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CHINA LAKE WELLHEAD SURVEY

CHINA LAKE, CA

JUL / AUG 2001

Geodetic Survey

China Lake Wellhead Survey
China Lake, CA

July/August 2001

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**China Lake Wellhead Survey
July/August 2001**

1. INTRODUCTION

This report covers the geodetic survey performed by NIMA/DOGIGA in and around the Naval Air Weapons Station (NAWS) located at China Lake, CA. The purpose of this survey was to provide precise geodetic data for various monitoring wellheads, target sites, and photo points in support of the Range Department and the Environmental Project Office located at the NAWS.

2. GENERAL INFORMATION

a. References: Geodetic Survey Request Worksheet received 22 March 2001 from Mike Stoner, Senior Geologist, Environmental Project Office, NAWS, requesting a precise geodetic survey of approximately 200 wellheads, target sites, and photo points throughout the Indian Wells Valley and the North Range of the NAWS.

b. Person(s) Contacted:

Mike Stoner
Environmental Project Office
Code 8G0000D
Bldg. 00982
NAWS China Lake, CA 93555
Phone: (760) 939-3243
FAX: (760) 939-2980

c. Duration of Mission: 15 July - 17 August 2001.

d. Reconnaissance: Reconnaissance was accomplished 16-19 July 2001 by Larry Schneider, Ken Bennett, Helen Miller, Ray Shipp, Bill Pressley, and Dennis Warring in and around the NAWS.

e. Deployment of Team: On 15 July 2001 a five member team was deployed to China Lake, CA, from Edwards AFB, CA. The team consisted of Larry Schneider, Ken Bennett, Helen Miller, Ray Shipp, and Bill Pressley. Dennis Warring deployed to China Lake, CA, from Vandenberg AFB, CA on the same day. GSA vehicles were used to transport the team and equipment.

3. REQUIREMENTS

a. Form of Data: Geodetic latitudes, longitudes, ellipsoid heights, and elevations.

b. Datum: WGS 84

c. Accuracy: 0.03 meter, all components, relative to local WGS-84 control.

4. DATA ACQUISITION

a. General: A total of 241 various wellheads, target sites, and photo points were positioned relative to previously surveyed precise geodetic control stations **SNORT A 1950** and **L20**, both located on the NAWS, China Lake, CA.

b. GPS Relative/Static: Two independent one-hour sessions utilizing a five-second epoch interval were used to collect data on all 241 stations. Ashtech Model Z-XII GPS receivers with Z-XII Whopper Antennas (700718) were used to collect data.

5. DATA REDUCTION

a. GPS: All of the GPS static data was processed using the Ashtech GPS Post-Processing System software (GPPS) using L1 carrier data for baselines under 10 kilometers in length and using L1/L2 carrier data for baselines over 10 kilometers in length. The computed vectors were then adjusted using the Geolab 3 three-dimensional least squares adjustment software. Geodetic control station **SNORT A 1950** was held fixed in a constrained adjustment for the 240 stations, and the adjusted coordinates for station **L20** were used as a check. All station confidence regions were less than 0.03 meter at the 95 percent confidence level.

6. SURVEY RESULTS

SEE ATTACHED DATA FILE

7. SURVEY ACCURACIES

a. WGS 84 Geodetic Positions: Station **SNORT A 1950** is estimated to have an accuracy of 0.30 meter, Standard Error (SE), each component relative to the WGS 84 (G873) geocentric reference system. Relative accuracies are 0.03 meter, SE, each component, relative station to station.

b. Explanation of WGS 84 (G873) Reference Frame: WGS 84 (G873) is a refined reference frame which includes a new GPS realization of WGS 84 and the adoption of the International Earth Rotation Service (IERS) Standards value of the product of the universal gravitational constant and the mass of the earth (GM). This refined reference frame is coincident with the IERS Terrestrial Reference Frame 1994 (ITRF94) at a level approaching 0.1 meter.

c. EGM 96 Based Orthometric Heights: The orthometric heights are **estimated** to have an accuracy of 0.03 meter, SE, relative station to station.

d. Explanation of Orthometric Height: The Mean Sea Level (MSL) orthometric heights in this publication are derived from geoid heights computed from NASA/NIMA Earth Gravity Model 96 (EGM 96) database. These geoid heights are then subtracted algebraically from the observed WGS 84 ellipsoid heights to establish the MSL orthometric heights. Both EGM 96 and WGS 84 are world models, making them extremely compatible on a global scale. Further information about EGM 96 can be found on the NIMA web site at "www.nima.mil" under the "PUBLICATIONS" sub heading.

