Garrett, Betty

From: Linton, Ron
Sent: Thursday, September 23, 2010 11:07 AM
To: Garrett, Betty
Subject: FW: 5MW66 email 2 of 2
Attachments: 5MW66 email 2 of 2

Docket 040-08502, public. Make sure this is packaged with the second e-mail I'm about to forward to you as an attachment.

Received: from HQCLSTR01.nrc.gov ([148.184.44.76]) by OWMS01.nrc.gov
([148.184.100.43]) with mapi; Thu, 23 Sep 2010 11:07:02 -0400
Content-Type: application/ms-tnef; name="winmail.dat"
Content-Transfer-Encoding: binary
From: "Linton, Ron" <Ron.Linton@nrc.gov>
To: "Garrett, Betty" <Betty.Garrett@nrc.gov>
Date: Thu, 23 Sep 2010 11:06:58 -0400
Subject: FW: 5MW66 email 2 of 2
Thread-Topic: 5MW66 email 2 of 2
Thread-Index: ActZzwpwSF5EONusRrylpSESErK2wgBYcqOQ
Message-ID:
<BE1CC4A72435624D84F8699734202B3E243E9558BF
@HQCLSTR01.nrc.gov>
Accept-Language: en-US
Content-Language: en-US
X-MS-Has-Attach: yes
X-MS-Exchange-Organization-SCL: -1
X-MS-TNEF-Correlator:
<BE1CC4A72435624D84F8699734202B3E243E9558BF
@HQCLSTR01.nrc.gov>
MIME-Version: 1.0

Garrett, Betty

From: Jon Winter (USA - Casper) [Jon.Winter@uranium1.com]
Sent: Tuesday, September 21, 2010 4:53 PM
To: Linton, Ron
Subject: FW: Monitor well 5MW66 and Christensen Ranch
Attachments: Complete copy of 9.21.10 5MW66 status report.pdf

Ron will send in two emails, this is 1 of 2

Jon F. Winter
Manager Environmental & Regulatory Affairs, Wyoming

907 North Poplar
Suite 260
Casper, WY 82601
Phone: 307-234-8235 ext. 331

uraniumone™
investing in our energy

This email, including any attachments, is confidential and may be privileged. Please check any attachments for viruses before opening them. If you are not the intended recipient, then any disclosure, copying, distribution or use of this email or any attachment, other than to or by the sender, is prohibited. If you received this email in error, please notify us immediately by returning it to the sender and delete this copy from your system.

From: Jon Winter (USA - Casper)
Sent: Tuesday, September 21, 2010 2:48 PM
To: 'Linton, Ron'
Cc: Donna Wichers (USA - Casper)
Subject: Monitor well 5MW66 and Christensen Ranch

Ron, attached is a status report for Monitor well 5MW66 (on excursion) prepared for the Wyoming Department of Environmental Quality – Land Quality Division. As per SUA-1341 License condition 11.2, Uranium One is required to provided reports to the NRC on a quarterly basis. The last report sent to the NRC was dated July 16, and the next scheduled report will be completed and submitted in October for the third quarter of 2010. Also, as per our telephone discussion, I am also providing a copy for your files of the August 13, 2010 report to the WDEQ-LQD on this same subject. If you have any questions please do not hesitate to contact me.

Jon F. Winter
Manager Environmental & Regulatory Affairs, Wyoming

907 North Poplar
Suite 260
Casper, WY 82601
Phone: 307-234-8235 ext. 331

uraniumone™
investing in our energy

This email, including any attachments, is confidential and may be privileged. Please check any attachments for viruses before opening them. If you are not the intended recipient, then any disclosure, copying, distribution or use of this email or any attachment, other than to or by the sender, is prohibited. If you received this email in error, please notify us immediately by returning it to the sender and delete this copy from your system.

Received: from mail1.nrc.gov (148.184.176.41) by OWMS01.nrc.gov
(148.184.100.43) with Microsoft SMTP Server id 8.1.393.1; Tue, 21 Sep 2010
16:54:15 -0400
X-Ironport-ID: mail1
X-SBRS: 2.9
X-MID: 22696139
X-fn: Complete copy of 9.21.10 5MW66 status report.pdf
X-IronPort-AV: E=Sophos;i="4.56,402,1280721600";
d="pdf'?jpg'145?scan'145,208,145,217";a="22696139"
Received: from pe1-2.uranium1.com ([69.90.31.228]) by mail1.nrc.gov with
ESMTP; 21 Sep 2010 16:53:47 -0400
Received: from srv-cas-mx-01.cas.u1.internal (10.10.150.10) by
srv-pe1-mx-01.u1.internal (10.10.10.10) with Microsoft SMTP Server (TLS) id
8.2.254.0; Tue, 21 Sep 2010 13:52:41 -0700
Received: from srv-cas-mx-01.cas.u1.internal ([10.10.150.10]) by
srv-cas-mx-01.cas.u1.internal ([10.10.150.10]) with mapi; Tue, 21 Sep 2010
14:52:38 -0600
From: "Jon Winter (USA - Casper)" <Jon.Winter@uranium1.com>
To: "Linton, Ron" <Ron.Linton@nrc.gov>
Date: Tue, 21 Sep 2010 14:52:36 -0600
Subject: FW: Monitor well 5MW66 and Christensen Ranch
Thread-Topic: Monitor well 5MW66 and Christensen Ranch
Thread-Index: ActZzkzKZ/nHeyh0Q/ytsufDH7sIwAAAIN/Q
Message-ID: <EF2FF00E3AB2A947B8EE03551C596EF00A19A9EEFC@srv-cas-
mx-01.cas.u1.internal>
Accept-Language: en-US
Content-Language: en-US
X-MS-Has-Attach: yes
X-MS-TNEF-Correlator:
acceptlanguage: en-US
Content-Type: multipart/mixed;
boundary="_006_EF2FF00E3AB2A947B8EE03551C596E
F00A19A9EEFCsrvcasmx01cas_"
MIME-Version: 1.0
Return-Path: Jon.Winter@uranium1.com

uraniumone
Investing in our energy

September 21, 2010

Glenn Mooney
Senior Geologist
Wyoming Department of Environmental Quality
Land Quality Division
2100 West 5th, Street
Sheridan, WY 82801

