ATTACHMENT D

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD PANEL

Before Chief Administrative Judge
B. Paul Cotter, Jr., Presiding Officer

Administrative Judge
Thomas D. Murphy, Special Assistant

In the matter of	)	
	)	
HYDRO RESOURCES, INC.	)	Docket No. 40-8968-ML
2929 Coors Road	)	
Suite 101	)	ASLBP No. 95-706-01-ML
Albuquerque, NM 87120	)	

AFFIDAVIT OF CRAIG S. BARTELS

1. My name is Craig S. Bartels. I am of sound mind and body and competent to make this affidavit. The actual statements herein are true and correct to the best of my knowledge, and the opinions expressed herein are based on my best professional judgment.

Professional Qualifications:

2. My education and experience are described in my vita, attached to this affidavit as Exhibit A. To summarize, I have a Bachelor of Science degree from Montana College of Mineral Science and Technology in Petroleum Engineering. I received my registration as a Professional Engineer through testing in the State of Illinois. I have worked in the in-situ leach (ISL) uranium recovery industry for almost twenty years and am familiar with all aspects of the ISL process, including well design and construction, well pattern design and development, well test analysis,

pump test design and analysis, computer modeling of flow processes, and wellfield and plant operations. I have supervised and trained others in the design and operation of ISL projects. I have evaluated numerous ISL properties and operations of other companies, and, as such, am familiar with their operations and procedures.

Documents Reviewed:

3. I have reviewed the affidavits prepared by Mr. Richard J. Abitz and Mr. Wallace attached to Petitioners' Stay Request.

Conclusions:

4. It is important to note that neither Mr. Abitz nor Mr. Wallace claim problems with Church Rock Section 8 but instead assert that there will be immediate and irreparable damage caused by proposed operations at Crownpoint, to a lesser extent by operations at Unit 1, and to a still lesser extent at Church Rock Section 17. (e.g., Abitz at ¶ 11 claims contamination from Unit 1; Abitz at ¶ 17 claims that HRI cannot adequately detect horizontal excursions at Unit 1 or Crownpoint; Wallace at ¶ 12 claims that HRI has incorrectly modeled groundwater travel time at Unit 1 and Crownpoint; and Wallace at ¶ 28 claims that HRI's Crownpoint wellfield will contaminate municipal water wells.)

5. As the affidavit of Richard Clement demonstrates, any activities at any of HRI's sites must necessarily be preceded by satisfaction of a variety of license or permitting requirements. This means that development or construction at these sites can not take place for, at a minimum, several years. Therefore, there can be no immediate and irreparable harm as claimed by

Petitioners. An analysis of several specific allegations in these affidavits will establish Petitioners' failure to demonstrate any significant potential for immediate and irreparable harm.

6. For example, Mr. Wallace's claim that "leakage" will occur from the proposed Westwater Canyon ore zone into the overlying Dakota sandstone, and his conclusion that "immediate and irreparable harm" will result is misleading, premature and inappropriate. An ISL project proceeds in phases, in a simple, orderly fashion. First, only very general data is gathered to characterize the flow properties and confining clays on a *regional* scale for the aquifer. This data is presented to regulatory authorities to obtain appropriate permits and licenses. After initial permits and licenses are received, a much more detailed analysis of aquifer characteristics, confining zones, and water quality is performed for each separate and distinct production area (recovery unit). This detailed analysis ensures that any variability in characteristics of the aquifer and confining clays, from recovery unit to recovery unit within the larger regional area, will be accounted for during actual uranium recovery operations and the concurrent monitoring process. Again, after all initial pemits/licenses are obtained, the actual operating parameters for a single, *proposed* recovery unit are developed by installing and testing the monitor wells for the production area or recovery unit. This includes the monitor wells surrounding the uranium recovery zone, those over and under the uranium recovery zone, as well as baseline water quality wells within the uranium recovery area itself. Baseline water quality samples are taken from each of the wells (including all monitor wells) and a pump test is conducted. (License Condition No. 10.21).

7. Once these tests are conducted, actual uranium recovery is not permitted until the data is analyzed; vertical confinement of the uranium recovery zone is demonstrated (i.e., no vertical "leakage" of mine solutions); pressure communication with monitor wells surrounding the uranium recovery area is demonstrated, the upper control limits (UCL) for water quality in all monitor wells are determined; and finally, necessary regulatory authorization is given to begin operation. This is done at *each* unit within the larger region of the initial permit/license.