8. COMMENTS

a. Supporting documentation is enclosed.

b. If you have any questions or concerns about this project please contact Larry C. Schneider or Robert E. Wideman at (661) 277-5050.

enclosures a/s

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Approved by: Robert E. Wideman
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Center, California Survey Office

SOME OF THE VARIOUS WELLHEAD TYPES



Station Name	WGS 84 Latitude (deg min sec)			WGS 84 Longitude (deg min sec)			Ellipsoid Height (meters)	Orthometric Height (meters)	Point of Survey
_726	N 35	48	07.71530	W117	45	32.28532	648.490	678.808	Punch mark in concrete pad, north side of well
_727	N 35	49	53.45966	W117	40	27.71849	641.506	671.892	Wooden stake and tack SW of well and windmill
BCW	N 35	47	56.10699	W117	35	36.04329	686.592	717.205	Punch mark in concrete, north side of well
_GW1	N 35	36	44.71806	W117	37	06.22365	693.145	724.187	Cut mark in north rim of well pipe
L20	N 35	41	57.80526	W117	37	33.70923	628.831	659.665	Control Point
_PPN	N 35	40	56.77087	W117	37	10.71500	634.587	665.469	Punch mark in center of N head wall,
_PPS	N 35	40	56.40671	W117	37	10.79290	634.428	665.310	Punch mark in center of S head wall
_W09 *	N 35	44	00.16837	W117	55	02.48875	935.960	966.109	Wooden stake and tack on north side of well
_W10	N 35	44	00.08357	W117	55	02.27547	935.140	965.289	Punch mark in concrete, north side of well
_W11	N 35	43	21.00481	W117	50	57.01914	688.531	718.868	Punch in south coner of concrete pad, S of shed
_W12	N 35	43	23.07141	W117	51	27.76118	708.382	738.698	Punch mark in concrete, north side of well
_W14	N 35	47	32.25483	W117	45	26.14674	649.473	679.828	Chisled "X" cut in north rim of metal well pipe
_W15	N 35	47	11.28930	W117	46	42.08555	656.490	686.806	Punch mark in concrete pad, north side of well
_W16	N 35	46	27.91357	W117	46	40.42353	655.011	685.370	Nail in NE corner of concrete pad, NE of well
_W24	N 35	46	24.68788	W117	38	20.06888	629.944	660.569	Wooden stake and tack, 11.81m WSW of well
_W32	N 35	43	36.74118	W117	36	19.97224	626.248	657.042	Punch mark in concrete pad, north side of well
_W33	N 35	39	56.45633	W117	52	33.55938	837.710	868.157	Punch mark in concrete pad, north side of well
_W34	N 35	41	12.88395	W117	49	47.93918	694.586	725.074	Wooden stake & tack, E of well & N side of WT
_W36	N 35	40	35.08374	W117	48	12.56299	687.702	718.282	Punch mark on NW corner of well plate cover
_W38	N 35	39	48.21357	W117	48	19.51468	698.132	728.744	Punch mark in concrete, north side of well
_W43	N 35	39	00.02394	W117	44	58.44130	698.133	728.916	Punch mark in north rim of well pipe
_W45	N 35	38	25.07744	W117	45	01.58416	701.738	732.545	Punch mark in concrete pad, north side of well
_W46	N 35	38	25.53029	W117	45	08.27450	702.634	733.436	Punch mark in concrete pad, north side of well
_W47	N 35	39	02.75011	W117	46	57.30685	707.708	738.409	Punch mark in concrete pad, north side of well
_W51	N 35	38	10.60584	W117	44	47.04237	701.097	731.921	Punch mark in concrete pad, north side of well
_W52	N 35	37	51.11635	W117	44	47.10238	707.144	737.981	Punch mark in concrete pad, north side of well
_W65	N 35	37	33.53864	W117	42	48.50923	697.872	728.770	Punch mark in concrete, north side of well
_W66	N 35	38	04.62326	W117	42	11.15521	684.738	715.628	Punch mark in concrete, SE corner of well shed
_W67	N 35	37	57.46056	W117	42	01.49911	682.494	713.394	Punch mark in concrete pad, east side of well
_W73	N 35	36	51.18119	W117	43	03.76509	715.110	746.031	Punch mark in concrete, north side of well
_W78	N 35	33	17.02289	W117	47	33.14966	828.600	859.527	Punch mark in concrete pad, north side of well
_W79	N 35	39	40.03211	W117	38	33.84314	645.668	676.572	Notch in top of PVC well pipe
_W80	N 35	35	36.37073	W117	49	50.23377	777.818	808.565	Punched hole in concrete
_W81	N 35	42	14.72320	W117	49	51.09855	676.032	706.468	Punch mark in concrete pad, north side of well

