

TECHNICAL MEMORANDUM

To: John Hamrick, Jim Cain, Cotter Corporation
From: Errol Lawrence, Hydrosolutions
Date: July 30, 2009
Subject: Quarterly Update of Corrective Action Plan for Groundwater North and West of the Canon City Milling Facility

Introduction

Cotter Corporation (Cotter) submitted a Corrective Action Plan (CAP) to the Colorado Department of Public Health and the Environment (CDPHE) for groundwater north and west of the Canon City Milling Facility in September 2008 (Cotter, 2008). The CAP was prepared in response to a Notice of Violation submitted to Cotter by CDPHE in July 2008. The initial phase of the proposed CAP, currently being conducted, includes an investigation to characterize and delineate the area where groundwater exceeds Colorado water quality standards, and to the extent possible, characterize and identify sources. This memorandum provides a quarterly update on activities conducted under the CAP

Activities that have been performed since the last quarterly report include the following;

- conducted a geoprobe (direct push) drilling program along the northwest property boundary of the Cotter Milling Facility,
- evaluated the data collected from the geoprobe survey and presented findings to the CDPHE in a technical meeting,
- evaluated water quality collected during the first quarter of 2009 from wells north and west of the Canon City Milling Facility to identify/confirm trends observed in previous sampling rounds,
- collected water quality samples during the second quarter of 2009 from wells north and west of the Canon City Milling Facility,
- continued review and evaluation of water quality and lithologic data to identify potential source areas and flowpaths, and
- prepared a scope of work for drilling additional borings along the northwest property boundary of the Cotter Milling Facility.

A number of location and structure maps and cross sections are included as attachments to this status report. These figures are draft working documents. A summary report will be prepared following completion of the investigation phase of the corrective action plan. The summary report will include results of all data collection activities, findings of the historical data review and present an updated conceptual model regarding the migration of dissolved uranium and molybdenum outside of the Restricted Area. Source areas will be identified if possible. The figures included in this quarterly update will be provided in final form as part of the summary report.

A brief summary of the results of the review and evaluation of available data sources is provided below.

Geoprobe Survey

A geoprobe (direct push drilling) survey was conducted along the northwest boundary of the Canon City Milling Facility from May 18 to May 20, 2009. The objective of the survey was to identify any alluvial channels incised into bedrock that could provide a preferential pathway for offsite migration of site-derived constituents (primarily uranium). Based on results of previous pump tests along the northwest boundary, it was observed that most of the upper Poison Canyon Formation, (where saturated) consists of low permeability materials. The distribution of uranium northwest of the facility suggests a relatively narrow migration pathway may exist. The conceptual model prior to conducting the geoprobe survey was that a relatively high permeability zone, most likely an incised alluvial channel, was the primary pathway for offsite migration of dissolved uranium. Results of the geoprobe survey indicate that this conceptualization is unlikely.

Errol Lawrence (Hydrosolutions) was present to direct the geoprobe survey and to log the lithology of the borings. The company providing the geoprobe unit and crew was Vista Geoscience from Golden, Colorado. The geoprobe unit was a DT6610, track-mounted rig, capable of switching between direct push and auger drilling. The unit was also capable of recovering core using a dual-tube coring system. The cores were recovered in PVC liners at five foot intervals. Each of the borings were cored to total depth with a few exceptions where subsurface conditions prevented advancement of the core tubes.

A total of twelve borings were probed along the northwest property boundary, identified as GP-1 through GP-12 (Figure 1). The borings extended from 100 feet west of monitor well 346 to approximately 250 feet east of monitor well MW037. One additional boring was probed near the West SCS dam (GP-13). Each boring was advanced until refusal of the direct push method. Two borings, GP-2 and GP-10 were augered beyond the direct push refusal point to total depths of 49 and 52.5 feet below ground surface (ft bgs), respectively. The depth of refusal ranged from 9.0 to 38.6 ft bgs. The alluvial materials consisted primarily of silty clay, silty sand and gravelly sand. The bedrock materials consisted primarily of sandy clay to claystone and cobbly sandstone. Table 1 provides the description of the cores from surface to total depth for each boring.

Saturated conditions were not encountered in any of the borings, even the two that were augered to greater depths than initial refusal. Projection of water levels from site potentiometric surface maps indicates that the water table aquifer should have been encountered at depths of approximately 40 to 45 ft bgs. However the two borings that were auger drilled encountered clay to claystone across the interval where groundwater would be intercepted. Based on experience with MW037 (which actually encountered a sandstone across the water table interval) initial groundwater flow into borings in this area can take several days or longer.

