GEOTECHNICAL SERVICES REPORT
12-INCH RECYCLED WATER
TRANSMISSION PIPELINE
YOSEMITE AVENUE TO McKINLEY ROAD
LATHROP, CALIFORNIA

PREPARED FOR: PACIFIC UNION HOMES
675 HARTZ AVENUE, #300
DANVILLE, CA 94526

BY: KLEINFELDER, INC.
2825 E. MYRTLE STREET
STOCKTON, CA 95205

DATE: NOVEMBER 11, 2004

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File No. 20-4099-04.G04
November 11, 2004 (revised)

Mr. Michael Badner
Pacific Union Homes
675 Hartz Avenue, #300
Danville, CA 94526

Subject: **GEOTECHNICAL SERVICES REPORT**
12-INCH RECYCLED WATER TRANSMISSION PIPELINE
YOSEMITE AVENUE TO McKINLEY ROAD
LATHROP, CALIFORNIA

Dear Mr. Badner:

Kleinfelder is pleased to present the results of our geotechnical services performed for the 12-inch Recycled Water Transmission Pipeline. The accompanying report includes information regarding the anticipated construction, the purpose of our services, and the scope of services provided. We have also included an information sheet published by ASFE regarding geotechnical engineering reports. Our firm is a member of ASFE, and we feel this sheet will help you better understand our report.

We appreciate the opportunity to be of service on this project. If you have any questions or need additional information, please contact us.

Respectfully submitted,

KLEINFELDER, INC.

Ron Heinzen, G.E.
Senior Principal

REGISTERED PROFESSIONAL ENGINEER
RONALD TERRY HEINZEN
No. 388
Exp. 3-31-07
GEOTECHNICAL
STATE OF CALIFORNIA

RTH:lr
Attachments
cc: Greg Jordan, MacKay & Somps

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PLATE 1 – SITE MAP

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GEOTECHNICAL SERVICES REPORT
12-INCH RECYCLED WATER TRANSMISSION PIPELINE
YOSEMITE AVENUE TO McKINLEY ROAD
LATHROP, CALIFORNIA

1. INTRODUCTION

In this report we present the results of our geotechnical services for the proposed 12-inch diameter recycled water transmission pipeline extending from the Lathrop Wastewater Treatment Plant to the Reiter property located south of Lathrop Road and east of McKinley Road. The majority of the pipeline will have minimal cover, approximately 5 feet, but there are two locations where bore and jack operations will be needed to extend the pipeline beneath existing rail lines. The anticipated depth of bore and receiving pits vary from approximately 9 to 13 feet below existing grade near the treatment plant to 18 to 20 feet at the McKinley Road location. At the McKinley Road site, we understand that the City of Lathrop is planning to install a gravity sewer casing beneath the recycled water line. The location of the project, as well as the bore and jack locations, are presented on Plate 1.

2. PURPOSE AND SCOPE OF SERVICES

The purpose of our services was to review published information regarding subsurface conditions along the alignment of the proposed recycled water transmission pipeline in order to develop recommendations related to the geotechnical aspects of the proposed design and construction. Since the majority of the pipeline has minimal cover and the soil conditions are relatively consistent in this area, additional borings beyond those described below were not considered necessary by our firm. The following projects were reviewed in the course of our work:

Project Name	Project No.
Reiter Property	39947.P01
California Natural Products	20-4587-01.MN1
SSJID Pipeline	20-4075-03.G05
Crossroads Industrial Park	20-4445-03.G01

After our review of the referenced soils reports, our scope of work included providing conclusions and recommendations related to the geotechnical aspects of:

- The general earthwork, including site preparation, fill materials, engineered fill, temporary excavations, and unstable subgrade conditions

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- Recommended lateral earth pressures
- Asphalt concrete pavements

3. SURFACE AND SUBSURFACE CONDITIONS

The following description of the soil conditions along the alignment of the proposed 12-inch recycled water pipeline is based on boring information from the referenced soils reports prepared by our firm. The majority of the soils encountered in these borings consisted of silty and relatively "clean" sands with occasional layers of sandy and clayey silt. Although the surface soils on the Reiter property are described on the attached lots as sandy silt, we expect that the sand content is very high. In general, zones of relatively "clean" sand were encountered below the depth of 5 feet in most of the borings reviewed. The sandy soils are generally loose to medium dense, and the sandy and clayey silt soils varied from stiff to hard.

Groundwater was encountered in the majority of the test borings at depths varying from approximately 15 to 16 feet below grade on the Reiter property, 15 to 23 feet along McKinley Road between Louise Avenue and Lathrop Road, and 8 to approximately 15 feet for borings drilled for SSJID along the pipeline alignment and for Crossroads. We have included groundwater measurements for the past three years on MW-W-1 near the northerly bore and jack location on McKinley Road. As noted, the last measured groundwater depth was approximately 21 feet, but historically, groundwater can rise to approximately 12 to 13 feet during winter and spring months.

More detailed of the soils encountered in the borings shown on Plate 1 are presented in the attached Logs of Borings B-115, B-119, B-120, B-121, B-134, W-4, MW-W-5, MW-1, MW-2, MW-3, and B-13. All soils have been classified according to the Unified Soil Classification System which is described on Plate C-1. A key to the Logs of Borings is presented on Plate C-2.