8. For over twenty years, this phased development and testing for purposes of ISL uranium recovery has been the standard at all ISL projects in Texas and Wyoming of which I am aware. This is also true for every ISL project that URI/HRI has been associated with since entering the industry over 20 years ago in 1977. In addition, the NRC has accepted this approach as the method of proposed operation in New Mexico (see response Q2/81 and also, the Consolidated Operating Plan (COP), Rev. 2.0 (pages 82 - 84), - both of which were noted as reviewed by Messrs. Abitz and Wallace).

As noted in § 8.5 of the COP, HRI's Hydrogeologic Testing Plan:

> HRI considers that the primary goal of pump testing in new mine areas for ISL is to determine the degree of communication between the mine zone and (1) the overlying zones, and (2), the production zone monitor wells. This will reflect the effects of hydraulic pathways, such as unplugged holes and non-sealing faults, to the overlying zones, as well as ascertain the ability of production zone monitor wells to respond to changing flow conditions within the mining area. The degree of communication at the production zone monitor wells surrounding the mine zone will also directly indicate the magnitude of horizontal formation anisotropy.

9. An additional problem with Mr. Wallace's Affidavit is that his analysis completely overlooks the historic differences in water levels between the Westwater Canyon uranium

recovery zone and the overlying Dakota sandstone when he claims '"immediate and irreparable harm" due to lixiviant migration between the sands. For example, in HRI's response to the NRC's Q1/81 (which Mr. Wallace noted as reviewed), HRI submitted plots of differences in water levels between the two zones in the Crownpoint area and at Unit I (attached hereto as Figures 1 and 2, respectively). Data for the Crownpoint area (Figure 1) shows about a 90 to 100 feet difference in water levels, while data for Unit 1 (Figure 2) shows about a 180 - 200 feet difference. In both cases, the overlying Dakota sand is at a *higher water pressure* than the Westwater sand. In either case, if "leakage" was as dramatic as described by Mr. Wallace, and water was strongly leaking from one zone to the other, the Dakota wells would show a general decrease in water levels, while the Westwater wells would show a related increase in water levels, corresponding in time. Thus, the data do not support Mr. Wallace's conclusion.

10. A number of allegations in their affidavits suggest that Messrs. Abitz and Wallace have only a limited knowledge of the ISL uranium recovery process and the safeguards routinely utilized therein. This technology has been developed and applied over the last 20 - 25 years in Texas, Wyoming, and Nebraska. Their limited knowledge seems to have caused them to develop conclusions without adequately reviewing or understanding documents relating to HRI's proposed ISL project. For instance, Mr. Abitz states in his affidavit (at ¶ 25) that:

> Moreover, neither HRI nor the NRC staff propose to use other, non-chemical indicators, such as groundwater elevation control levels, which the Groundwater Monitoring STP (at 19) also considers reliable early warning mechanisms for excursions.

Mr. Wallace reviewed Mr. Abitz' affidavit, and did not disagree with this important claim (Abitz at ¶ 4). However, *this claim is completely incorrect.* The ISL industry does indeed measure and monitor water levels. In fact this is done for *every* monitor well during each *bi-weekly* sampling for water quality. HRI considers this a very basic, standard operating procedure at any ISL project and has documented its intention of continuing this in New Mexico through multiple communications with the NRC. Considering just a few sources that Messrs. Abitz and Wallace purport to have reviewed:

> An extensive water monitoring program is required for *in situ* mining. Specifically designated wells are monitored for water level, and sampled for certain water quality parameters on a regular basis to ensure that the injected lixiviant stays within the defined production zone. ("Consolidated Operating Plan (COP), Rev. 2.0, page 11).

This intention was again stated on pages 63 (Section 6.3) and 79 (Section 8.4.1.1) of the COP, Rev 2.0. In addition, it was described in HRI's response to the NRC Q2/81:

> Water levels will be taken on all monitor wells prior to each routine, bi-weekly water sampling and reviewed for unusual water level changes denoting a hydraulic connection with the mining zone.

11. In nearly twenty years of association with the ISL industry, I know of no ISL project that is not required to measure water levels in the monitor wells in conjunction with the routine water quality sampling. There are a number of other instances of such claims by Abitz and Wallace that make plain to me their failure to understand ISL uranium recovery practices in general, and HRI's New Mexico project in particular.

