

0009233

**UNCONFINED AQUIFER & RATTLESNAKE RIDGE AQUIFER
WATER-LEVEL MEASUREMENTS
DATA MAPS**

December 1984

**H-2-38396 Rev. 18 Hanford Reservation Water-Table Map
Separations Area Water-Table Map
Separations Area Depth-to-Water Map
Potentiometric Surface of the Rattlesnake Ridge Confined
Aquifer in the Separations Area**

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Waste Management Systems Engineering Department

Research and Engineering



**Rockwell International
Rockwell Hanford Operations**



SEPARATIONS AREA WATER TABLE MAP

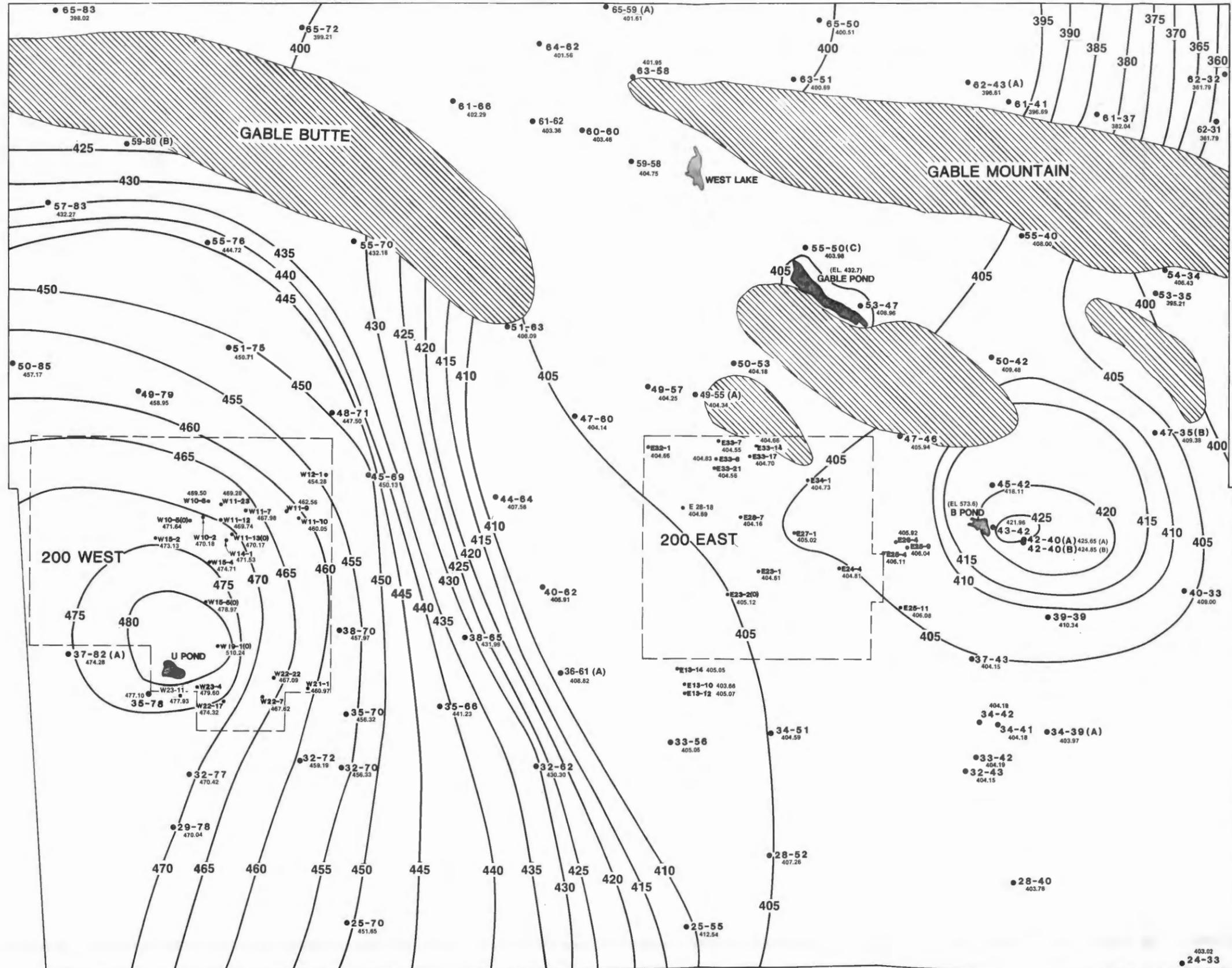
DECEMBER 1984

- WATER-TABLE CONTOURS IN FEET ABOVE MEAN SEA LEVEL (ft-MSL)
- FIVE-FOOT CONTOUR
- WELLS USED IN PREPARATION OF MAP
- PONDS, WATER SURFACE ELEVATION (ft-MSL)
- ▨ BASALT OUTCROPS ABOVE WATER TABLE, AS INFERRED 6/1984

THE SEPARATIONS AREA WATER-TABLE MAP IS PREPARED BY THE HYDROGEOLOGY UNIT OF THE RESEARCH AND ENGINEERING FUNCTION OF ROCKWELL HANFORD OPERATIONS. THIS MAP IS AN ENLARGED SECTION OF THE HANFORD RESERVATION WATER-TABLE MAP, SHEET H-2-38396, REVISION 18.