In our opinion, the boring information summarized above represents the typical soil profile likely to be encountered in the pipeline excavation. It is always possible, however, that variations in the soil and groundwater conditions could occur between our points of exploration.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based on our findings, it is our professional opinion that construction of the proposed pipeline can proceed as planned. We anticipate that primarily silty and "clean" sands will be

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encountered along the alignment. The loose to medium-dense soils are likely to provide nominal sidewall support and will generally require more stringent shoring and/or flatter excavation slopes. Based on the previous information, we do not anticipate significant problems with dewatering, although groundwater levels are likely to rise during the winter months.

4.2 Excavations

Assuming that the majority of the excavations will be limited to approximately 6 feet with the exception of the two bore and jack locations, it is our opinion that excavations for this project can be performed with typical backhoe-type equipment. Somewhat slower excavations may be realized where hard or partially-cemented soils are encountered, such as in B-115 near Vierra and McKinley.

Pockets of loose to medium-dense, relatively "clean" sands were encountered within the proposed depth of excavation in several of the borings located along the alignment. It is our opinion that where loose, sandy soils and relatively "clean" sands are encountered, large, "glory hole" type excavations (open, sloped excavations) and possibly sheeting to control caving or sloughing may be required. However, based on our experience with numerous previous pipeline projects, it is our opinion that excavations in more-silty soils, even though loose to medium dense, may stay open and relatively stable at relatively-steep excavation slopes (near vertical) for a short time until shoring can be placed, if needed. For the shallow excavations planned, most contractors have been able to excavate the sandy materials at 3/4(h):1(v) slopes and eliminate the need for shoring. These sandy soils can typically be classified as OSHA soil Type B. If pockets of very "clean" sand are encountered along the alignment, excavation slopes of 1(h):1(v) to 1¼(h):1(v) may be required.

Where shoring is required, we recommend an active earth pressure equivalent to a fluid pressure of 35 per square foot (psf) per square foot of depth be used. This value is for unsaturated sandy soils and silt/clay soils at near-optimum moisture content. Saturated sands will require higher values if they will be present. This value should be increased if space limitations require equipment and stockpiles of soil adjacent to the excavation.

Temporary sloped excavations should not encroach adjoining buildings, walls, or other structures within an area defined by an imaginary 1½(h):1(v) line drawn outward and downward from closest edge of the structure. Furthermore, slope excavations should maintain a minimum 1-foot separation from adjacent pipelines and pipeline backfill. Where the stability of a structure may be endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation.

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Removal of material in a shored excavation causes a change of stress in the soils beside and beneath the open excavation. This change in stress has corresponding lateral deformations inward of the material at the sides of the excavation. Likewise, this horizontal movement is accompanied by a vertical settlement of the retained soil mass in order to fill the area of movement. Even well constructed shoring will experience lateral movement, typically between 0.5 and 2 percent of the excavation depth. The average vertical settlement due to lateral movement of the support may be taken as twice the lateral movement over a horizontal distance equal to twice the excavation depth from the top of the shoring. Movement tends to be greatest close to the excavation, becoming less with increasing distance away.

4.3 Dewatering

The highest groundwater levels (i.e., above 10 feet) were generally encountered in the south and west portion of the alignment. In our opinion, dewatering will likely not be a major concern for the remainder of the pipeline unless isolated, perched groundwater is encountered. If perched groundwater layers are encountered, it is likely that a sump pump arrangement will be able to handle the flow of water into the excavations.

An exception is the proposed bore and jack location by McKinley Road. The last measured depth to groundwater (8-2-04 in MW-W-1) was below the planned excavation depth of 20 feet; however, winter readings last year rose to approximately 12 to 13 feet. With the likelihood of clean sands being encountered and construction in December and January, the contractor should plan on driving sheet piles to reduce inflow and lessen the excavation. We recommend that piles be driven at least 15 feet below the bottom of excavation to reduce the potential for boiling and possibly even seal the excavation. A sump pump should be adequate if piles are driven relatively deep. Often a layer of drain rock is placed in the bottom of the pit to provide a more stable work surface. If boiling sands become an issue, a layer of filter cloth, such as Supac 140NP or equivalent, should be placed beneath the drain rock. If the contractor wants to use conventional shoring/lagging/shields, wells will likely be required, and the flow could be a few hundred gallons per minute due to the clean sand and up to 7 to 8 feet of head.

4.4 Pipe Jacking and Tunneling

We understand that pipe jacking will be required at two areas along the proposed alignment, both beneath railroad tracks. We have assumed that excavations for the bore and jack pits would extend approximately 8 to 13 feet below existing ground surface near the treatment plant and up to 18 to 20 feet near McKinley Road.

We anticipate that the soils at the proposed bore and jack pit locations will consist of predominately loose to medium-dense silty to relatively "clean" sands. At both locations, loose, saturated sands may be encountered, requiring more-stringent shoring. The Contractor should become familiar with the condition of the subsurface materials and as-built plans of

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adjacent utilities. However, it should be understood that this geotechnical report does not represent a study of the ease or difficulty of boring and jacking through all subsurface materials and conditions that may be encountered within the limits of the proposed pipeline. The Contractor is responsible to evaluate the subsurface conditions and make a selection of equipment and techniques.