The shallow depth of penetration achieved by the geoprobe survey did not allow for full characterization of subsurface conditions along the northwest boundary of the facility. Although valuable information was collected on shallow subsurface conditions, the failure to reach depths where saturated conditions are present precluded collection and analysis of water quality data to further refine the distribution of uranium in groundwater along the northwest boundary. The geoprobe survey did provide information that indicates that an alluvial channel incised into bedrock is not the likely pathway for uranium migration from the site. Prior to the survey, the area considered most likely for that pathway to be present was between wells 346 and MW037. The data collected from the survey indicate that the bedrock surface generally conforms to the surface topography and rises west of 346 to within 9 feet of ground surface. It is possible that a high permeability paleochannel exists within the bedrock, but based on the spacings of the geoprobe borings it is highly unlikely that an alluvial channel is incised into bedrock.

Results of the lithologic interpretation of the cores are plotted on cross sections. Two interpretations of the data are presented. In Figure 2, the sandstone identified in existing wells MW037 and 346 (as well as historic boring C-1) that is below the water table, is assumed to be connected. For that to be true, the sandstone must be deeper than the total depth penetrated at boring GP-10. Cuttings from GP-10 were clearly clay to claystone for the last 30 feet of penetration (to total depth of 52.5 ft bgs). Figure 3 present an alternate interpretation whereby the sandstone in MW037 and 346 pinchout and are discontinuous. This interpretation might explain why water quality at MW037 does not showed elevated uranium concentrations.

The shallow occurrence of bedrock west of 346 resulted in a change in the bedrock surface map. Figure 4 represents the bedrock surface map prior to the geoprobe survey. The revised bedrock surface map, indicating the bedrock high west of well 346 and near well MW037, is shown on Figure 5.

The single boring (GP-13) located two hundred feet upgradient (north) of the West SCS dam also met refusal before reaching groundwater. Total depth of that boring was 30.0 ft. Lithologic description of the core is also provided in Table 1.

Based on the results of the geoprobe survey, and the failure to reach groundwater in any of the borings, a drilling program is being developed to collect additional data on groundwater quality and saturated subsurface conditions. That program will be implemented during the third quarter of 2009.

Water Quality Sampling Results

Water samples were collected from wells in the area northwest of the facility during the first quarter of 2009, including wells 009, 014, 015A, 037, 038, 337, 338, 342, 346, 348, 802, 803, 804, 805, and 806. Results of the analyses of those samples were reviewed to assess any significant changes that might be occurring to groundwater conditions. There were no changes of note with the exception of well 015A. That well has been dry for several years (since February 2000 when uranium was measured at 0.0417 mg/L) but

contained sufficient water for sampling during the first quarter of 2009. Results of the first quarter sampling indicated uranium at 0.0428 mg/L, exceeding the Colorado groundwater standard of 0.03 mg/L. That value extends the limits of the uranium plume beyond what has been projected in recent uranium isoconcentration maps. Additional investigation into the extent of elevated uranium concentration north of 015A is planned.

Additional Investigation

Based on the results of the geoprobe survey, additional investigation is required to fully assess subsurface conditions along the northwest boundary of the facility. A conventional drilling program, using a combination of air rotary and hollow stem auger drilling methods is planned. The borings will be cored through the saturated materials and completed as 4-inch monitor wells. Technical meetings were held with Cotter, CDPHE and USEPA personnel to select locations for the additional monitoring wells. In addition to wells in the vicinity of the northwest property boundary, a well will be located downgradient of existing well 015A to delineate the offsite extent of uranium above groundwater standards.

A scope of work was prepared and submitted to drilling companies that could perform the requested work. Bids have been received and are being evaluated. A start date has not yet been determined but it is anticipated that field operations will begin in August 2009. Following completion of the drilling program, a report will be prepared that will include the results of the data evaluation and field investigation

Summary of 2nd Quarter Activities

- A geoprobe survey was conducted in the vicinity of the northwest property boundary of the Canon City Milling Facility to determine if an alluvial channel incised into bedrock was present that could provide a preferential pathway for groundwater migration.
- Results of the 12 geoprobe borings indicate that such an alluvial channel does not exist. The bedrock surface conforms to surface topography, rising east of well 346.
- No saturated conditions were encountered in any of the geoprobe holes, even those that should have been deep enough to intercept the water table.
- Although useful information was collected as a result of the geoprobe survey, direct push methods are inadequate to fully characterize subsurface saturated conditions because of limitations to depth of penetration.
- Water quality collected from monitor well 015A indicates the presence of uranium above the Colorado groundwater standard of 30 micrograms per liter, thus extending the uranium plume further to the north.
- Additional drilling and monitor well installation is planned for the area of the northwest boundary of the facility and downgradient of well 015A.