Re: Mine Unit 5 Response, Irigaray–Christensen Ranch In Situ Operations, Permit No. 478

Dear Mr. Mooney:

Uranium One Americas (Uranium One) has prepared this excursion status report for Monitor Well 5MW66 at the Irigaray–Christensen Ranch Project. A corrective action plan was previously submitted to the Wyoming Department of Environmental Quality-Land Quality Division (WDEQ-LQD) that proposed implementation of a phased approach to delineate and to recover (if necessary) the excursion identified at Well 5MW66, located downgradient of Mine Unit 5 (MU5). A follow-up phase of additional monitoring proposed on August 13, 2010 has been completed. Results and interpretation of the additional monitoring are summarized in this status report. Further corrective actions are proposed in this report. A summary of the phased corrective action plan is also provided at the end of this status report.

Site Conditions

Insitu recovery mining of uranium was conducted at MU5 from June 1995 through March 2000. Aquifer restoration was initiated in April 2000 and completed in August 2004. Production in Module 5-5 was within the "K2" and "K3" subunits of the K Sandstone. Monitor Well 5MW66 is located downgradient of Module 5-5 of MU5. The nearest production to Well 5MW66 was in the "K2" and "K3" Sands 200 feet to the southeast, and in the "K3" Sand 300 feet to the northeast. Monitor Well 5MW66 is completed across both the "K2" and "K3" sands.

Uranium One USA, Inc.
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • fax +1 307-237-8235
907 N. Poplar Street, Suite 260
Casper, Wyoming 82601
www.uranium1.com

uraniumone
Investing in our energy

Monitoring Results and Evaluation

As described in the August 13, 2010 status report, baseline water quality for 5MW66 exceeded the Wyoming Class I (Domestic) Standard for TDS, Class I and II (Agriculture) Standards for sulfate and the US Environmental Protection Agency (USEPA) maximum contaminant level (MCL) for uranium of 0.03 mg/l. The selenium and gross alpha Class I, II and III (Livestock) Standards are also exceeded. The baseline water quality data for 5MW66 indicate that pre-mining water quality for that well exceeded Class III Standards.

Results of the recent analysis of the groundwater samples collected from Well 5MW66 indicate that the water quality at 5MW66 still exceeds each of those standards for TDS and sulfate and the MCL for uranium. Although the levels of excursion parameters have increased over baseline values, the class of use of the well has not changed (still exceeding Class III Standards, unsuitable for domestic, agricultural or livestock use).

In order to better characterize the extent of elevated constituents in the vicinity of Well 5MW66, the following wells were sampled for excursion parameters and uranium in June 2010:

"K2" completions: 5BO104-1 and 5BO102-2
"K3" completions: 5BM102-1, 5BM103-1, 5BR117-1

A follow-up round of monitoring was completed in early September to confirm the results of the June round and to add additional monitoring locations. The following monitoring locations were added in the September round:

"K3" completions: 5BM98-2, 5BM99-2, 5BP118-1 and 5BP119-2
"K2-K3" monitor wells: 5MW2, 5MW64, 5MW65, and 5MW68

Figure 1 shows the location of all the sampled wells. Results of the June and September monitoring are included in Table 2. The chloride, conductivity, alkalinity, uranium and pH data from the wells were plotted and contoured. Potentiometric surface maps were developed from water level data collected at the time of sampling.

It should be noted that the wellfield average for TDS, chloride, sulfate, conductivity, and alkalinity after the 4th quarter stability monitoring round were all below the Target

Uranium One USA, Inc.
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • fax +1 307-237-8235
907 N. Poplar Street, Suite 260
Casper, Wyoming 82601
www.uranium1.com

Restoration Values (TRVs) for MU5, as reported in the Wellfield Restoration Report, Christensen Ranch Project, Wyoming (COGEMA Mining, Inc and Petrotek Engineering Corporation, 2007). Water quality at 5MW66 exceeds the TRV for each of these parameters; therefore, the source of the excursion is unclear.

Figure 2 shows the distribution of chloride in the vicinity of Well 5MW66 for the September 2010 sampling round. Well 5MW66 has the highest concentration among the sampled wells, although wells 5BM103-1, 5BM102-1, 5BR117-1, 5BR118-2 and 5BR119-2, located along the western edge of the MU5 wellfields, and completed across the "K3" Sand, also had relatively elevated chloride levels. No wells have been identified within the wellfields northeast and southeast of Well 5MW66 that have values as high as those observed at well 5MW66.

The September 2010 distribution of conductivity (Figure 3) shows that, besides 5MW66, the only other wells that exceed the TRV (1095 umhos/cm) are 5BR117-1 and 5BR119-2, located in the wellfield to the northeast. Alkalinity (Figure 4) exceeded the TRV of 158 mg/l at 5MW66 and three wells to the northeast and two wells to the southeast, all completed in the "K3" sand. The alkalinity at 5MW66 was substantially lower in the September round (176 mg/l) compared to the June sampling (314 mg/l).

The distribution of chloride, conductivity and alkalinity suggest that the extent of the excursion is generally focused in the area around Well 5MW66.

The distribution of uranium for September 2010 indicates that all of the production/injection wells sampled (except for K2 completion 5BO104-1) had values similar to Well 5MW66 (Figure 5) ranging from 1.5 to 4.9 mg/l. Upgradient (5MW65) and downgradient (5MW2, 5MW64 and 5MW68) monitor ring wells were all below the analytical reporting limit for these samples. This demonstrates that, with the exception of 5MW66, the elevated uranium is generally attenuated near the wellfield and has limited migration. It should be emphasized that 5MW66 is completed within an ore-body.

The September 2010 distribution of pH is shown on Figure 6. The pH at 5MW66 is unusually low (7.0) compared to all other sampled wells. Each of the other monitor ring wells have pH in excess of 8 and all of the sampled production/injection wells had pH between 7.2 and 7.9.