T. 13 N.
T. 12 N.

SCALE
0 1 MILE
0 1 KILOMETERS



**SEPARATION AREA
DEPTH-TO-WATER MAP**

DECEMBER 1984

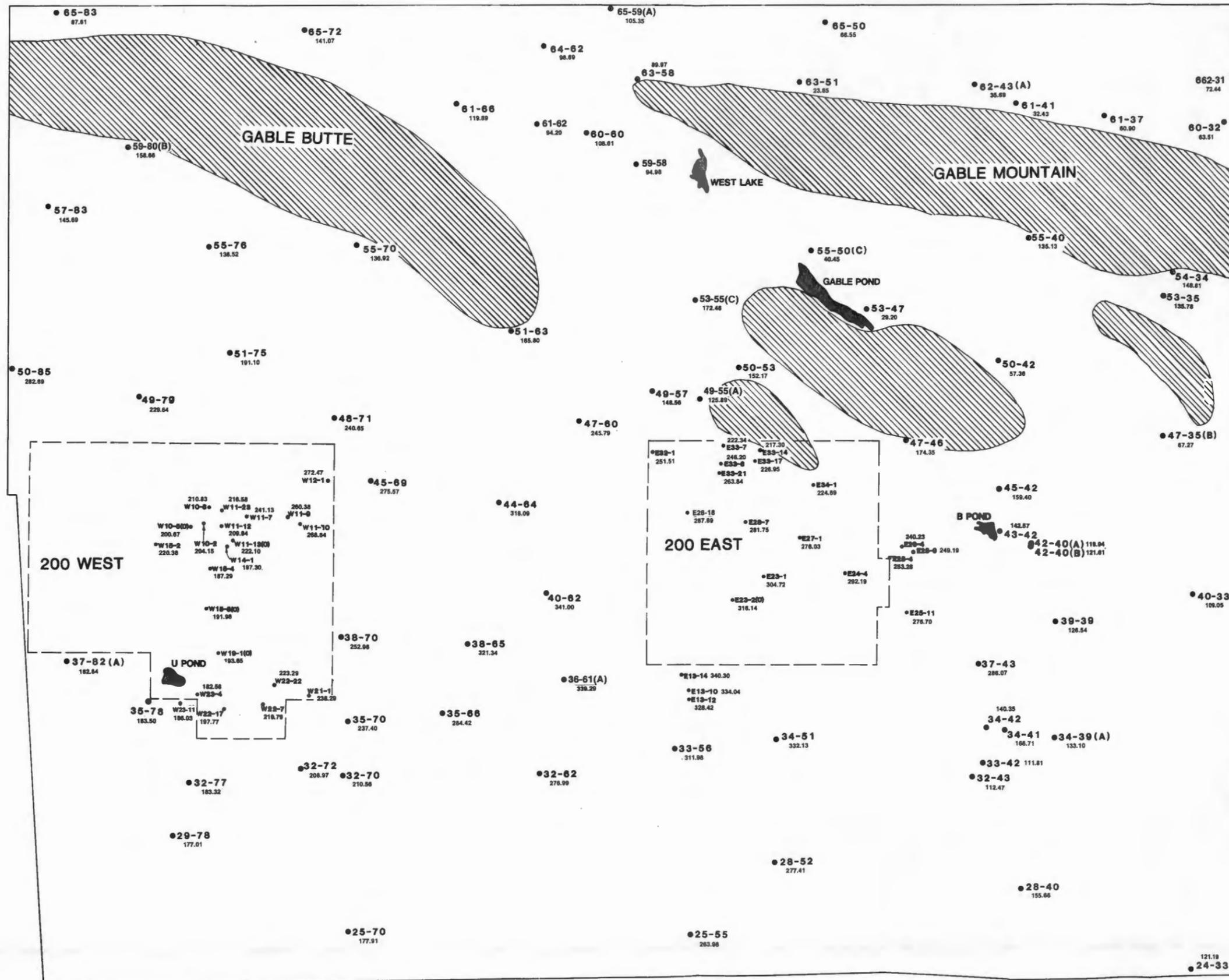
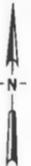
DEPTH TO THE SURFACE OF THE
WATER FROM THE TOP OF THE WELL
CASING, IN FEET