* Denotes approximate latitude and longitude for these stations only

Station Name	WGS 84 Latitude (deg min sec)			WGS 84 Longitude (deg min sec)			Ellipsoid Height (meters)	Orthometric Height (meters)	Point of Survey
W82	N 35	42	13.91881	W117	50	18.09634	683.678	714.096	Punch mark in concrete, north side of well
W83	N 35	41	57.92420	W117	51	18.04765	703.238	733.631	Wooden stake & tack outside entry to well shed
WCW	N 35	51	18.09696	W117	36	06.19159	774.656	805.081	Punch mark in concrete, north side of well
719	N 35	50	55.94754	W117	52	22.50414	755.349	785.194	Punch mark in well cover
720	N 35	50	29.19719	W117	52	18.38655	750.237	780.112	Punched hole in concrete
724	N 35	48	06.68809	W117	52	18.35441	721.892	751.912	Punch hole in concrete pad
11M2	N 35	41	18.64495	W117	45	20.32987	672.151	702.817	Punch mark in concrete pad, north side of well
11N1	N 35	41	14.92995	W117	45	19.61230	672.767	703.438	Punch mark in concrete pad, north side of well
1267	N 35	47	43.67082	W117	52	25.75036	718.667	748.705	Punch mark in concrete pad, north side of well
1271	N 35	46	47.33012	W117	50	50.38527	695.699	725.857	Punch mark in concrete, north side of well
1272	N 35	46	34.29861	W117	50	27.85322	686.994	717.180	Punch mark in concrete, north side of well
1281	N 35	45	29.55272	W117	50	02.31954	668.338	698.602	Wooden stake and tack on north side of well
1283	N 35	44	55.93344	W117	51	23.25797	705.366	735.606	Punch mark in concrete post, southeast of well
1287	N 35	44	22.07146	W117	50	32.88533	680.237	710.540	Punch mark in concrete pad, north side of well
1289	N 35	43	55.53863	W117	49	51.14775	663.670	694.022	Punch mark in concrete pad, north side of well
1295	N 35	43	05.32409	W117	52	15.30211	737.933	768.233	Punch hole in concrete pad (north side of well)
1300	N 35	43	30.37677	W117	51	10.31452	700.061	730.382	Wooden stake and tack on north side of well
1301	N 35	43	07.01916	W117	51	08.59580	688.067	718.409	Punch mark in concrete pad, south side of well
1302	N 35	43	29.55483	W117	50	08.73777	669.490	699.853	Punch mark in north rim of well pipe
1303	N 35	43	24.30334	W117	50	45.84612	684.033	714.375	Punch mark concrete pad, north side of well
1309	N 35	47	02.97608	W117	45	41.57834	648.205	678.576	Punch mark in concrete pad, north side of well
1313	N 35	46	13.43464	W117	43	29.83455	640.797	671.291	Punch mark in concrete pad, north side of well
1316	N 35	44	33.96099	W117	45	42.81282	645.787	676.288	Chisle cut in north rim of iron pipe
1318	N 35	43	31.94107	W117	47	09.99401	648.935	679.421	Chisle cut in north rim of iron pipe
1320	N 35	43	54.73439	W117	48	42.64418	650.010	680.412	Wooden stake and tack, north side of well
1321	N 35	43	59.49657	W117	49	32.67509	655.021	685.384	Punch mark in concrete pad, north side of well
1325	N 35	42	38.20164	W117	48	52.37531	658.964	689.420	Wooden stake and tack on north side of well
1339	N 35	42	35.92684	W117	42	52.58655	637.366	668.049	Punch mark in concrete, north side of well
1342	N 35	42	41.25030	W117	38	34.28283	628.382	659.165	Chisled cut in north rim of steel pipe
1344	N 35	44	54.59063	W117	36	14.08713	628.345	659.089	Chisled cut in north rim of steel pipe
14P1	N 35	40	00.53188	W117	44	56.25338	683.569	714.310	Punch mark in concrete pad, north side of well
15JX	N 35	40	05.41247	W117	45	32.11849	684.549	715.261	Wooden stake and tack, north side of well
17Q1	N 35	39	58.97481	W117	41	47.74670	662.951	693.773	Punch mark in concrete pad, north side of well
19NX	N 35	39	14.58192	W117	43	10.48676	681.159	711.978	Punch mark in concrete pad, north side of well