The water quality results of the June and September 2010 sampling efforts did not clearly delineate the source of the excursion as being from either the wellfield to the

Uranium One USA, Inc.
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • fax +1 307-237-8235
907 N. Poplar Street, Suite 260
Casper, Wyoming 82601
www.uranium1.com

northeast or southeast of 5MW66. As previously stated, the average wellfield values following restoration for each of the excursion parameter were below the TRVs but the 5MW66 water quality values are greater than the TRVs.

Water levels were measured in each of the wells prior to the September sampling. A potentiometric surface map was developed from the data (Figure 7). The map shows a potentiometric surface that is reasonably consistent with the regional groundwater flow system, with a hydraulic gradient toward the west-northwest. However, well 5MW66 has a higher water level elevation than all of the production wells with the exception of 5BO-102-2 and 5BR117-1. As with the water quality data, the potentiometric data do not clearly identify the source of the excursion at 5MW66.

Additional Corrective Action

The additional monitoring conducted under the phased corrective action plan indicates the potential source area for the Well 5MW66 excursion could be from either the wellfields to the southeast or to the northeast, or from both areas, but is most likely from the "K3" Sand.

Although it is apparent that Well 5MW66 has been affected by ISR activities, it is important to note that the Class of Use of this well has not been changed. Additional monitoring at downgradient monitor ring wells 5MW68, 5MW64 and 5MW2 indicate that the area of elevated uranium does not extend to these wells.

Because the nature and extent of the excursion are not adequately characterized, despite additional monitoring efforts by Uranium One, additional investigation is proposed. An improperly designed extraction system could result in moving impacted groundwater into areas that are not currently impacted or mobilizing constituents that are currently stabilized. This might result in the degradation of other wells to water quality that does not meet current class of use. The wellfield has already been restored and should not be an ongoing source of excursion.

Additional corrective actions proposed by Uranium One include the following. Uranium One will prepare geologic cross sections within the area of well 5MW66 to identify potential preferential pathways that may result in groundwater flow in directions other than expected based on the potentiometric surface. Additionally, Uranium One will develop a groundwater flow model to assess various capture scenarios that could be implemented to recover the excursion at 5MW66 without resulting in mobilizing uranium into non impacted areas. Scenarios that will be evaluated include:

Uranium One USA, Inc.
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • fax +1 307-237-8235
907 N. Poplar Street, Suite 260
Casper, Wyoming 82601
www.uranium1.com

- Extraction from well 5MW66
- Extraction from production wells in the southeast wellfield
- Extraction from production wells in the northeast wellfield
- Simultaneous extraction from production wells in both wellfield's
- Installation and extraction from a well or wells located between the wellfields
- Injection into select locations in combination with the previous extraction scenarios for hydraulic control and flushing of residual constituents

Summary of the Corrective Action Program

A phased corrective action program has been implemented to characterize the nature and extent of the excursion at 5MW66 and to develop viable remedial options. The corrective action program is ongoing and has included or will include the following steps.

1. Assess production and restoration history of module 5-5 - August 13, 2010 report to WDEQ.
2. Evaluate historic and recent water quality and water level data - August 13, 2010 report to WDEQ and September 21, 2010 report to WDEQ.
3. Collect additional water quality data for further characterization - August 13, 2010 report to WDEQ and September 21, 2010 report to WDEQ.
4. Measure water levels to establish the current potentiometric surface - September 21, 2010 report to WDEQ.
5. Review historic groundwater models used to assess excursion recovery - Complete
6. Prepare geologic cross-sections to identify potential pathways for migration - October 15, 2010.
7. Develop or update groundwater models to assess current conditions and evaluate excursion recovery alternatives – October 30, 2010.
8. Propose a corrective action option along with a monitoring plan to demonstrate the effectiveness of the selected remedy – October 30, 2010.

Uranium One USA, Inc.
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • fax +1 307-237-8235
907 N. Poplar Street, Suite 260
Casper, Wyoming 82601
www.uranium1.com

uraniumone™
Investing in our energy

Steps 1 through 5 are complete and have been presented in this and previous status update reports. Steps 6 and 7 are currently in progress and are anticipated to be completed by October 15th and 30th, 2010. Results of the modeling will be provided to WDEQ in a summary report along with the preferred corrective action. Following review and approval by WDEQ, Uranium One will commence with the final corrective action. If you have any questions please do not hesitate to contact me at 307-234-8235 ext. 331or at jon.winter@uranium1.com.

Sincerely,

Jon Winter
Manager: Wyoming Environmental and Regulatory Affairs
Uranium One Americas