I declare on this 23rd day of January, 1998, at Albuquerque, New Mexico, under penalty of perjury that the foregoing is true and correct.

Craig S Bartels

Craig S. Bartels

Sworn and subscribed before me, the undersigned, a Notary Public in and for the State of New Mexico, on this 23rd day of January, 1998, at Albuquerque, New Mexico. My commission expires on March 31, 1999.

Anne M Thompson

Notary

(SEAL)

OFFICIAL SEAL
Anne M. Thompson
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 3-31-99

CRAIG S. BARTELS
HRI, Inc.
2929 Coors Road, NW
Albuquerque, NM 87120

Education:
B.S. Petroleum Engineering, Montana College of Mineral Science and Technology (1972)
REGISTERED PROFESSIONAL ENGINEER - Illinois (By EXAMINATION, 1978)

Continuing Education –
Partial Completion of Masters in Finance, Texas A & M University - Kingsville
Physical and Contaminant Hydrogeology, Texas A & M University - Kingsville
USGS Course: Principles & Applications of Modeling Chemical Reactions in Ground Water

Work and Technical Experience:

HRI, Inc., Albuquerque, New Mexico
VICE-PRESIDENT – TECHNOLOGY – 1996 TO PRESENT
Responsible for all technical and operational aspects of Company's New Mexico ISL projects, including design, operation and restoration/reclamation, as well as, regulatory compliance, and employee safety and training.

Crow Butte Resources, Inc., Crawford, Nebraska
WELLFIELD MANAGER – 1995 TO 1996
Responsible for all aspects of wellfield design, operation, and restoration. Directly responsible for all regulatory compliance, and employee training and safety associated with wellfield operations.

URI, Inc., 1981 to 1994
SPECIAL PROJECTS
Key investigator in numerous evaluations of ISL properties considered for acquisition. Troubleshooter for specific wellfield problems. Conducted informal one week seminar on wellfield design and operations for another ISL company. Designed, supervised and analyzed pumping tests for mine unit and regional ISL permits, focusing on flow characteristics and "leakage" potential of the aquifer.

Developed reservoir computer simulation system used in design and operation of wellfields, combining advective transport (pathlines), unsteady state pressure calculations, ore configuration, and interactive computer graphics to allow efficient design and operation of ISL wellfields. The system allows layered sands and incorporates actual, measured well flowrates.

MANAGER OF WELLFIELD OPERATIONS, 1994

Responsible for all design and wellfield operations, including all geology and reservoir engineering staff.

PLANT MANAGER, Kingsville Dome Project, 1989 to 1994

Responsible for all operations associated with 5,200 gpm ISL plant and uranium product dryer, including technical aspects, regulatory compliance and employee relations.

CHIEF RESERVOIR ENGINEER, 1981 to 1989

Responsible for ISL wellfield design, operation and forecasting. Designed, conducted, and analyzed pumping tests (routinely accepted by state and federal regulatory agencies). Developed multi-layer computer model for advective transport and pressure simulations in multi-layer reservoir.

Union Carbide Corporation, Metals Division, Palangana ISL Project, 1978 to 1981

SUPERINTENDENT OF OPERATIONS, 1980 to 1981

Responsible for all site activities including production, processing, restoration, employee relations, safety, budget development and review. Coordinator of Division efforts in developing and implementing new restoration technology.

Received management award in special recognition of outstanding contribution.

TECHNICAL SUPERINTENDENT, 1979 to 1980

Coordinated all technical operations for the plant and wellfield. Developed production reservoir computer simulation. Responsible for all individual well test and pumping test design, conduct and analysis.

RESERVOIR ENGINEER, 1978 to 1979

Developed enhanced ISL production techniques, as well as, techniques associated with well drilling, mud program design, well casing design, zone isolation and logging methods, well pattern development and flow control, geologic interpretation of roll fronts, and reservoir computer simulation. Analyzed individual well test and pumping test data.