Table 1. Results of 2009 Geoprobe Survey, Northwest Area, Cotter Corporation Canon City Milling Facility

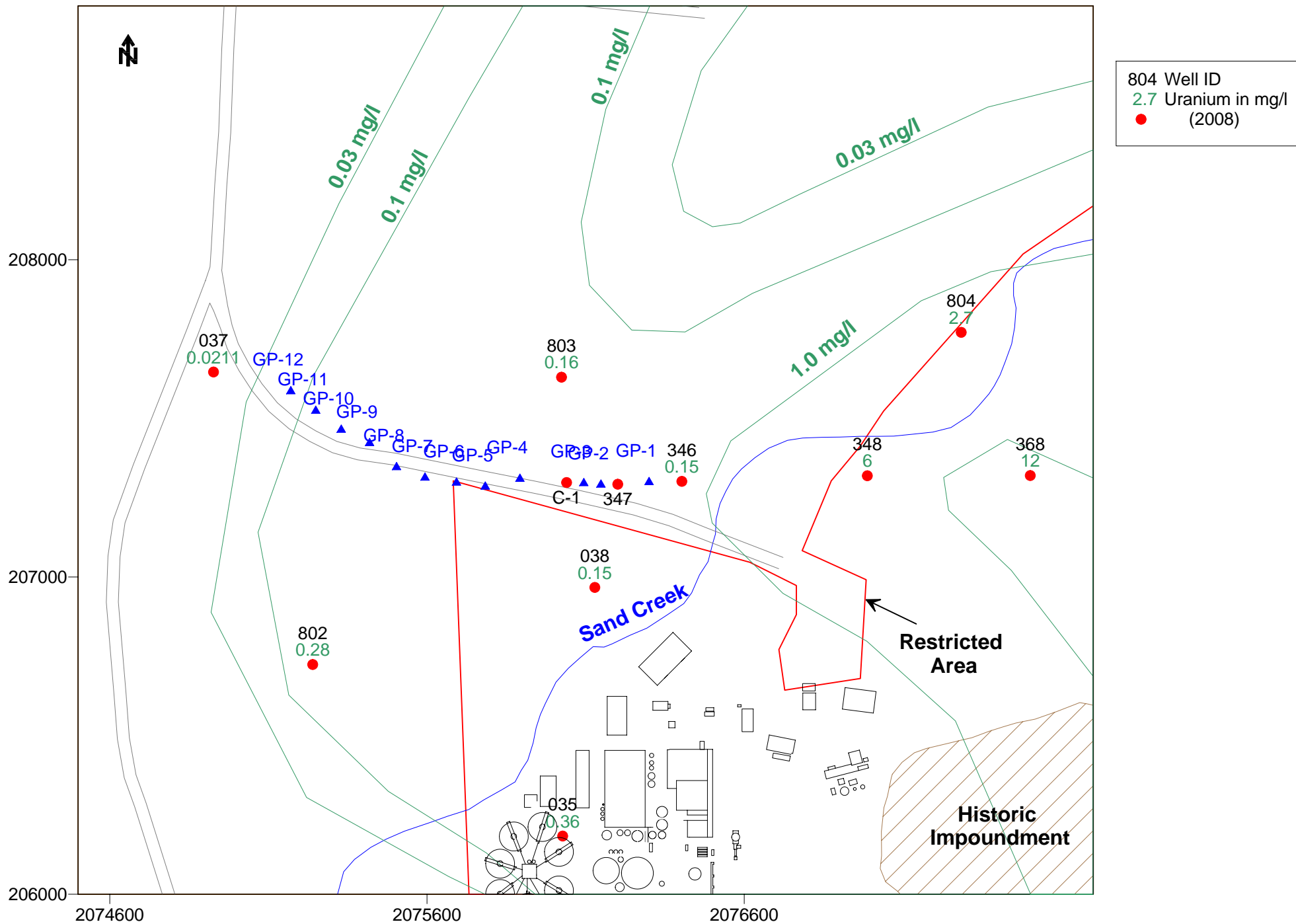
Boring ID	Depth Interval	Recovery (feet)	Lithology	Color	Bedrock depth 9 Ft bgs)	Descriptors
GP-1						Located between 346 and 347. Started drilling at 1:35 on 5/18/09
GP-1	0 - 5'	2.2	silty sand	v. pale brn		thin silty clay stringers
GP-1	5 - 10'	3	siltysand	v. pale brn		sandier than above
GP-1	10 - 15'	1.3	silty sand	brn		increasing clay content w depth
GP-1	15 - 20'	2.8	silty clay/gravelly sand			0.5'silty clay/sharp contact w gravelly sand, pink granite frags, med to fine gr qtz, subrounded, argillaceous, fracture zones minerlized
GP-1	20 - 25'	3	gravelly sd	gray green		very hard, dry, zones of micaceous materials
GP-1	25 - 30'	3.2	silty clay/gravelly sand	yellow brn		0.6' silty sand, argillaceous, decomposed granite
GP-1	30 - 35'	5	gravelly sdstone		31	argillaceous, pink granite frags, more firmly cemented at 31'
GP-1	35 - 38.6'	2.5	gravelly sdstone			refusal at 38.6
GP-2						Located 50' west of 347. Started drilling at 3:30 on 5/18/09
GP-2	0 - 5'	2.4	silty sand	pale brown		