Cc: Ron Linton – NRC
Errol Lawrence - Petrotek

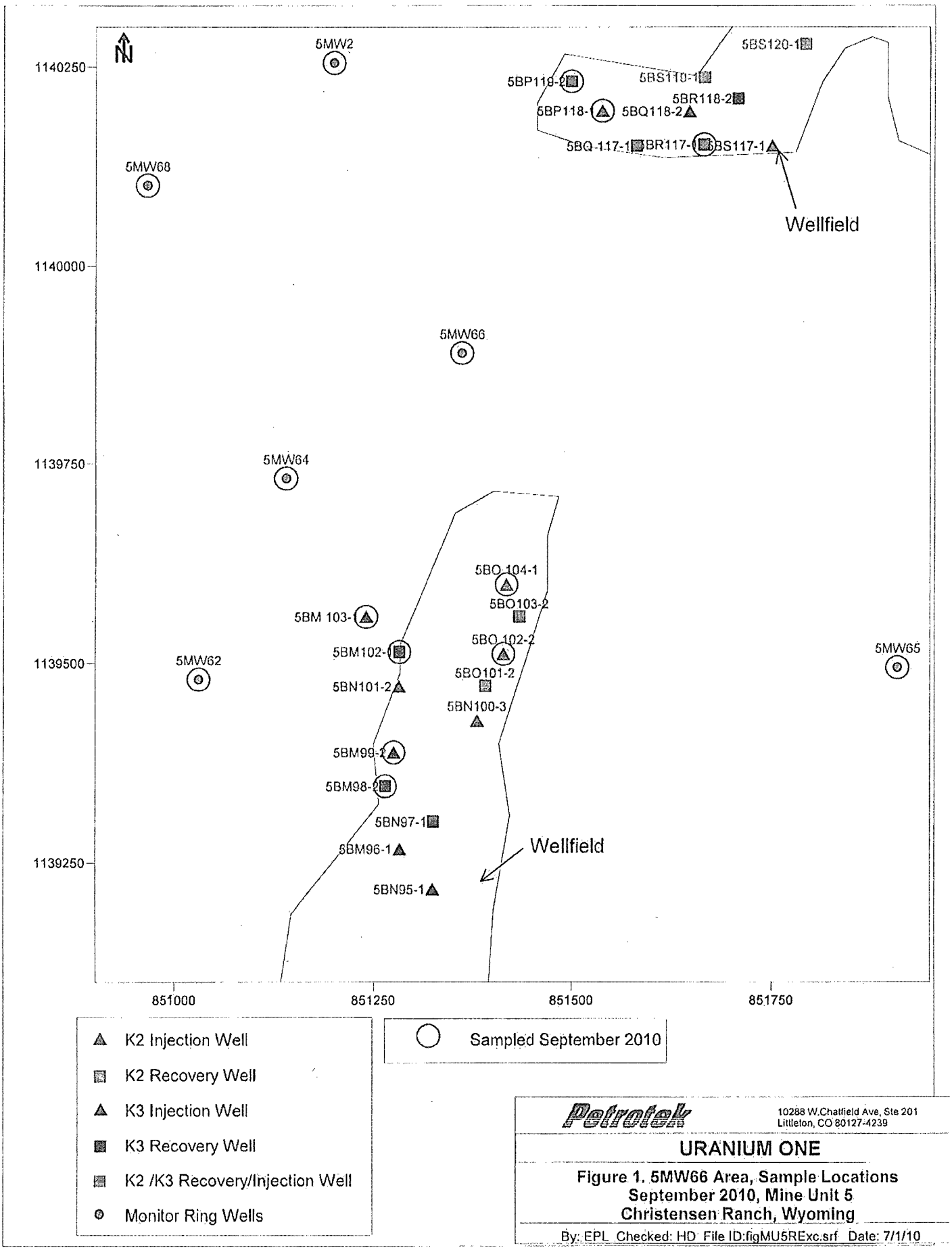
Enclosures: Table 1, Groundwater monitoring results - MU 5 area
Figures 1-6, MU 5 monitoring wells – Isoconcentration contour maps
Figure 7, MU 5 monitoring wells – Potentiometric surface map

Uranium One USA, Inc.
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • fax +1 307-237-8235
907 N. Poplar Street, Suite 260
Casper, Wyoming 82601
www.uranium1.com

Table 1. Monitoring Results 5MW66 Excursion Investigation, Mine Unit 5, Christensen Ranch, Wyoming

WELL I.D.	Completion	Chloride		Conductivity		Alkalinity		pH		Uranium		Water Level Elevation
		(mg/l)		(mg/l)		(mg/l)		(s.u)		(mg/l)		(ft amsl)
		Jun-10	Sep-10	Jun-10	Sep-10	Jun-10	Sep-10	Jun-10	Sep-10	Jun-10	Sep-10	Sep-10
5MW2	K2-K3	NS	13	NS	865	NS	92	NS	8.2	NS	<0.4	4630.20
5MW62	K2-K3	NS	9.3	NS	749	NS	125	NS	8.3	NS	<0.4	4629.70
5MW64	K2-K3	NS	8	NS	733	NS	109	NS	8.4	NS	<0.4	4630.30
5MW65	K2-K3	NS	9	NS	734	NS	105	NS	8.3	NS	<0.4	4636.90
5MW66	K2-K3	36.2	38.4	1371	1379	314	176	7.0	7.0	2.0	2.0	4631.90
5MW68	K2-K3	NS	8.7	NS	872	NS	102	NS	8.1	NS	<0.4	4627.72
5BM103-1	K3	21.9	21.5	940	957	197	195	7.1	7.6	2.0	1.5	4631.31
5BM98-2	K3	NS	11.5	NS	940	NS	225	NS	7.4	NS	2.7	4630.16
5BM99-2	K3	NS	9.9	NS	675	NS	132	NS	7.2	NS	1.6	4628.52
5BP118-1	K3	NS	17.7	NS	872	NS	243	NS	7.5	NS	2.4	4630.36
5BP119-2	K3	NS	19.4	NS	1172	NS	324	NS	7.5	NS	1.8	4625.74
5BR117-1	K3	15.2	18	969	1115	290	334	6.9	7.9	2.3	4.9	4633.13
5BM102-1	K3	17.1	21.5	941	708	205	205	7.3	7.6	2.9	1.9	4630.84
5BO102-2	K2	6.9	6.5	632	708	189	205	7.2	7.6	0.7	1.9	4632.17
5BO104-1	K2	5.4	4.8	500	533	120	122	7.2	7.7	0.5	<0.4	4630.81