4.5 Pipe Bedding and Backfill

The majority of the soils encountered in the borings consisted of sandy soils that are often used for bedding. For example, the SSJID pipeline uses native soil for bedding. However, we recommend that the design comply with the more-stringent bedding requirements of the City of Lathrop used at the Mossdale project. We recommend that mechanically-compacted backfill, as required by the City of Lathrop, be placed in loose lifts no thicker than approximately 8 inches. We recommend that trench backfill be compacted to a minimum of 90 percent below a depth of subgrade minus 6 inches beneath proposed paved areas and 95 percent for the top 6 inches of subgrade beneath paved areas. These percentages refer to the ASTM D-1557 maximum density, at a moisture content near optimum. It is important that no trench backfill be compacted in a relatively-dry state since the likelihood of voids and future settlement is then greater. In addition, where extremely-wet soils are excavated from trenches, the soils will likely have to be allowed to dry prior to use as fill.

4.6 Recommended Pavement Replacing

Based on our experience, the Public Works Departments which have jurisdiction over portions of the alignment, (San Joaquin County and the City of Lathrop), have varying requirements for asphalt replacement in street areas. The replacement pavement section must either match the existing section or be based on the resistance value (R-value) design method. The R-value for materials along the alignment will likely vary but generally are more than 50 for this portion of Lathrop.

This R-value is based loosely on the predominant surface and near-surface soil types. During the course of backfilling operations, it is possible that more silty materials could be incorporated into the top of the backfill, thus lowering the design R-value. For planning purposes, we recommend the use of a reduced R-value of 30. Typically, the Public Works Departments have required R-value conformance tests during construction. The actual pavement sections will be dependant on the Traffic Index (TI) required by the appropriate Public Works Departments.

5. ADDITIONAL SERVICES

The review of plans and specifications, field observations, and testing by Kleinfelder, Inc. are an integral part of the conclusions and recommendations made in this report. If Kleinfelder,

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Inc. is not retained for these services, the client agrees to assume Kleinfelder, Inc.'s responsibility for any potential claims that may arise during construction. The required tests, observations, and consultation by Kleinfelder, Inc. during construction include, but are not necessarily limited to:

- Continuous observation and testing during site preparation and grading, placement of engineered fill, and placement of backfill
- Consultation as required during construction

The above listed testing and observations would be additional services provided by our firm. The costs for these services are not included in our current fee arrangements.

6. LIMITATIONS

1. The conclusions and recommendations of this report are for preliminary design purposes for the 12-inch Recycled Water Transmission Pipeline project as described in the text of this report. The conclusions and recommendations in this report are invalid if:

   - The report is used for adjacent or other property
   - Changes of grades and/or groundwater occur between the issuance of this report and construction
   - Any other change is implemented which materially alters the project from that proposed at the time this report was prepared

2. The conclusions and recommendations in this report are based on borings drilled for previous projects in the vicinity of the project. It is likely that variations in the soil conditions exist between or beyond the points of exploration, or the groundwater elevation may change, both of which may require additional investigations, consultation, and possible design revisions.

3. We are not corrosion engineers and have not been requested to perform corrosion testing. We recommend the designer retain a competent corrosion engineer to design corrosion protection systems appropriate for the project.

4. This report was prepared in accordance with the generally accepted standard of practice which existed in San Joaquin County at the time the report was written. No warranty, express or implied, is made.

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5. It is the CLIENT'S responsibility to see that all parties to the project, including the designer, contractor, subcontractor, etc., are made aware of this report in its entirety.

6. This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder, Inc. of such intended use. Based on the intended use of the report, Kleinfelder, Inc. may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder, Inc. from any liability resulting from the use of this report by any unauthorized party.