GP-2	5 - 10'	1	silty, clayey sand			clay increasing w depth
GP-2	10 - 15'	1	clayey silt	gray brown		
GP-2	15 - 20'	1	clayey silt/gravelly sand			gray/pale brown
GP-2	20 - 25'	2	gravelly sand			large granite frags, cobble size
GP-2	25 - 30'	2.6	gravelly sand			large granite frags, cobble size
GP-2	30-32.3	3.8	sand/sandstone	yellow brn	31	fine to med gr, weathered PC, refusal at 32.3'
GP-2	32.3-49	NA	sandy clay to claystone			switched to auger to 49'
GP-3						Located 50 ft west of GP-2. Started drilling at 8:10 on 5/19/09
GP-3	0 - 5'	2	silty sand	pale brown		unconsolidated dry
GP-3	5 - 10'	2.7	silty, gravelly sand	pale brown		thin silty layers, qtz, argillaceous, sub rounded, fine gr
GP-3	10 - 15'	1.5	silty, gravelly sand	pale brown		thin clay layers, qtz, argillaceous, sub rounded, fine gr
GP-3	15 - 20'	2	clay/gravelly sand	gray/brown		0.4' clay, sand becoming more gravelly w depth, large granitic frags
GP-3	20 - 25'	2.7	gravelly sand	brown		pink granite frag to 1 in., qtz sd w silt matrix
GP-3	25 - 30'	3.5	gravelly Sd/sandstone	brn/yellow brn	29	1.8' gravelly sand, qtz, med gr. weathered sandst (PC bedrock @29'
GP-3	30 - 31.1'	1.1	sandstone	brn/yellow brn		refusal at 31.1'