- WELLS USED IN PREPARATION OF MAP
- ▬ PONDS
- ▨ BASALT OUTCROPS ABOVE WATER TABLE, AS INFERRED 6/1984

THE SEPARATIONS AREA DEPTH-TO-WATER MAP IS PREPARED BY THE HYDROGEOLOGY UNIT OF THE RESEARCH AND ENGINEERING FUNCTION OF ROCKWELL HANFORD OPERATIONS. THIS MAP IS PREPARED IN CONJUNCTION TO THE HANFORD SITE WATER-TABLE MAP, SHEET H-2-38396, REVISION 18.

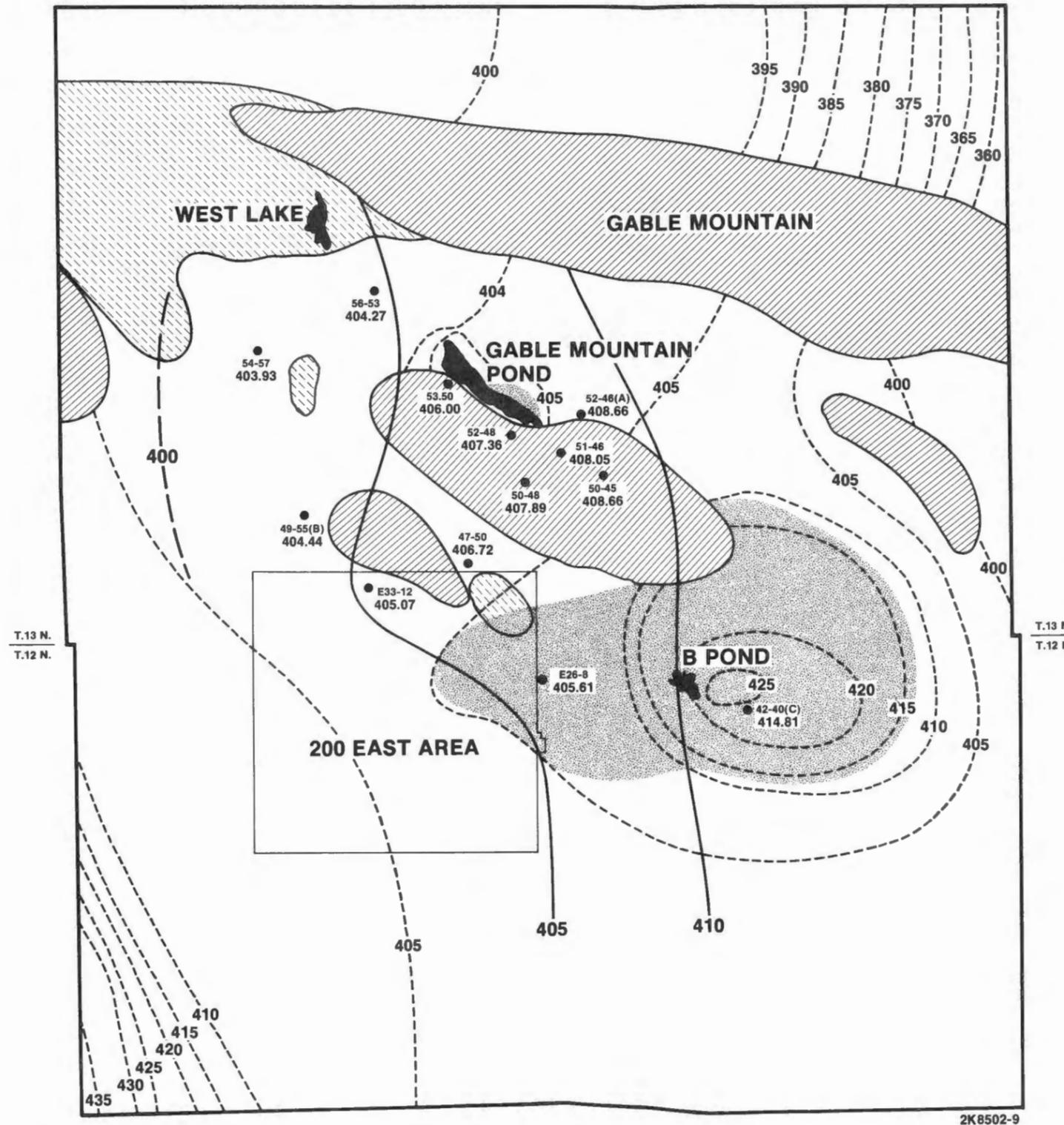
T. 13 N.
T. 12 N.