Station Name	WGS 84 Latitude (deg min sec)			WGS 84 Longitude (deg min sec)			Ellipsoid Height (meters)	Orthometric Height (meters)	Point of Survey
1L01	N 35	42	07.99115	W117	50	57.76085	694.342	724.740	Wooden stake and tack on NE side of well shed
2011	N 35	42	11.03223	W117	50	05.95886	680.823	711.252	Wooden stake & tack, north side of well
2012	N 35	41	59.76736	W117	51	22.53237	703.955	734.344	Punch mark in concrete pad, north side of well
2017	N 35	39	52.86410	W117	52	07.55077	782.227	812.693	Punch mark in concrete pad, north side of well
2021	N 35	38	09.91023	W117	51	14.76520	754.152	784.732	Punch hole in concrete pad
2022	N 35	38	13.72288	W117	51	50.35292	787.912	818.467	Punch hole in concrete pad
2023	N 35	42	33.91596	W117	43	20.85322	645.274	675.945	Punch mark in concrete pad, north side of well
2024	N 35	42	33.63903	W117	43	20.48949	645.360	676.032	Punch mark in concrete pad, north side of well
2026	N 35	41	45.46463	W117	45	18.31850	666.325	696.972	Wooden stake and tack on north side of well
2027	N 35	42	18.39548	W117	48	24.25738	663.728	694.220	Punch mark on metal well cover
2030	N 35	41	52.06515	W117	49	20.28909	674.856	705.330	Punch mark in concrete pad, west side of well
2040	N 35	41	25.58364	W117	48	30.91439	676.408	706.937	Punch mark in concrete pad, north side of well
2041	N 35	41	26.89072	W117	47	37.05531	674.297	704.861	Punch mark in concrete pad, north side of well
2042	N 35	41	24.20005	W117	45	27.48448	671.681	702.338	Wooden stake and tack, north side of well
2044	N 35	40	00.05825	W117	43	23.73092	676.165	706.946	Punch mark in concrete pad, north side of well
2045	N 35	39	59.71407	W117	43	23.65856	676.306	707.088	Punch mark in concrete pad, north side of well
2046	N 35	40	27.85886	W117	45	27.45643	681.119	711.818	Wooden stake and tack, north side of well
2047	N 35	40	04.10995	W117	45	32.00809	684.902	715.615	Punch mark in concrete pad, north side of well
2049	N 35	40	14.31125	W117	48	32.92710	691.502	722.085	Punch mark in concrete pad, east side of well
2057	N 35	39	49.01202	W117	48	27.09116	697.834	728.440	Punch mark in concrete pad, south side of well
2060	N 35	39	45.77337	W117	48	51.20884	698.628	729.222	Punch hole in concrete, north side of well
2061	N 35	39	51.31047	W117	48	46.16833	698.604	729.196	Punch mark in concrete pad, north side of well
2072	N 35	38	58.81723	W117	44	31.69174	693.617	724.538	Punch mark in concrete, north side of well
2082	N 35	38	54.74243	W117	46	29.77625	706.441	737.167	Punch mark in concrete pad, north side of well
2086	N 35	38	57.17871	W117	47	12.29847	709.026	739.721	Punch mark in top center of bolt on well pipe
2095	N 35	38	38.44466	W117	48	50.25612	714.235	744.881	Punch mark in concrete pad, north side of well
2105	N 35	38	11.75707	W117	46	32.93691	715.518	746.273	Punch mark in concrete pad, east side of well
2110	N 35	41	50.08164	W117	37	41.42327	628.700	659.536	Chisled cut in north rim of steel pipe
2111	N 35	41	54.43650	W117	37	03.72869	629.101	659.948	Chisle cut in north rim of steel pipe
2113	N 35	41	51.54213	W117	40	32.63991	635.842	666.615	Punch mark in concrete pad, north side of well
2118	N 35	41	41.15469	W117	40	19.37526	636.505	667.289	Punch mark in concrete pad, north side of well
2119	N 35	41	27.73811	W117	40	04.41936	637.655	668.455	Punch mark in concrete pad, north side of well
2123	N 35	41	07.73230	W117	38	10.66189	633.356	664.210	Chisle cut in north rim of steel pipe
2124	N 35	41	35.76910	W117	37	51.02659	629.402	660.244	Chisle cut in north rim of PVC pipe