Table 1. Results of 2009 Geoprobe Survey, Northwest Area, Cotter Corporation Canon City Milling Facility

Boring ID	Depth Interval	Recovery (feet)	Lithology	Color	Bedrock depth (9 Ft bgs)	Descriptors
GP-4	0 - 5'	2	silty gravelly sand	brown		Located 200 ft west of GP-3. Started drilling at 9:30 on 5/19/09 unconsolidated, dry, qtz, argillaceous, granite frags unconsolidated, dry, qtz, argillaceous, weathered Poison Canyon PC at 23.5, refusal at 23.7'
GP-4	5 - 10'	2.2	silty sand			
GP-4	10 - 15'	1.5	clay	gray brown		
GP-4	15 - 20'	2.8	clayey sd/sdy clay	brown		
GP-4	20 - 23.7'	3.7	sandy clay	yellow brown	23.5	
GP-5	0 - 5'	2.4	silty sd	brown		Located 100 west of GP-4. Started drilling at 10:15 on 5/19/09 argillaceous, unconsolidated dry argillaceous, unconsolidated dry 0.5 ft sandy clay, 1.5'gravelly sd with granite frags, 0.8'clayey3s sand refusal at 23.7'
GP-5	5 - 10'	1.7	silty sd	brown		
GP-5	10 - 15'	1	sandy clay	dark brown		
GP-5	15 - 20'	2.4	sandy clay	brown		
GP-5	20 - 23.7'	2.8	sandy clay/ grav sd		22.9'	
GP-6	0 - 5'	2.8	fill/silty sd	brown		Located 100 west of GP-5. Started drilling at 11:15 on 5/19/09 some granite fragments becoming more clayey w depth very hard drilling refusal at 20.5
GP-6	5 - 10'	1	silty sand			
GP-6	10 - 15'	3	clay/siltstone	brown/white		
GP-6	15 - 20'	4.9	clay/gravelly sd	brown/white		
GP-6	20 - 20.5'	0.5	gravelly sdstone	brown	20.5	
GP-7	0 - 5'	2.8	slty sd/clayey sd			Located 100 west of GP-6. Started drilling at 12:00 on 5/19/09 becoming increaseingly clayey with depth brown, appears to be weathered sandy clay (Poison Canyon at 12'?) refusal at 18.0'
GP-7	5 - 10'	1.8	slty sd/clayey sd			
GP-7	10 - 15'	4.7	clay/sandy clay		12	
GP-7	15 - 18'	3	sandy clay			
GP-8	0 - 5'	2.5	fill/silty sd	dark brown		Located 100 west of GP-7. Started drilling at 12:30 on 5/19/09 clay grading to silt w depth loosely cemented, argillaceous (weathered bedrock) loosely cemented, argillaceous (weathered bedrock) refusal at 15.5'
GP-8	5 - 10'	2.2	clay/silt	brown		
GP-8	10 - 15'	4.5	clayey sdstone	yellow brn	10	
GP-8	15 - 15.5'	0.5	clayey sdstone	yellow brn		

Table 1. Results of 2009 Geoprobe Survey, Northwest Area, Cotter Corporation Canon City Milling Facility

Boring ID	Depth Interval	Recovery (feet)	Lithology	Color	Bedrock depth (9 Ft bgs)	Descriptors
GP-9						Located 100 west of GP-8. Started drilling at 13:30 on 5/19/09
GP-9	0 - 5'	2	Fill/Silty Clay			Clayey, loosely cemented argillaceous, alternating clay and sand stringers in upper section, appears to be decomposed granite, refusal at 9.1'
GP-9	5 - 9.1'	4.9	Sandstone	yellow brown	6.5	refusal at 9.0'
GP-10						Located 100 west of GP-9. Started drilling at 14:35 on 5/19/09
GP-10	0 - 5'	2.1	Fill/Sand Clay			2 ft clay, Clayey, loosely cemented argillaceous, appears to be decomposed granite, refusal at 9.0'
GP-10	5 - 9.0'	5	Sandy Clay/Sandstone			argillaceous, decomposed granite refusal at 13.0'
GP-10	9 - 13'	NA-auger	Sandstone	yellow brown	7	Switched to Auger, only cuttings
GP-10	13-30'	NA-auger	Claystone-Shale	Choc. Brn		Clay becoming darker with depth, continuous to 52.5 ft
GP-10	30-52.5'	NA-auger	Claystone-Shale	gray		
GP-11						Located 100 west of GP-10. Started drilling at 10:30 on 5/20/09
GP-11	0 - 5'	2.5	fill/silty sand	brown		
GP-11	5 - 10'	2.5	silty clay/claysiltstone	green brown	5.5	0.5 ft silty clay, siltstone may be PC
GP-11	10 - 15'	5	siltstone	green brown		
GP-11	15 - 16.5'	1.5	siltstone	green brown		refusal at 16.5'
GP-12						Located 100 west of GP-11. Started drilling at 11:40 on 5/20/09
GP-12	0 - 5'	1.5	fill/silty sand	brown		
GP-12	5 - 10'	3.2	silty clay/claysiltstone	green brown	6	1 ft silty clay, siltstone may be PC
GP-12	10 - 15'	4.5	siltstone	green brown		
GP-12	15 - 16'	1	siltstone	green brown		refusal at 16.0
GP13						Located 200 ft south of West SCS dam near center of drainage basin
GP13	0 - 5'	3	soil	dark brown		
GP13	5 - 10'	0.8	silty clay/clay	brown		clay has rock fragments
GP13	10 - 15'	0.5	clay	brown		
GP13	15 - 20'	2.6	clay	brown		
GP13	20 - 25'	3.2	clay/gravelly sd	brown		
GP13	25 - 30'	4.3	clay/gravelly sd	brown		refusal at 30.0'