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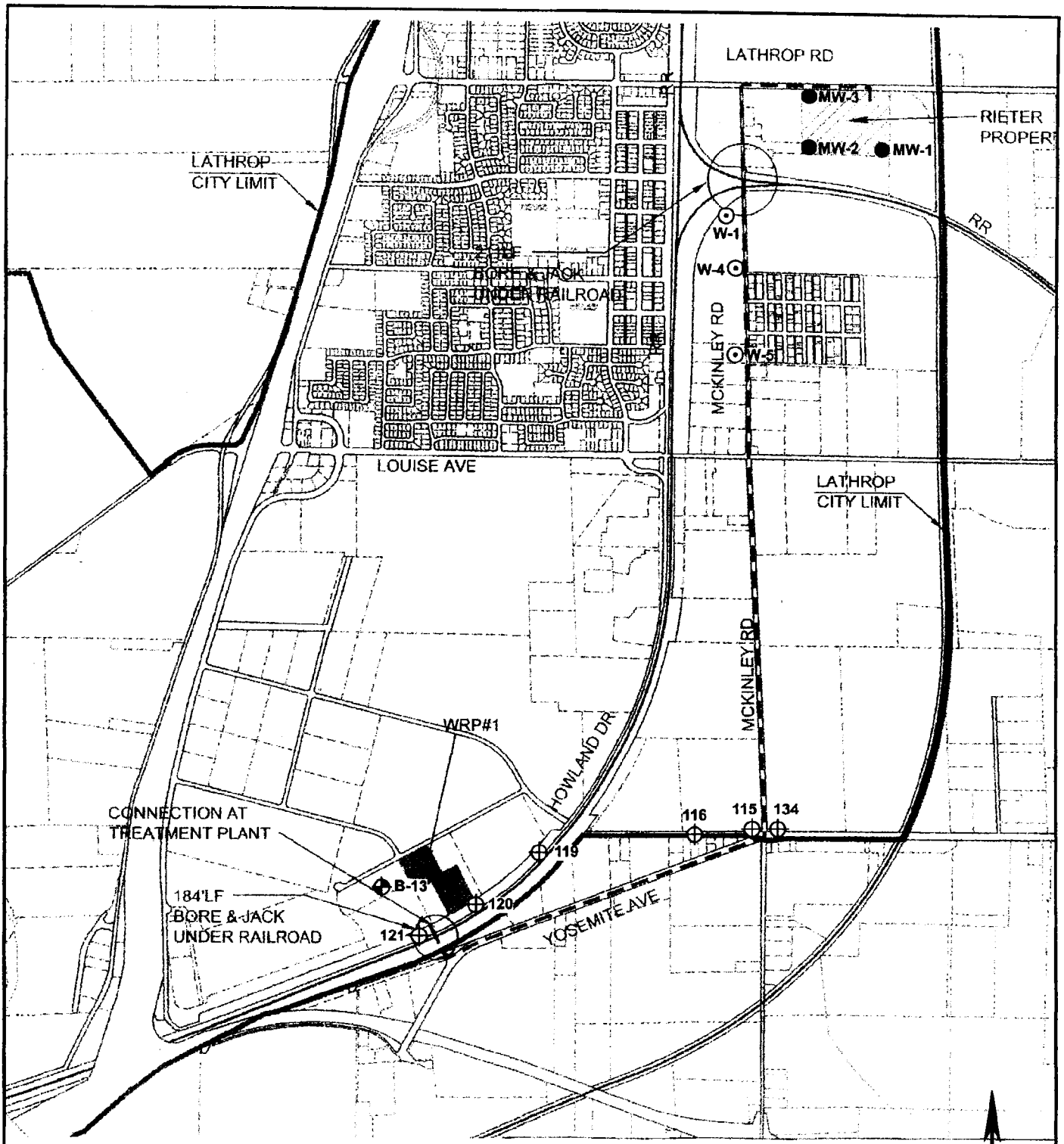

CROSSROADS INDUSTRIAL PARK

CALIFORNIA NATURAL PRODUCTS

SSJID

RIETER PROPERTY

NOT TO SCALE

KLEINFELDER

RECYCLED WATER LINE
FOR McKINLEY ROAD AND YOSEMITE AVENUE
LATHROP, CALIFORNIA

PLATE No.

1

DATE PRODUCED: 11/5/2004	DATE REVISED:
PROJ. NO.: 20-409904.G04	FILENAME: STO4D865.FH9

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APPENDIX
LOGS OF BORINGS AND
SUMMARY OF LABORATORY TESTS

LIST OF ATTACHMENTS

The following plates are attached and complete this appendix.

	Plate
Unified Soil Classification System	C-1
Log Key	C-2
Log of Boring B-115 - SSJID	A-117
Log of Boring B-119 - SSJID	A-121
Log of Boring B-120 - SSJID	A-122
Log of Boring B-121 - SSJID	A-123
Log of Boring B-134 - SSJID	A-136
Log of Well W-4 - California Natural Products	C-3
Log of Well MW-W-5 - California Natural Products	C-3
Log of Well MW-1 - Reiter Property	A-3
Log of Well MW-2 - Reiter Property	A-4
Log of Well MW-3 - Reiter Property	A-5
Log of Boring B-13 - Crossroads Industrial	B-16
Elevation and Depth of Groundwater	

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UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
LOAMS				UNDER USDA SOIL CLASSIFICATION SYSTEM, SOIL OF APPROXIMATELY EQUAL SAND/SILT/CLAY

KA-USCS 2011G095.GPJ 7/13/01

KLEINFELDER

Drafted By: GDG
Date: 7/13/2001
Project No.: 20-4587-01.MW1
File Number: 2011G095

UNIFIED SOIL CLASSIFICATION SYSTEM

CALIFORNIA NATURAL PRODUCTS PROPERTIES
1250 EAST LATHROP ROAD (MAIN PLANT)
LATHROP, CALIFORNIA

PLATE
C-1

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GrfcText\KA-LOG_KEY 11/5/2004 1:59:07 PM

LOG SYMBOLS

	BULK / BAG SAMPLE	-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
	MODIFIED CALIFORNIA SAMPLER (2-1/2 inch outside diameter)	-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
	CALIFORNIA SAMPLER (3 inch outside diameter)	LL	LIQUID LIMIT (ASTM Test Method D 4318)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)	PI	PLASTICITY INDEX (ASTM Test Method D 4318)
	CONTINUOUS CORE	TXCU	CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (EM 1110-1-1906)
	SHELBY TUBE	EI	EXPANSION INDEX (UBC STANDARD 18-2)
	ROCK CORE	COL	COLLAPSE POTENTIAL
	WATER LEVEL (level where first encountered)	UC	UNCONFINED COMPRESSION (ASTM Test Method D 2166)
	WATER LEVEL (level after completion)		
	SEEPAGE	MC	MOISTURE CONTENT (ASTM Test Method D 2216)

GENERAL NOTES

1. *Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.*
2. *No warranty is provided as to the continuity of soil conditions between individual sample locations.*
3. *Logs represent general soil conditions observed at the point of exploration on the date indicated.*
4. *In general, Unified Soil Classification System designations presented on the logs were evaluated by visual methods. Where laboratory tests were performed, the designations reflect the laboratory test results.*

KLEINFELDER

Drafted By: *
Date: *

Project No.: *
File Number: *

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LOG KEY

CALIFORNIA NATURAL PRODUCTS
LATHROP, CALIFORNIA

PLATE
C-2

Surface Conditions: North side of Vierra Road

Groundwater: No free groundwater encountered.