SCALE
0 1 MILE
0 1 KILOMETERS



**POTENTIOMETRIC SURFACE
OF THE
RATTLESNAKE RIDGE
CONFINED AQUIFER**

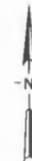
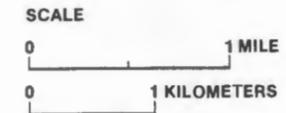
DECEMBER 1984



- 400 — POTENTIOMETRIC SURFACE OF THE RATTLESNAKE RIDGE IN FEET ABOVE MEAN SEA LEVEL (ft MSL)
- - - 420 - - - WATER-TABLE CONTOURS IN FEET ABOVE MEAN SEA LEVEL (ft MSL)
- AREAS OF COMPLETE EROSION OF THE ELEPHANT MOUNTAIN BASALT (from RHO-RE-ST-12)
- AREAS OF DOWNWARD HYDRAULIC GRADIENT
- 53-50 ● CONFINED WELLS USED IN PREPARATION OF MAP
- POND
- BASALT OUTCROPS ABOVE WATER TABLE, AS INFERRED 6/1984

THE RATTLESNAKE RIDGE AQUIFER, WHICH IS CONFINED BY THE ELEPHANT MOUNTAIN BASALT IS MONITORED MONTHLY IN THE EASTERN PORTION OF THE SEPARATIONS AREA. THE DECEMBER, 1984, WATER-LEVEL MEASUREMENTS IN 13 WELLS COMPLETED IN THE RATTLESNAKE RIDGE INTERBED WERE USED TO CONTOUR THE POTENTIOMETRIC SURFACE OF THE AQUIFER. AREAL EXTENT OF DOWNWARD HYDRAULIC GRADIENT FROM THE UNCONFINED AQUIFER TO THIS CONFINED AQUIFER IS INFERRED FROM THE WATER-TABLE MAP AND THE CONTOURS OF THE POTENTIOMETRIC SURFACE OF THE RATTLESNAKE RIDGE. THIS AREA REPRESENTS THE ZONE IN WHICH DOWNWARD FLOW MIGHT OCCUR IF A PATHWAY IS AVAILABLE, SUCH AS ABSENCE OF THE ELEPHANT MOUNTAIN BASALT DUE TO EROSION. SINCE DECEMBER, 1983, THE ZONE OF THE DOWNWARD HYDRAULIC GRADIENT HAS EXPANDED INTO THE EASTERN PORTION OF 200 EAST AREA DUE TO EXPANSION OF THE WATER-TABLE MOUND BENEATH THE B POND SYSTEM.

THE POTENTIOMETRIC SURFACE OF THE RATTLESNAKE RIDGE CONFINED AQUIFER MAP IS PREPARED BY THE HYDROGEOLOGY UNIT OF THE RESEARCH AND ENGINEERING FUNCTION OF ROCKWELL HANFORD OPERATIONS. DATA IS COLLECTED BY THE ENVIRONMENTAL EVALUATIONS SECTION OF PACIFIC NORTHWEST LABORATORY.



Unconfined Aquifer Measurements
For the Hanford Site, December 1984

Well Number	Casing Elevation (ft Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft Above MSL)
199-B04-01	461.80	63.50	398.30
199-D02-05	460.87	73.23	387.64
199-F05-01	406.56	36.10	370.46
199-H03-01	421.98	44.91	377.07
199-K00-11	467.65	73.90	393.75
299-E13-10	737.70	334.04	403.66
299-E13-12	733.49	328.42	405.07
299-E13-14	745.37	340.30	405.07
299-E19-01	736.00	330.34	405.66
299-E23-01	709.65	305.04	404.61
299-E23-02(0)	721.26	316.14	405.12
299-E24-04	697.00	292.19	404.81
299-E25-04	659.39	253.28	406.11
299-E25-09	655.23	249.19	406.04
299-E25-11	682.72	276.64	406.08
299-E26-01	617.25	211.59	405.66
299-E26-04	646.15	240.23	405.92
299-E27-01	681.05	276.03	405.02
299-E28-07	685.91	281.75	404.16
299-E28-18	692.58	287.89	404.69
299-E32-01	656.17	251.51	404.66
299-E33-07	626.89	222.34	404.55
299-E33-08	651.03	246.20	404.41
299-E33-14	622.12	217.46	404.66
299-E33-17	631.65	226.95	404.70
299-E33-21	668.40	263.84	404.56
299-E34-01	629.42	224.69	404.73
299-W10-02	674.33	204.15	470.18
299-W10-05(0)	672.31	200.67	471.64
299-W10-08	680.33	210.83	469.50
299-W11-07	709.11	241.13	467.98
299-W11-09	722.94	260.38	462.56
299-W11-10	728.89	268.84	460.05
299-W11-12	679.58	209.84	469.74
299-W11-13(0)	692.27	222.10	470.17
299-W11-23	685.86	216.58	469.28
299-W12-01	726.46	272.18	454.28
299-W14-01	668.83	197.30	471.53
299-W15-02	693.51	220.38	473.13
299-W15-04	662.00	187.29	474.71
299-W15-05(0)	670.95	191.98	478.97
299-W19-01(0)	674.04	193.80	480.24
299-W19-04(0)	715.52	249.62	465.90
299-W21-01	699.26	238.29	460.97
299-W22-07	687.41	219.79	467.62
299-W22-17	672.09	197.77	474.32