Station Name	WGS 84 Latitude (deg min sec)			WGS 84 Longitude (deg min sec)			Ellipsoid Height (meters)	Orthometric Height (meters)	Point of Survey
2125	N 35	41	26.02533	W117	37	19.59052	631.690	662.549	Chisle cut in north rim of well pipe
2126	N 35	41	30.67274	W117	37	01.98821	630.442	661.304	Wooden stake and tack, north side of well
2127	N 35	41	00.00012	W117	37	26.70383	633.296	664.170	Chisle cut in north rim of steel pipe
2128	N 35	40	56.70422	W117	37	08.35655	635.214	666.097	Chisle cut in north rim of steel pipe
2129	N 35	40	44.72861	W117	37	42.84029	637.119	667.998	Chisle cut in north rim of iron pipe
2130	N 35	40	39.45381	W117	37	38.13057	637.509	668.392	Chisle cut in north rim of steel pipe
2131	N 35	40	15.11721	W117	38	00.64535	639.788	670.680	Chisle cut in north rim of steel pipe (well)
2132	N 35	40	39.58318	W117	38	30.68581	636.973	667.840	Chisle cut in north rim of iron pipe
2133	N 35	40	18.84388	W117	38	45.66531	641.421	672.297	Saw cut in west rim of PVC well pipe
2136	N 35	40	02.02846	W117	40	10.15370	653.361	684.217	Chisled "X" in north rim of well pipe
2137	N 35	40	07.54941	W117	40	03.73287	650.800	681.655	Wooden stake and tack on north side of well
2138	N 35	40	16.36685	W117	41	37.85294	659.818	690.631	Wooden stake and tack, north side of well
2139	N 35	40	01.47330	W117	42	17.67475	668.742	699.549	Punch mark in concrete pad, north side of well
2143	N 35	39	14.97474	W117	43	14.27860	681.757	712.575	Punch mark in concrete pad, north side of well
2144	N 35	39	14.92470	W117	43	13.50357	681.640	712.458	Punch mark in concrete pad, north side of well
2146	N 35	39	31.11291	W117	42	01.89109	669.254	700.089	Punch mark in concrete pad, north side of well
2148	N 35	39	23.99166	W117	41	11.39622	663.962	694.822	Punch mark in concrete pad, north side of well
2149	N 35	39	24.38262	W117	40	42.33164	660.055	690.925	Punch mark in concrete pad, north side of well
2150	N 35	39	42.89989	W117	39	12.19366	648.259	679.149	Wooden stake and tack
2151	N 35	39	42.81761	W117	39	12.24127	648.330	679.219	Wooden stake and tack
2152	N 35	39	42.88315	W117	39	12.10542	648.133	679.023	Wooden stake and tack
2154	N 35	39	15.24430	W117	40	09.93728	659.297	690.185	Chisled "X" in NW corner of guard post
2155	N 35	39	09.13525	W117	39	55.67656	659.083	689.980	Chisled "X" in NW corner of barrier
2156	N 35	39	07.22753	W117	39	43.92809	660.155	691.058	Notch in well pipe
2157	N 35	39	12.51849	W117	39	48.91547	657.618	688.515	Chisled "X" in north cover of well
2158	N 35	39	12.54142	W117	39	49.42862	657.579	688.476	Chisled "X" in north cover of well
2159	N 35	39	48.08560	W117	38	11.80864	645.682	676.588	Wooden stake and tack, south side of well
2160	N 35	39	48.14629	W117	38	11.72669	645.748	676.654	Wooden stake and tack, south side of well
2161	N 35	39	49.91873	W117	38	45.94639	643.481	674.375	Punch mark in concrete form, north side of well
2162	N 35	39	49.41696	W117	38	45.87582	644.636	675.531	Chisled "X" cut in north rim of well pipe
2165	N 35	38	53.44833	W117	37	43.48714	658.518	689.469	Chisled "X" cut in north rim of aluminum pipe
2166	N 35	38	53.78176	W117	37	43.21975	658.727	689.677	"X" cut on north side of aluminium rim set on well
2168	N 35	38	51.29049	W117	38	39.27053	649.631	680.565	Wooden stake and tack, north side of well
2170	N 35	39	02.48835	W117	39	59.48248	660.407	691.307	Punch mark in concrete pad, north side of well