Date Completed: 3/16/2001

Logged By: JFC

Total Depth: 26.5 feet

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate depth feet)
													(SM) SILTY SAND - Red-brown, moist, medium dense, scattered mica, fine grained
		115-2.5-1	20		103	10							Brown
5		115-5-1	40/3"	>4.5									(ML) SANDY SILT - Light brown, moist, hard, moderately cemented, low plasticity
		115-7.5-1	22		91	25							(SP) SAND - Light brown, moist, medium dense, scattered mica, fine grained
10		115-10-1	23		101	16							(SP-SM) SAND WITH SILT - Olive-brown, wet, medium dense, fine grained
													(CL) SILTY CLAY WITH SAND - Olive-brown, moist, very stiff, moderate plasticity, scattered mica
15		115-15-1	29	>4.5	102	18			100	75	UC = 1.9 ksf		(ML) SILT WITH SAND - Olive-brown, moist, hard, scattered mica, low plasticity
													(ML) SANDY SILT -Olive-brown, moist, very stiff, low plasticity
20		115-20-1	21	2.0									
													(CL) SILTY CLAY WITH SAND - Olive-brown, moist, very stiff to hard, moderate plasticity
25		115-25-1	21	4.0									Boring completed at a depth of 26.5 below existing site grade .

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Drafted By: GDG
Date: 10/12/2001
Project No.: 20-4075-03.G05
File Number: 2011G089

LOG OF BORING B-115
SSJID PIPELINE
LATHROP, CALIFORNIA

PLATE
1 of 1
A-117

KA_2001 2011G089.GPJ 10/12/01

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Surface Conditions: West side of Howland Road

Date Completed: 3/20/2001

Logged By: AC

Groundwater: Groundwater encountered at a depth of approximately 15 feet below existing site grade.

Total Depth: 26.5 feet

Depth (feet)	Sample Type	Sample No.	Blows/ft	Pen (tsf)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate depth feet)
													(SP-SM) SAND WITH SILT - Brown, moist, medium dense, scattered mica, fine grained
		119-2.5-1	15		97	6				10			
5		119-5-1	13		100	5							
		119-7.5-1	26	>4.5	89	17							**(SM/ML) SILTY SAND/SANDY SILT** - Brown, moist, hard, fine grained
10		119-10-1	20	4.5	94	26							**(ML) SILT WITH SAND** - Olive-brown, moist, hard, scattered mica, low plasticity
15		119-15-1	19		103	18						▽	**(SP) SAND** - Light brown, wet, medium dense, scattered mica
													Dense
20		119-20-1	37										
25		119-25-1	24										**(SC) CLAYEY SAND** - Brown, wet, medium dense, fine grained
													Boring completed at a depth of 26.5 below existing site grade .

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Drafted By: GDG
Date: 10/11/2001
Project No.: 20-4075-03.G05
File Number: 2011G089

LOG OF BORING B-119
SSJID PIPELINE
LATHROP, CALIFORNIA

PLATE
1 of 1
A-121

KA_2001 2011G089.GPJ 10/11/01

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Surface Conditions: West side of Howland Road

Groundwater: No free groundwater encountered.

Date Completed: 3/20/2001

Logged By: AC

Total Depth: 16.5 feet

Depth (feet)	FIELD: Sample Type	Sample No.	Blows/ft	Pen (tsf)	LABORATORY: Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate depth feet)
													(SP-SM) SAND WITH SILT - Brown, moist, loose, scattered mica, fine grained
	■	120-2.5-1	10		97	5							
5	■	120-5-1	12		99	12				23			**(SM) SILTY SAND** - Brown, moist, loose to medium dense, scattered mica, fine grained
													Medium dense
	■	120-7.5-1	13		91	13					Direct shear		
10	■	120-10-1	15		90	18							
													(CL) SILTY CLAY WITH SAND - Olive-brown, moist, very stiff, scattered mica, moderate plasticity
15	■	120-15-1	14	3.5									
													Boring completed at a depth of 16.5 below existing site grade .
20													
25													

KLEINFELDER

Drafted By: GDG
Date: 10/11/2001
Project No.: 20-4075-03.G05
File Number: 2011G089

LOG OF BORING B-120
SSJID PIPELINE
LATHROP, CALIFORNIA

PLATE
1 of 1
A-122

KA_2001 2011G089.GPJ 10/11/01

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Surface Conditions: West side of Howland Road

Date Completed: 3/20/2001

Groundwater: No free groundwater encountered.