Unconfined Aquifer Measurements
For the Hanford Site, December 1984

Well Number	Casing Elevation (ft Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft Above MSL)
299-W22-22	690.38	223.29	467.09
299-W23-04	662.82	182.72	480.10
299-W23-11	664.14	186.21	477.93
399-08-01	394.87	52.61	342.26
699-S31-01	460.11	81.72	378.39
699-S30-E15A	400.39	59.21	341.18
699-S29-E12	387.97	42.65	345.32
699-S19-E13	394.55	51.01	343.54
699-S18-E02A	434.85	76.24	358.61
699-S14-20	492.74	93.25	399.49
699-S12-03	435.52	57.81	377.71
699-S12-29	487.68	84.83	402.85
699-S08-19	503.81	109.20	394.61
699-S07-34	527.12	120.37	406.75
699-S06-E04D	430.47	59.30	371.17
699-S06-E14A	378.29	27.56	350.73
699-S03-E12	397.90	43.90	354.00
699-S03-25	523.50	125.70	397.80
699-02-03	477.14	89.21	387.93
699-03-45	504.54	93.89	410.65
699-08-17	522.44	125.36	397.08
699-08-25	509.30	110.64	398.66
699-09-E02	418.09	46.63	371.46
699-10-E12	430.86	73.66	357.20
699-10-54	516.40	103.96	412.44
699-11-45A	578.58	168.09	410.49
699-14-E06(T)		NO MEASUREMENT	
699-14-38	514.89	111.85	403.04
699-14-47	587.23	176.42	410.81
699-15-15A	547.14	150.37	396.77
699-15-26	523.83	123.31	400.52
699-17-05	433.19	47.00	386.19
699-17-70	563.18	89.35	473.83
699-19-43	551.58	148.34	403.24
699-20-E12	437.25	79.95	357.30
699-20-20	505.58	105.75	399.83
699-20-39	539.98	136.69	403.29
699-24-01(T)		NO MEASUREMENT	
699-24-33	524.21	121.19	403.02
699-25-55	676.55	263.96	412.59
699-25-70	629.56	177.91	451.65
699-26-15	442.64	44.62	398.02
699-27-08	465.67	72.50	393.17
699-28-40	559.44	155.66	403.78
699-28-52	684.67	277.41	407.26
699-29-78	647.05	177.01	470.04

Unconfined Aquifer Measurements
For the Hanford Site, December 1984

Well Number	Casing Elevation (ft Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft Above MSL)
699-31-31	529.32	126.23	403.09
699-32-22	517.55	116.81	400.74
699-32-43	516.62	112.47	404.15
699-32-62	707.09	276.79	430.30
699-32-70	666.61	210.28	456.33
699-32-72	668.16	208.97	459.19
699-32-77	653.74	183.32	470.42
699-33-42	516.00	111.81	404.19
699-33-56	717.03	311.98	405.05
699-34-39A	537.07	133.10	403.97
699-34-41	570.89	166.71	404.18
699-34-42	540.20	140.35	399.85
699-34-51	736.76	332.17	404.59
699-34-88	632.82	160.24	
699-35-09	499.83	115.79	384.04
699-35-66	725.65	284.42	441.23
699-35-70	693.72	237.40	456.32
699-35-78	660.65	183.55	477.10
699-36-61A	748.11	339.29	408.82
699-36-93	644.77	170.99	473.78
699-37-43	690.17	286.02	404.15
699-37-82A	636.75	162.47	474.28
699-38-65	753.33	321.34	431.99
699-38-70	710.67	252.70	457.13
699-39-39	536.65	126.31	410.34
699-39-79		NO MEASUREMENT	
699-40-01	437.77	76.27	361.50
699-40-33	518.05	109.05	409.00
699-40-62	747.78	340.87	406.91
699-41-23	466.50	68.96	397.54
699-42-12A	514.27	139.30	374.97
699-42-40A	545.43	119.78	425.65
699-42-40B	546.46	121.20	425.26
699-43-42	564.48	142.52	421.96
699-43-89	644.15	175.51	468.64
699-44-64	725.60	318.02	407.58
699-45-42	577.33	159.22	418.11
699-45-69	725.46	275.33	450.13
699-46-21	522.02	132.24	389.78
699-47-35B	476.65	67.27	409.38
699-47-46	580.14	174.20	405.94
699-47-60	649.84	245.70	404.14
699-48-07	384.72	28.97	355.75
699-48-71	688.15	240.65	447.50
699-49-13	412.72	51.71	361.01
699-49-28	535.40	143.00	392.40