Station Name	WGS 84 Latitude (deg min sec)			WGS 84 Longitude (deg min sec)			Ellipsoid Height (meters)	Orthometric Height (meters)	Point of Survey
2171	N 35	38	58.19225	W117	40	00.51966	660.013	690.915	Punch mark in concrete on north side of well
2172	N 35	38	12.55245	W117	39	07.27008	654.552	685.502	Punch mark in concrete pad, north side of well
2175	N 35	38	28.41851	W117	40	16.78446	667.364	698.281	N corner of two story bldg, NW of well
2176	N 35	38	30.76312	W117	42	10.97282	679.516	710.389	Punch mark in concrete pad, north side of well
2177	N 35	38	28.60975	W117	41	58.99307	677.679	708.558	Punch mark in concrete pad, N side of well shed
2178	N 35	38	16.42157	W117	42	06.40942	679.990	710.875	Punch mark in concrete pad, WSW of well shed
2179	N 35	38	16.54778	W117	42	01.26404	679.517	710.403	Punch mark in center of well pipe
2184	N 35	38	06.14213	W117	43	16.23402	692.321	723.185	Wooden stake & tack, east side of well shake
2185	N 35	38	05.22432	W117	43	14.84048	692.375	723.241	Wooden stake and tack, south side of well shack
2186	N 35	38	02.75322	W117	43	20.50611	693.728	724.593	Punch mark in concrete pad, north side of well
2192	N 35	37	52.94047	W117	42	06.31179	684.971	715.872	Punch mark in concrete pad, north side of well
2198	N 35	37	50.41037	W117	40	00.80741	668.420	699.367	South fence line corner, SSE of the well
21J1	N 35	39	27.34795	W117	40	17.26245	656.698	687.575	Punch mark in concrete pad, north side of well
2200	N 35	37	55.03407	W117	38	16.84886	655.547	686.524	Punch mark in concrete pad, north side of well
2201	N 35	37	54.96183	W117	38	16.39477	655.449	686.427	Punch mark in concrete pad, north side of well
2202	N 35	37	21.83821	W117	38	30.25011	655.677	686.672	Wooden stake & tack on north side of well
2203	N 35	38	00.87307	W117	37	15.26562	655.092	686.084	Notch in rim of well pipe
2204	N 35	41	56.82376	W117	36	25.62688	630.928	661.785	Punch hole in shaft of PK nail, N side of well
23G1	N 35	39	32.68742	W117	44	49.06247	690.051	720.815	Wooden stake and tack, north side of well
3028	N 35	37	10.01576	W117	50	36.34642	753.215	783.864	Punch mark in concrete pad, north side of well
3031	N 35	37	22.11644	W117	51	27.45364	778.619	809.228	Punch mark in concrete
3034	N 35	34	10.58403	W117	51	46.42723	838.087	868.833	Punch mark in concrete
3038	N 35	33	12.10421	W117	55	41.92658	913.298	943.970	Punch mark in concrete
3039	N 35	36	44.35196	W117	44	49.59249	718.453	749.337	Punch mark in concrete pad, north side of well
3040	N 35	35	46.85987	W117	48	57.23153	750.777	781.547	Punch mark on north rim of well pipe
3041	N 35	36	25.97993	W117	47	53.50682	741.649	772.430	Punch mark in concrete pad, west side of well
3043	N 35	36	01.67772	W117	48	34.14900	747.522	778.295	Wooden stake and tack on north side of well
3044	N 35	35	38.19389	W117	48	13.40126	755.882	786.685	Wooden stake and tack on north side of well
3045	N 35	36	26.37028	W117	45	17.48897	734.300	765.180	Punch mark in concrete pad, north side of well
3051	N 35	34	26.39653	W117	49	46.91527	773.726	804.527	Chisled "X" mark on north rim of subsurface pipe
3052	N 35	34	24.44855	W117	46	33.40638	779.590	810.507	Punch mark in concrete pad, north side of well
3055	N 35	36	52.94016	W117	37	28.93917	676.917	707.948	Punch mark in concrete pad, north side of well
3056	N 35	36	42.24667	W117	38	06.22961	671.561	702.588	Punch mark in concrete, SE corner of well shed
3057	N 35	36	30.36513	W117	39	10.65419	665.505	696.520	Punch mark in concrete, north side of well