NS Not Sampled
< - Sample was below reporting limit



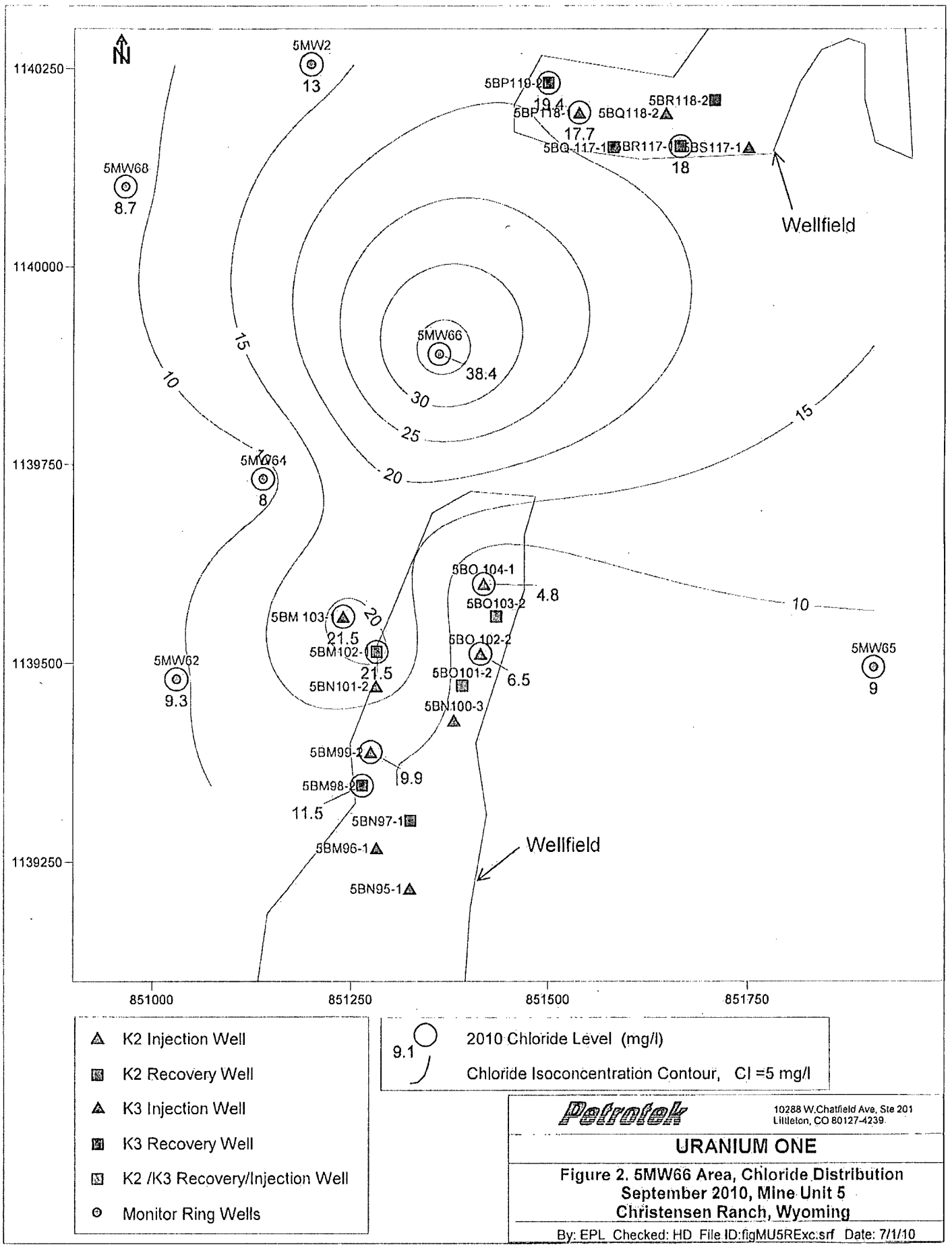
Petrotek

10288 W.Chatfield Ave, Ste 201
Littleton, CO 80127-4239

URANIUM ONE

Figure 1. 5MW66 Area, Sample Locations
September 2010, Mine Unit 5
Christensen Ranch, Wyoming