Logged By: AC

Total Depth: 16.5 feet

Depth (feet)	FIELD: Sample Type	Sample No.	Blows/ft	Pen (tsf)	LABORATORY: Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate depth feet)
													(SC) CLAYEY SAND - Brown, moist, loose, scattered mica, fine grained
	■	121-2.5-1	11		106	12					Direct shear		
5													(SM) SILTY SAND - Brown, moist, medium dense, scattered mica, fine grained
	■	121-5-2	13		103	14							
	■	121-7.5-2	13		100	21					Corrosion		
10													(SP) SAND - Light gray, moist, medium dense, scattered mica, fine grained
	■	121-10-2	14		89	22					Corrosion		
													(CL) SILTY CLAY - Olive-brown, moist, stiff, moderate plasticity
15	■	121-15-1	19	1.5									
													Boring completed at a depth of 16.5 below existing site grade .
20													
25													

KA_2001 2011G089.GPJ 10/11/01

KLEINFELDER

Drafted By: GDG
Date: 10/11/2001
Project No.: 20-4075-03.G05
File Number: 2011G089

LOG OF BORING B-121
SSJID PIPELINE
LATHROP, CALIFORNIA

PLATE
1 of 1
A-123

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Surface Conditions: Yosemite Avenue

Date Completed: 3/22/2001

Groundwater: Groundwater encountered at a depth of approximately 14 feet below existing site grade.

Logged By: AC

Total Depth: 26.5 feet

Depth (feet)	FIELD: Sample Type	Sample No.	Blows/ft	Pen (tsf)	LABORATORY: Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plasticity Index	Passing #4 Sieve (%)	Passing #200 Sieve (%)	Other Tests	Lithography	DESCRIPTION (Approximate depth feet)
													(SP) SAND - Light brown, moist, medium dense, scattered mica, fine grained
	■	134-2.5-1	16		102	5							
5													
	■	134-5-1	23		102	7							
	■	134-7.5-1	17		85	22							
10													
	■		31										
													(SM) SILTY SAND - Light gray-brown, wet, dense, scattered mica, fine grained
15													
	■	134-15-1	54										
													Brown, grades more silt
20													
	■	134-20-1	43										
													(ML) SANDY SILT - Brown, wet, hard, low plasticity, scattered mica
25													
	■	134-25-1	40	>4.5									
													Boring completed at a depth of 26.5 below existing site grade .

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Drafted By: GDG
Date: 10/11/2001
Project No.: 20-4075-03.G05
File Number: 2011G089

LOG OF BORING B-134
SSJID PIPELINE
LATHROP, CALIFORNIA

PLATE
1 of 1
A-136

KA_2001 2011G089.GPJ 10/11/01

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Surface Conditions: Landscaped lawn

Date Completed: 6/16/2001

Groundwater: No free groundwater encountered.

Logged By: LS

Total Depth: 30 feet

Depth (feet)	FIELD: Sample Type	Sample No.	Blows/ft	PID (ppmv)	Lithography	DESCRIPTION: Approximate Depth feet	Well Const.
						(SM) SILTY SAND - Brown, moist, loose, fine to medium grained, micaceous	
5		23800	9			**(SM) SILTY SAND** - Yellow-brown, moist, loose, very fine to fine grained, pred. quartz, micaceous	
10		23801	13			**(SP) SAND** - Light brown, moist, medium dense, medium to coarse grained, pred. frosted quartz	
15		23802	19			**AB** - Saturated	
20							
25						Driller reported clay at 23 feet	

KLEINFELDER

Drafted By: GDG

Date: 7/17/2001

Project No.: 20-4587-01.MW1

File Number: 2011G095

LOG OF WELL W-4
CALIFORNIA NATURAL PRODUCTS PROPERTIES
1250 EAST LATHROP ROAD (MAIN PLANT)
LATHROP, CALIFORNIA

PLATE 1 of 2

C-3

KA_2001 2011G095.GPJ 7/17/01

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Depth (feet)	FIELD: Sample Type	Sample No.	Blows/ft	PID (ppmv)	Lithography	DESCRIPTION: Approximate Depth feet	Well Const.
30						Well completed at a depth of 30 feet below existing site grade .	
35							
40							
45							
50							
55							
60							

KLEINFELDER

Drafted By: GDG
Date: 7/17/2001
Project No.: 20-4587-01.MW1
File Number: 2011G095

LOG OF WELL W-4
CALIFORNIA NATURAL PRODUCTS PROPERTIES
1250 EAST LATHROP ROAD (MAIN PLANT)
LATHROP, CALIFORNIA

PLATE
2 of 2
C-3

KA_2001 2011G095.GPJ 7/17/01

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Surface Conditions: Vacant lot, weeds and cobbles on surface

Date Completed: 11/22/2003

Logged By: FXB

Groundwater: Groundwater encountered at a depth of approximately 18.5 feet below existing site grade.