Unconfined Aquifer Measurements
For the Hanford Site, December 1984

Well Number	Casing Elevation (ft Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft Above MSL)
699-49-55A	530.14	125.80	404.34
699-49-57	552.81	148.56	404.25
699-49-79	688.59	229.64	458.95
699-50-19	411.08	49.68	361.40
699-50-28B	537.30	145.39	391.91
699-50-30	528.84	136.60	392.24
699-50-42	466.84	57.36	409.48
699-50-53	556.30	152.12	404.18
699-50-85	739.35	282.18	457.17
699-51-63	571.84	165.75	406.09
699-51-75	641.51	190.80	450.71
699-53-35	530.99	135.78	395.21
699-53-47A	438.28	29.40	408.88
699-53-47B	438.58	29.62	408.96
699-53-48A	442.85	36.59	406.26
699-53-48B	442.71	36.79	405.92
699-53-55B		NO. MEASUREMENT	
699-53-55C	564.82	172.37	392.45
699-54-19	383.60	22.10	361.50
699-54-34	550.24	143.81	406.43
699-54-48	457.02	53.01	404.01
699-55-21	395.96	35.71	360.25
699-55-40	543.13	135.13	408.00
699-55-50C	444.43	40.45	403.98
699-55-70	569.03	136.85	432.18
699-55-76	583.24	138.52	444.72
699-55-89	617.43	163.04	454.39
699-55-95	777.05	311.17	465.88
699-56-60		NEW WELL	
699-57-25A	414.57	50.73	363.84
699-57-29B	416.18	54.55	361.63
699-57-83	577.96	145.69	432.27
699-58-24	418.80	57.29	361.51
699-59-32	424.29	62.39	361.90
699-59-58	499.77	94.92	404.85
699-59-80B	583.25	158.66	424.59
699-60-32	425.30	63.51	361.79
699-60-60	512.03	108.57	403.46
699-61-37	442.94	60.90	382.04
699-61-41	428.92	32.23	396.69
699-61-62	497.51	94.15	403.36
699-61-66	522.18	119.89	402.29
699-62-31	434.12	72.44	361.68
699-62-43A	432.30	35.69	396.61
699-63-25A	395.15	33.57	361.58
699-63-51	424.54	23.85	400.69

Unconfined Aquifer Measurements
For the Hanford Site, December 1984

Well Number	Casing Elevation (ft Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft Above MSL)
699-63-58	491.90	89.95	401.95
699-63-90	509.73	112.88	396.85
699-63-92	497.50	99.51	397.99
699-64-27	414.29	52.57	361.72
699-64-62	500.25	98.69	401.56
699-65-22		NO MEASUREMENT	
699-65-23	DRY	DRY	DRY
699-65-50	467.06	66.55	400.51
699-65-59A	506.96	105.35	401.61
699-65-72	540.28	141.07	399.21
699-65-83	485.63	87.61	398.02
699-65-95	452.26	54.59	397.67
699-66-23	389.01	28.45	360.56
699-66-38	436.20	32.84	403.36
699-66-39	453.70	48.44	405.26
699-66-58	503.33	101.96	401.37
699-66-64	505.92	105.91	400.01
699-66-91	467.75	69.36	398.39
699-66-103	463.01	64.68	398.33
699-67-51	524.60	124.02	400.58
699-67-86	472.39	74.62	397.77
699-67-98	455.47	57.22	398.25
699-68-105	451.85	54.90	396.95
699-69-38	422.93	20.33	402.60
699-69-45(0)	487.18	87.61	399.57
699-70-23	391.71	29.08	362.63
699-70-68	526.21	126.65	399.56
699-71-30	400.68	29.26	371.42
699-71-52	523.00	123.26	399.74
699-71-77	472.28	75.59	396.69
699-72-73	482.57	85.25	397.32
699-72-88	437.37	37.65	399.72
699-72-92	452.22	53.45	398.77
699-72-98	DRY	DRY	DRY
699-74-44	445.18	48.78	396.40
699-74-48	487.18	88.72	398.46
699-77-36	412.28	35.25	377.03
699-77-54	480.59	82.56	398.03
699-78-62	469.88	73.24	396.64
699-81-38	406.47	27.50	378.97
699-82-45A	413.73	24.57	389.16
699-83-47	435.27	45.89	389.38
699-86-42	409.92	24.88	385.04
699-87-55	458.63	68.90	389.73
699-89-35	397.46	26.84	370.62
699-90-45	422.15	37.80	384.35