By: EPL Checked: HD File ID:figMU5RExc.srf Date: 7/1/10



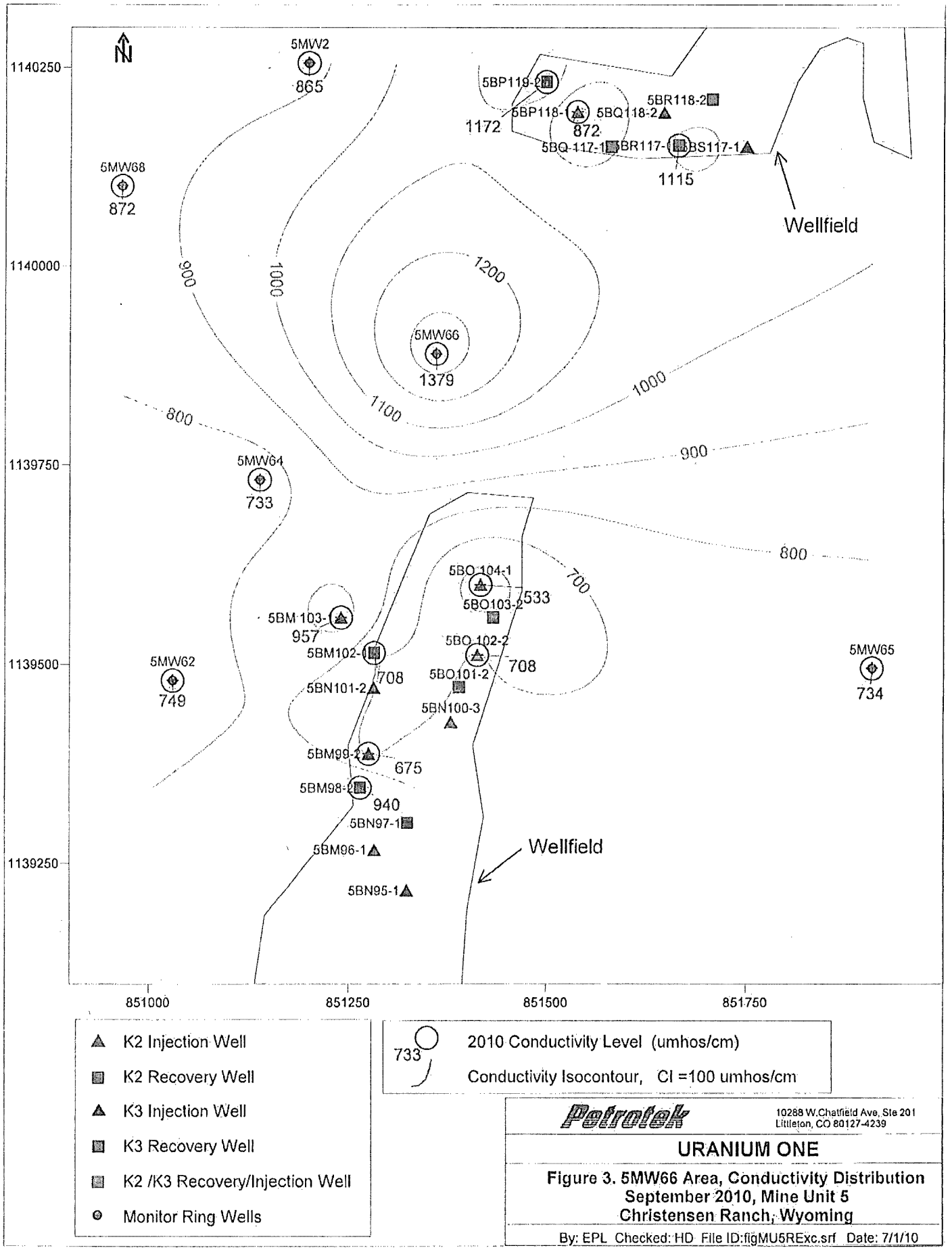
Petrotek

10288 W.Chatfield Ave, Ste 201
Littleton, CO 80127-4239

URANIUM ONE

Figure 2. 5MW66 Area, Chloride Distribution
September 2010, Mine Unit 5
Christensen Ranch, Wyoming

By: EPL Checked: HD File ID:figMU5RExc.srf Date: 7/1/10



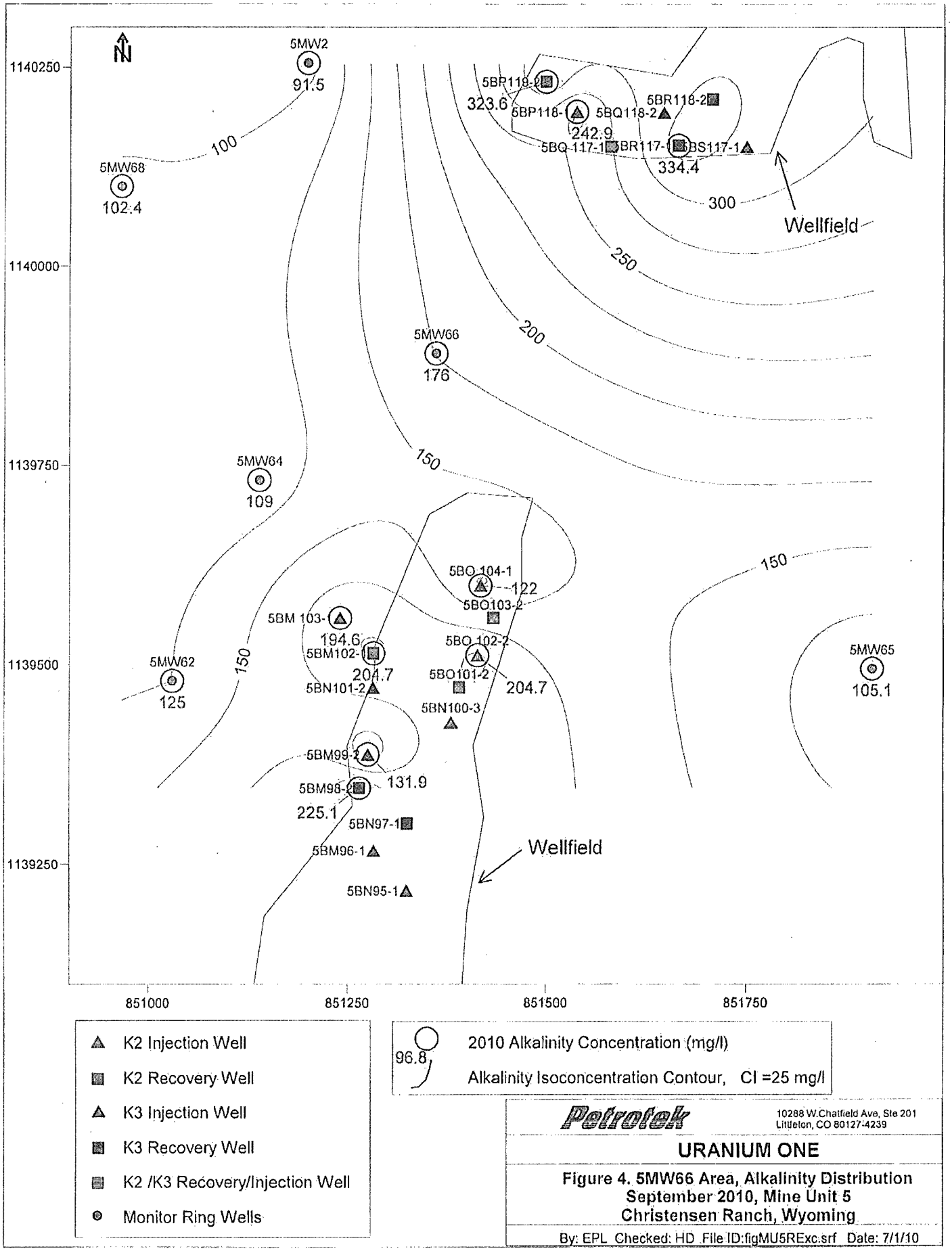
Petrotek

10288 W.Chatfield Ave, Ste 201
Littleton, CO 80127-4239

URANIUM ONE

Figure 3. 5MW66 Area, Conductivity Distribution
September 2010, Mine Unit 5
Christensen Ranch, Wyoming