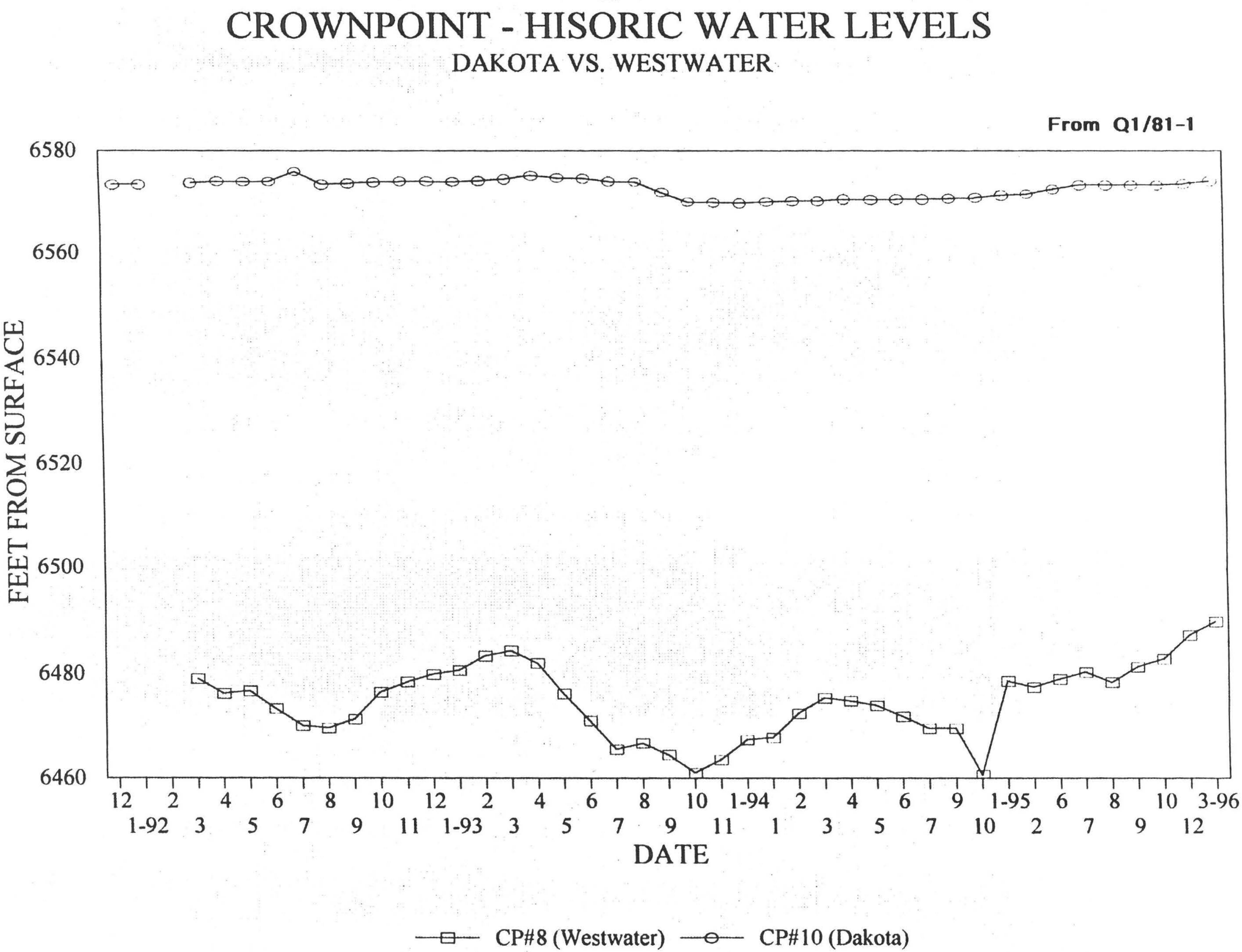
Natural Gas Pipeline Company of America (NGPL), 1972 to 1978

RESERVOIR ENGINEER, Chicago, IL, 1974 to 1978

Responsibilities included wellfield deliverability estimates, field and well testing and analysis, water movement calculations, log interpretation, inventory verification, field monitoring, new well locations, general field development for six gas cycling projects. Development of computer code for field simulations utilizing gas cycling and water influx/efflux. Gas storage pumping test analysis (per Witherspoon, Javendel, Neuman, and Freeze).

DRILLING ENGINEER, Columbus Junction, IA, 1972 to 1974

Experience in drilling, blowout control, lost circulation, fishing operations, casing string design and installation, cementing, logging and remedial well work. Direct supervision of field personnel in varied assignments. Field supervision of pumping test for Gas Storage.