Well Number	Casing Elevation (ft Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft Above MSL)
699-91-37	422.93	49.86	373.07
699-92-49	432.00	37.30	394.70
699-97-43	421.81	42.20	379.61

Rattlesnake Ridge Confined Aquifer Measurements for the
Separations Area of the Hanford Site, December 1984

Well Number	Casing Elevation (ft) (Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft) (Above MSL)
699-56-53	434.34	30.07	404.27
699-54-57	575.58	171.65	403.93
699-49-55B	530.33	125.89	404.44
699-53-50	444.21	38.21	406.00
699-52-48	466.06	58.70	407.36
699-47-50	583.87	177.15	406.72
600-52-46A	455.61	46.95	408.66
699-51-46	444.63	36.58	408.05
699-50-48	550.39	142.50	407.89
699-50-45	451.41	42.75	408.66
699-42-40C	546.19	131.38	414.81
299-E26-8	602.79	197.18	405.61
299-E33-12	623.03	217.96	405.07

Pond Elevations for the
Hanford Site, December 1984

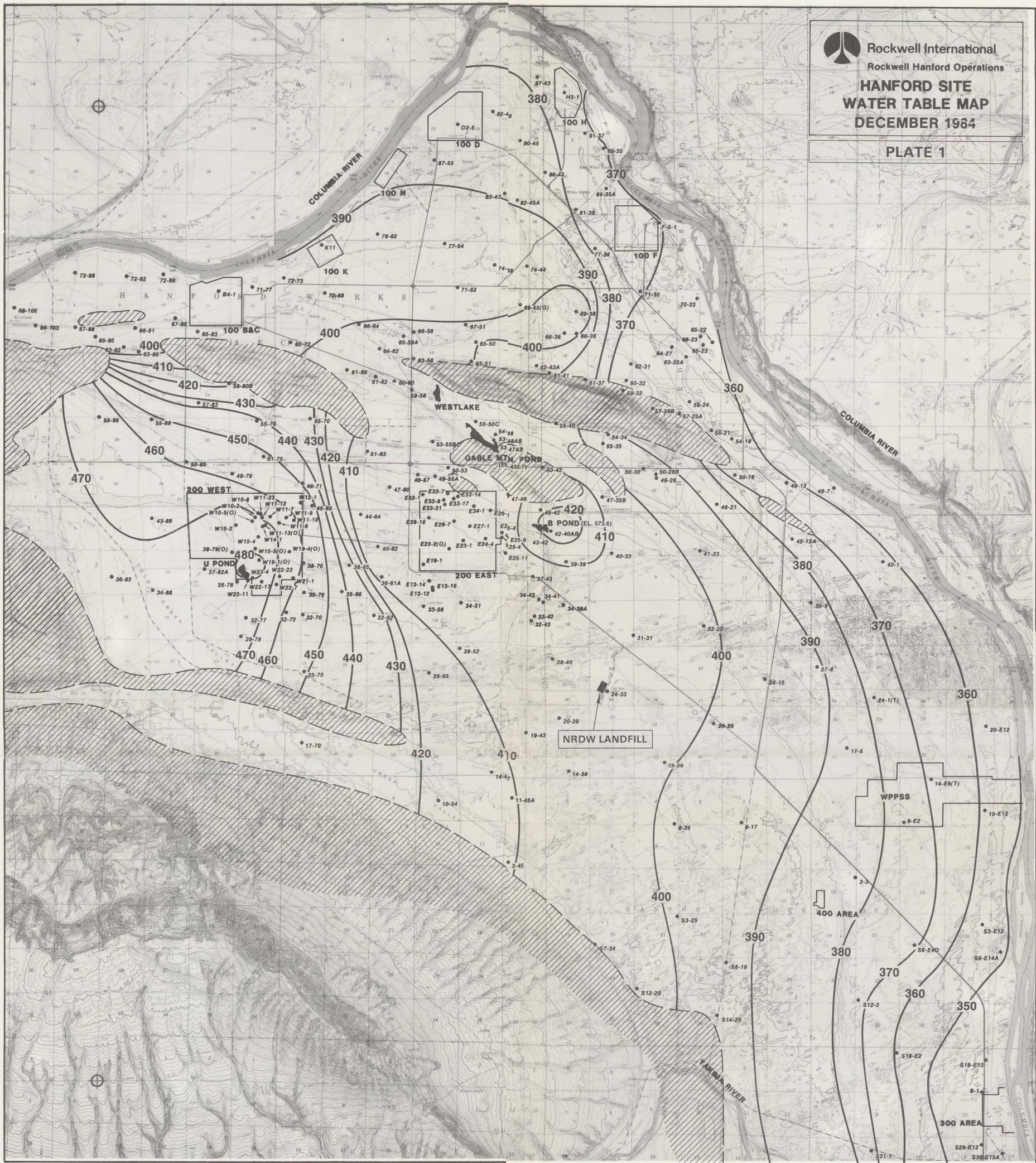
Pond Name	Pond Elevation (ft. Above MSL)
B Pond	573.55
Gable Mountain Pond	432.65
U Pond	In Process of Deactivation
West Lake	No Measurement