By: EPL Checked: HD File ID:figMU5RExc.srf Date: 7/1/10



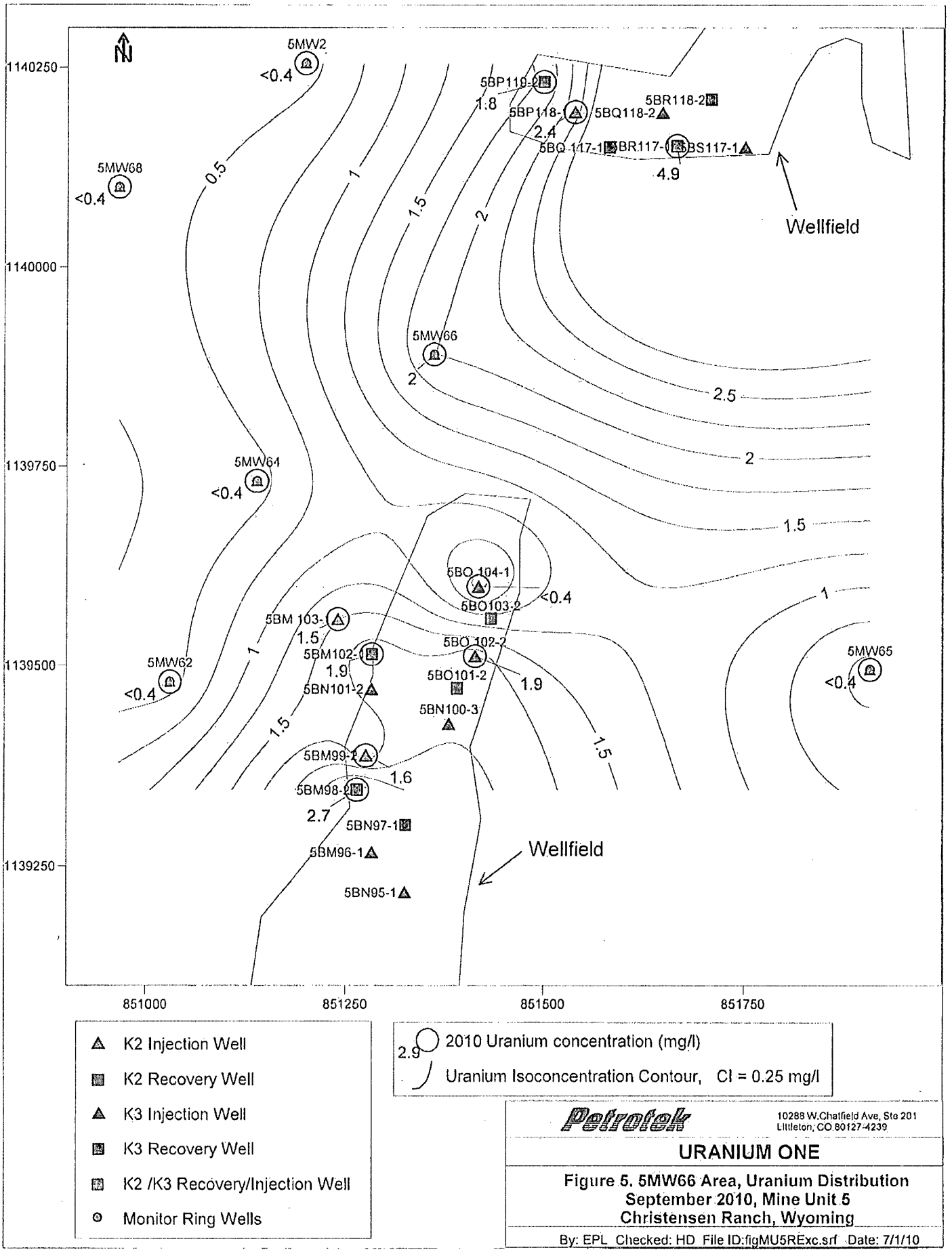
Petrotek

10288 W.Chatfield Ave, Ste 201
Littleton, CO 80127-4239

URANIUM ONE

Figure 4. 5MW66 Area, Alkalinity Distribution
September 2010, Mine Unit 5
Christensen Ranch, Wyoming