**Figure 1. Geoprobe Locations-CAP Investigation
 Canon City Milling Facility, Colorado, Cotter Corporation**

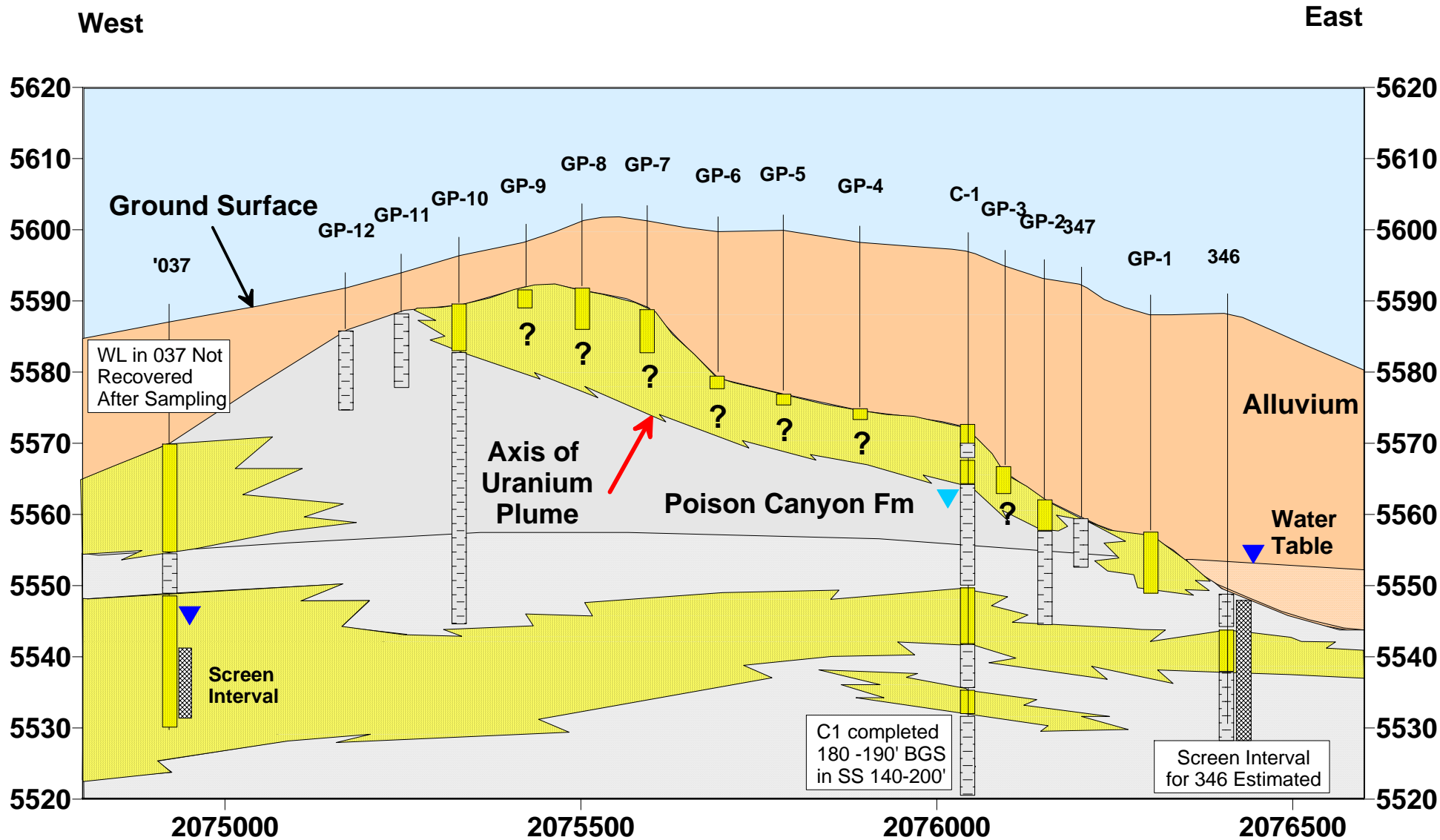
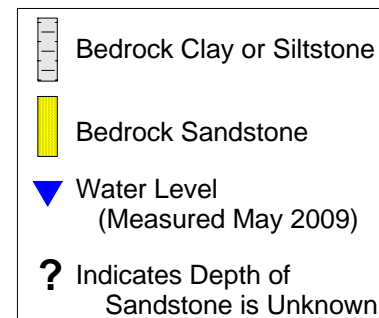