Rattlesnake Ridge Confined Aquifer Measurements for the
Separations Area of the Hanford Site, December 1984

Well Number	Casing Elevation (ft) (Above MSL)	Depth to Water (ft)	Water-Level Elevation (ft) (Above MSL)
699-56-53	434.34	30.07	404.27
699-54-57	575.58	171.65	403.93
699-49-55B	530.33	125.89	404.44
699-53-50	444.21	38.21	406.00
699-52-48	466.06	58.70	407.36
699-47-50	583.87	177.15	406.72
600-52-46A	455.61	46.95	408.66
699-51-46	444.63	36.58	408.05
699-50-48	550.39	142.50	407.89
699-50-45	451.41	42.75	408.66
699-42-40C	546.19	131.38	414.81
299-E26-8	602.79	197.18	405.61
299-E33-12	623.03	217.96	405.07

Pond Elevations for the
Hanford Site, December 1984

Pond Name	Pond Elevation (ft. Above MSL)
B Pond	573.55
Gable Mountain Pond	432.65
U Pond	In Process of Deactivation
West Lake	No Measurement



SCALE

0 1 2 3 MILES
 0 1 2 3 KILOMETERS

GN 21°
 1°43' 31 MILS
 21° 373 MILS

UTM GRID AND 1951 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

- WELLS USED IN PREPARATION OF MAP
- ◼ PONDS, WATER SURFACE ELEVATION (ft-MSL)
- ▨ BASALT OUTCROPS ABOVE WATER TABLE, AS INFERRED

WATER TABLE CONTOURS IN FEET ABOVE MEAN SEA LEVEL (ft-MSL)
 10 FOOT CONTOUR

BASE MAPS ARE PORTIONS OF HANFORD, COYOTE RAPIDS, RICHLAND AND CORRAL 15' QUADRANGLES PUBLISHED BY U.S. DEPT. OF INTERIOR, GEOLOGICAL SURVEY

The aquifer system underlying the Hanford site is composed of an upper unconfined aquifer and multiple confined aquifers. The Rattlesnake Ridge Interbed is confined by the Elephant Mountain basalt and contains the uppermost confined aquifer. The purpose of water-level measurements and water-table mapping is to assess the impacts of liquid waste discharged to the ground on the unconfined and uppermost confined aquifers.

The water-table on the Hanford site is monitored on a semiannual basis. Unconfined ground-water elevation maps are prepared from water-level measurements made in June and December. Approximately 220 wells and piezometers are used in contouring the water table. The December water-level measurements are also used to produce a separations area water-table map and a separations area depth-to-water map. This enlarged map details ground-water elevation measurements and contours in and around the 200 areas.

The water table mound surrounding B Pond has expanded due to increased volume of water discharged to the B Pond system. Aside from this region, the water table has not significantly changed since the last measurements taken in June, 1984. Seasonal fluctuations along the Columbia River reflect surface water/ground water interaction.

The Rattlesnake Ridge confined aquifer is monitored monthly in the eastern portion of the separations area. The December, 1984 water-level measurements in 13 wells completed in the Rattlesnake Ridge Interbed were used to contour the potentiometric surface of the Rattlesnake Ridge. Areal extent of downward gradient from the unconfined aquifer to this confined aquifer is inferred from the water-table map and the contours of the potentiometric surface of the Rattlesnake Ridge.

The Hanford site water-table map, separations area water-table map, and potentiometric surface of the Rattlesnake Ridge confined aquifer map are prepared by the Hydrogeology unit of the Research and Engineering function of Rockwell Hanford Operations. Water level measurements are made by the Environmental Evaluations section of Pacific Northwest Laboratory. The Hanford site water-table map is the 18th revision of Sheet H-2-38396 and depicts the water-table configuration in December, 1984.

DEPARTMENT OF ENERGY
 RICHLAND OPERATIONS OFFICE

ROCKWELL INTERNATIONAL
 ROCKWELL HANFORD OPERATIONS

**HANFORD SITE WATER TABLE MAP
 DECEMBER 1984
 H-2-38396 REV. 18**

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