By: EPL Checked: HD File ID:figMU5RExc.srf Date: 7/1/10



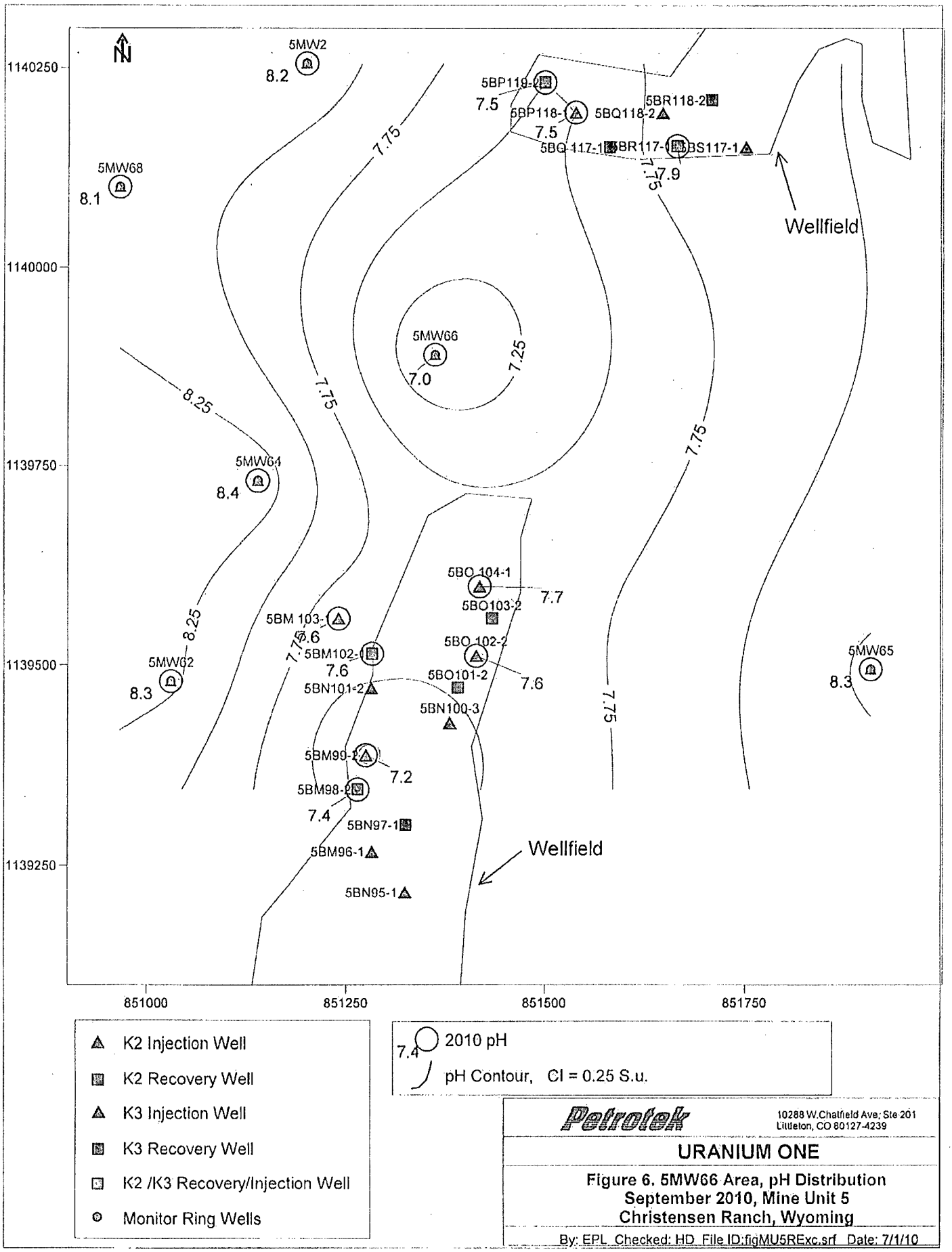
Petrotek

10288 W.Chatfield Ave, Ste 201
Littleton, CO.80127-4239

URANIUM ONE

Figure 5. 5MW66 Area, Uranium Distribution
September 2010, Mine Unit 5
Christensen Ranch, Wyoming

By: EPL Checked: HD File ID:figMU5RExc.srf Date: 7/1/10



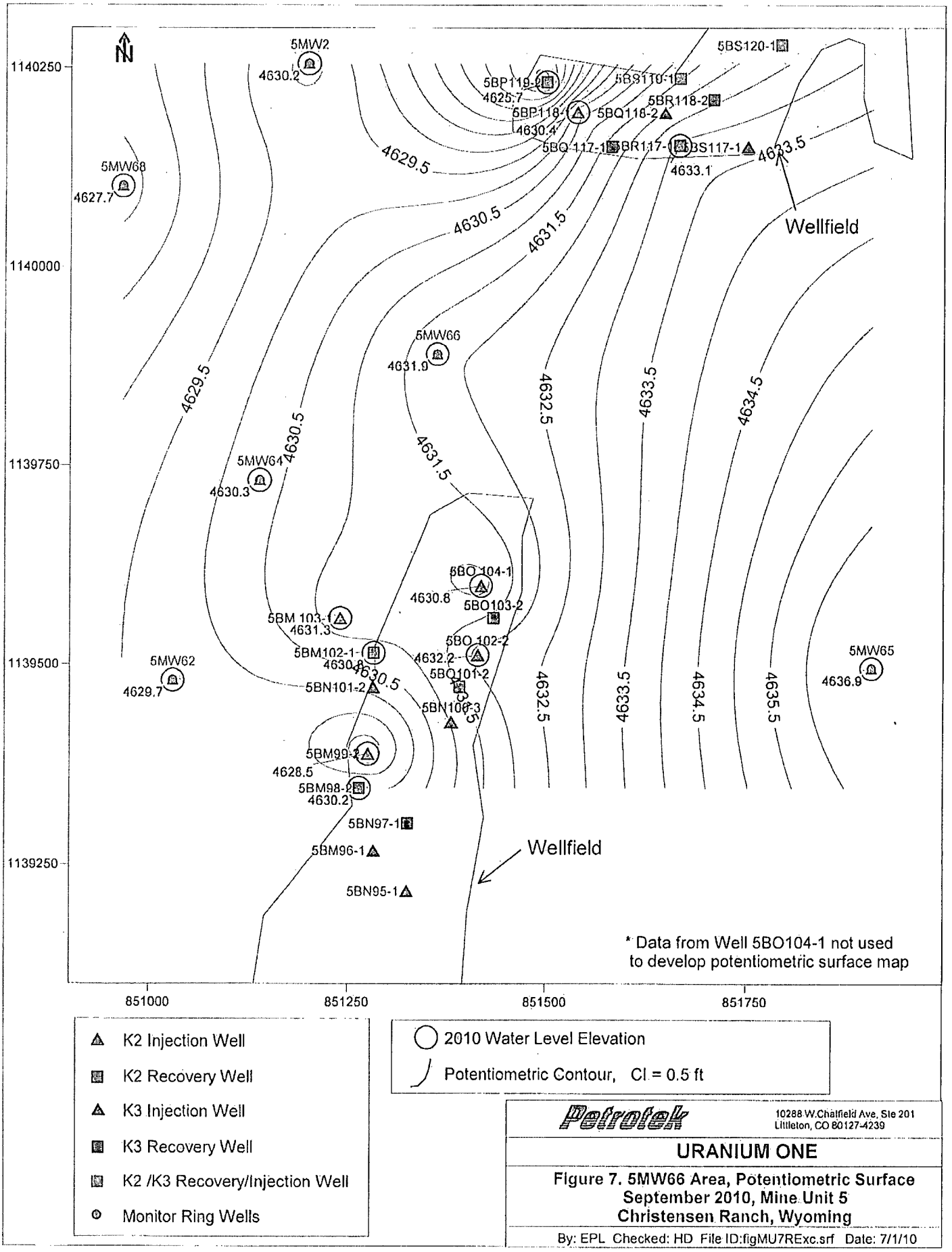
Petrotek

10288 W.Chatfield Ave; Ste 201
Littleton, CO 80127-4239

URANIUM ONE

Figure 6. 5MW66 Area, pH Distribution
September 2010, Mine Unit 5
Christensen Ranch, Wyoming

By: EPL Checked: HD File ID:figMU5RExc.srf Date: 7/1/10



Petrotek

10288 W.Chatfield Ave, Ste 201
Littleton, CO 80127-4239

URANIUM ONE

Figure 7. 5MW66 Area, Potentiometric Surface September 2010, Mine Unit 5 Christensen Ranch, Wyoming

By: EPL Checked: HD File ID:figMU7RExc.srf Date: 7/1/10