3-29-00	Page #	1
To	Greg Howard	From	B.T.S. Ware		
Co./Dept.		Co.			
Phone #	978-229-5277	Phone #	637-2620		
Fax #	978-229-5272	Fax #			
	978-856-9478				

Dear Dr. Pappas,

With your assistance I set the new Subsidence points as follows:

GPS Calibration Control

Station	Northing	Easting	Elevation
1	3,700.00	-12,700.00	9,942.39
2	-1,415.58	-10,715.18	9,897.29

calculated between them N 21°12'23" W 5,487.1476 feet, the residual is 0.593 feet and rotation is 0°16'18"

New Points

Station	Northing	Easting	Elevation
1	-2,741.97	-13,272.01	9,570.66
2	-2,746.45	-13,883.31	9,801.24
3	-2,879.25	-15,423.34	9,675.86

Old Calibration Control at State Plane CAP 1.000475257

P Sea Level	482,137.84	2,085,025.59	9,942.39
E Datum	482,366.98	2,086,016.51	
N Sea Level	477,040.93	2,087,051.59	9,897.29
E Datum	477,267.65	2,088,043.48	

calculated between them N 21°40'39" W 5,484.8124 feet at Sea Level,
the residual is 0.451 feet and rotation is 359°48'30"

New Points

Station	Northing	Easting	Elevation
1 Datum	475,920.37	2,085,497.62	9,570.66
1 Sea Level	475,694.29	2,084,506.94	
2 Datum	475,910.89	2,084,886.35	9,801.24
2 Sea Level	475,684.82	2,083,895.96	
3 Datum	475,765.37	2,082,347.48	9,675.86
3 Sea Level	475,539.37	2,082,357.63	

Sincerely

Bruce T. S. Ware

REGISTERED LAND SURVEYOR
HELPER, UTAH 84526

MT. 1, BOX 146 H-2
Phone 637-2620

March 27, 2000

Lodestar Energy, Inc.

Attn: Kit Pappas

Scotfield Route

RD 35 Box 370

Helper, UT 84526

Post-It Fax Note	7671	Date	3-24-05
To	Greg Howard	From	B.T.S. Ware
Co./Dept.		Co.	B.T.S. Ware
Phone #	970-929-5277	Phone #	637-2620
Fax #	970-929-5278	Fax #	
	970-856-9478		

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1	3,700.00	-12,700.00	9,942.39
B	-1,415.58	-10,715.18	9,897.29

calculates between them N 21°12'23" W 5,487.1476 feet, the residual is 0.593 feet and rotation is 0°16'18"

New Points

Station	Northing	Easting	Elevation
1	-2,741.97	-13,272.01	9,570.66
2	-2,746.45	-13,883.31	9,801.24
3	-2,879.25	-15,423.34	9,675.07

Old Calibration Control at State Plane CAP 1.000475257

P Sea Level	482,137.84	2,085,025.59	9,942.39
F Datum	482,366.98	2,086,016.51	
B Sea Level	477,040.93	2,087,051.59	9,897.29
B Datum	477,267.65	2,088,043.48	

calculates between them N 21°40'39" W 5,484.8124 feet at Sea Level, the residual is 0.451 feet and rotation is 359°48'50"

New Points

Station	Northing	Easting	Elevation
1 Datum	475,920.37	2,085,497.62	9,570.66
1 Sea Level	475,694.29	2,084,506.94	
2 Datum	475,910.89	2,084,886.35	9,801.24
2 Sea Level	475,684.82	2,083,895.96	
3 Datum	475,765.37	2,083,347.48	9,675.06
3 Sea Level	475,539.37	2,082,357.63	

Sincerely