Total Depth: 28.5 feet

Depth (feet)	Sample Type	Sample No.	Blows/ft	PID (ppmv)	Lithography	DESCRIPTION (Approximate elevation feet)	Well Const.
						(SM) SILTY SAND - Yellow brown, moist, fine grained, trace clay	
5		27068	69				
						Light brown, fine to medium grained	
10		27069	31				
						(ML) CLAYEY SILT - Brown, moist, some fine sand	
15			37				
						(ML) CLAYEY SILT WITH FINE SAND - Brown, moist	
20		27070	22				
						(SM) SILTY SAND - Brown, wet, fine to medium grained, trace clay	
25							
30						Boring completed at a depth of 28.5 feet below existing site grade	

KLEINFELDER

LOG OF BORING MW-W-5
CALIFORNIA NATURAL PRODUCTS
LATHROP, CALIFORNIA

PLATE 1 of 1

C-3

Drafted By: GDG
Date: 2/24/2003
Project No.: 20-4587-01.MN2
File Number: STO3D003

KA_2001 STO3G003.GPJ 2/24/03

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Surface Conditions:	Weeds/grasses, dry	Date Completed:	3/31/2004
Groundwater:	Groundwater encountered at a depth of approximately 15.5 feet below existing site grade.	Logged By:	6238
		Total Depth:	31.5 feet
Method:	Drilling Rig, Hollow Stem Auger	Boring Diameter:	8-Inch
Equipment:	CME75		

Depth (feet)	Sample Type	Sample No.	Blows/ft (FIELD)	PID (ppmv) (FIELD)	Lithography	DESCRIPTION	Well Const.
						(ML) SANDY SILT - Light brown, moist, medium dense, fine sands, no odor	
5	■		14				
						(SP) SAND - Gray, moist, medium dense, fine sand	
10	■		29			**(ML) SANDY SILT** - Light brown, moist, medium dense, fine grained	
						Coarse grained, yellow brown **(SP) SAND** - Yellow brown, moist, medium dense, coarse grained	
15	■		16	▼		**(SM) SILTY SAND** - Brown, wet at 15', medium dense, fine to coarse grained, with fine sands, no odor	
20	■		12			**(SP) SAND** - Dark gray, moist, wet, medium dense	
						(SC/ML) SANDY CLAY AND SANDY SILT - Light tan, wet	
25	■		22			**(SM) SILTY SAND** - Light brown, wet, medium dense, fine silty sands, medium trace gravel	
30	■		66			Brown, very dense, coarse, no odor	
						Boring completed at a depth of approximately 31.5 feet below existing site grade.	

KLEINFELDER

Drafted By: GDG
Date: 4/29/2004
Project No.: 39947.P01
File Number: STO4G071

LOG OF BORING MW-1
REITER PROPERTY
1520 E. LATHROP ROAD
LATHROP, CALIFORNIA

PLATE
1 of 1
A-3

SAC 2004 STO4G071.GPJ 4/29/04

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Surface Conditions:	Weeds/grasses, dry	Date Completed:	3/30/2004
Groundwater:	Groundwater encountered at a depth of approximately 19.2 feet below existing site grade.	Logged By:	6238
		Total Depth:	31.5 feet
Method:	Drilling Rig, Hollow Stem Auger	Boring Diameter:	8-Inch
Equipment:	CME75		

Depth (feet)	Sample Type	Sample No.	FIELD Blows/ft	FIELD PID (ppmv)	Lithography	DESCRIPTION	Well Const.
						(ML) SANDY SILT - Light brown/brown, moist, loose, no odor	
5			6				
						(SM) SILTY SAND - Light brown/white, moist, medium dense	
10			15				
15			14			**(CL) SILTY CLAY** - Light brown, moist	
						(SM) SANDY SILT - Olive brown, moist, medium dense, fine sands, no odor	
20			38			Brown/gray, wet, fine sands	
25			14			Increasing fines, brown/light brown	
						(CL) SILTY CLAY - Light brown, wet, stiff	
30			21			**(SM) SILTY SAND** - Brown, moist, fine sands, medium dense	
						Boring completed at a depth of approximately 31.5 feet below existing site grade.	

KLEINFELDER

Drafted By: GDG
Date: 4/29/2004
Project No.: 39947.P01
File Number: STO4G071

LOG OF BORING MW-2
REITER PROPERTY
1520 E. LATHROP ROAD
LATHROP, CALIFORNIA

PLATE
1 of 1
A-4

SAC 2004 STO4G071.GPJ 4/29/04

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Surface Conditions:	Weeds/grasses, dry	Date Completed:	3/30/2004
Groundwater:	Groundwater encountered at a depth of approximately 20 feet below existing site grade.	Logged By:	6238
		Total Depth:	31.5 feet
Method:	Drilling Rig, Hollow Stem Auger	Boring Diameter:	8-Inch
Equipment:	CME75		

Depth (feet)	Sample Type	Sample No.	FIELD Blows/ft	FIELD PID (ppmv)	Lithography	DESCRIPTION	Well Const.
						(ML) SANDY SILT - Light brown, moist, fine sands	
5			50/6				
						(SM) SILTY SAND - Brown/light brown, moist, medium dense, fine to medium sand	
10			27				
15			11			**(CL) SILTY CLAY** - Brown/olive brown, moist, medium dense, some fine sands	
						(SP) SAND - Olive brown, wet, coarse grained, dense	
20			37			**(SC) SANDY CLAY** - Brown, wet, very stiff, medium grained sand	
						(SP) SANDS - Olive brown, wet, coarse sands, dense	
						(SC) SANDY CLAY - Light brown, wet, fine sand	
25			75			**(SM) SILTY SAND** - Light brown, wet, very dense	
30			60			**(SP) SAND** - Brown to olive brown, wet, very dense, coarse sands	
						(CL) CLAY Hard, wet	
						Boring completed at a depth of approximately 31.5 feet below existing site grade.	