Figure 2. Cross Section Interpretation of Geoprobe Survey Northwest Property Boundary, Canon City Milling Facility, Colorado, Cotter Corporation

Prepared by E Lawrence
Hydrosolutions, 5/28/09



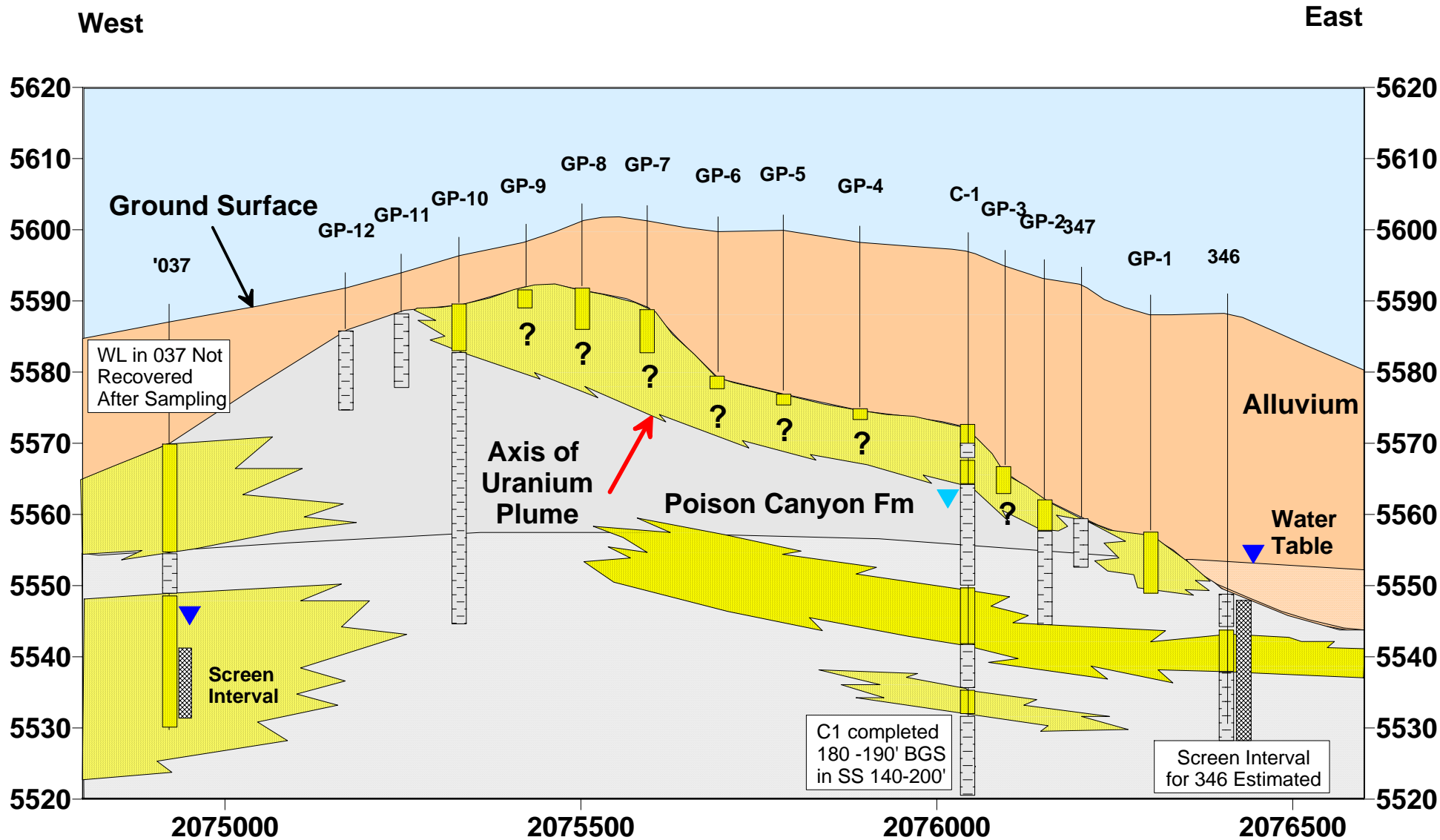






Figure 3. Alternate Cross Section Interpretation of Geoprobe Survey Northwest Property Boundary, Canon City Milling Facility, Colorado, Cotter Corporation