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3066	N 35	37	06.72056	W117	43	12.98917	710.648	741.555	Punch mark in concrete pad, north side of well
3067	N 35	36	58.66028	W117	43	05.36164	712.673	743.588	Punch mark in concrete pad, N side of well shed
3072	N 35	36	49.26861	W117	43	08.94396	714.596	745.517	Wooden stake and tack, NNE of well shack
3073	N 35	36	35.89056	W117	43	12.04551	722.422	753.350	Wooden stake and tack, 3.6m south of well
3074	N 35	36	32.39031	W117	43	17.58418	723.073	754.001	Punch mark in concrete pad, south side of well
3085	N 35	35	29.02988	W117	40	12.40606	695.067	726.101	Wooden stake and tack, north side of well
3843	N 35	29	57.39356	W117	55	42.40130	891.750	922.572	Chisled "X" mark on north rim of well
3844	N 35	29	36.94283	W117	55	15.46514	888.745	919.593	Wooden stake at NW corner of concrete border
726A	N 35	48	07.61924	W117	45	31.89058	648.582	678.901	Chisled "X" in north rim of iron well pipe
727P *	N 35	49	53.55600	W117	40	27.61197	641.685	672.071	Chisle mark on north side of rim
BW01	N 35	39	54.91861	W117	38	28.50485	642.034	672.931	Punch hole in concrete
BW02	N 35	39	55.37109	W117	38	28.89602	642.073	672.969	Punch mark in concrete pad, north side of well
BW03	N 35	40	01.18735	W117	37	38.87695	642.833	673.741	Punch hole in concrete, north side of well
BW04	N 35	40	15.51511	W117	38	00.31510	640.003	670.895	Chisled "X" cut in north rim of iron pipe
BW05	N 35	40	28.99186	W117	37	31.71928	640.592	671.485	Chisle mark on north side of rim
BW06	N 35	40	34.17719	W117	37	16.56550	640.290	671.184	"X" cut in north rim of PVC pipe
BW07	N 35	40	39.90033	W117	37	26.99958	640.245	671.133	Chisle cut in north rim of iron pipe
BW08	N 35	40	55.01617	W117	37	56.40583	635.209	666.076	Chisled "X" in north rim of PVC pipe
BW09	N 35	41	07.69582	W117	38	11.21618	633.261	664.115	Chisled "X" in north rim of PVC pipe
BW10	N 35	41	01.33388	W117	37	33.97991	635.231	666.101	Chisle cut in north rim of iron well pipe
BW11	N 35	39	47.20959	W117	39	00.64293	646.739	677.629	Chisled "X" cut in north rim of iron pipe
BW12	N 35	39	47.25719	W117	39	00.09740	646.686	677.577	Chisled "X" cut in north rim of iron pipe
BW13	N 35	38	58.20056	W117	38	44.68636	650.733	681.661	Punch mark in concrete pad, north side of well
BW14	N 35	38	58.24589	W117	38	39.96576	650.509	681.438	Punch mark in concrete pad, north side of well
BW15	N 35	37	49.16402	W117	38	18.37034	655.323	686.303	Chisled mark on north rim of PVC well pipe
BW16	N 35	37	59.75670	W117	38	17.34997	654.593	685.568	Nail in concrete pad, north side of well
BW17	N 35	37	59.92107	W117	38	17.26785	654.740	685.714	Punch mark in concrete pad, north side of well
BW18	N 35	37	58.46665	W117	38	04.49936	653.853	684.832	Punch mark in concrete pad, north side of well
BW19	N 35	37	59.53257	W117	37	51.63716	654.674	685.657	Nail in concrete form, north side of well
BW20	N 35	37	59.45578	W117	37	43.69929	655.336	686.321	Notch in lock hasp, north side of well
BW21	N 35	38	18.96802	W117	39	01.54706	655.020	685.969	Chisled "X" in north rim of well
BW22	N 35	39	47.47846	W117	39	14.21487	648.669	679.554	Knotch in north rim of well pipe
BW23	N 35	39	49.92759	W117	39	12.68680	648.414	679.299	Punch hole in concrete form (north side of well)
BW24	N 35	39	53.08161	W117	39	10.81705	648.219	679.102	Chisle cut in north rim of iron pipe