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Drafted By: GDG
Date: 4/29/2004
Project No.: 39947.P01
File Number: STO4G071

LOG OF BORING MW-3
REITER PROPERTY
1520 E. LATHROP ROAD
LATHROP, CALIFORNIA

PLATE
1 of 1
A-5

SAC 2004 STO4G071.GPJ 4/29/04

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Date Completed: 2/14/01

Logged By: JMY

Total Depth: 30 feet

Surface Conditions: Uneven field, weeds.

Groundwater: Groundwater encountered at approximate 8 foot depth.

Depth (ft)	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density (pcf)	LABORATORY: Moisture Content (%)	LABORATORY: Compress. Strength (Ksf)	LABORATORY: Other Tests	Pen (tsf)	DESCRIPTION / USCS Classification
								(SM) SANDY SILT - Gray-Brown, Very Moist, Very Fine Grained
		14						(CL) CLAYEY SILTY SAND - Light Gray-Brown, Very Moist, Slightly Clayey, Very Silty, Very Fine Grained
								SM) SANDY CLAY - Light Brown, Moist, Very Fine Grained
		10						(SM) SILTY SANDY CLAY - LIght Gray-Brown, Moist, Very Fine Grained
5								(SM) SILTY SAND - Light Brown, Moist, Very Silty, Very Fine Grained
								(SP) SAND - Light Gray-Brown, Very Moist, Very Fine Grained
								(SP) SAND - Light Gray, Wet, Very Fine Grained
		9				Groundwater Encountered		
10								(CL) CLAY - Light Gray-Brown
								(CL) SANDY CLAY - Light Gray, Very Fine Grained
								(CL) CLAY - Light Brown
		10						(SP) SAND - Light Brown
15								(SM) SILTY CLAY - Light Gray-Brown
								(SM) SILTY SAND - Light Brown, Very Fine Grained
								(CL) CLAYEY SILT - Light Brown
								(CL) CLAY - Light Brown
								(SM) SILTY CLAY - Blue-Gray
20								

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PROJECT NO. 20-4445-03.G01

CATLIN PROPERTIES
CROSSROADS INDUST. CENTER
LATHROP, CALIFORNIA
LOG OF BORING B-13

PLATE 1 of 2

B-16

Well	Date	Location	Elevation (feet)	Depth to Water	Elevation of Water
MW-W1	4/8/2001	Northern Percolation Area Well	21.34	12.20	9.14
	4/22/2001		21.34	12.06	9.28
	4/29/2001		21.34	12.27	9.07
	5/9/2001		21.34	13.28	8.06
	5/22/2001		21.34	13.60	7.74
	5/29/2001		21.34	13.76	7.58
	6/5/2001		21.34	14.06	7.28
	6/7/2001		21.34	14.24	7.10
	6/12/2001		21.34	14.36	6.98
	6/19/2001		21.34	14.05	7.29
	7/5/2001		21.34	15.59	5.75
	7/10/2001		21.34	15.85	5.49
	7/26/2001		21.34	16.60	4.74
	7/31/2001		21.34	16.63	4.71
	8/1/2001		21.34	16.79	4.55
	8/7/2001		21.34	15.96	5.38
	8/14/2001		21.34	17.40	3.94
	8/21/2001		21.34	17.70	3.64
	8/28/2001		21.34	NA	NA
	9/4/2001		21.34	18.95	2.39
	9/5/2001		21.34	17.69	3.65
	9/11/2001		21.34	18.09	3.25
	9/18/2001		21.34	18.21	3.13
	9/25/2001		21.34	17.06	4.28
	10/2/2001		21.34	17.75	3.59
	10/11/2001		21.34	17.82	3.52
	10/16/2001		21.34	17.89	3.45
	10/23/2001		21.34	17.95	3.39
	11/6/2001		21.34	17.47	3.87
	11/13/2001		21.34	16.90	4.44
	11/20/2001		21.34	18.08	3.26
	11/27/2001		21.34	15.73	5.61
	12/4/2001		21.34	14.70	6.64
	12/11/2001		21.34	15.05	6.29
	12/18/2001		21.34	14.80	6.54
	12/25/2001		21.34	not taken	NA
	1/2/2002		21.34	13.00	8.34
	1/8/2002		21.34	12.72	8.62
	1/15/2002		21.34	13.90	7.44
	1/22/2002		21.34	13.05	8.29
	1/31/2002		21.34	not taken	NA
	2/6/2002		21.34	13.22	8.12
	2/13/2002		21.34	12.53	8.81
	2/19/2002		21.34	13.36	7.98
	2/27/2002		21.34	13.10	21.34
	3/6/2002		21.34	13.44	7.90
	3/7/2002		21.34	13.44	7.90
	3/13/2002		21.34	13.26	8.08
	3/19/2002		21.34	13.05	8.29
	3/26/2002		21.34	12.97	8.37
	4/15/2002		21.34	13.60	7.74
	7/1/2002		21.34	15.38	5.96
	10/17/2002		21.34	18.72	2.62
	1/28/2003		21.34	14.42	6.92
	5/8/2003		21.34	14.95	6.39
	8/4/2003		21.34	18.90	2.44
	11/19/2003		21.34	17.97	3.37
	1/26/2004		21.34	15.77	5.57
	4/26/2004		21.34	16.76	4.58
	8/2/2004		21.34	20.25	1.09

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