Prepared by E Lawrence
Hydrosolutions, 5/28/09

-  Bedrock Clay or Siltstone
-  Bedrock Sandstone
-  Water Level (Measured May 2009)
-  ? Indicates Depth of Sandstone is Unknown

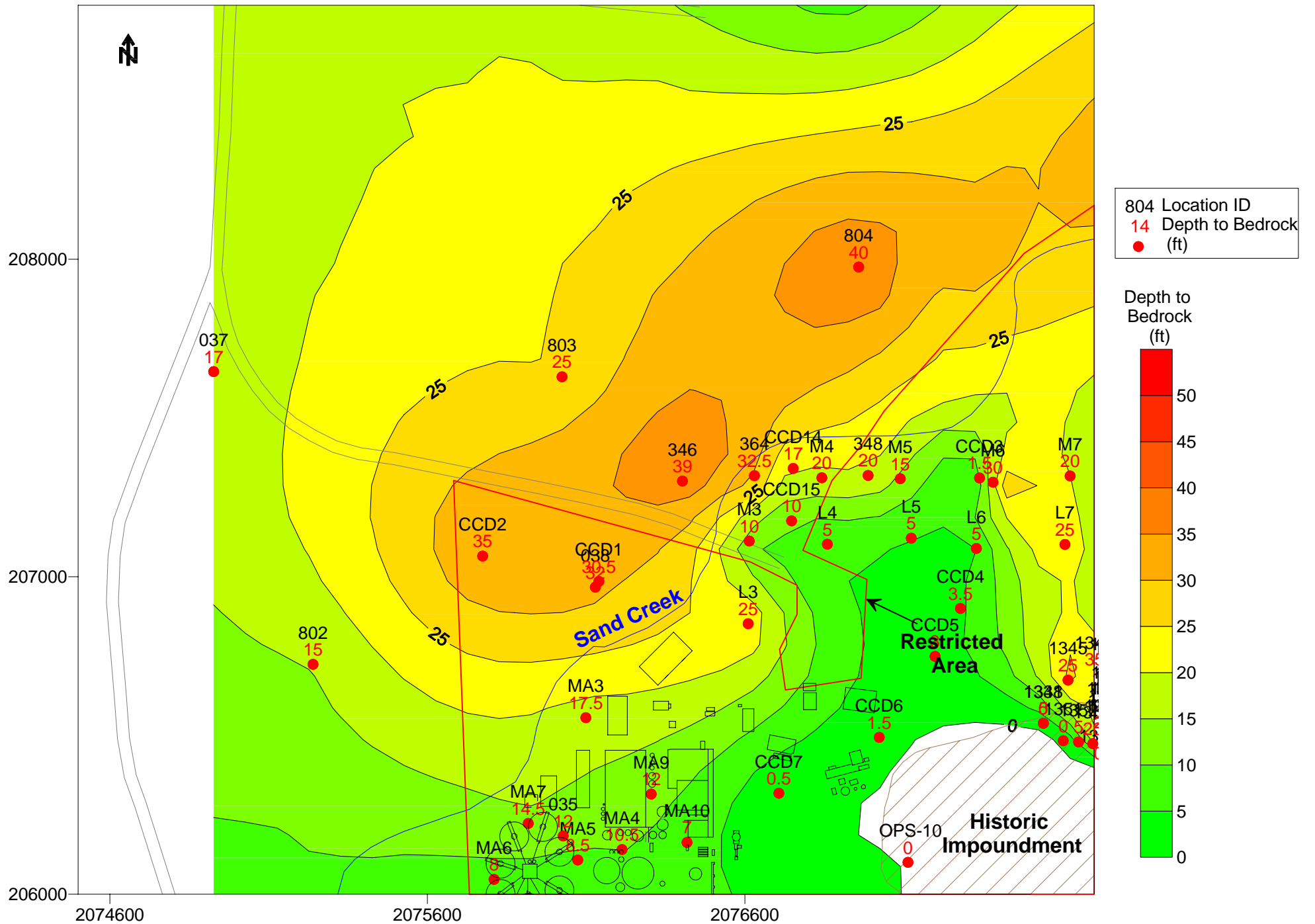


Figure 4. Pre-Geoprobe Survey - Depth to Bedrock Map
Canon City Milling Facility, Colorado, Cotter Corporation