CROWNPOINT - HISORIC WATER LEVELS
DAKOTA VS. WESTWATER
From Q1/81-1
FEET FROM SURFACE
6580
6560
6540
6520
6500
6480
6460
12 1-92 2 3 4 5 6 7 8 9 10 11 12 1-93 2 3 4 5 6 7 8 9 10 11 1-94 1 2 3 4 5 6 7 9 10 1-95 2 6 7 8 9 10 12 3-96
DATE
CP#8 (Westwater)
CP#10 (Dakota)

FIGURE 1

From Q1/81-3

Attachment 81-3

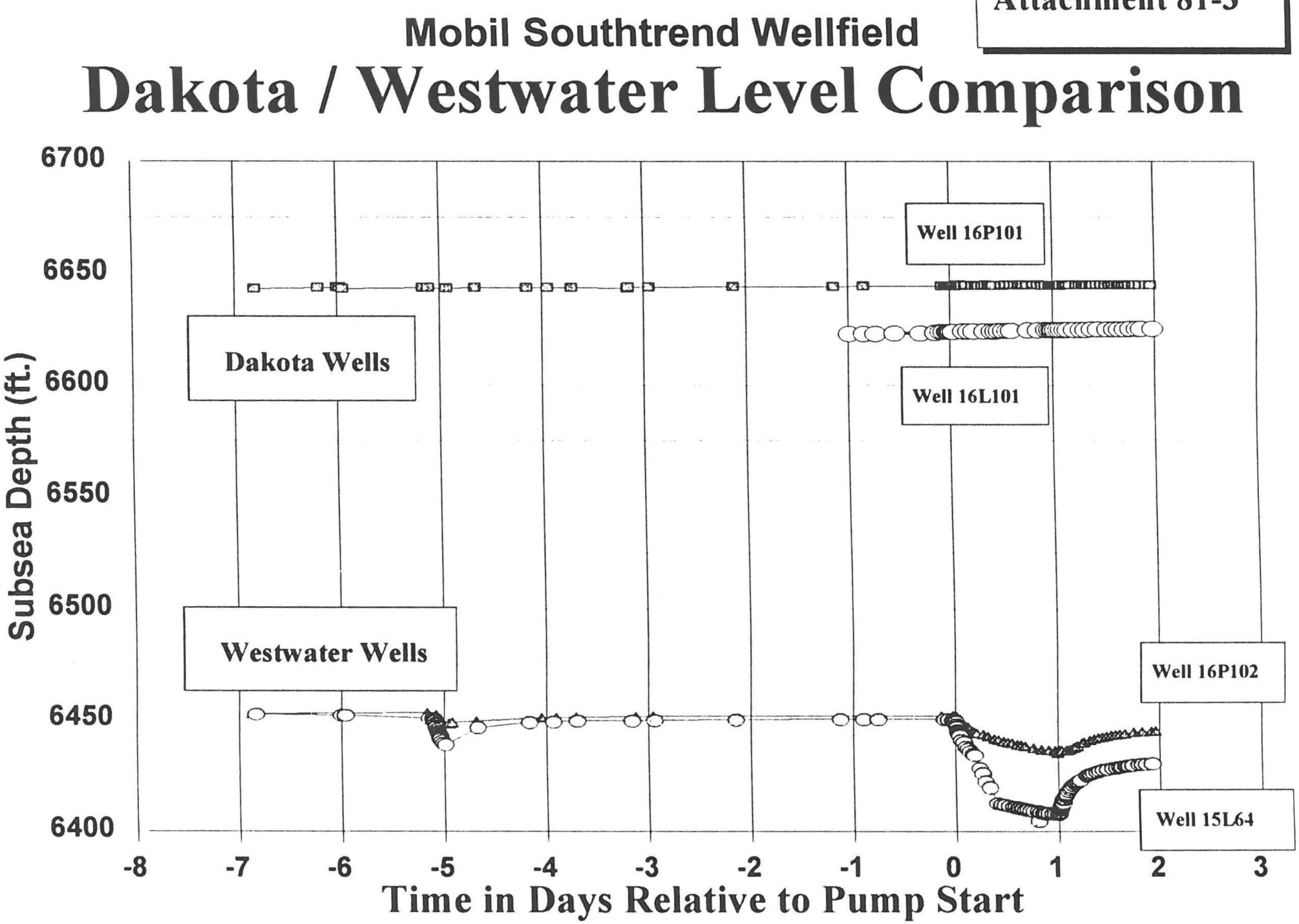


FIGURE 2