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BW25	N 35	39	53.83381	W117	39	14.42201	647.973	678.854	Drill hole in concrete (north side of well)
BW26	N 35	39	53.87752	W117	39	15.62250	648.255	679.136	Chisle cut in north rim of well pipe
BW27	N 35	39	45.34029	W117	39	20.92012	650.189	681.074	Chisle cut in north rim of well pipe
BW28	N 35	39	51.99758	W117	39	29.56942	650.769	681.647	Chisled "X" cut on iron latch
BW29	N 35	43	56.88913	W117	43	13.23592	637.568	668.181	Chisled "X" cut on iron latch, E side of well pipe
BW30	N 35	44	56.66069	W117	44	24.74708	642.564	673.098	Chisled "X" cut in top of iron latch, E side of well
BW31	N 35	45	36.38798	W117	45	17.08206	647.516	677.983	Chisled "X" cut on iron latch, SE side of well
BW32	N 35	43	03.78349	W117	42	07.44839	635.212	665.894	Chisle mark on north side of rim
CW02	N 35	38	38.08235	W117	44	36.54779	695.963	726.771	Punch mark in concrete pad, north side of well
CW03	N 35	38	47.76097	W117	44	22.56781	692.706	723.514	Chisled "X" in NW concrete fence post form
CW04	N 35	38	54.46929	W117	44	25.51340	693.261	724.063	Punch mark in center of steel well cap
CW05	N 35	38	54.02824	W117	44	17.15483	691.531	722.336	Punch mark in SW concrete corner fence post
CW06	N 35	38	15.68275	W117	43	42.22981	694.692	725.539	Wooden stake and tack on north side of well
CW07	N 35	38	26.57009	W117	44	24.82569	696.940	727.762	Punch mark in north rim of steel well pipe
CW08	N 35	38	10.74077	W117	44	20.26078	700.735	731.571	Punch mark in north side of metal well cover
CW09	N 35	38	02.24715	W117	43	53.70999	698.712	729.565	Punch mark NW corner fence post concrete form
CW10	N 35	38	06.38369	W117	43	57.22516	699.711	730.559	Punch mark in north rim of iron well pipe
CW11	N 35	37	51.34343	W117	44	22.69053	705.548	736.395	Punch mark in concrete pad, north side of well
CW12	N 35	37	59.97055	W117	44	20.12055	703.082	733.925	Punch mark in concrete pad, north side of well
CW13	N 35	38	04.36434	W117	44	22.72840	702.424	733.263	Punch mark on north edge of well cover
GS19	N 35	39	35.06577	W117	44	22.73463	688.074	718.848	Control point
GW01	N 35	42	12.10411	W117	50	39.59440	689.933	720.339	Punch mark in concrete, south side of pipe
GW02	N 35	36	45.41785	W117	37	03.39953	693.849	724.891	Wooden stake and tack on north side of well
GW03	N 35	36	36.24235	W117	37	04.47628	700.384	731.431	Chisled "X" in NW concrete fence post form
GW04	N 35	36	16.36895	W117	37	06.19511	715.390	746.449	Chisled "X" on top of well steel plate
GW05	N 35	36	53.13949	W117	37	17.93341	681.907	712.940	Chisled "X" on north side of well pipe cover
GW06	N 35	36	58.99548	W117	37	30.87261	673.124	704.150	Chisled "X" on the north rim of PVC well pipe
GW07	N 35	36	55.75697	W117	37	28.16468	675.835	706.864	Chisled mark on north rim of iron well pipe
GW08	N 35	36	55.26943	W117	37	29.55862	675.282	706.310	Chisled "X" on well cover
GW09	N 35	36	49.35409	W117	37	24.61524	680.981	712.015	Chisled "X" on north side of well pipe cover
GW10	N 35	36	48.35045	W117	37	30.31689	679.127	710.160	Chisled "X" on north rim of well pipe
GW11	N 35	36	45.22883	W117	37	45.77482	673.739	704.769	hisled "X" on north side of well cover
GW14	N 35	36	26.98843	W117	37	36.62074	689.297	720.342	Chisled "X" on north side of well pipe
GW16	N 35	36	43.80145	W117	37	29.38996	682.320	713.356	Chisled "X" on north side of well pipe

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GW17	N 35	36	32.00861	W117	37	19.36882	695.497	726.543	Chisled mark on north rim of iron well pipe
W13A	N 35	42	38.50927	W117	50	23.33280	679.159	709.554	Wooden stake and tack, south side of well shack
W24P *	N 35	46	24.86758	W117	38	19.65418	630.477	661.102	Top of pipe
WW01	N 35	46	33.53111	W117	54	27.63202	841.630	871.657	Punch mark in a wooden 2 x 4 post west of weir
WW02 *	N 35	43	59.52423	W117	55	00.48827	932.253	962.404	Punch mark in concrete curb NE of weir

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